

**DRAFT ENVIRONMENTAL IMPACT ASSESSMENT`  
AND  
ENVIRONMENT MANAGEMENT PLAN**

**FOR OBTAINING  
Environmental Clearance under EIA Notification – 2006**

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

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

**CLUSTER EXTENT = 15.15.85hectares**

**At**

**Mennallur Village, Vembakkam Taluk,  
Tiruvannamalai District, Tamil Nadu**

**ToR Identification No. TO24B0108TN5158721N Dated: 12.01.2025, File No.11022**

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

| Name and Address  | Extent & S.F.Nos.  | Mineral Production   |
|---|--|--|
| T.Ponnambalam,<br>S/o. Thangavelu,<br>No.12, Balakrishnan<br>Street, Srinivasa Nagar,<br>Chennai,<br>Tamil Nadu-600063. | 1.34.50 Ha &135/1, 135/2,<br>135/3A, 135/3B, 135/4 & 135/5 | Rough Stone-386102m <sup>3</sup><br>Gravel-23528m <sup>3</sup> |

**ENVIRONMENTAL CONSULTANT**

**GEO TECHNICAL MINING SOLUTIONS**



No: 1/213-B, Ground Floor, Natesan Complex  
Oddapatti, Collectorate Post office,  
Dharmapuri-636705. Tamil Nadu.  
E-mail: [info.gtmsdpi@gmail.com](mailto:info.gtmsdpi@gmail.com),  
Website: [www.gtmsind.com](http://www.gtmsind.com)



NABET ACC. NO: NABET/EIA/23-26/RA 0319  
Valid till: 31.12.2026

**ENVIRONMENTAL LAB**

**CREATIVE ENGINEERS AND CONSULTANTS**

**(NABL Accredited Testing Laboratory)**

**Baseline study period-December 2022 – February 2023**

**JAN-2025**



**GEO TECHNICAL MINING SOLUTIONS**

## TABLE OF CONTENTS

| S No.               | TITLE  | PAGE No.    |
|---------------------|--|-------------|
|                     | ToR Compliance                                     | i - liii    |
| <b>EIA CHAPTERS</b> |  |             |
| <b>I</b>            | <b>Introduction</b>                                | <b>1-7</b>  |
| 1.0                 | Preamble   | 1           |
| 1.1                 | Purpose of the report                              | 3           |
| 1.2                 | Environmental clearance                            | 3           |
| 1.3                 | Terms of reference (Tor)                           | 4           |
| 1.4                 | Post environment clearance monitoring              | 4           |
| 1.5                 | Transferability of environmental clearance         | 4           |
| 1.6                 | Identification of the project proponent            | 4           |
| 1.7                 | Brief description of the project                   | 6           |
| 1.8                 | Scope of the study                                 | 7           |
| 1.9                 | Legislation Applicable to Mining of Mineral Sector | 7           |
| <b>II</b>           | <b>PROJECT DESCRIPTION</b>                         | <b>8-22</b> |
| 2.0                 | General introduction                               | 8           |
| 2.1                 | Description of the project                         | 8           |
| 2.2                 | Location and accessibility                         | 9           |
| 2.3                 | Leasehold area                                     | 10          |
| 2.3.1               | Corner Coordinates                                 | 10          |
| 2.4                 | Geology  | 10          |
| 2.5                 | Quantity of reserves                               | 14          |
| 2.6                 | Mining method                                      | 14          |
| 2.6.1               | Magnitude of operation                             | 18          |
| 2.6.2               | Extent of mechanization                            | 18          |
| 2.6.3               | Progressive quarry closure plan                    | 18          |
| 2.6.4               | Progressive quarry closure budget                  | 18          |
| 2.6.5               | Conceptual mining plan                             | 19          |
| 2.6.6               | Infrastructures                                    | 19          |
| 2.6.6.1             | Other Infrastructure Requirement                   | 19          |
| 2.6.7               | Water requirement                                  | 19          |
| 2.6.8               | Energy requirement                                 | 20          |
| 2.6.9               | Capital requirement                                | 20          |
| 2.7                 | Manpower requirement                               | 22          |
| 2.8                 | Project Implementation Schedule                    | 22          |

| <b>III</b> | <b>DESCRIPTION OF THE ENVIRONMENT</b>                  | <b>23-88</b> |
|------------|--|--------------|
| 3.0        | General  | 23           |
| 3.1        | Land Environment                                       | 25           |
| 3.1.1      | Geology and Geomorphology                              | 25           |
| 3.1.2      | Land Use/Land Cover                                    | 25           |
| 3.1.3      | Topography   | 25           |
| 3.1.4      | Drainage pattern                                       | 25           |
| 3.1.5      | Seismic sensitivity                                    | 25           |
| 3.1.6      | Soil   | 30           |
| 3.2        | Water Environment                                      | 31           |
| 3.2.1      | Ground Water Resources and Quality                     | 31           |
| 3.2.2      | Hydrogeological Studies                                | 35           |
| 3.2.2.1    | Groundwater level and flow direction                   | 35           |
| 3.2.2.2    | Electrical resistivity investigation                   | 37           |
| 3.3        | Air Environment  | 43           |
| 3.3.1      | Meteorology  | 43           |
| 3.3.1.1    | Climatic Variables                                     | 43           |
| 3.3.1.2    | Wind Pattern   | 43           |
| 3.3.2      | Ambient Air Quality Study                              | 47           |
| 3.4        | Noise Environment                                      | 53           |
| 3.5        | Biological Environment                                 | 56           |
| 3.5.1      | Flora  | 58           |
| 3.5.2      | Fauna  | 67           |
| 3.5.3      | Agriculture & Horticulture in Tiruvannamalai district  | 72           |
| 3.6        | Socio-Economic environment                             | 72           |
| 3.6.1      | Objectives of the Study                                | 73           |
| 3.6.2      | Scope of work  | 73           |
| 3.6.3      | Methodology  | 73           |
| 3.6.4      | Sources of Information and Data Base                   | 74           |
| 3.6.5      | Primary Survey   | 74           |
| 3.6.6      | Collection of Data from Secondary Sources              | 76           |
| 3.6.7      | Tiruvannamalai District                                | 76           |
| 3.6.8      | Study area- Mennallur Village, Vembakkam Taluk         | 77           |
| 3.6.9      | Working Population- Mennallur Village, Vembakkam Taluk | 77           |
| 3.6.10     | Recommendation and Suggestions                         | 83           |

|           |  |               |
|-----------|--|---------------|
| 3.6.11    | Conclusion   | 84            |
| 3.7       | Traffic Density  | 84            |
| 3.8       | Site Specific Features   | 87            |
| <b>IV</b> | <b>ANTICIPATED ENVIRONMENTAL IMPACTS AND<br/>MITIGATION MEASURES</b> | <b>89-106</b> |
| 4.0       | General  | 89            |
| 4.1       | Land Environment   | 89            |
| 4.1.1     | Anticipated Impact   | 89            |
| 4.1.2     | Mitigation Measures from Proposed Project                            | 89            |
| 4.2       | Soil Environment   | 90            |
| 4.2.1     | Anticipated Impact on Soil Environment                               | 90            |
| 4.2.2     | Common Mitigation Measures from Proposed Project                     | 90            |
| 4.3       | Water Environment  | 90            |
| 4.3.1     | Anticipated Impact   | 90            |
| 4.3.2     | Common Mitigation Measures from Proposed Project                     | 90            |
| 4.4       | Air Environment  | 91            |
| 4.4.1     | Anticipated impact from Proposed Project                             | 91            |
| 4.4.2     | Emission Estimation  | 91            |
| 4.4.2.1   | Modelling of Incremental Concentration                               | 92            |
| 4.4.2.2   | Model Results  | 92            |
| 4.4.3     | Mitigation Measures  | 95            |
| 4.5       | Noise Environment  | 95            |
| 4.5.1     | Anticipated Impact   | 96            |
| 4.5.2     | Common Mitigation Measures   | 97            |
| 4.5.3     | Ground Vibrations  | 98            |
| 4.5.3.1   | Common Mitigation Measures   | 100           |
| 4.6       | Ecology And Biodiversity   | 100           |
| 4.6.1     | Impact on Ecology and Biodiversity                                   | 100           |
| 4.6.2     | Mitigation Measures on Flora   | 101           |
| 4.6.3     | Anticipated Impact on Fauna  | 102           |
| 4.6.4     | Mitigation Measures on Fauna   | 102           |
| 4.6.5     | Impact on agriculture and horticulture crops in 1km<br>Radius        | 102           |
| 4.6.6     | Mitigation Measures on agriculture and horticulture crops.           | 102           |
| 4.7       | Socio Economic Environment   | 103           |
| 4.7.1     | Anticipated Impact from Proposed and Existing Projects               | 103           |
| 4.7.2     | Common Mitigation Measures for Proposed Project                      | 103           |

|            |   |                |
|------------|---|----------------|
| 4.8        | Occupational Health and Safety                            | 104            |
| 4.8.1      | Respiratory Hazards                                       |                |
| 4.8.2      | Noise   | 104            |
| 4.8.3      | Physical Hazards  | 104            |
| 4.8.4      | Occupational Health Survey                                | 104            |
| 4.9        | Mine Waste Management                                     | 105            |
| 4.10       | Mine Closure  | 105            |
| 4.10.1     | Mine Closure Criteria                                     | 105            |
| 4.10.1.1   | Physical Stability  | 105            |
| 4.10.1.2   | Chemical Stability  | 106            |
| 4.10.1.3   | Biological Stability                                      | 106            |
| <b>V</b>   | <b>ANALYSIS OF ALTERNATIVES<br/>(TECHNOLOGY AND SITE)</b> | <b>107</b>     |
| 5.0        | Introduction  | <b>107</b>     |
| 5.1        | Factors behind the Selection of Project Site              | <b>107</b>     |
| 5.2        | Analysis of Alternative Site                              | <b>107</b>     |
| 5.3        | Factors behind Selection of Proposed Technology           | <b>107</b>     |
| 5.4        | Analysis of Alternative Technology                        | <b>107</b>     |
| <b>VI</b>  | <b>ENVIRONMENTAL MONITORING PROGRAM</b>                   | <b>108-112</b> |
| 6.0        | General   | 108            |
| 6.1        | Methodology of Monitoring Mechanism                       | 108            |
| 6.2        | Implementation Schedule of Mitigation Measures            | 110            |
| 6.3        | Monitoring Schedule and Frequency                         | 110            |
| 6.4        | Budgetary provision for Environment Monitoring Program    | 112            |
| 6.5        | Reporting schedules of monitored data                     | 112            |
| <b>VII</b> | <b>ADDITIONAL STUDIES</b>                                 | <b>113-121</b> |
| 7.0        | General   | <b>113</b>     |
| 7.1        | Public Consultation for Proposed Project                  | <b>113</b>     |
| 7.2        | Risk Assessment for Proposed Project                      | <b>113</b>     |
| 7.3        | Disaster Management Plan for Proposed Project             | 115            |
| 7.3.1      | Emergency Control Procedure                               | 116            |
| 7.4        | Cumulative Impact Study                                   | 117            |
| 7.4.1      | Air Environment   | 118            |
| 7.4.1.1    | Cumulative Impact of Air Pollutants                       | 119            |
| 7.4.2      | Noise Environment   | 119            |
| 7.4.3      | Socio Economic Environment                                | 120            |
| 7.4.4      | Ecological Environment                                    | 120            |

|             |  |                |
|-------------|--|----------------|
| 7.5         | Plastic Waste Management Plan for Proposed Project                             | 121            |
| 7.5.1       | Objective  | 121            |
| <b>VIII</b> | <b>PROJECTS BENEFITS</b>   | <b>122-124</b> |
| 8.0         | General  | <b>122</b>     |
| 8.1         | Employment Potential   | <b>122</b>     |
| 8.2         | Socio-Economic Welfare Measures Proposed                                       | <b>122</b>     |
| 8.3         | Improvement in Physical Infrastructure   | <b>122</b>     |
| 8.4         | Improvement in Social Infrastructure   | 123            |
| 8.5         | Other Tangible Benefits  | 123            |
| 8.6         | Corporate Social Responsibility  | 123            |
| 8.7         | Corporate Environment Responsibility   | 124            |
| 8.8         | Summary Of Project Benefits  | 124            |
| <b>IX</b>   | <b>ENVIRONMENTAL COST BENEFIT ANALYSIS</b>                                     | <b>125</b>     |
| <b>X</b>    | <b>ENVIRONMENTAL MANAGEMENT PLAN</b>   | <b>126-131</b> |
| 10.0        | General  | 126            |
| 10.1        | Environmental Policy   | 126            |
| 10.1.1      | Description of the Administration and Technical Setup                          | 126            |
| 10.2        | Budgetary Provision for Environmental Management                               | 127            |
| 10.3        | Conclusion   | 131            |
| <b>XI</b>   | <b>SUMMARY AND CONCLUSION</b>  | <b>132-142</b> |
| 11.1        | Introduction   | <b>132</b>     |
| 11.2        | Project Description  | <b>132</b>     |
| 11.3        | Description of the Environment   | <b>132</b>     |
| 11.3.1      | Land Environment   | 133            |
| 11.3.2      | Soil Environment   | 133            |
| 11.3.3      | Water Environment  | 133            |
| 11.3.4      | Air Environment  | 133            |
| 11.3.5      | Noise Environment  | 134            |
| 11.3.6      | Biological Environment   | 134            |
| 11.3.7      | Socio-Economic Environment   | 135            |
| 11.4        | Anticipated Environmental Impacts and Mitigation Measures for Proposed Project | 135            |
| 11.4.1      | Land Environment   | 135            |
| 11.4.2      | Soil Environment   | 136            |
| 11.4.3      | Water Environment  | 137            |
| 11.4.4      | Air Environment  | 137            |
| 11.4.5      | Noise Environment  | 138            |

|            |                                 |                |
|------------|---------------------------------|----------------|
| 11.4.6     | Biological Environment          | 139            |
| 11.4.7     | Socio Economic Environment      | 140            |
| 11.4.8     | Occupational Health             | 140            |
| 11.5       | Environment Monitoring Program  | 141            |
| 11.6       | Additional Studies              | 141            |
| 11.6.1     | Risk Assessment                 | 141            |
| 11.6.2     | Disaster Management Plan        | 141            |
| 11.6.3     | Cumulative Impact Study         | 142            |
| 11.7       | Project Benefits                | 142            |
| 11.8       | Environment Management Plan     | 142            |
| <b>XII</b> | <b>DISCLOSURE OF CONSULTANT</b> | <b>143-148</b> |

### LIST OF TABLES

| <b>TABLE No.</b> | <b>CONTENTS</b>  | <b>PAGE No.</b> |
|------------------|--|-----------------|
| 1.1              | Details of Quarries within the cluster area of 500 m radius                    | 2               |
| 1.2              | Details of project proponent   | 4               |
| 1.3              | Salient Features of the Proposed Project                                       | 6               |
| 2.1              | Site connectivity to the project area  | 10              |
| 2.2              | Corner coordinates of proposed project   | 10              |
| 2.3              | Estimated resources and reserves of the project                                | 14              |
| 2.4              | Year-wise production details   | 14              |
| 2.5              | Conceptual Blasting Design   | 17              |
| 2.6              | Operational details for proposed project                                       | 18              |
| 2.7              | Machinery details  | 18              |
| 2.8              | Land use data at present, during scheme of mining, and at the end of mine life | 18              |
| 2.9              | Mine closure budget  | 19              |
| 2.10             | Ultimate pit dimension   | 19              |
| 2.11             | Water requirement for the project  | 19              |
| 2.12             | Fuel requirement details   | 20              |
| 2.13             | Capital requirement details  | 20              |
| 2.14             | Employment potential for the proposed project                                  | 22              |
| 2.15             | Expected time schedule   | 22              |

|      |  |    |
|------|--|----|
| 3.1  | Monitoring attributes and frequency of monitoring  | 24 |
| 3.2  | LULC statistics of the study area  | 25 |
| 3.3  | Soil sampling locations  | 30 |
| 3.4  | Soil quality of the study area   | 30 |
| 3.5  | Water Sampling Locations   | 31 |
| 3.6  | Ground Water Quality Result  | 33 |
| 3.7  | Pre-monsoon water level of Open wells within 2 km radius   | 36 |
| 3.8  | Post-monsoon water level of Open wells within 2 km radius  | 36 |
| 3.9  | Pre-monsoon water level of Bore wells within 2 km radius   | 37 |
| 3.10 | Post-monsoon water level of bore wells within 2 km radius  | 37 |
| 3.11 | Vertical electrical sounding data  | 42 |
| 3.12 | Onsite Meteorological Data   | 43 |
| 3.13 | Methodology and Instrument used for AAQ analysis   | 47 |
| 3.14 | National ambient air quality standards   | 47 |
| 3.15 | Ambient air quality (AAQ) monitoring locations   | 48 |
| 3.16 | Summary of AAQ result  | 50 |
| 3.17 | Noise Monitoring Locations   | 53 |
| 3.18 | Ambient Noise Quality Result   | 53 |
| 3.19 | Calculation of Density, Frequency (%), Dominance, Relative Density, Relative Frequency, Relative Dominance & Important Value Index | 57 |
| 3.20 | Calculation of Species Diversity by Shannon – Wiener Index, Evenness and Richness  | 57 |
| 3.21 | Flora Diversity in mine lease area   | 58 |
| 3.22 | Flora in 300 m Radius  | 59 |
| 3.23 | Calculation of Species Diversity in 300m Radius  | 62 |
| 3.24 | Species Richness (Index) in 300m radius  | 63 |
| 3.25 | Flora in Buffer Zone   | 63 |
| 3.26 | Aquatic Vegetation   | 67 |
| 3.27 | Methodology applied during survey of fauna   | 68 |
| 3.28 | Fauna in 300m radius from the mine lease area  | 68 |
| 3.29 | Fauna in 10km radius   | 69 |
| 3.30 | Major Crops in 1km radius  | 72 |
| 3.31 | Type of Information and Sources  | 76 |



|      |  |     |
|------|--|-----|
| 3.32 | Mennallur Village Population Facts   | 77  |
| 3.33 | Population and literacy data of study area                                 | 78  |
| 3.34 | Workers Profile of Study Area  | 81  |
| 3.35 | Traffic Survey Locations   | 85  |
| 3.36 | Existing Traffic Volume  | 85  |
| 3.37 | Rough Stone Transportation Requirement                                     | 85  |
| 3.38 | Summary of Traffic Volume  | 85  |
| 3.39 | Details of environmentally sensitive ecological features in the study area | 87  |
| 4.1  | Empirical formula for emission rate from overall mine                      | 91  |
| 4.2  | Estimated emission rate  | 91  |
| 4.3  | Incremental & Resultant GLC of PM <sub>2.5</sub>                           | 93  |
| 4.4  | Incremental & Resultant GLC of PM <sub>10</sub>                            | 93  |
| 4.5  | Activity and noise level produced by machinery                             | 96  |
| 4.6  | Predicted noise incremental values   | 96  |
| 4.7  | Predicted PPV Values due to Blasting                                       | 98  |
| 4.8  | Predicted PPV Values due to Blasting at 100-500 radius                     | 98  |
| 4.9  | Carbon Released During Five Years of Rough Stone and Gravel Production     | 101 |
| 4.10 | CO <sub>2</sub> Sequestration  | 101 |
| 4.11 | Recommended Species for Greenbelt Development Plan                         | 101 |
| 4.12 | Greenbelt development plan   | 102 |
| 6.1  | Implementation schedule for proposed project                               | 110 |
| 6.2  | Proposed monitoring schedule post EC for the proposed quarry               | 111 |
| 6.3  | Environment monitoring budget  | 112 |
| 7.1  | Risk assessment & control measures for proposed project                    | 113 |
| 7.2  | Cumulative Production Load of Rough Stone                                  | 117 |
| 7.3  | Cumulative Production Load of Gravel                                       | 118 |
| 7.4  | Cumulative Impact Results from the proposed projects                       | 118 |
| 7.5  | Cumulative Impact of Noise from Proposed projects                          | 119 |
| 7.6  | Cumulative impact of noise from two proposed projects                      | 119 |
| 7.7  | Cumulative effect of ground vibrations resulting from two projects         | 120 |
| 7.8  | Socio Economic Benefits from three proposed projects                       | 120 |

|      |  |     |
|------|--|-----|
| 7.9  | Employment Benefits for the proposed projects                        | 120 |
| 7.10 | Greenbelt Development Benefits for the projects                      | 120 |
| 7.10 | Action Plan to Manage Plastic Waste                                  | 121 |
| 8.1  | CER – action plan  | 124 |
| 8.2  | Project Benefits to the state Government                             | 124 |
| 10.1 | EMP budget for proposed project                                      | 127 |
| 10.2 | Estimation of overall EMP budget after adjusting 5% annual inflation | 131 |
| 11.1 | LULC Statistics of the Study Area                                    | 133 |
| 11.2 | Environment Monitoring Program                                       | 141 |

### LIST OF FIGURES

| FIGURE NO. | TITLE  | PAGE NO. |
|------------|--|----------|
| 1.1        | Location of the proposed and existing rough stone quarries in the cluster of 500m radius                   | 5        |
| 2.1        | Overall view of proposed project site  | 9        |
| 2.2        | Location Map Showing the Project Site  | 11       |
| 2.3        | Google Earth Image Showing Lease Area with Pillars   | 12       |
| 2.4        | Mine Lease Plan  | 13       |
| 2.5        | Year-Wise Development Production Plan & Section  | 15       |
| 2.6        | Conceptual Plan & Sections   | 21       |
| 3.1        | Geology Map of 5Km Radius from proposed project site   | 26       |
| 3.2        | Geomorphology Map of 5 km Radius from Proposed Project Site  | 27       |
| 3.3        | LULC Map of 5km radius from the proposed project site  | 28       |
| 3.4        | Drainage Map of 5 km Radius from Proposed Project Site   | 29       |
| 3.5        | Toposheet Showing Soil Sampling Locations within 5 km Radius around Proposed Project Site                  | 32       |
| 3.6        | Showing Water Sampling Locations within 5 km Radius around Proposed Project Site                           | 34       |
| 3.7        | Long-Term Monthly Average Rainfall Vs Monthly Rainfall   | 35       |
| 3.8        | Open Well Static Groundwater Elevation Map Showing Direction of Groundwater Flow during Pre-Monsoon Season | 38       |

|       |   |    |
|-------|---|----|
| 3.9   | Open Well Static Groundwater Elevation Map Showing Direction of Groundwater Flow during Post-Monsoon Season   | 39 |
| 3.10  | Borewell Static Groundwater Elevation Map Showing Direction of Groundwater Flow during Pre-Monsoon Season   | 40 |
| 3.11  | Borewell Static Groundwater Elevation Map Showing Direction of Groundwater Flow during Post-Monsoon Season  | 41 |
| 3.12  | Graph Showing Occurrence of Water Bearing Fracture Zones at the Depth of 60m Below Ground Level in Proposed Project   | 42 |
| 3.13  | Windrose Diagram for 2018-2019 and 2019-2020 (December through February)  | 44 |
| 3.13a | Windrose Diagram for 2020-2021 and 2021-2022 (December through February)  | 45 |
| 3.14  | Onsite Wind Rose Diagram  | 46 |
| 3.15  | Map Showing Ambient Air Quality Monitoring Station Locations Around 5 km Radius from Proposed Project Site  | 49 |
| 3.16  | Bar Chart Showing Maximum, Minimum, and Average Concentrations of PM <sub>2.5</sub> Measured from 8 Air Quality Monitoring Stations within 5 km Radius      | 50 |
| 3.17  | Bar Chart Showing Maximum, Minimum, and Average Concentrations of PM <sub>10</sub> Measured from 8 Air Quality Monitoring Stations within 5 km Radius       | 51 |
| 3.18  | Bar Chart Showing Maximum, Minimum, and Average Concentrations of SO <sub>2</sub> Measured from 8 Air Quality Monitoring Stations within 5 km Radius        | 51 |
| 3.19  | Bar chart showing maximum, minimum, and the average concentrations of NO <sub>x</sub> measured from the 8 air quality monitoring stations within 5km radius | 52 |
| 3.20  | Bar Chart Showing Maximum, Minimum, And Average Concentrations of Pollutants in Atmosphere within 5 km Radius   | 52 |
| 3.21  | Bar Chart Showing Day Time Noise Levels Measured in Core and Buffer Zones   | 54 |
| 3.22  | Bar Chart Showing Night Time Noise Levels Measured in Core and Buffer Zones   | 54 |
| 3.23  | Map Showing Noise Level Monitoring Station Locations around 5 km Radius from Proposed Project Site  | 55 |
| 3.24  | Quadrates Sampling Methods of Flora   | 56 |

|      |   |     |
|------|---|-----|
| 3.25 | Species Richness (Index) in 300m radius Flora in 10 km radius buffer zone   | 63  |
| 3.26 | Socio Economic Village Map  | 75  |
| 3.27 | Chart Diagram about Population, SC, ST and Literacy in Surrounding Villages | 80  |
| 3.28 | Chart Diagram about Workers Profile in Surrounding Villages                 | 83  |
| 3.29 | Traffic Density Map   | 86  |
| 3.30 | Field Study Photographs   | 88  |
| 4.1  | Predicted incremental concentration of PM <sub>2.5</sub>                    | 93  |
| 4.2  | Predicted incremental concentration of PM <sub>10</sub>                     | 94  |
| 4.3  | Predicted PPV Values due to Blasting at 100-500 m radius                    | 99  |
| 6.1  | Proposed environmental monitoring chart                                     | 109 |
| 7.1  | Disaster management team layout for proposed project                        | 116 |

#### LIST OF ANNEXURES

| <b>Annexure No.</b> | <b>Contents</b>  | <b>Page No.</b> |
|---------------------|--|-----------------|
| I                   | Copy of ToR letter   | 149-173         |
| II                  | Copy of 500 m radius letter  | 174-177         |
| III                 | Approved mining plan along with mining plan AD/DD letter/original mining plan plates / modified plates | 178-248         |
| IV                  | VAO 300m radius letter   | 249             |
| V                   | NABET certificate of EIA consultant  | 250             |

## TERMS OF REFERENCE (ToR) COMPLIANCE

ToR File No.11530

TOR Identification No. TO24B0108TN5158721N, dated.12/01/2025

Thiru.T. Ponnambalam, Rough Stone and Gravel Quarry

### Specific Terms of Reference for (Mining of Minerals)

#### 1. SEIAA Specific Conditions

| S.No | Terms of Reference  | Remarks   |
|------|---|---|
| 1.1  | After detailed discussions, the Authority accepts the recommendation of SEAC and decided to grant Terms of Reference (ToR) along with Public Hearing for the quantity of 3,86,102m <sup>3</sup> of rough stone and 23,528m <sup>3</sup> of gravel upto the depth of 50m BGL and the annual peak production of 93,310m <sup>3</sup> of rough stone and 10,920m <sup>3</sup> of gravel for the period of 5 years as per approved mining plan under cluster for undertaking the combined Environment Impact Assessment Study and preparation of separate Environment Management Plan subject to the conditions as recommended by SEAC, standard conditions stipulated by MoEF&CC & the following conditions. |   |
| 1    | The PP shall carry out the studies assessing the impact of mining on drainage pattern and agricultural activities and submit the study report and the mitigation measures along with the EIA Report.  | There is no drainage pattern within the proposed lease area. No major impact on the nearby water bodies due to project operations. The mitigation measures on agriculture impact and drainage pattern are discussed in the Section 4.6.5 and 4.6.6 under Chapter IV in the EIA report page 102-103. |
| 2    | It was noted from the KML, agricultural activity is carried out around the proposed site. Hence the PP is requested to furnish the No Objection Certificate (NOC) from the competent Authority of Agricultural Department and submit along with the EIA Report.   | The NOC from the competent Authority of Agricultural Department will be submitted in the final EIA report.  |

## 2. SEAC Conditions – Site Specific

| S.No | Terms of Reference |   | Remarks  |
|------|--------------------|---|--|
| 2.1  | 1                  | <p>A Cluster Management Committee (CMC) shall be constituted including all the mines in the cluster as Committee Members for the effective management of the mining operation in the cluster through systematic &amp; scientific approach with appointment of statutory personnel, appropriate environmental monitoring, good maintenance of haul roads and village/panchayat roads, authorized blasting operation etc. The PP shall submit the following details in the form of an Affidavit during the EIA appraisal:</p> <p>(i) Copy of the agreement forming CMC.</p> <p>(ii) The Organisation chart of the Committee with defining the role of the members.</p> <p>(iii) The ‘Standard Operating Procedures’ (SoP) executing the planned activities.</p> | <p>The details regarding the Cluster Management Committee (CMC) will be submitted in the final EIA report.</p>                                 |
|      | 2                  | <p>The PP shall erect the DGPS reference pillars painted with blue &amp; white colour indicating the safety barrier of 7.5 m to be left under the Rule 13 (1) of MCDR, 1988 within the lease boundary and protective bunds, and submit the photographic/videographic evidence along with the EIA report.</p>  | <p>After receiving the EC, the PP will set up DGPS reference pillar points in blue and white colour indicating the safety barrier of 7.5m.</p> |

|   |   |   |
|---|---|---|
| 3 | The details of enumeration of structures including schools, colleges, primary health centres should be submitted along with the EIA report.   | The details of structures is discussed in the Table 2.1 under the Chapter II in the EIA report page 10.           |
| 4 | The structures within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m and (iv) 300 m & upto 1km shall be enumerated with details such as dwelling houses with number of occupants, whether it belongs to the owner (or) not, places of worship, industries, factories, sheds, etc. and spell out the mitigation measures to be proposed for the protection of the above structures, if any during the quarrying operations. | The details of structures within 1km will be submitted in the final EIA report.                                   |
| 5 | The proponent shall furnish photographs of adequate fencing, garland drainage built with siltation tank & green belt along the periphery including replantation of existing trees; maintaining the safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan.  | The photographs of adequate fencing, garland drainage and green belt will be submitted in the final EIA report.   |
| 6 | Since the structures and village roads are situated within a radial distance of 500 m, the PP shall design the controlled blast parameters for reducing the blast-induced ground/air- vibrations and eliminating the fly rock from the blasting operations and a copy of such scientific study report shall be submitted  | The design of blast parameters is discussed in the Section 2.6 under the Chapter II in the EIA report page 14-21. |

|    |  |   |
|----|--|---|
|    | during the EIA appraisal without any deviation.  |   |
| 7  | The PP shall furnish the Standard Operating Procedures (SoP) for carrying out the 'Best Mining Practices' in the areas of drilling, blasting, loading/excavation, transportation, and green belt development, in securing the safety of the persons living within a radial distance of 500 m (danger zone) at the time of EIA appraisal. | The procedure for carrying area of drilling, blasting, loading/excavation, transportation, and green belt development is strictly followed by the PP.   |
| 8  | The Proponent shall carry out Bio diversity study as a part of EIA study and the same shall be included in the Report.   | The Bio diversity study is discussed in the Section 3.5 under the Chapter III in the EIA report page 56-72.   |
| 9  | The PP shall prepare the EMP for the entire life of mine and also furnish the sworn affidavit stating to abide the EMP for the entire life of mine   | A detailed EMP is prepared shown in Chapter X in the EIA report page 126-131. The sworn affidavit stating to abide the EMP for the entire life of mine will be submitted during final EIA report. |
| 10 | The PP shall carry out the comprehensive studies on the cumulative environmental impacts of the existing & proposed quarries which included drilling & blasting, loading & hauling on the surrounding village and structures.  | Results of cumulative impact study due to mining operations are given in Section 7.4 under Chapter VII in the EIA report page 117-121.  |
| 11 | The PP shall prepare a conceptual working plan accommodating the inclusion of haul road accessibility keeping the benches intact, by ensuring the slope stability of the working   | As it is a fresh lease area, the Slope Stability report is not required.  |



|  |  |   |  |
|--|--|---|--|
|  |  | benches to be constructed and existing quarry wall. |  |
|--|--|---|--|

### 3.SEAC Standard Conditions

|     |        |  |  |
|-----|--------|--|--|
| 3.1 | 1      | In the case of existing/operating mines, a letter obtained from the concerned AD (Mines) shall be submitted and it shall include the following:  |  |
|     | (i)    | Original pit dimension   | As it is a fresh quarry, the conditions are not applicable.  |
|     | (ii)   | Quantity achieved Vs EC Approved Quantity  |  |
|     | (iii)  | Balance Quantity as per Mineable Reserve calculated.   |  |
|     | (iv)   | Mined out Depth as on date Vs EC Permitted depth   |  |
|     | (v)    | Details of illegal/illicit mining  |  |
|     | (vi)   | Violation in the quarry during the past working.   |  |
|     | (vii)  | Quantity of material mined out outside the mine lease area   |  |
|     | (viii) | Condition of Safety zone/benches   |  |
|     | (ix)   | Revised/Modified Mining Plan showing the benches of not exceeding 6 m height and ultimate depth of not exceeding 50m.  |  |
|     | 2      | Details of habitations around the proposed mining area and latest VAO certificate regarding the location of habitations within 300m radius from the periphery of the site.                               | The VAO certificate is attached in Annexure IV.  |
|     | 3      | The proponent is requested to carry out a survey and enumerate on the structures located within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m and (iv) 300 m (v) 500m shall be enumerated with details | There is no any permanent structures within 300m radius from the mine lease area. The VAO letter is attached in the Annexure IV. |

|   |  |   |
|---|--|---|
|   | such as dwelling houses with number of occupants, whether it belongs to the owner (or) not, places of worship, industries, factories, sheds, etc with indicating the owner of the building, nature of construction, age of the building, number of residents, their profession and income, etc   |   |
| 4 | The PP shall submit a detailed hydrological report indicating the impact of proposed quarrying operations on the waterbodies like lake, water tanks, etc are located within 1 km of the proposed quarry.   | Detailed hydrological study is discussed in the Section 3.2.3 under the Chapter III in the EIA report page 35-42. |
| 5 | The Proponent shall carry out Bio diversity study through reputed Institution and the same shall be included in EIA Report.  | The details of Bio diversity from the reputed institution will be submitted in the final EIA report.              |
| 6 | The DFO letter stating that the proximity distance of Reserve Forests, Protected Areas, Sanctuaries, Tiger reserve etc, up to a radius of 25 km from the proposed site.  | The DFO letter will be submitted in the final EIA report.   |
| 7 | In the case of proposed lease in an existing (or old) quarry where the benches are not formed (or) partially formed as per the approved Mining Plan, the Project Proponent (PP) shall the PP shall carry out the scientific studies to assess the slope stability of the working benches to be constructed and existing quarry wall, by involving any one of the reputed Research and Academic | As it is a fresh lease area, the Slope Stability report is not required.  |

|    |   |   |
|----|---|---|
|    | <p>Institutions - CSIR-Central Institute of Mining &amp; Fuel Research / Dhanbad, NIRM/Bangalore, Division of Geotechnical Engineering-IIT-Madras, NIT-Dept of Mining Engg, Surathkal, and Anna University Chennai-CEG Campus.</p> <p>The PP shall submit a copy of the aforesaid report indicating the stability status of the quarry wall and possible mitigation measures during the time of appraisal for obtaining the EC.</p> |   |
| 8  | <p>However, in case of the fresh/virgin quarries, the Proponent shall submit a conceptual 'Slope Stability Plan' for the proposed quarry during the appraisal while obtaining the EC, when the depth of the working is extended beyond 30 m below ground level.</p>   | <p>As it is a fresh lease area, the Slope Stability report is not required.</p>                                     |
| 9  | <p>The PP shall furnish the affidavit stating that the blasting operation in the proposed quarry is carried out by the statutory competent person as per the MMR 1961 such as blaster, mining mate, mine foreman, II/I Class mines manager appointed by the proponent.</p>  | <p>The affidavit for blasting will be enclosed in the final EIA report.</p>   |
| 10 | <p>The PP shall present a conceptual design for carrying out only controlled blasting operation involving line drilling and muffle blasting in the proposed quarry such that the blast-induced ground vibrations are controlled as well as no fly rock travel beyond 30 m from the blast site.</p>  | <p>A conceptual design of blasting has been given in Section 2.6 under Chapter II in the EIA report page 14-21.</p> |

|    |  |  |
|----|--|--|
| 11 | The EIA Coordinators shall obtain and furnish the details of quarry/quarries operated by the proponent in the past, either in the same location or elsewhere in the State with video and photographic evidences. | The details of quarry operated by the proponent in the past, in the same village i.e., T. Ponnambalam, proposed rough stone and Gravel quarry project over an Extent of 4.30.0Ha, in S.F. Nos:134/15A, 134/15B, 134/17 134/18. 134/19, 136/1, 136/2, 136/3A, 136/3B, 136/3C, 136/4, 136/4, 136/5, 136/6, 136/7, 136/8, 136/9, 136/10, 143/1A, 143/1B, 143/C, 143/1D, 143/2, 143/3, 143/4, 143/5, 143/6, 143/7A, 143/7B, 143/8, 143/10, 143/11, 144/2, 144/3, 144/3, 144/4, and 144/5 at Mennallur Village. Vembakkam Taluk, Tiruvannmalai Distrit, Tamil Nadu. The drone video and photographs of this quarry will be submitted in the final EIA report. |
| 12 | If the proponent has already carried out the mining activity in the proposed mining lease area after 15.01.2016, then the proponent shall furnish the following details from AD/DD, mines,                       |  |
| 13 | What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines?  | As it is a new quarry, the conditions are not applicable.  |
| 14 | Quantity of minerals mined out.  |  |
|    | <ul style="list-style-type: none"> <li>• Highest production achieved in any one year</li> </ul>  |  |
|    | <ul style="list-style-type: none"> <li>• Detail of approved depth of mining.</li> </ul>  |  |
|    | <ul style="list-style-type: none"> <li>• Actual depth of the mining achieved earlier.</li> </ul>   |  |
|    | <ul style="list-style-type: none"> <li>• Name of the person already mined in that leases area. If EC and CTO</li> </ul>  |  |

|    |  |   |
|----|--|---|
|    | <p>already obtained, the copy of the same shall be submitted.</p> <ul style="list-style-type: none"> <li>• Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches.</li> </ul>  |   |
| 15 | <p>All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/Topo sheet, topographic sheet, geomorphology, lithology and geology of the mining lease area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).</p> | <p>All corner coordinates of the mine lease area have been superimposed on a high-resolution Google Earth Image, as shown in Figure 2.3, under Chapter II in the EIA report page 12.</p>  |
| 16 | <p>The PP shall carry out Drone video survey covering the cluster, green belt, fencing, etc.,</p>  | <p>The drone video will be submitted during final EIA presentation.</p>   |
| 17 | <p>The proponent shall furnish photographs of adequate fencing, green belt along the periphery including replantation of existing trees &amp; safety distance between the adjacent quarries &amp; water bodies nearby provided as per the approved mining plan.</p>  | <p>Photographs of adequate fencing, green belt along the periphery of the project area and the photographs showing nearby water bodies will be included in final EIA report.</p>  |
| 18 | <p>The Project Proponent shall provide the details of mineral reserves and mineable reserves, planned production capacity, proposed working methodology with justifications, the anticipated impacts of the mining operations on the surrounding environment, and the remedial measures for the same.</p>  | <p>The Resources and Reserves of Rough Stone were calculated based on cross-section method by plotting sections to cover the maximum lease area for the proposed project. The plate used for reserve estimation has discussed in the Section 2.5 under the Chapter II in the EIA report page 14. The approved</p> |

|    |   |  |
|----|---|--|
|    |   | mining plates is attached in the Annexure III.   |
| 19 | The Project Proponent shall provide the Organization chart indicating the appointment of various statutory officials and other competent persons to be appointed as per the provisions of the Mines Act'1952 and the MMR, 1961 for carrying out the quarrying operations scientifically and systematically in order to ensure safety and to protect the environment.  | Details of manpower required for this project have been given in Table 2.14 under Chapter II in the EIA report page 22.  |
| 20 | The Project Proponent shall conduct the hydro-geological study considering the contour map of the water table detailing the number of groundwater pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds, etc. within 1 km (radius) along with the collected water level data for both monsoon and non-monsoon seasons from the PWD / TWAD so as to assess the impacts on the wells due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. | The hydrogeological study is discussed in the Section 3.2.3 under the Chapter III in the EIA report page 35-42.  |
| 21 | The proponent shall furnish the baseline data for the environmental and ecological parameters with regard to surface water/ground water quality, air quality,   | The baseline data were collected for the environmental components including land, soil, water, air, noise, biology, socio-economy, and traffic and the results have been discussed |

|    |  |   |
|----|--|---|
|    | soil quality & flora/fauna including traffic/vehicular movement study.   | under Chapter III in the EIA report page 23-88.   |
| 22 | The Proponent shall carry out the Cumulative impact study due to mining operations carried out in the quarry specifically with reference to the specific environment in terms of soil health, biodiversity, air pollution, water pollution, climate change and flood control & health impacts. Accordingly, the Environment Management plan should be prepared keeping the concerned quarry and the surrounding habitations in the mind. | Results of cumulative impact study due to mining operations are given in Section 7.4 under Chapter VII in the EIA report page 117-121.  |
| 23 | Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.   | As part of rainwater harvesting measures, the rain water from garland drainage system will be diverted to nearby check dams after treating the water in settling tanks.   |
| 24 | Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given. | Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features has been discussed in Section 3.1 in the EIA report page 25-31 under Chapter III. The details of surrounding sensitive ecological features have been provided in Table 3.39 under Chapter III in the EIA report page 87. Land use plan of the project area showing pre-operational, operational and post-operational |

|    |  |   |
|----|--|---|
|    |  | phases are discussed in Table 2.8 under Chapter II in the EIA report page 18.   |
| 25 | Details of the land for storage of Overburden/Waste Dumps (or) Rejects outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be provided.  | This condition is not applicable to this project because no dumps have been proposed outside the lease area.                        |
| 26 | Proximity to Areas declared as 'Critically Polluted' (or) the Project areas which attracts the court restrictions for mining operations, should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the TNPCB (or) Dept. of Geology and Mining should be secured and furnished to the effect that the proposed mining activities could be considered. | Not Applicable.<br>Project area / Study area is not declared in 'Critically Polluted' Area and does not come under 'Aravalli Range. |
| 27 | Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.   | The rain water collected in the pits after spell of rain will be used for greenbelt development and dust suppression.               |
| 28 | Impact on local transport infrastructure due to the Project should be indicated.   | Details regarding the impact of the project on traffic are given in Section 3.7 under Chapter III in the EIA report page 84-86.     |
| 29 | A tree survey study shall be carried out (nos., name of the species, age, diameter etc.,) both within the mining lease applied   | A detailed tree survey was carried out within 300 m radius and the results have been discussed in Section 3.5                       |



|    |  |   |
|----|--|---|
|    | area & 300m buffer zone and its management during mining activity.   | under Chapter III in the EIA report page 56-72.   |
| 30 | A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.   | A progressive mine closure plan has been attached with the approved mining plan report in Annexure III. The budget details for the progressive mine closure plan are shown in Table 2.9 under Chapter II in the EIA report page 19. |
| 31 | As a part of the study of flora and fauna around the vicinity of the proposed site, the EIA coordinator shall strive to educate the local students on the importance of preserving local flora and fauna by involving them in the study, wherever possible.  | The EIA coordinator and the FAE for ecology and biodiversity visited the study area and educated the local students about the importance of protecting the biological environment.  |
| 32 | The purpose of green belt around the project is to capture the fugitive emissions, carbon sequestration and to attenuate the noise generated, in addition to improving the aesthetics. A wide range of indigenous plant species should be planted as given in the appendix-I in consultation with the DFO, State Agriculture University. The plant species with dense/moderate canopy of native origin should be chosen. Species of small/medium/tall trees alternating with shrubs should be planted in a mixed manner. | A detailed greenbelt development plan has been provided in Section 4.6 under Chapter IV in the EIA report page 100-103.   |
| 33 | Taller/one year old Saplings raised in appropriate size of bags, preferably ecofriendly bags should be planted as per  | The FAE of ecology and biodiversity has advised the project proponent that saplings of one year old raised in the   |

|    |   |  |
|----|---|--|
|    | <p>the advice of local forest authorities/botanist/Horticulturist with regard to site specific choices. The proponent shall earmark the greenbelt area with GPS coordinates all along the boundary of the project site with at least 3 meters wide and in between blocks in an organized manner</p>   | <p>eco-friendly bags should be purchased and planted with the spacing of 3 m between each plant around the proposed project area as per the advice of local forest authorities/botanist.</p> |
| 34 | <p>A Disaster management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.</p>  | <p>A disaster management plan for the project has been provided in Section 7.3 under Chapter VII in the EIA report page 115-117.</p>   |
| 35 | <p>A Risk Assessment and management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.</p>   | <p>A risk assessment plan for the project has been provided in Section 7.2 under Chapter VII in the EIA report page 113-115.</p>   |
| 36 | <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 the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.</p> | <p>Occupational health impacts of the project and preventive measures have been discussed in detail in Section 4.8 under Chapter IV in the EIA report 104-105.</p>                           |
| 37 | <p>Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial</p>  | <p>No public health implications are anticipated due to this project. Details of CSR and CER activities have been discussed in Sections 8.6 and 8.7</p>                                      |

|    |   |  |
|----|---|--|
|    | measures should be detailed along with budgetary allocations.   | under Chapter VIII in the EIA report page 123-124.   |
| 38 | The Socio-economic studies should be carried out within a 5 km buffer zone from the mining activity. Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation. | No negative impact on socio-economic environment of the study area is anticipated and this project shall benefit the socio-economic environment by offering employment for 20 people directly as discussed in Section 8.1 under Chapter VIII in the EIA report page 122. |
| 39 | Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.  | No litigation is pending in any court against this project.  |
| 40 | Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.   | The benefits of the project are discussed in the Chapter VIII in the EIA report page 122-124.  |
| 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.          | It is fresh lease area and the condition is not applicable.  |
| 42 | The PP shall prepare the EMP for the entire life of mine and also furnish the   | A detailed environment management plan has been prepared following the suggestion made by SEAC, as shown   |

|    |  |  |
|----|--|--|
|    | sworn affidavit stating to abide the EMP for the entire life of mine.  | in Chapter X in the EIA report page 126-131. The sworn affidavit stating to abide the EMP for the entire life of mine will be submitted during final EIA report.   |
| 43 | Concealing any factual information or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this Terms of Conditions besides attracting penal provisions in the Environment (Protection) Act, 1986. | The EIA report has been prepared keeping in mind the fact that concealing any factual information or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may lead to withdrawal of this terms of reference besides attracting penal provisions in the Environment (Protection) Act, 1986. |

### Standard Terms of Reference for (Mining of Minerals)

#### 1.

| S.No | Terms of reference   |  |
|------|--|--|
| 1.1  | Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994. | Not applicable. This is not a violation category project. This proposal falls under B1 category.   |
| 1.2. | A copy of the document in support of the fact that the proponent is the rightful lessee of the mine should be given.   | The proposed site for quarrying is a private land. A copy of the document showing that the proponent is the rightful lessee has been enclosed along with the approved mining plan in Annexure III. |

|      |   |   |
|------|---|---|
| 1.3. | 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.   | All the documents are in the name of the lessee.  |
| 1.4. | All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/ toposheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone). | All corner coordinates of the mine lease area have been superimposed on a high- resolution Google Earth Image, as shown in Figure 2.3 under Chapter II in the EIA report page 10.     |
| 1.5. | Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.  | Toposheets of Survey of India have been used for showing sampling locations of air, soil, water, and noise, as shown in Chapter III in the EIA report page 23-88.                     |
| 1.6. | Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.  | The lease area was inspected by the officers of Department of Geology along with revenue officials and found that the land is fit for quarrying under the policy of State Government. |
| 1.7. | 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   | The Environmental Policy is discussed in the Section 10.1 under Chapter X in the EIA report page 126-127.   |

|      |  |  |
|------|--|--|
|      | <p>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> |  |
| 1.8. | <p>Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.</p>   | <p>It is an opencast quarrying operation proposed to operate in Manual method. The rough stone formation is a hard, compact and homogeneous body. The height and width of the bench will be maintained as 5m with 90° bench angles. Quarrying activities will be carried out under the supervision of Competent Persons like Mines Manager, Mines Foreman and Mining Mate. Necessary permissions will be obtained from DGMS after obtaining Environmental Clearance.</p> |
| 1.9. | <p>The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc., should be for the life of the mine / lease period.</p>   | <p>The study area considered for this study is of 5 km radius for air, soil, water, and noise level sample collections, while the study area is 10 km radius for ecology and</p>   |

|       |  |   |
|-------|--|---|
|       |  | biodiversity studies and all data contained in the EIA report such as waste generation etc., is for the life of the mine / lease period.  |
| 1.10. | Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given. | Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features has been discussed in Section 3.1 under Chapter III in the EIA report page 25-31. The details of surrounding sensitive ecological features have been provided in Table 3.39 under Chapter III in the EIA report page 87. Land use plan of the project area showing pre- operational, operational and post- operational phases are discussed in Table 2.8 under Chapter II in the EIA report page 18. |
| 1.11. | 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.  | It is not applicable as no dumps have been proposed outside the lease area. The entire quarried out rough stone will be transported to the needy customers.   |
| 1.12. | A Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest   | It is not applicable as there is no forest land involved within the proposed project area. The details have been discussed in Table 3.39 under Chapter III in the EIA report page 87.   |

|       |  |  |
|-------|--|--|
|       | 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 State Expert Appraisal Committees. |  |
| 1.13. | 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.  | It is not applicable as the proposed project area does not involve any forest land.  |
| 1.14. | Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.   | Not Applicable.<br>The project doesn't attract Recognition of Forest Rights Act, 2006 as there are neither forests nor forest dwellers / forest dependent communities in the mine lease area. There shall be no forest impacted families (PF) or people (PP). Thus, the rights of Traditional Forest Dwellers will not be compromised on account of the project. |
| 1.15. | The vegetation in the RF / PF areas in the study area, with necessary details, should be given.  | Reserve Forest is found within the study area. The matter has been discussed Section 3.5.1 under Chapter III in the EIA report page 58-67.   |
| 1.16. | 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  | There is no any wildlife/protected area within 10 km radius from the periphery of the project area. Information regarding the same has   |



|       |   |   |
|-------|---|---|
|       | surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.   | been given in Table 3.39 under Chapter III in the EIA report page 87.   |
| 1.17. | Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/ (existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.  | There are No National Parks, Biosphere Reserves, Wildlife Corridors, and Tiger/Elephant Reserves within 10 km radius from the periphery of the project area. Information regarding the same has been given in Table 3.39 under Chapter III in the EIA report page 87. |
| 1.18. | 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 | A detailed biological study was carried out in both core and buffer zones and the results have been discussed in Section 3.5 under Chapter III in the EIA report page 56-72.  |

|       |  |  |
|-------|--|--|
|       | implementing the same should be made as part of the project cost.  |  |
| 1.19. | Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravalli Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Department should be secured and furnished to the effect that the proposed mining activities could be considered.   | Not Applicable.<br>Project area / Study area is not declared. in 'Critically Polluted' Area and does not come under 'Aravalli Range.   |
| 1.20. | Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the mine lease w.r.t CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).  | Not Applicable<br>The project doesn't attract the C.R.Z. Notification, 2018.   |
| 1.21. | 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 | Not Applicable.<br>There are no approved habitations of SCs/STs and other weaker sections in the lease area. Therefore, R&R Plan / Compensation Plan for the Project Affected People (PAP) are not provided. |

|       |  |  |
|-------|--|--|
|       | <p>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&amp;R and socio-economic aspect should be discussed in the Report</p>  |  |
| 1.22  | <p>One season (non-monsoon) [i.e., March-May (Summer Season); October-December (post monsoon season); December-February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.</p> | <p>Baseline data were collected for the period of December 2022 to February 2023 as per CPCB notification and MoEF &amp; CC Guidelines. Primary baseline data and the results have been included in Sections 3.1-3.8 under Chapter III in the EIA report page 25-87.</p> |
| 1.23. | <p>Air quality modelling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for</p>  | <p>Air quality modelling for prediction of incremental GLCs of pollutants was carried out using AERMOD view 11.2.0. The model results have been given in Section 4.4 under the</p>   |

|       |   |   |
|-------|---|---|
|       | modelling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map | Chapter IV in the EIA report page 91-95.  |
| 1.24. | The water requirement for the project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the project should be indicated.  | The water requirement for the project, its availability and source have been provided in Table 2.11 under Chapter II in the EIA report page 19.   |
| 1.25. | Necessary clearance from the competent Authority for drawl of requisite quantity of water for the project should be provided.   | Not Applicable.<br>Water for dust suppression, greenbelt development and domestic use will be sourced from accumulated rainwater/seepage water in mine pits and purchased from local water vendors through water tankers on daily requirement basis. Drinking water will be sourced from the approved water vendors.  |
| 1.26. | Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.  | Part of the working pit will be allowed to collect rain water during the spell of rain. The water thus collected will be used for greenbelt development and dust suppression. The mine closure plan has been prepared for converting the excavated pit into rain water harvesting structure and serve as water reservoir for the project village during draught season. |

|       |   |   |
|-------|---|---|
| 1.27. | Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.   | Impact studies and mitigation measures of water environment including surface water and ground water have been discussed in Section 4.3 under Chapter IV in the EIA report page 90-91.  |
| 1.28. | 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 ground water table is found at the depth of 60m below ground level. The ultimate depth of quarry is 50m BGL. Therefore, the mining activity will not intersect the ground water table. Data regarding the occurrence of groundwater table have been provided in Section 3.2 under Chapter III in the EIA report page 31-42. |
| 1.29. | Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out   | Not Applicable.<br>There are no streams, seasonal or other water bodies passing within the project area. Therefore, no modification or diversion of water bodies is anticipated   |
| 1.30. | Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and BGL. A schematic diagram may also be provided for the same.  | The highest elevation of the project area is 93m AMSL. Ultimate depth of the mine is 50m BGL. Depth to the water level in the area is 60m BGL.  |

|       |  |  |
|-------|--|--|
| 1.31. | <p>A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed 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</p> | <p>Greenbelt development plan has been given in Section 4.6 under Chapter IV in the EIA report page 100-103.</p>   |
| 1.32. | <p>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.</p>   | <p>Traffic density survey was carried out to analyses the impact of transportation in the study area as per IRC guidelines 1961 and it is inferred that there is no significant impact due to the proposed transportation from the project area. Details have been provided in Section 3.7 under Chapter III in the EIA report page 84-86.</p> |

|       |  |   |
|-------|--|---|
| 1.33. | Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.  | Infrastructure & other facilities will be provided to the mine workers after the grant of quarry lease and the same has been discussed in Section 2.6.6 under Chapter II in the EIA report page 19.           |
| 1.34. | Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.  | Progressive mine closure plan has been prepared for this project and is given in Section 2.6.4 under Chapter II in the EIA report page 18-19.   |
| 1.35. | Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed. | Occupational health impacts of the project and preventive measures have been explained in detail in Section 4.8 under Chapter IV in the EIA report page 104-105.  |
| 1.36. | Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.  | No public health implications are anticipated due to this project. Details of CSR and CER activities have been discussed in Sections 8.6 and 8.7 under Chapter VIII in the EIA report page 123-124.           |
| 1.37. | Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.   | No negative impact on socio-economic environment of the study area is anticipated and this project shall benefit the socio-economic environment by offering employment for 20 people directly as discussed in |

|       |   |  |
|-------|---|--|
|       |   | Section 8.1 under Chapter VIII in the EIA report page 122.   |
| 1.38. | 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. | A detailed Environment Management Plan has been prepared and provided in Tables 10.1 & 10.2 under Chapter X in the EIA report page 127-131.  |
| 1.39. | Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.                                   | The outcome of public hearing will be submitted during the final EIA report.   |
| 1.40. | Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given   | No litigation is pending in any court against this project.  |
| 1.41  | The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.  | Project Cost is Rs.76,20,000/-<br>CER Cost is Rs.5,00,000/-<br>In order to implement the environmental protection measures, an amount of Rs.5345405 as capital cost and recurring cost as Rs.2188866 as recurring cost/annum is proposed considering present market price considering present market scenario for the proposed project. After the adjustment of 5% inflation per year, the overall EMP cost for 5 years will be Rs.17440269 as shown in Tables |



|       |   |  |
|-------|---|--|
|       |   | 10.1 & 10.2 under Chapter X in the EIA report page 127-131.  |
| 1.42. | A disaster management plan shall be prepared and included in the EIA/EMP Report.  | The disaster management plan for this project has been provided in Section 7.3 under Chapter VII in the EIA report page 115-117. |
| 1.43. | Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.   | Benefits of the project details have been given under Chapter VIII in the EIA report page 122-124.                               |
| 1.44  | Besides the above, the below mentioned general points are also to be followed:  |  |
| a)    | Executive Summary of the EIA/EMP Report.  | Executive summary has been enclosed as a separate booklet.   |
| b)    | All documents to be properly referenced with index and continuous page numbering.   | All the documents have been properly referenced with index and continuous page numbering.  |
| c)    | Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated.   | List of tables and source of the data collected have been mentioned.   |
| d)    | Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF & CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project. | Original Baseline monitoring reports will be submitted in the final EIA report.  |
| e)    | Where the documents provided are in a language other than English, an English translation should be provided.   | All the documents provided here are in English language.   |
| f)    | The Questionnaire for environmental appraisal of mining projects as devised   | The questionnaire will be submitted in the final EIA report.   |

|    |   |   |
|----|---|---|
|    | 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.   | Instructions issued by MoEF & CC O.M. No. J-11013/41/2006-IA. II (I) dated 4 <sup>th</sup> August, 2009 have been followed while preparing the EIA report |
| h) | Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF & CC with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation | No changes are made in the basic scope and the project parameters.  |
| i) | As per the circular no. J-11011/618/2010-IA. II(I) Dated: 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.  | As it is a new lease area, the condition is not applicable.   |
| j) | The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and  | All the plans including surface & geological plans, and progressive closure plan have been included in Annexure III.                                      |

|  |  |  |
|--|--|--|
|  | sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area. |  |
|--|--|--|

### SEIAA Standard Conditions

| <b>Cluster Management Committee</b> |   |  |
|-------------------------------------|---|--|
| 1                                   | Cluster Management Committee shall be framed which must include all the proponents in the cluster as members including the existing as well as proposed quarry.   | A cluster management committee including all the proponents of the rough stone quarrying projects within the cluster of 500 m radius will be constituted for the effective implementation of green belt development plan, water sprinkling, blasting, etc. |
| 2                                   | The members must coordinate among themselves for the effective implementation of EMP as committed including Green Belt Development, Water sprinkling, tree plantation, blasting etc.,   | The members of the cluster management committee will be instructed to carry out EMP in coordination.   |
| 3                                   | The List of members of the committee formed shall be submitted to AD/Mines before the execution of mining lease and the same shall be updated every year to the AD/Mines.   | The list of members of the committee formed will be submitted to AD/Mines before the execution of mining lease.  |
| 4                                   | Detailed Operational Plan must be submitted which must include the blasting frequency with respect to the nearby quarry situated in the cluster, the usage of haul roads by the individual quarry in the form of route map and network. | All the information has been discussed in Section 2.6 under Chapter II in the EIA report page 14-21.   |
| 5                                   | The committee shall deliberate on risk management plan pertaining to the cluster in a holistic manner especially during natural   | It will be informed to the committee.  |

|  |   |   |
|--|---|---|
|  | calamities like intense rain and the mitigation measures considering the inundation of the cluster and evacuation plan.   |   |
| 6  | The Cluster Management Committee shall form Environmental Policy to practice sustainable mining in a scientific and systematic manner in accordance with the law. The role played by the committee in implementing the environmental policy devised shall be given in detail. | It will be advised to the cluster management committee to practice sustainable mining in a scientific and systematic manner in accordance with the law. The role played by the committee in implementing the environmental policy devised will be given in detail.  |
| 7  | The committee shall furnish action plan regarding the restoration strategy with respect to the individual quarry falling under the cluster in a holistic manner.  | A proper action plan regarding the restoration will be followed by the committee.   |
| 8  | The committee shall deliberate on the health of the workers/staff involved in the mining as well as the health of the public.   | The information on the health of the workers and the local people will be updated periodically.   |
| <b>Agriculture &amp; Agro-Biodiversity</b> |   |   |
| 9  | Impact on surrounding agricultural fields around the proposed mining Area.  | There shall be negligible air emissions or effluents from the project site. During loading the truck, dust generation will be likely. This shall be a temporary effect and not anticipated to affect the surrounding vegetation significantly, as shown in Section 4.6 under Chapter IV in the EIA report page 100-103. |
| 10   | Impact on soil flora & vegetation around the project site.  | The details on flora have been provided in Section 3.5 under Chapter III in the EIA report page 56-72. There is no schedule I species of animals  |

|                |   |  |
|----------------|---|--|
|                |   | observed within study area as per Wildlife Protection Act, 1972 and no species falls in vulnerable, endangered or threatened category as per IUCN. There is no endangered red list species found in the study area.                                  |
| 11             | Details of type of vegetations including no. of trees & shrubs within the proposed mining area and. If so, transplantation of such vegetations all along the boundary of the proposed mining area shall committed mentioned in EMP. | Details of vegetation in the lease area have been provided in Section 3.5 under Chapter III in the EIA report page 56-72. Details about transplantation of plants have been provided in Section 4.6 under Chapter IV in the EIA report page 100-103. |
| 12             | The Environmental Impact Assessment should study the biodiversity, the natural ecosystem, the soil micro flora, fauna and soil seed banks and suggest measures to maintain the natural Ecosystem.                                   | The ecological details have been provided in Section 3.5 under Chapter III in the EIA report page 59-72. and measures have been provided in Section 4.6 under Chapter IV in the EIA report page 100-103.   |
| 13             | Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.  | All the essential environmental protective measures will be followed by the proponent to manage the surrounding environment and restore the ecosystem, as discussed in Chapter IV in the EIA report page 89-106.                                     |
| 14             | The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock.   | The impact of project on the land environment has been discussed in Section 4.1 under Chapter IV in the EIA report page 89-90.   |
| <b>Forests</b> |   |  |
| 15             | The project proponent shall detail study on impact of mining on Reserve forests free ranging wildlife.  | The project proponent shall do barbed wire fencing work and develop a green  |

|                          |  |   |
|--------------------------|--|---|
|                          |  | belt around the lease area to prevent wildlife from entering the site.  |
| 16                       | The Environmental Impact Assessment should study impact on forest, vegetation, endemic, vulnerable and endangered indigenous flora and fauna.  | The impacts of the project on ecology and biodiversity have been discussed in Section 4.6 under Chapter IV in the EIA report page 100-103.  |
| 17                       | The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection.   | The impacts of the project on standing trees and the existing trees have been discussed in Section 4.6 under Chapter IV in the EIA report page 100-103.                                 |
| 18                       | The Environmental Impact Assessment should study impact on protected areas, Reserve Forests, National Parks, Corridors and Wildlife pathways, near project site.   | The protected areas, National Parks, Corridors and Wildlife pathways near project site within 10 km radius has been provided in Table 3.39 under Chapter III in the EIA report page 87. |
| <b>Water Environment</b> |  |   |
| 19                       | Hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 1 km (radius) so as to assess the impacts on the nearby waterbodies due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided, covering the entire mine lease period. | The hydrogeological study is discussed in the Section 3.2.3 under Chapter III in the EIA report page 35-42.   |
| 20                       | Erosion Control measures.  | Garland drainage structures will be constructed around the lease area to  |

|    |   |   |
|----|---|---|
|    |   | control the erosion, as discussed in Section 4.3 under Chapter IV in the EIA report page 90-91.   |
| 21 | 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 matter has been discussed under Chapter IV in the EIA report page 89-106.   |
| 22 | The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and  | An analysis for food chain in aquatic ecosystem has been discussed in Section 3.5 under Chapter 3 in the EIA report page 59-72.                                     |
| 23 | The project proponent shall study and furnish the details on potential fragmentation impact on natural environment, by the activities.  | The impacts of the proposed project on the surrounding environment have discussed in Chapter IV in the EIA report page 89-106.                                      |
| 24 | 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 impact of the proposed project on aquatic plants and animals in water bodies has been discussed in Section 4.6 under Chapter IV in the EIA report page 100-103. |
| 25 | The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components.  | The impact of mining on soil environment has been discussed in Section 4.2 under Chapter IV in the EIA report page 90.  |
| 26 | The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites.   | The impacts on water bodies, streams, lakes have been discussed in Section 4.3 under Chapter IV in the EIA report page 90-91.                                       |

|               |   |   |
|---------------|---|---|
| 27            | The EIA shall include the impact of mining activity on the following:   |   |
|               | a) Hydrothermal / Geothermal effect due to destruction in the Environment.  | The proposed mining area and the surrounding falls under Garnite Gnesis, commercially called as rough stone within the mimatite rock and the district has not recorded any Hydrothermal / Geothermal effect and as per the Seismic Zonation Map of India, the district falls under the Seismic Zone III classification.<br>The resultant of this open cast mining shall not have any Hydrothermal/Geothermal effect on the surrounding environment. |
|               | b) Bio-geochemical processes and its foot prints including environmental stress.  | No, Bio-geochemical processes and its foot prints including environmental stress are anticipated and at the end of life of mine the proposed quarry shall be left as an artificial reservoir structure and allowed to collect rain water and shall enrich the ecosystem.  |
|               | c) Sediment geochemistry in the surface streams.  | Sediment geochemistry is discussed in the Table 3.5 under the Chapter III in the EIA report page 56-72.   |
| <b>Energy</b> |   |   |
| 28            | The measures taken to control Noise, Air, Water, Dust Control and steps adopted to efficiently utilise the Energy shall be furnished. | The measures taken to control noise, air, water, and dust have been given under Chapter IV in the EIA report page 89-106.   |



| <b>Climate Change</b>    |  |   |
|--------------------------|--|---|
| 29                       | The Environmental Impact Assessment shall study in detail the carbon emission and also suggest the measures to mitigate carbon emission including development of carbon sinks and temperature reduction including control of other emission and climate mitigation activities. | The carbon emission and the measures to mitigate carbon emission have been discussed in Section 4.6 under Chapter IV in the EIA report page 100-103.  |
| 30                       | The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock, soil health and physical, chemical & biological soil features.  | The matter has been discussed in Chapter IV in the EIA report page 89-106.  |
| 31                       | Impact of mining on pollution leading to GHGs emissions and the impact of the same on the local livelihood.  | There is no emission impact to local livelihood from this quarry project. All the vehicles used for transportation of the quarry materials will be maintained regularly to keep the GHGs emissions within statutory limits.         |
| <b>Mine Closure Plan</b> |  |   |
| 32                       | Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued.   | A progressive mine closure plan has been attached with the approved mining plan report in Annexure III. The budget details for the progressive mine closure plan are shown in Table 2.9 under Chapter II in the EIA report page 19. |
| <b>EMP</b>               |  |   |
| 33                       | Detailed Environment Management Plan along with adaptation, mitigation & remedial strategies covering the entire mine lease period as per precise area communication order issued.   | A detailed Environment Management plan has been given under Chapter X in the EIA report page 126-131.   |

|                                 |   |   |
|---------------------------------|---|---|
| 34                              | The Environmental Impact Assessment should hold detailed study on EMP with budget for Green belt development and mine closure plan including disaster management plan.  | A detailed Environment Management plan has been given in Tables 10.1 & 10.2 under Chapter X in the EIA report page 127-131.                 |
| <b>Risk Assessment</b>          |   |   |
| 35                              | To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining.  | The risk assessment and management plan for this project has been provided in Section 7.2 under Chapter VII in the EIA report page 113-115. |
| <b>Disaster Management Plan</b> |   |   |
| 36                              | To furnish disaster management plan and disaster mitigation measures in regard to all aspects to avoid/reduce vulnerability to hazards & to cope with disaster/untoward accidents in & around the proposed mine lease area due to the proposed method of mining activity & its related activities covering the entire mine lease period as per precise area communication order issued. | The disaster management plan for this project has been provided in Section 7.3 under Chapter VII in the EIA report page 115-117.            |
| <b>Others</b>                   |   |   |
| 37                              | The project proponent shall furnish VAO certificate with reference to 300m radius regard to approved habitations, schools, Archaeological sites, Structures, railway lines, roads, water bodies such as streams, odai, vaari, canal, channel, river, lake pond, tank etc.   | The VAO certificate of 300 m radius have been attached in the attached in the Annexure IV.  |
| 38                              | 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  | The concerns raised during the public consultation will be submitted in the final EIA report.   |

|    |   |  |
|----|---|--|
|    | shall be part of the Environment Management Plan.   |  |
| 39 | The project proponent shall study and furnish the possible pollution due to plastic and microplastic on the environment. The ecological risks and impacts of plastic & microplastics on aquatic environment and fresh water systems due to activities, contemplated during mining may be investigated and reported. | The plastic waste management has been given in Section 7.5 under Chapter VII in the EIA report page 121. |

## STANDARD CONDITIONS

### A. STANDARD TERMS OF REFERENCE

| S.No | Terms of reference   |  |
|------|--|--|
| 1    | Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994. | Not applicable. This is not a violation category project. This proposal falls under B1 category.   |
| 2.   | A copy of the document in support of the fact that the proponent is the rightful lessee of the mine should be given.   | The proposed site for quarrying is a private land. A copy of the document showing that the proponent is the rightful lessee has been enclosed along with the approved mining plan in Annexure III. |
| 3.   | All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining   | All the documents are in the name of the lessee.   |

|    |   |   |
|----|---|---|
|    | 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/ toposheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).   | All corner coordinates of the mine lease area have been superimposed on a high- resolution Google Earth Image, as shown in Figure 2.3 under Chapter II in the EIA report page 10.     |
| 5. | Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.  | Toposheets of Survey of India have been used for showing sampling locations of air, soil, water, and noise, as shown in Chapter III in the EIA report page 23-88.                     |
| 6. | Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.  | The lease area was inspected by the officers of Department of Geology along with revenue officials and found that the land is fit for quarrying under the policy of State Government. |
| 7. | It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/ procedures to bring into focus any infringement/ deviation/ violation of the environmental or forest norms/conditions? The hierarchical system or administrative order of the Company to | The Environmental Policy is discussed in the Section 10.1 under Chapter X in the EIA report page 126-127.   |

|     |   |   |
|-----|---|---|
|     | 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.   | It is an opencast quarrying operation proposed to operate in Manual method. The rough stone formation is a hard, compact and homogeneous body. The height and width of the bench will be maintained as 5m with 90° bench angles. Quarrying activities will be carried out under the supervision of Competent Persons like Mines Manager, Mines Foreman and Mining Mate. Necessary permissions will be obtained from DGMS after obtaining Environmental Clearance. |
| 9.  | The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc., should be for the life of the mine / lease period.   | The study area considered for this study is of 5 km radius for air, soil, water, and noise level sample collections, while the study area is 10 km radius for ecology and biodiversity studies and all data contained in the EIA report such as waste generation etc., is for the life of the mine / lease period.  |
| 10. | Land use of the study area delineating forest area, agricultural land, grazing land, wildlife   | Land use of the study area delineating forest area, agricultural land, grazing  |

|     |  |   |
|-----|--|---|
|     | <p>sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.</p>  | <p>land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features has been discussed in Section 3.1 under Chapter III in the EIA report page 25-31. The details of surrounding sensitive ecological features have been provided in Table 3.39 under Chapter III in the EIA report page 87. Land use plan of the project area showing pre- operational, operational and post- operational phases are discussed in Table 2.8 under Chapter II in the EIA report page 18.</p> |
| 11. | <p>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&amp;R issues, if any, should be given.</p>   | <p>It is not applicable as no dumps have been proposed outside the lease area. The entire quarried out rough stone will be transported to the needy customers.</p>  |
| 12. | <p>A Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the State Expert Appraisal Committees.</p> | <p>It is not applicable as there is no forest land involved within the proposed project area. The details have been discussed in Table 3.39 under Chapter III in the EIA report page 87.</p>  |

|     |   |  |
|-----|---|--|
| 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.   | It is not applicable as the proposed project area does not involve any forest land.  |
| 14. | Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.  | Not Applicable.<br>The project doesn't attract Recognition of Forest Rights Act, 2006 as there are neither forests nor forest dwellers / forest dependent communities in the mine lease area. There shall be no forest impacted families (PF) or people (PP). Thus, the rights of Traditional Forest Dwellers will not be compromised on account of the project. |
| 15. | The vegetation in the RF / PF areas in the study area, with necessary details, should be given.   | Reserve Forest is found within the study area. The matter has been discussed Section 3.5.1 under Chapter III in the EIA report page 58-67.   |
| 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. | There is no any wildlife/protected area within 10 km radius from the periphery of the project area. Information regarding the same has been given in Table 3.39 under Chapter III in the EIA report page 87.   |
| 17. | Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/ (existing as well as proposed), if any, within   | There are No National Parks, Biosphere Reserves, Wildlife Corridors, and Tiger/Elephant Reserves within 10 km radius from  |

|     |  |   |
|-----|--|---|
|     | <p>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.</p>  | <p>the periphery of the project area. Information regarding the same has been given in Table 3.39 under Chapter III in the EIA report page 87.</p>                                  |
| 18. | <p>A detailed biological study of the study area [core zone and buffer zone (10 KM radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.</p> | <p>A detailed biological study was carried out in both core and buffer zones and the results have been discussed in Section 3.5 under Chapter III in the EIA report page 56-72.</p> |
| 19. | <p>Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravalli Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed</p>  | <p>Not Applicable.<br/>Project area / Study area is not declared. in 'Critically Polluted' Area and does not come under 'Aravalli Range.</p>  |



|     |  |   |
|-----|--|---|
|     | <p>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>   |   |
| 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, 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).</p>   | <p>Not Applicable</p> <p>The project doesn't attract the C.R.Z. Notification, 2018.</p>   |
| 21. | <p>R&amp;R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&amp;R Plan, the relevant State/National Rehabilitation &amp; 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&amp;R and socio-economic aspect should be discussed in the Report</p> | <p>Not Applicable.</p> <p>There are no approved habitations of SCs/STs and other weaker sections in the lease area. Therefore, R&amp;R Plan / Compensation Plan for the Project Affected People (PAP) are not provided.</p> |

|     |  |  |
|-----|--|--|
| 22  | <p>One season (non-monsoon) [i.e., March-May (Summer Season); October-December (post monsoon season); December-February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.</p> | <p>Baseline data were collected for the period of December 2022 to February 2023 as per CPCB notification and MoEF &amp; CC Guidelines. Primary baseline data and the results have been included in Sections 3.1-3.8 under Chapter III in the EIA report page 25-87.</p> |
| 23. | <p>Air quality modelling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modelling should be provided. The air quality contours may be shown on a location map clearly 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</p>  | <p>Air quality modelling for prediction of incremental GLCs of pollutants was carried out using AERMOD view 11.2.0. The model results have been given in Section 4.4 under the Chapter IV in the EIA report page 91-95.</p>  |

|     |  |   |
|-----|--|---|
| 24. | The water requirement for the project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the project should be indicated. | The water requirement for the project, its availability and source have been provided in Table 2.11 under Chapter II in the EIA report page 19.   |
| 25. | Necessary clearance from the competent Authority for drawl of requisite quantity of water for the project should be provided.  | Not Applicable.<br>Water for dust suppression, greenbelt development and domestic use will be sourced from accumulated rainwater/seepage water in mine pits and purchased from local water vendors through water tankers on daily requirement basis. Drinking water will be sourced from the approved water vendors.  |
| 26. | Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.                 | Part of the working pit will be allowed to collect rain water during the spell of rain. The water thus collected will be used for greenbelt development and dust suppression. The mine closure plan has been prepared for converting the excavated pit into rain water harvesting structure and serve as water reservoir for the project village during draught season. |
| 27. | Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.                                    | Impact studies and mitigation measures of water environment including surface water and ground water have been discussed in Section 4.3 under Chapter IV in the EIA report page 90-91.  |
| 28. | Based on actual monitored data, it may clearly be shown whether working will   | The ground water table is found at the depth of 60m below ground level. The   |

|     |   |  |
|-----|---|--|
|     | <p>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.</p> | <p>ultimate depth of quarry is 50m BGL. Therefore, the mining activity will not intersect the ground water table. Data regarding the occurrence of groundwater table have been provided in Section 3.2 under Chapter III in the EIA report page 31-42.</p> |
| 29. | <p>Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out</p>  | <p>Not Applicable.<br/>There are no streams, seasonal or other water bodies passing within the project area. Therefore, no modification or diversion of water bodies is anticipated</p>  |
| 30. | <p>Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and BGL. A schematic diagram may also be provided for the same.</p>   | <p>The highest elevation of the project area is 93m AMSL. Ultimate depth of the mine is 50m BGL. Depth to the water level in the area is 60m BGL.</p>  |
| 31. | <p>A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed 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</p>   | <p>Greenbelt development plan has been given in Section 4.6 under Chapter IV in the EIA report page 100-103.</p>   |

|     |   |   |
|-----|---|---|
|     | be planted. The details of plantation already done should be given. The plant species selected for green belt should have greater ecological value and should be of good utility value to the local population with emphasis on local and native species and the species which are tolerant to pollution  |   |
| 32. | Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines. | Traffic density survey was carried out to analyses the impact of transportation in the study area as per IRC guidelines 1961 and it is inferred that there is no significant impact due to the proposed transportation from the project area. Details have been provided in Section 3.7 under Chapter III in the EIA report page 84-86. |
| 33. | Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.   | Infrastructure & other facilities will be provided to the mine workers after the grant of quarry lease and the same has been discussed in Section 2.6.6 under Chapter II in the EIA report page 19.   |
| 34. | Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.   | Progressive mine closure plan has been prepared for this project and is given in Section 2.6.4 under Chapter II in the EIA report page 18-19.   |
| 35. | Occupational Health impacts of the Project should be anticipated and the proposed   | Occupational health impacts of the project and preventive measures have   |

|     |   |   |
|-----|---|---|
|     | <p>preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.</p> | <p>been explained in detail in Section 4.8 under Chapter IV in the EIA report page 104-105.</p>   |
| 36. | <p>Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.</p>  | <p>No public health implications are anticipated due to this project. Details of CSR and CER activities have been discussed in Sections 8.6 and 8.7 under Chapter VIII in the EIA report page 123-124.</p>  |
| 37. | <p>Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.</p>   | <p>No negative impact on socio-economic environment of the study area is anticipated and this project shall benefit the socio-economic environment by offering employment for 20 people directly as discussed in Section 8.1 under Chapter VIII in the EIA report page 122.</p> |
| 38. | <p>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.</p>                | <p>A detailed Environment Management Plan has been prepared and provided in Tables 10.1 &amp; 10.2 under Chapter X in the EIA report page 127-131.</p>  |
| 39. | <p>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</p>  | <p>The outcome of public hearing will be submitted during the final EIA report.</p>   |

|     |   |  |
|-----|---|--|
|     | 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 is pending in any court against this project.  |
| 41  | The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.  | Project Cost is Rs.76,20,000/-<br>CER Cost is Rs.5,00,000/-<br>In order to implement the environmental protection measures, an amount of Rs.5345405 as capital cost and recurring cost as Rs.2188866 as recurring cost/annum is proposed considering present market price considering present market scenario for the proposed project. After the adjustment of 5% inflation per year, the overall EMP cost for 5 years will be Rs.17440269 as shown in Tables 10.1 & 10.2 under Chapter X in the EIA report page 127-131. |
| 42. | A disaster management plan shall be prepared and included in the EIA/EMP Report.  | The disaster management plan for this project has been provided in Section 7.3 under Chapter VII in the EIA report page 115-117.   |
| 43. | Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc. | Benefits of the project details have been given under Chapter VIII in the EIA report page 122-124.   |
| 44  | Besides the above, the below mentioned general points are also to be followed:  |  |

|    |   |   |
|----|---|---|
| a) | Executive Summary of the EIA/EMP Report.  | Executive summary has been enclosed as a separate booklet.  |
| b) | All documents to be properly referenced with index and continuous page numbering.   | All the documents have been properly referenced with index and continuous page numbering.   |
| c) | Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated.   | List of tables and source of the data collected have been mentioned.  |
| d) | Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF & CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project.                     | Original Baseline monitoring reports will be submitted in the final EIA report.   |
| e) | Where the documents provided are in a language other than English, an English translation should be provided.   | All the documents provided here are in English language.  |
| f) | The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.   | The questionnaire will be submitted in the final EIA report.  |
| g) | While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF & CC vide O.M. No. J-11013/41/2006-IA. II(I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed. | Instructions issued by MoEF & CC O.M. No. J-11013/41/2006-IA. II (I) dated 4 <sup>th</sup> August, 2009 have been followed while preparing the EIA report |
| h) | Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF & CC  | No changes are made in the basic scope and the project parameters.  |



|    |  |  |
|----|--|--|
|    | with reasons for such changes and permission should be sought, as the TOR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation                                   |  |
| i) | As per the circular no. J-11011/618/2010-IA. II(I) Dated: 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable. | As it is a new lease area, the condition is not applicable.  |
| j) | The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.  | All the plans including surface & geological plans, and progressive closure plan have been included in Annexure III. |

# CHAPTER I

## INTRODUCTION

### 1.0 PREAMBLE

Environmental Impact Assessment (EIA) study is a process used to identify the environmental, social and economic impacts of a project prior to decision-making. EIA systematically examines both beneficial and adverse consequences of the proposed project and ensure that these impacts are considered during the project designing. According to the Ministry of Environment and Forests, Govt. of India, EIA notification S.O. 1533(E) of 14<sup>th</sup> September 2006 and its subsequent amendments as per Gazette Notification S.O. 3977 (E) of 14<sup>th</sup> August 2018, all the mining projects are broadly classified into two categories, i.e., category A and category B, based on the spatial extent of the projects. The category B projects are further divided into B1 and B2 on the basis of the guidelines issued of the Ministry of Environment and Forests. All mining projects included in category B1 require an EIA report for obtaining environmental clearance from the State Environment Impact Assessment Authority (SEIAA). As the proposed project falls within the cluster of quarries of overall extent of greater than 5 ha and less than 50 ha in the case of non-coal mine lease, the proposed project falls under the category B1 and the project requires preparation and submission of an EIA report after public consultation to SEIAA for obtaining environmental clearance as per the order dated 04.09.2018 & 13.09.2018 passed by Hon'ble National Green Tribunal, New Delhi in O.A. No. 173 of 2018 & O.A. No, 186 of 2016 and MoEF & CC Office Memorandum F. No. L-11011/175/2018-IA-II (M) Dated: 12.12.2018.

In compliance with ToR Identification No. TO24B0108TN5158721N Dated: 12.01.2025 File No.11022, this EIA report has been prepared for the project proponent, Thiru.T.Ponnambalam applied for rough stone and gravel quarry lease in the Patta land falling in S.F.No.135/1, 135/2, 135/3A, 135/3B, 135/4 & 135/5 over an extent of 1.34.5ha of Mennallur Village, Vembakkam Taluk, Tiruvannamalai District Tamil Nadu. This EIA report takes into account the rough stone and Gravel quarry within the cluster of 500 m radius from the periphery of the proposed project site. The cluster contains two proposed projects known as P1, P2 and three existing project E1, E2 and E3. All the projects mentioned above have been taken for cluster extent calculation as per MoEF & CC Notification S.O. 2269 (E) Dated 1st July 2016 the total extent of all the quarries is 15.15.85ha, also known as the cluster extent. The quarries involved in the calculation of cluster extent are shown in Figure 1.1.

**Table 1.1 Details of Quarries within the cluster area of 500 m radius**

| <b>Proposed Quarries</b>    |                                   |  |                |                    |                                |
|-----------------------------|-----------------------------------|--|----------------|--------------------|--------------------------------|
| <b>Code</b>                 | <b>Name of the Owner</b>          | <b>S.F. No</b>   | <b>Village</b> | <b>Extent (ha)</b> | <b>Status</b>                  |
| <b>P1</b>                   | Thiru.<br>T. Ponnambalam          | 135/1, 135/2, 135/3A,<br>135/3B, 135/4 & 135/5   | Mennallur      | 1.34.5             | Proposed<br>Area               |
| <b>P2</b>                   | M/s. Sri Thirumala<br>Blue Metal  | 148/16, 148/17, 148/18,<br>148/19, 148/20, 148/21,<br>148/22, 148/23,148/24,<br>148/25,148/38A,<br>148/39A1, 146/39B,<br>146/46, 148/1, 148/10,<br>148/2, 148/26, 148/27,<br>148/28, 148/29, 148/3,<br>148/30, 48/39A2,<br>148/39B2A,<br>148/39B1, 148/4,<br>148/5, 148/6,<br>148/7, 148/9, 149/1A,<br>149/2A and 150/1A | Mennallur      | 4.44.35            | Applied<br>Area                |
| <b>Existing Quarry</b>      |                                   |  |                |                    |                                |
| <b>E1</b>                   | T. Ponnambalam                    | 134/15A, 15B, 17,<br>18,19,136/1, 2, 3A, 3B,<br>3C, 4,5,6,7,8,9,10,11,<br>143/1A, 1B, 1C, 1D,<br>2,3,4,5,6,7A,7B,8,10,<br>11, 144/2,3,4,5  | Mennallur      | 4.29.5             | 06.10.2022<br>to<br>05.10.2032 |
| <b>E2</b>                   | M/s. Sri Ganesh Blue<br>Metals-II | 123/10, 11, 12, 14A,<br>14B, 15, 16, 17, 131/1,<br>2, 3, 4, 5A, 5B, 6, 7, 8,<br>9, 10A, 10B, 10C and<br>132/4B   | Mennallur      | 3.26.0             | 08.02.2023<br>to<br>07.02.2023 |
| <b>E3</b>                   | Thiru.R.Monishkumar               | 139/21A, 139/21B,<br>139/21C, 139/22A,<br>139/22B, 139/23,<br>139/24, 139/25A,<br>139/25B, 139/25C,<br>139/26, 139/27,<br>139/28, 139/29, 140/1,<br>140/2, 140/3, 141/42A,<br>141/43A, 141/44,<br>141/45, 141/46,<br>141/47, 141/48,<br>141/49, 148/11,<br>148/12A, 148/12B,<br>148/14, 148/15A,<br>148/15B, 148/8       | Mennallur      | 3.16.0             | 25.10.2024<br>to<br>24.10.2029 |
| <b>Total Cluster Extent</b> |                                   |  |                | <b>15.15.85</b>    |                                |

**Source:** AD Letter - Rc.No. 270/Mines/2024 dated 25.11.2024.

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

## **1.1 PURPOSE OF THE REPORT**

The purpose of the report is to study baseline environmental conditions in and around the proposed project area for the period of **December 2022 – February 2023** according to the provisions of MoEF & CC Office Memorandum dated 29.08.2017 and MoEF & CC Notification, S.O. 996 (E) dated 10.04.2015, to analyse impacts and provide mitigation measures.

## **1.2 ENVIRONMENTAL CLEARANCE**

The Environmental Clearance process for the project will comprise of four stages. These stages are screening, scoping, public consultation & appraisal.

### ***Screening***

Screening is the first stage of the EIA process. In this stage, the State level Expert Appraisal Committee (SEAC) examined the application of EC made by the proponent in Form 1 through online (Proposal No. SIA/TN/MIN/509861/2024, Dated:30.11.2024) and decided that the project requires detailed environmental studies for the preparation of EIA report. Therefore, the proponent submitted application for Terms of Reference (ToR) on: 03.12.2024.

### ***Scoping***

The proposal was placed in the 523<sup>rd</sup> meeting of SEAC on 27.12.2024. Based on the presentation and documents furnished by the project proponent, SEAC decided to recommend the proposal for the grant of Terms of Reference (ToR) and the recommendation for ToR is subjected to the outcome of the Honourable NGT, Principal Bench, New Delhi (O.A No.186 of 2016 (M.A.No.350/2016) and O.A. No.200/2016 and O.A.No.580/2016 (M.A.No.1182/2016) and O.A.No.102/2017 and O.A.No.404/2016 (M.A.No. 758/2016, M.A.No.920/2016, M.A.No.1122/2016, M.A.No.12/2017 & M.A. No. 843/2017) and O.A.No.405/2016 and O.A.No.520 of 2016 (M.A.No. 981/2016, M.A.No.982/2016 & M.A.No.384/2017).

### ***Public Consultation***

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

### ***Appraisal***

In this stage, an application along with final EIA report including the outcome of the public consultations will be made to the SEIAA. The application thus made will be scrutinized by the

SEAC. Then, the SEAC will make recommendations to grant EC or reject the application to the SEIAA.

### **1.3 TERMS OF REFERENCE (ToR)**

The SEAC framed a comprehensive Terms of Reference (ToR) based on the information provided in the Form 1 and information collected from the proposed project site visit and issued TOR Identification No. TO24B0108TN5158721N Dated: 12.01.2025, File No. 11530.

### **1.4 POST ENVIRONMENT CLEARANCE MONITORING**

For category B projects, irrespective of its clearance by MoEF/SEIAA, the project proponent shall prominently advertise in the newspapers indicating that the project has been accorded environmental clearance and the details of MoEF website where it is displayed.

After obtaining EC, the project proponent will submit a half-yearly compliance report of stipulated environmental clearance terms and conditions to MoEF & CC Regional Office & SEIAA on 1<sup>st</sup> June and 1<sup>st</sup> December of every year.

### **1.5 TRANSFERABILITY OF ENVIRONMENTAL CLEARANCE**

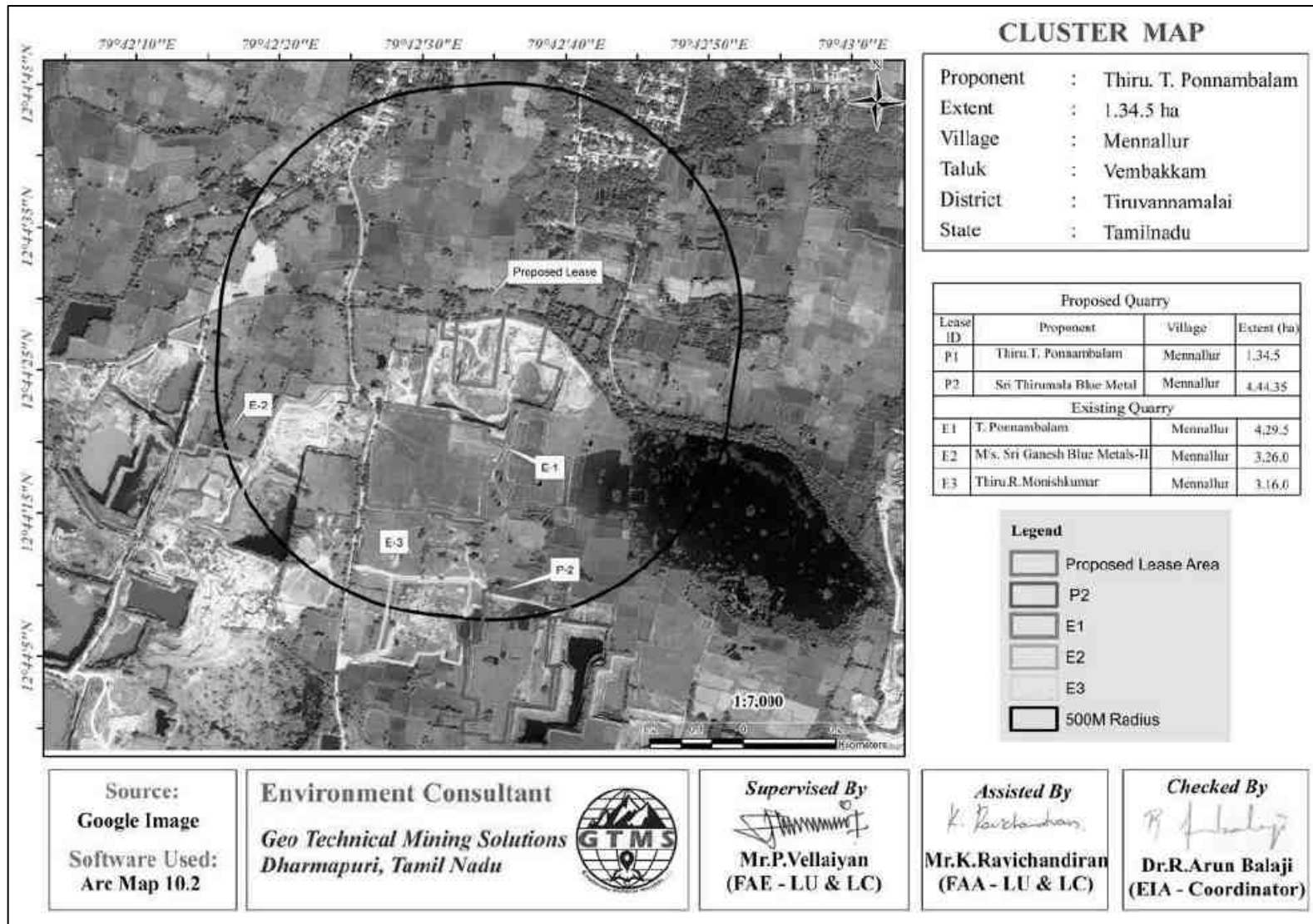
A prior environmental clearance granted for a specific project or activity to an applicant may be transferred during its validity to another legal person entitled to undertake the project or activity on application by the transferor or the transferee with a written “no objection” by the transferor, to, and by the regulatory authority concerned, on the same terms and conditions under which the prior environmental clearance was initially granted, and for the same validity period (EIA Guidance Manual for Mining of Minerals, 2010).

### **1.6 IDENTIFICATION OF THE PROJECT PROPONENT**

The profile of the project proponent who has involved in this quarrying project has been given in Table 1.2.

**Table 1.2 Details of Project Proponent**

|                                      |   |
|--------------------------------------|---|
| <b>Name of the Project Proponent</b> | <b>T.Ponnambalam</b>  |
| Address                              | S/o. Thangavelu,<br>No.12, Balakrishnan Street,<br>Srinivasa Nagar,<br>Chennai-600063 |
| Status                               | Proprietor  |



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

## 1.7 BRIEF DESCRIPTION OF THE PROJECT

The proposed project deals with excavation of rough stone and gravel which is primarily used in construction projects. The method adopted for rough stone and gravel excavation is open cast semi mechanized mining method involving formation of benches with 5 m height and 5 m width. The proposed project site is located in Mennallur Village, Vembakkam Taluk, Tiruvannamalai District Tamil Nadu. Some of the important features of the proposed project have been provided in Table 1.3.

**Table 1.3 Salient Features of the Proposed Project**

|                                  |  |                          |
|----------------------------------|--|--------------------------|
| Name of the Quarry               | <b>Mr.T.Ponnambalam, Rough stone and gravel quarry</b>   |                          |
| Type of Land                     | Patta Land   |                          |
| Extent                           | 1.34.5ha   |                          |
| Toposheet No                     | 57 P/10  |                          |
| Location of Project Site         | 12°44'23.84"N to 12°44'28.80"N<br>79°42'32.15"E to 79°42'35.65"E   |                          |
| Highest Elevation                | 93m AMSL   |                          |
| Proposed depth of Mining         | 50m BGL  |                          |
| Geological Resources             | Rough Stone in m <sup>3</sup>  | Gravel in m <sup>3</sup> |
|                                  | 626618   | 26888                    |
| Mineable Reserves                | Rough Stone in m <sup>3</sup>  | Gravel in m <sup>3</sup> |
|                                  | 386102   | 23528                    |
| Proposed reserves for five years | Rough Stone in m <sup>3</sup>  | Gravel in m <sup>3</sup> |
|                                  | 386102   | 23528                    |
| Method of Mining                 | Open-Cast Mechanized mining  |                          |
| Topography                       | Flat Topography  |                          |
| Machinery proposed               | Jack Hammer  | 2                        |
|                                  | Compressor   | 1                        |
|                                  | Tipper   | 9                        |
|                                  | Hydraulic Excavator  | 2                        |
| Blasting Method                  | The quarrying operation is proposed to carried out by open cast mining in conjunction with conventional method using jack hammer drilling and blasting for shattering effect and loosen the rough stone. |                          |
| Proposed Manpower Deployment     | 20 Nos   |                          |

|                            |              |
|----------------------------|--------------|
| Project Cost               | Rs.76,20,000 |
| CER Cost                   | Rs. 5,00,000 |
| Proposed Water Requirement | 3.0 KLD      |

## 1.8 SCOPE OF THE STUDY

The main scope of the EIA study is to quantify the cumulative impact of the quarries in the cluster on the study area and formulate the effective mitigation measures for each individual lease. A detailed account of the emission sources, emissions control equipment, background air quality levels, meteorological measurements, dispersion model and all other aspects of pollution like effluent discharge, and dust generation has been provided in this report. The baseline monitoring study has been carried out during the period of **December 2022 - February 2023** for various environmental components such as land, soil, air, water, noise, ecology, etc. to assess the anticipated impacts of the cluster quarry projects on the environment and suggest suitable mitigation measures for likely adverse impacts due to the proposed project. The sampling methodologies for the various environmental parameters required for the study, frequency of sampling, method of sample analysis, etc., are given in Table 3.1 in chapter III.

## 1.9 Legislation Applicable to Mining of Mineral Sector

A few important legislations are given below:

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



## CHAPTER II

### PROJECT DESCRIPTION

#### 2.0 GENERAL INTRODUCTION

The open cast mining method, also known as open-pit mining has been proposed to extract the mineral deposit. It is the most commonly used surface mining method all over the world and is generally suitable for mining low-grade mineral deposits that are found close to the surface of the earth and distributed uniformly over a large area. Open pits are also termed quarries when the pits are used for the extraction of building materials and dimension stones.

Opencast mining starts with the development of benches, the widths of which will be determined in such a way to accommodate the use of heavy machinery. The walls of open pits will be dug at an angle that will be decided based on well-established industry standards to provide safety. In some cases where the walls are composed of weak material such as soil and highly weathered rocks, dewatering holes will be drilled horizontally to relieve the water pressure to avoid wall collapse inside the mine site.

The required mine-related infrastructures will be established close to the open pit. The mining infrastructures may include an administration building, a maintenance garage, and a warehouse. The materials mined from open pits will be brought to the surface using trucks. The waste rocks will be piled up in a suitable location, usually close to the open pit. The structure produced by the waste rock pile is known as a waste dump. The dimension of the waste dump will be determined based on industrial safety standards to prevent the rocks from falling into the surrounding area.

#### 2.1 DESCRIPTION OF THE PROJECT

The proponent, **Mr.T.Ponnambalam** is involved in the undertaking of establishment, construction, development, and closure of opencast mines. He, through the exploration phase, identified the proposed project site as the one that has a great potential of producing an economically viable quantity of rough stone and gravel. Therefore, the proponent had applied for quarry lease on 16.08.2024 to extract rough stone and gravel. The precise area communication letter was issued by Department of Geology and Mining, vide Rc.No.270/Mines/2024 Dated:12.11.2024. Based on the precise area communication letter, mining plan was prepared. The mining plan thus prepared was approved by Assistant Director Department of Geology and Mining, Rc.No.270/Mines/2024 Dated:25.11.2024 The overall view of the project site is shown in Figure 2.1.



**Figure 2.1 Overall View of Proposed Project Site**

## **2.2 LOCATION AND ACCESSIBILITY**

The proposed quarry project is located in Mennallur Village, Vembakkam Taluk, Tiruvannamalai District Tamil Nadu as shown in Figure 2.2. The area lies between Latitudes from  $12^{\circ}44'23.84''N$  to  $12^{\circ}44'28.80''N$  and Longitudes from  $79^{\circ}42'32.15''E$  to  $79^{\circ}42'35.65''E$ . The maximum altitude of the project area is 93m AMSL. Accessibility details to the proposed project site have been given in Table 2.1.

**Table 2.1 Site Connectivity to the Project Area**

|                          |   |            |
|--------------------------|---|------------|
| Nearest Roadways         | NH-45 Vellore - Chennai                                   | 14.9 km N  |
|                          | SH -118A Kanchipuram - Uthiramerur                        | 3.75 km E  |
| Nearest Town             | Kancheepuram  | 10.4 km N  |
| Nearest Railway Station  | Kancheepuram  | 11 km N    |
| Nearest Airport          | Chennai   | 56.8 km N  |
| Nearest Seaport          | Chennai   | 74.2 km NE |
| Nearest School           | GHSS-Menallur   | 0.57km N   |
| Nearest College          | Sri Annamalaiyar Polytechnic College-<br>Ukkamperumbakkam | 5.73km-SW  |
| Nearest Medical Facility | Primary Health Centre-Menallur                            | 1.1km N    |
| Nearest Village          | Mennallur   | 0.4 km N   |
|                          | Suruttal  | 2.0 km E   |
|                          | Chinna Elacheri   | 1.5 km S   |
|                          | Bagavandapuram  | 2.3 km W   |

### 2.3 LEASEHOLD AREA

- ❖ The extent of the proposed project site is 1.34.5ha.
- ❖ The proposed project is site specific.
- ❖ There is no mineral beneficiation or processing proposed inside the project area.
- ❖ There is no forest land involved in the proposed area and is devoid of major vegetation and trees.

#### 2.3.1 Corner Coordinates

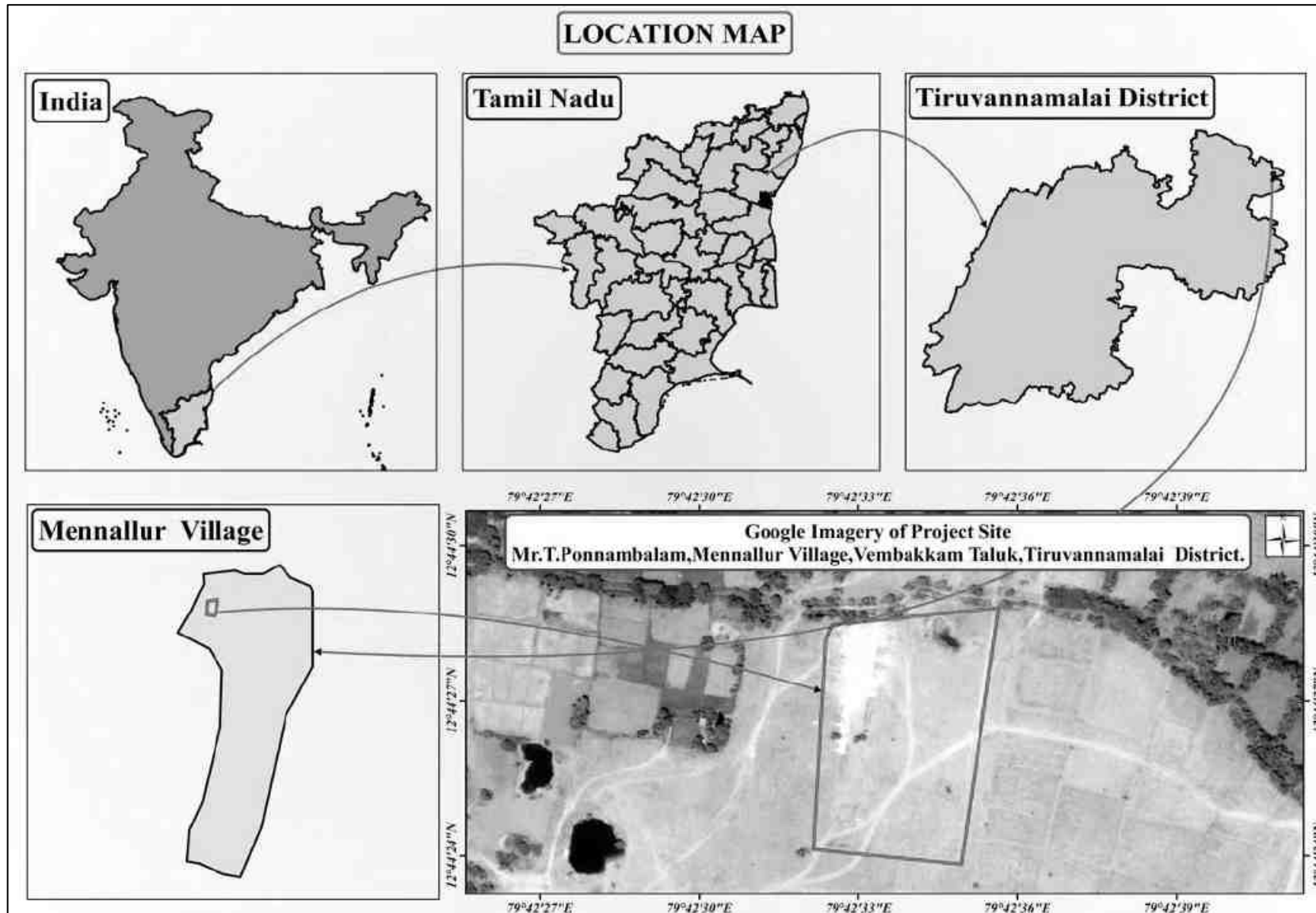
- ❖ The boundary corner geographic coordinates are given in Table 2.2 and the proposed project site with boundary coordinates has been shown in Figure 2.3 & 2.4.

**Table 2.2 Corner Coordinates of Proposed Project**

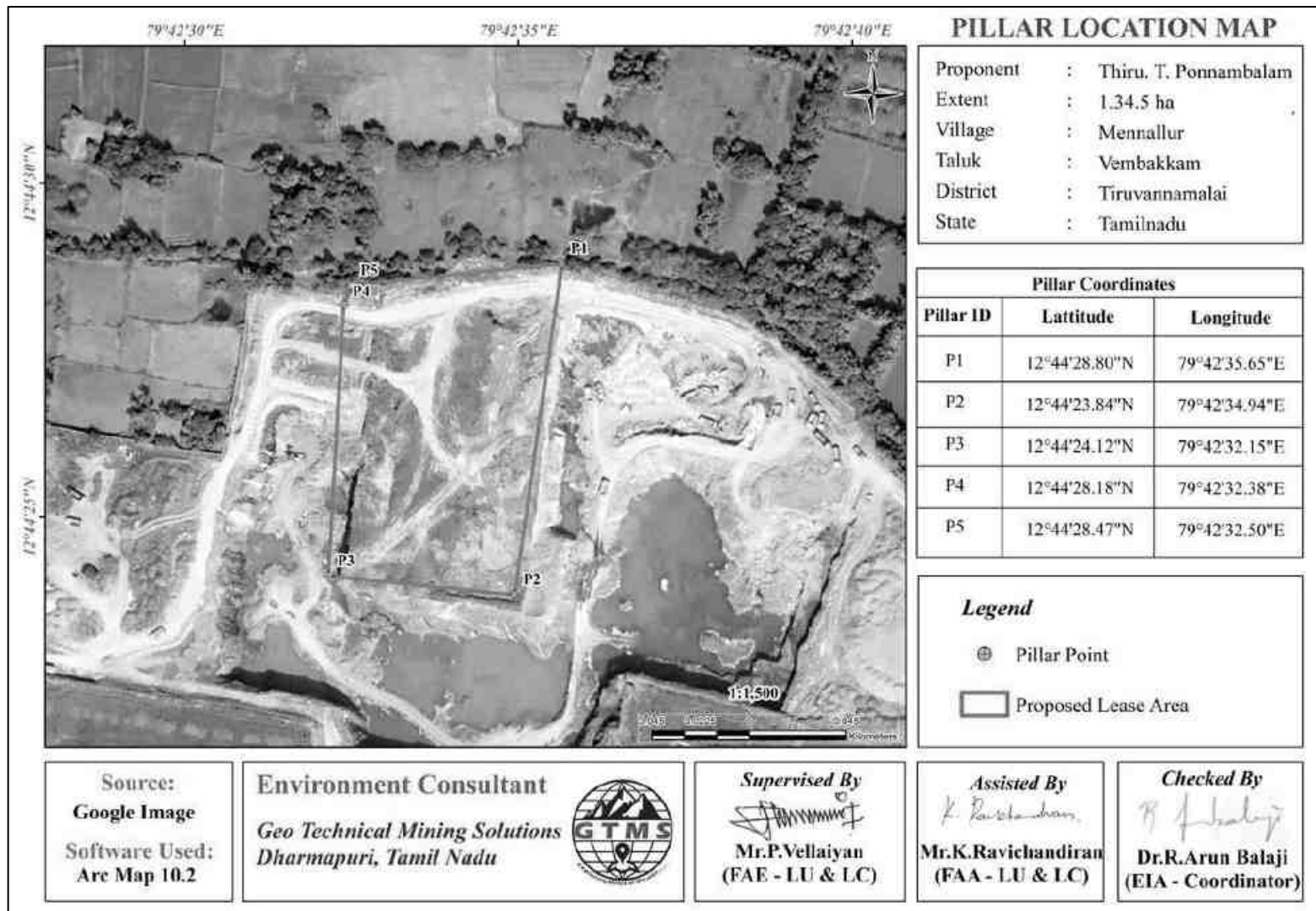
| Pillar ID | Latitude      | Longitude     |
|-----------|---------------|---------------|
| 1         | 12°44'28.80"N | 79°42'35.65"E |
| 2         | 12°44'23.84"N | 79°42'34.94"E |
| 3         | 12°44'24.12"N | 79°42'32.15"E |
| 4         | 12°44'28.18"N | 79°42'32.38"E |
| 5         | 12°44'28.47"N | 79°42'32.50"E |

### 2.4 GEOLOGY

The lease area geologically occurs over Garnite Gneiss. The Garnet gneiss, commercially called as rough stone occurs within the migmatite rock. Also, the lease area geomorphologically occurs Pediment Pediplain Complex.



**Figure 2.2 Location Map Showing the Project Site**



**Figure 2.3 Google Earth Image Showing Lease Area with Pillars**

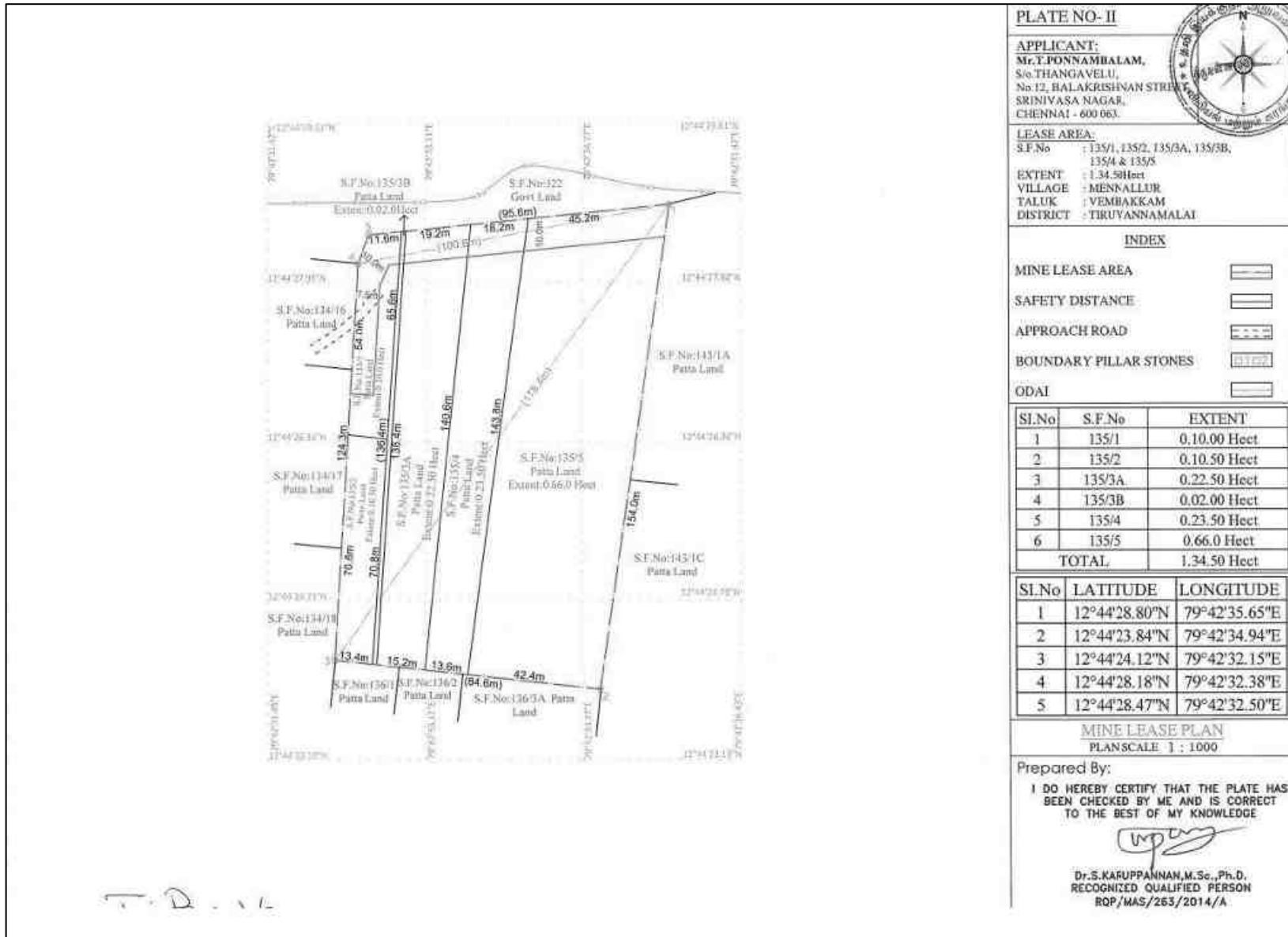


Figure 2.4 Mine Lease Plan

## 2.5 QUANTITY OF RESERVES

The Resources and Reserves of Rough Stone and Gravel were calculated based on cross-section method by plotting sections to cover the maximum lease area for the proposed project. Based on the availability of geological resources, the mineable reserves are calculated by considering excavation system of bench formation and leaving essential safety distance of 7.5 m and 10m safety distance as per precise area communication letter and deducting the locked-up reserves during bench formation (also called as Bench Loss). The mineable reserves are calculated up to the depth of 50m below the ground level considering there is no waste / overburden / side burden (100% Recovery anticipated) for the proposed project. The plate used for reserve estimation has been attached in approved mining plan results of geological resources and reserves have been shown in Table 2.3.

**Table 2.3 Estimated Resources and Reserves of the Project**

| Resource Type                                     | Rough Stone in m <sup>3</sup> | Gravel in m <sup>3</sup> |
|---|-------------------------------|--------------------------|
| Geological Resource in m <sup>3</sup>             | 626618                        | 26888                    |
| Mineable Reserves in m <sup>3</sup>               | 386102                        | 23528                    |
| Proposed production for 5 years in m <sup>3</sup> | 386102                        | 23528                    |

Based on the year wise development and production plan and sections, the year wise production results have been given in Table 2.4 and Year-Wise Production plan has been shown in Figure 2.5

**Table 2.4 Year-Wise Production Details**

| Year         | Rough Stone in (m <sup>3</sup> ) | Gravel in (m <sup>3</sup> ) / 3 year |
|--------------|----------------------------------|--------------------------------------|
| I            | 68008                            | 10920                                |
| II           | 81688                            | 8560                                 |
| III          | 67056                            | 4048                                 |
| IV           | 76040                            | 0                                    |
| V            | 93310                            | 0                                    |
| <b>Total</b> | <b>386102</b>                    | <b>23528</b>                         |

*Source: Approved Mining Plan & Tord*

## 2.6 MINING METHOD

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

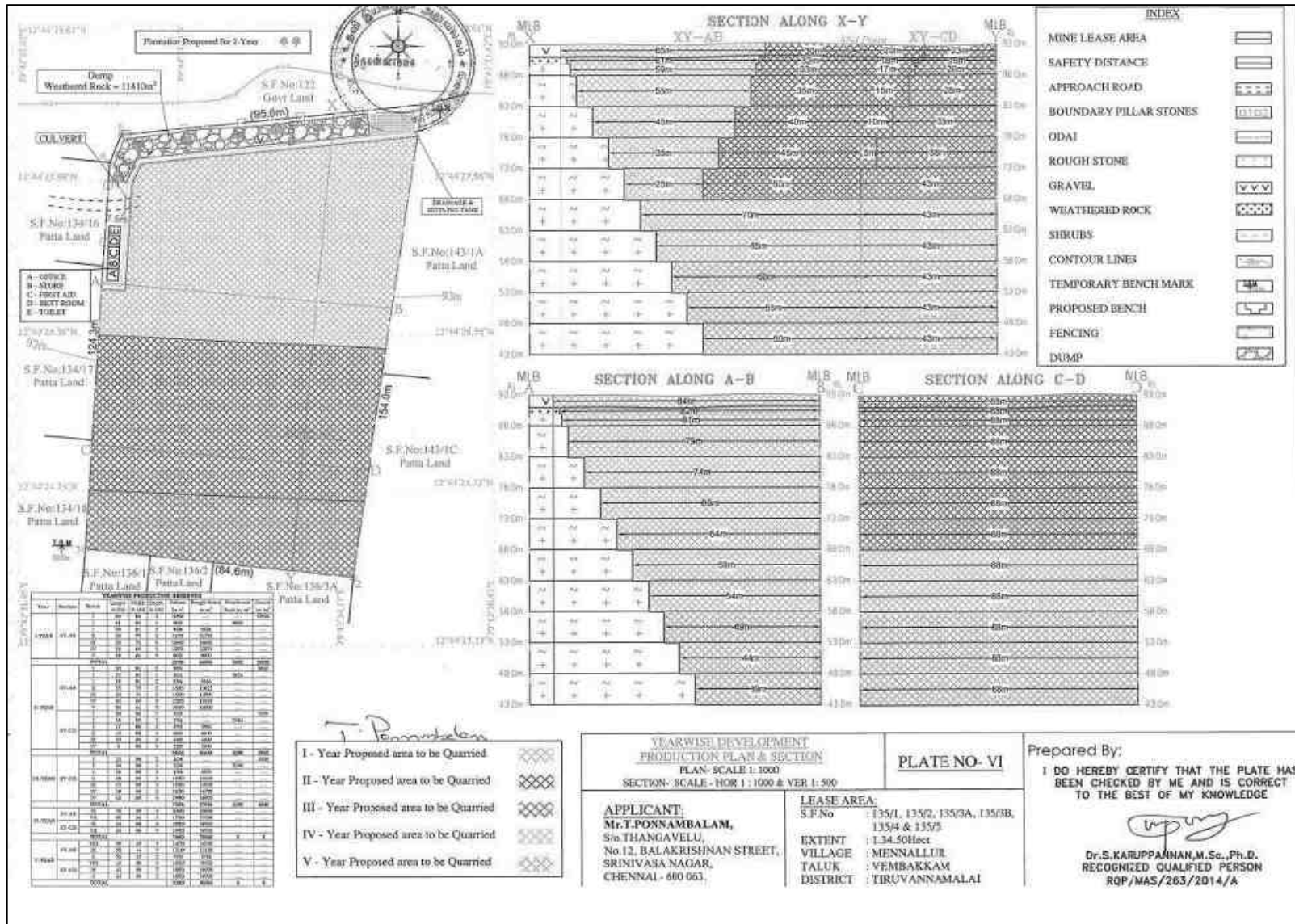


Figure 2.5 YEARWISE DEVELOPMENT PRODUCTION PLAN & SECTION



## **Conceptual Blasting Design**

In this project, NONEL blasting will be employed to win rough stone. This method will involve closed spaced perimeter holes to reduce the overbreak/backbreak on a blast. The objective of the blasting design is to prevent fly rocks from damaging the nearby structures.

### **Rules of Thumb for Blast Design**

Based on practical experience and technical information, a set of rules for blasting have been provided as below ([Chapter 8 \(nps.gov\)](#)). These rules will be applied to blast rocks in the proposed project.

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

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

**Rule 2: Generally, select the densest explosive possible.**

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

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

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

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

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

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

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

**Rule 6: Stemming should be equal to the burden.**

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

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

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

**Table 2.5 Conceptual Blasting Design**

|   |           |
|---|-----------|
| Blasthole Diameter (D) in mm                    | 32        |
| Burden (B) in m                                 | 1.5       |
| Spacing (S) in m                                | 1.30      |
| Subdrill in m                                   | 0.45      |
| Charge length (C) in m                          | 0.64      |
| Stemming  | 1.5       |
| Hole Length (L) in m                            | 2.6       |
| Bench Height (BH) in m                          | 2.1       |
| Mass of explosive/hole in g                     | 400       |
| Stemming material size in mm                    | 3.2       |
| Burden stiffness ratio                          | 1.43      |
| Blast volume/hole in m <sup>3</sup>             | 4.16      |
| Production of rough stone/day in m <sup>3</sup> | 286       |
| Number of blastholes/day                        | 69        |
| Blasthole pattern                               | Staggered |
| Mass of explosive /day in kg                    | 27.5      |
| Powder factor in kg/m <sup>3</sup>              | 0.10      |
| Loading density                                 | 0.63      |
| Type of explosives                              | Slurry    |
| Diameter of packaging in mm                     | 25        |
| Initiation system                               | NONEL     |
| Fly rock distance in m                          | 19        |

### 2.6.1 Magnitude of Operation

Based on the results of estimated production for the 5 years, details about the size of operation have been provided in Table 2.6.

**Table 2.6 Operational Details for Proposed Project**

|                                      | <b>Rough Stone in m<sup>3</sup>/ 5 years</b> | <b>Gravel in m<sup>3</sup>/3 years</b> |
|--------------------------------------|--|--|
| Proposed production for 5 years      | 386102                                       | 23528                                  |
| Number of Working Days /Annum        | 270  | 270                                    |
| Production of /Day (m <sup>3</sup> ) | 286  | 29                                     |
| No. of Lorry Loads                   | 48   | 5                                      |

### 2.6.2 Extent of Mechanization

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

**Table 2.7 Machinery Details**

| <b>S. No.</b> | <b>Type</b>         | <b>No. of. Unit</b> | <b>Size /Capacity</b> | <b>Make</b> | <b>Motive Power</b> |
|---------------|---------------------|---------------------|-----------------------|-------------|---------------------|
| 1             | Jack Hammers        | 2                   | Hand held             | --          | Diesel              |
| 2             | Compressor          | 1                   | Air                   | --          | Diesel              |
| 3             | Hydraulic Excavator | 2                   | 2.9-4.5m <sup>3</sup> | --          | Diesel              |
| 4             | Tipper              | 9                   | ---                   | --          | Diesel              |

### 2.6.3 Progressive Quarry Closure Plan

The progressive quarry closure plan of the proposed project shows past, present, and future land use statistics. According to the land use results, as shown in Table 2.8 At Present about 1.34.5ha of land is unutilized. Whereas, at the end of the mine life, about 1.34.5ha of land is used for area under quarry, about 1.17.30ha of land is used for green belt, 0.07.7ha will be used for roads, 0.05.0ha is used for infrastructure and about 0.02.0ha of land is used for drainage & settling tank.0.02.5ha.

**Table 2.8 Land use data at present, during scheme of mining, and at the end of mine life**

| <b>Description</b>       | <b>Present Area (ha)</b> | <b>Area at the end of life of quarry (ha)</b> |
|--------------------------|--------------------------|---|
| Area under quarry        | Nil                      | 1.17.30                                       |
| Infrastructure           | Nil                      | 0.02.0  |
| Roads                    | Nil                      | 0.05.0  |
| Green Belt & Dump        | Nil                      | 0.07.7  |
| Drainage & Settling Tank | Nil                      | 0.02.5  |
| Unutilized area          | 1.34.5                   | Nil   |
| <b>Total</b>             | <b>1.34.5</b>            | <b>1.34.5</b>                                 |

### 2.6.4 Progressive Quarry Closure Budget

As the proposed project has the enormous potential for continuous operations even after the expiry of lease period, mine closure plan is not proposed for now. Based on the progressive mine closure plan for the scheme period, the mine closure cost is given in Table 2.9.

**Table 2.9 Mine Closure Budget**

| Activity                          | Capital Cost       |
|-----------------------------------|--------------------|
| 269 plants inside the lease area  | 53800              |
| 404 plants outside the lease area | 121050             |
| Wire Fencing                      | 269000             |
| Renovation of Garland Drain       | 13450              |
| <b>Total</b>                      | <b>Rs.4,57,300</b> |

Source: Environment Management Plan

### 2.6.5 Conceptual Mining Plan

The ultimate pit size is designed based on certain practical parameters such as economical depth of mining, safety zones, permissible area, etc. Details of ultimate pit dimensions have been derived from given in Table 2.10. Conceptual Plan has been shown in Figure 2.6

**Table 2.10 Ultimate Pit Dimension**

| Pit | Length (m) | Width (m) (Max) | Depth (m) |
|-----|------------|-----------------|-----------|
| I   | 95         | 88              | 50        |

Source: Approved Mining Plan & ToR

### 2.6.6 Infrastructures

Infrastructures like mines office, temporary rest shelters for workers, latrine and urinal facilities have been proposed as per the mine rule and will be established after the grant of quarry lease. There is no proposal for the mineral processing or ore beneficiation plants in this project.

#### 2.6.6.1 Other Infrastructure Requirement.

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

### 2.6.7 Water Requirement

Detail of water requirement in 3.0 KLD is given in Table 2.11.

**Table 2.11 Water Requirement for the Project**

| Purpose                | Quantity      | Source   |
|------------------------|---------------|--|
| Dust Suppression       | 1.0 KLD       | Existing bore wells nearby the lease area      |
| Green Belt development | 1.0 KLD       | Existing bore wells nearby the lease area      |
| Drinking & Domestic    | 1.0 KLD       | Existing bore wells and approved water vendors |
| <b>Total</b>           | <b>3.0KLD</b> |  |

Source: Prefeasibility Report

### 2.6.8 Energy Requirement

High speed Diesel (HSD) will be used for quarrying machineries. As per the data shown in Table 2.12. Around 1715497 litres of HSD will be used for rough stone and gravel extraction during this 5 years plan period. The diesel will be brought to the site from nearby diesel pumps.

**Table 2.12 Fuel Requirement Details**

| <b>Fuel Requirement for Excavator</b>                               |   |   |                                 |
|---|---|---|---------------------------------|
| <b>Details</b>  | <b>Rough Stone<br/>(386102 m<sup>3</sup>)</b> | <b>Gravel<br/>(23528 m<sup>3</sup>)</b> | <b>Total Diesel<br/>(litre)</b> |
| Average Rate of Fuel Consumption (l/hr)                             | 16  | 10                                      | ---                             |
| Working Capacity (m <sup>3</sup> /hr)                               | 20  | 60                                      | ---                             |
| Time Required (hours)   | 19305   | 392                                     | ---                             |
| Total Diesel Consumption for 5 years (litre)                        | 308882  | 3921                                    | <b>312803</b>                   |
| <b>Fuel Requirement for Compressor</b>                              |   |   |                                 |
| Average Rate of Fuel Consumption/hole (litre)                       | 0.4   | ---                                     | ---                             |
| Number of Drillholes/day  | 69  | ---                                     | ---                             |
| Total Diesel Consumption for 5 years (litre)                        | 37260   | ---                                     | <b>37260</b>                    |
| <b>Fuel Requirement for Tipper</b>                                  |   |   |                                 |
| Average Rate of Fuel Consumption/Trip (litre)                       | 20  | 20                                      | ---                             |
| Carrying Capacity in m <sup>3</sup>                                 | 6   | 6                                       | ---                             |
| Number of Trips / days  | 48  | 5                                       | ---                             |
| Number of Trips / 5 years   | 64350   | 3921                                    | ---                             |
| Total Diesel Consumption for 5 years (litre)                        | 1287007                                       | 78427                                   | <b>1365434</b>                  |
| <b>Total Diesel Consumption by Excavator, Compressor and Tipper</b> |   |   | <b>1715497</b>                  |

### 2.6.9 Capital Requirement

The project proponent will invest **Rs. 76,20,000/-** to the project. The breakup summary of the investment has been given in Table 2.13.

**Table 2.13 Capital Requirement Details**

| <b>S. No.</b>             | <b>Description</b> | <b>Cost (Rs.)</b>  |
|---------------------------|--------------------|--------------------|
| 1                         | Fixed Asset Cost   | 27,50,000/-        |
| 2                         | Machinery cost     | 20,00,000/-        |
| 3                         | EMP Cost           | 28,70,000/-        |
| <b>Total Project Cost</b> |                    | <b>76,20,000/-</b> |

*Source: Approved Mining Plan*

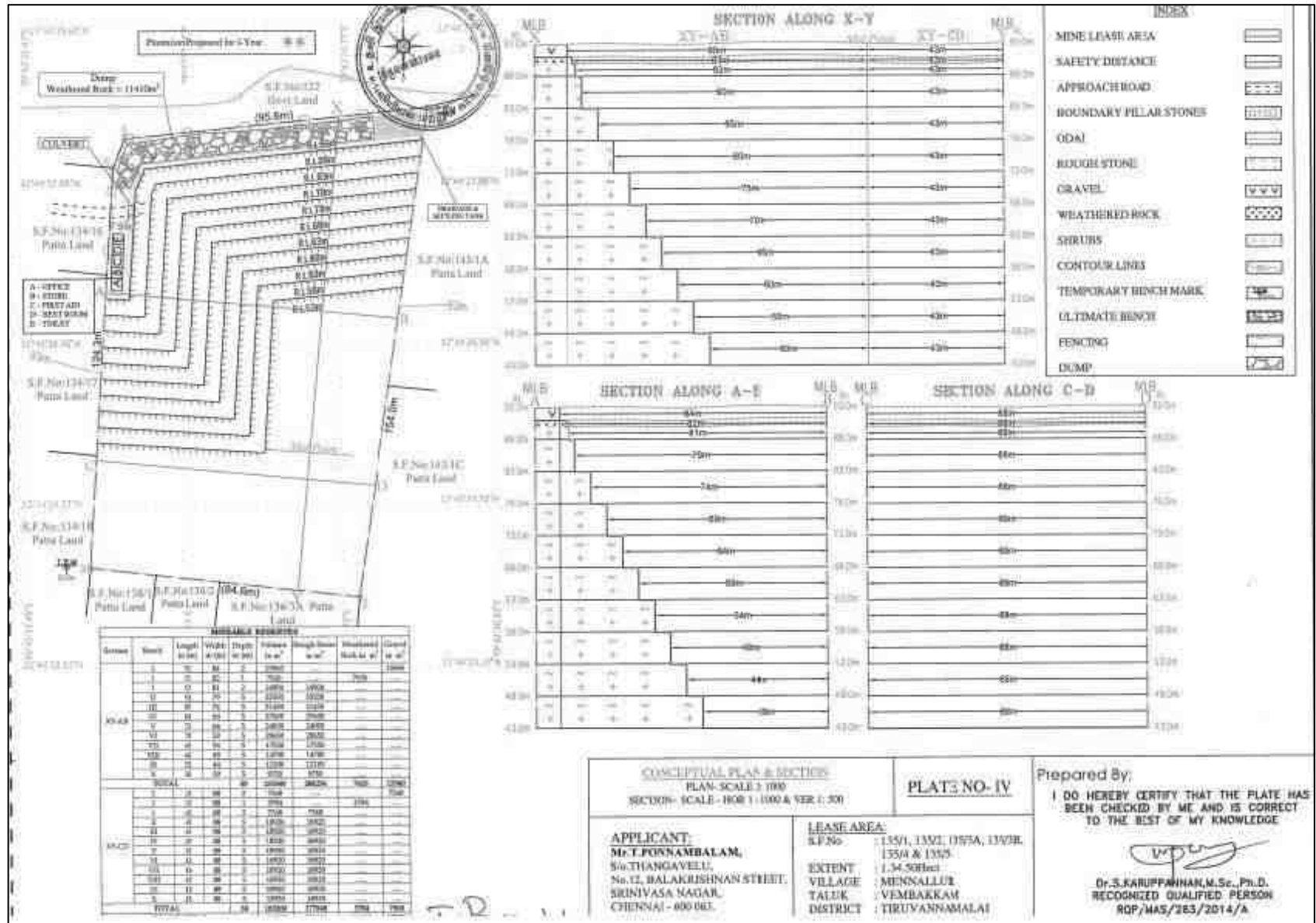


Figure 2.6 Conceptual Plan & Sections

## 2.7 MANPOWER REQUIREMENT

The skilled, competent qualified statutory persons will be engaged for quarrying operation, preference will be given to the local community. Number of employees required for this project have been provided in Table 2.14.

**Table 2.14 Employment Potential for the proposed project**

| S. No.       | Category       | Role             | Nos.      |
|--------------|----------------|------------------|-----------|
| 1.           | Highly Skilled | Mine manager     | 1         |
|              |                | Mine Geologist   | 1         |
|              |                | Mine Engineer    | 1         |
|              |                | Blaster          | 1         |
| 2.           | Unskilled      | Musdoor/ Labours | 16        |
| <b>Total</b> |                |                  | <b>20</b> |

Source: Prefeasibility Report

## 2.8 PROJECT IMPLEMENTATION SCHEDULE

The commercial operation will commence after the grant of Environmental Clearance. CTO and CTE will be obtained from the Tamil Nadu State Pollution Control Board. The conditions imposed during the environmental clearance will be compiled before the start of mining operation. Expected time schedule for the quarrying operation is given Table 2.15.

**Table 2.15 Expected Time Schedule**

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

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

## CHAPTER III

### DESCRIPTION OF THE ENVIRONMENT

#### 3.0 GENERAL

This chapter presents a regional background to the baseline data at the very onset, which will help in better appreciation of micro-level field data, generated on several environmental and ecological attributes of the study area. The baseline status of the project environment is described section wise for better understanding of the broad-spectrum conditions. The baseline environment quality represents the background environmental scenario of various environmental components such as land, water, air, noise, biological and socio-economic status of the study area. The monitoring of ambient air quality, noise levels, water quality and soil analysis for the nearby cluster were done in pre monsoon season from December 2022 to February 2023 through the third party NABL accredited laboratory. The baseline monitoring done for 5km radius (TERMS OF REFERENCE [TOR] FOR EIA REPORT FOR ACTIVITIES / PROJECTS REQUIRING ENVIRONMENTAL CLEARANCE Prepared by Administrative Staff College of India, Bellavista, Khairatabad, AUGUST 2009, Page No.86) not varied as much. Therefore, we utilize the baseline data for this cluster which is collected for the adjacent cluster in the year 2022 & 2023 between December 2022 to February 2023 as per the Office Memorandum F. No. IA3-22/10/2022IA.III [E 177258] issued by Government of India Ministry of Environment, Forest and Climate Change (IA Division) dated 8<sup>th</sup> June 2022. Field monitoring studies to evaluate the base line status of the project site were carried out covering December 2022 to February 2023 with CPCB guidelines. Environmental baseline data were collected by an NABL accredited and MoEF notified **Creative Engineers and Consultants** for the environmental attributes soil, water, air, noise and FAEs of **Geo Technical Mining Solutions** for ecology and biodiversity, geology, hydrogeology, traffic, and socio-economy.

#### ***Study Area***

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



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

| <b>Attribute</b>             | <b>Parameters</b>   | <b>Frequency of Monitoring</b>  | <b>No. of Locations</b>          | <b>Protocol</b>  |
|------------------------------|---|---|----------------------------------|--|
| Land Use/<br>Land Cover      | Land-use<br>Pattern within 5<br>km radius of the<br>study area  | Once during<br>the study<br>period                                    | Study Area                       | Satellite Imagery &<br>Primary Survey  |
| *Soil                        | Physico-<br>Chemical<br>characteristics   | Once during<br>the study<br>period                                    | 4<br>4 in buffer<br>zone)        | IS 2720<br>Agriculture<br>Handbook - Indian<br>Council of<br>Agriculture<br>Research, New<br>Delhi |
| *Water<br>Quality            | Physical,<br>Chemical and<br>Bacteriological<br>Parameters  | Once during<br>the study<br>period                                    | 8<br>(8 ground<br>water)         | IS 10500& CPCB<br>Standards  |
| Meteorology                  | Wind speed<br>Wind direction<br>Temperature<br>Cloud cover<br>Dry bulb<br>temperature<br>Rainfall                     | 1 hourly<br>continuous<br>mechanical/aut<br>omatic weather<br>station | 1                                | Site specific primary<br>data &<br>secondary data from<br>IMD Station                              |
| *Ambient<br>Air Quality      | PM <sub>10</sub> PM <sub>2.5</sub> SO <sub>2</sub><br>NO <sub>x</sub>   | 24 hours, twice<br>a week   | 8<br>(1 core &<br>7buffer)       | IS 5182 Part 1-23<br>National Ambient<br>Air Quality<br>Standards, CPCB                            |
| *Noise<br>Levels             | Ambient noise   | Hourly<br>observation for<br>24 hours per<br>location                 | 8<br>(1 core & 7<br>buffer zone) | IS 9989<br>As per CPCB<br>Guidelines   |
| Ecology                      | Existing flora<br>and fauna   | Through field<br>visit during the<br>study period                     | Study area                       | Primary Survey by<br>Quadrat &<br>Transect Study<br>Secondary Data –<br>Forest Working Plan        |
| Socio<br>Economic<br>Aspects | Socio-economic<br>characteristics,<br>Population<br>statistics and<br>existing<br>infrastructure in<br>the study area | Site visit &<br>Census<br>Handbook,<br>2011                           | Study area                       | Primary Survey,<br>census handbook &<br>need based<br>assessments.                                 |

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

### 3.1 LAND ENVIRONMENT

#### 3.1.1 Geology and Geomorphology

Study area is mainly composed of Granite gneiss, as shown in Figure 3.1. The lease area occurs in Granite gneissic terrain. Among the geomorphic units, pediment pediplain complex dominate the study area, as shown in Figure 3.2. The lease area occurs in shallow pediment pediplain complex.

#### 3.1.2 Land Use/ Land Cover

Land Use and Land Cover (LULC) map, as shown in Figure 3.3 was prepared using Sentinel II image for the study area of 5 km radius to provide a baseline status of the study area covering 5 km radius around the proposed mine site. Totally, 7 LULCs were mapped. The areal extent of each LULC is provided in Table 3.2. Of the total area, mining area covers only 135.23 ha accounting for 1.69 %, of which lease area of 1.34.5 ha contributes only about 0.016 %. This small percentage of mining activities shall not have any significant impact on the land environment.

**Table 3.2 LULC Statistics of the Study Area**

| S. No.       | Classification         | Area (ha)     | Area (%)     |
|--------------|------------------------|---------------|--------------|
| 1            | Crop land              | 5752.63       | 71.80        |
| 2            | Water bodies           | 750.55        | 9.37         |
| 3            | Plantation             | 158.23        | 1.97         |
| 4            | Mining/Industrial Area | 135.23        | 1.69         |
| 5            | Built Area             | 988.23        | 12.33        |
| 6            | Bare Ground            | 55.23         | 0.69         |
| 7            | Rangeland              | 172.3         | 2.15         |
| <b>Total</b> |                        | <b>8288.7</b> | <b>100.0</b> |

Source: Sentinel II Satellite Imagery

#### 3.1.3 Topography

The proposed lease area Exhibits flat topography the high elevation in 93m ASML observed in North Side of the lease area the Slope is towards South Side and falls in Toposheet No 57-P/10.

#### 3.1.4 Drainage Pattern

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

#### 3.1.5 Seismic Sensitivity

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

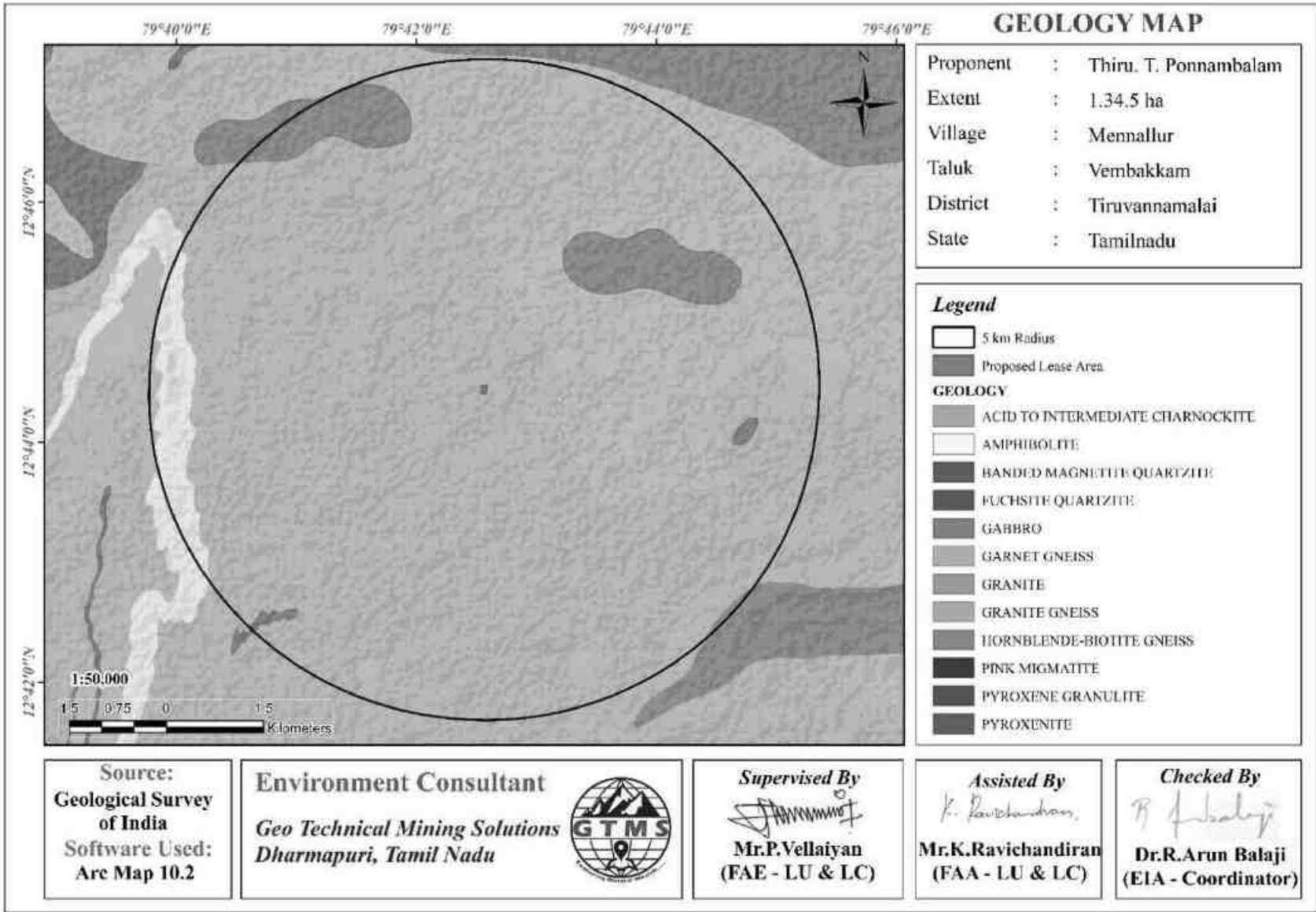


Figure 3.1 Geology Map of 5 km Radius from Proposed Project Site

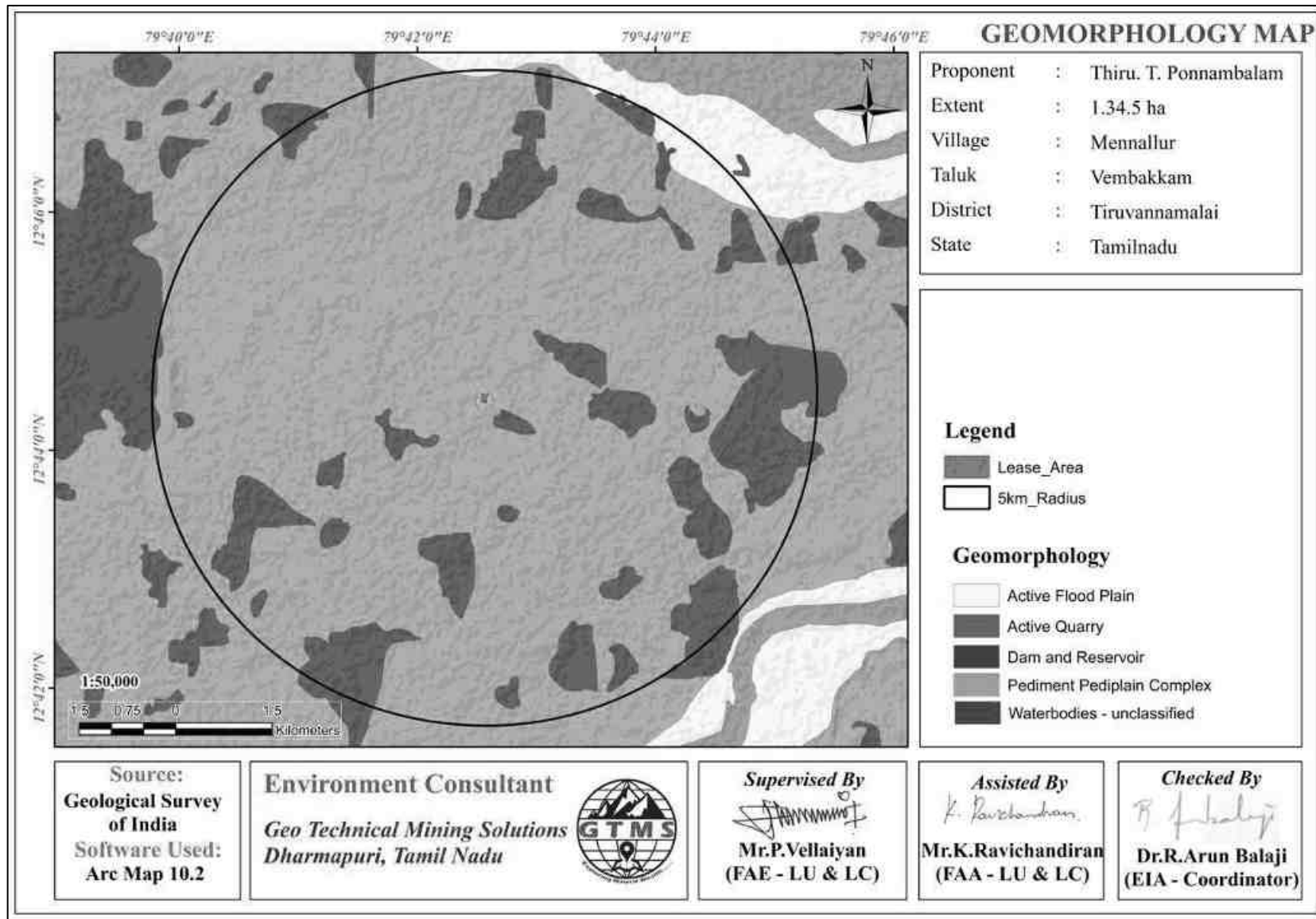


Figure 3.2 Geomorphology Map of 5 km Radius from Proposed Project Site

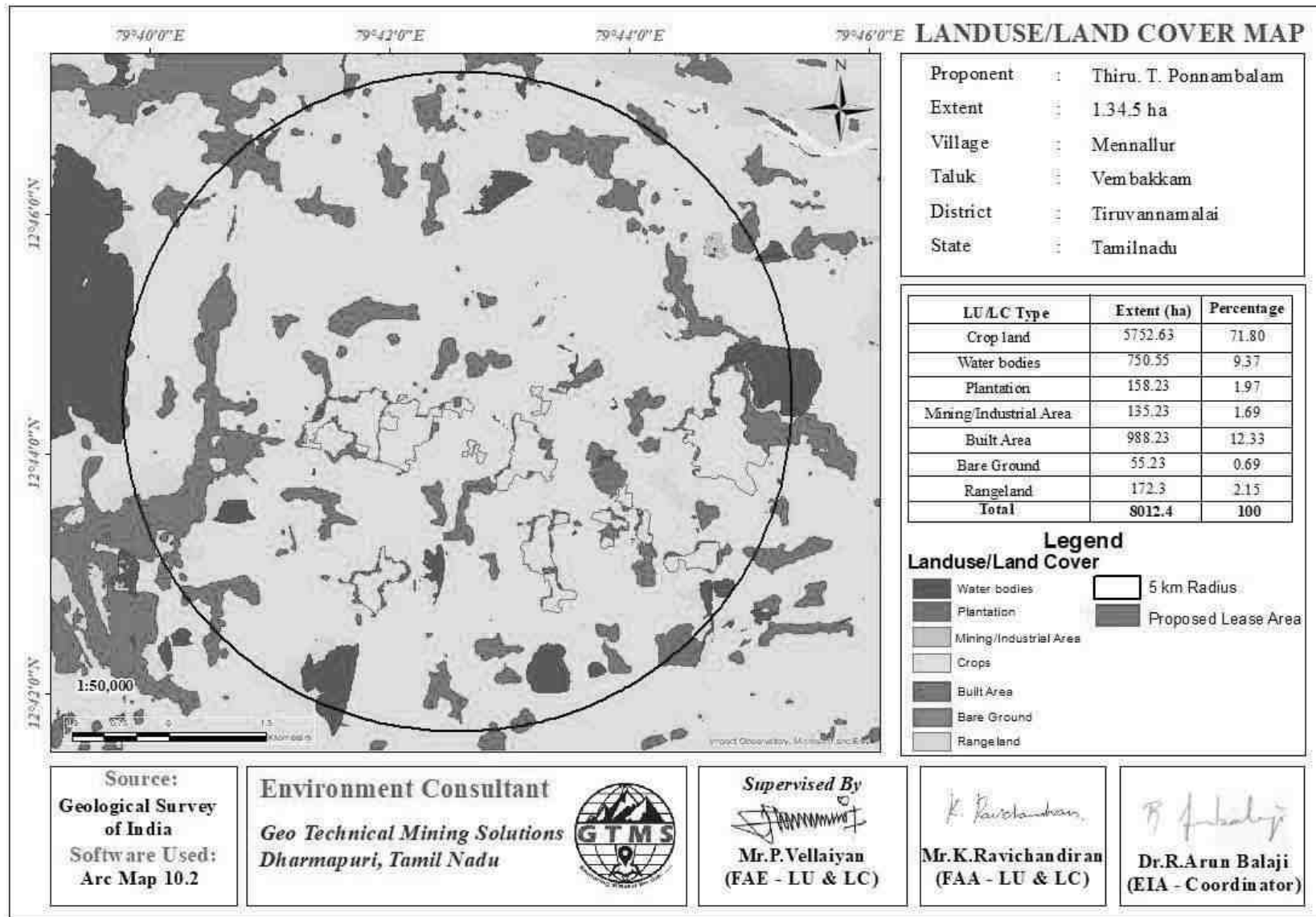
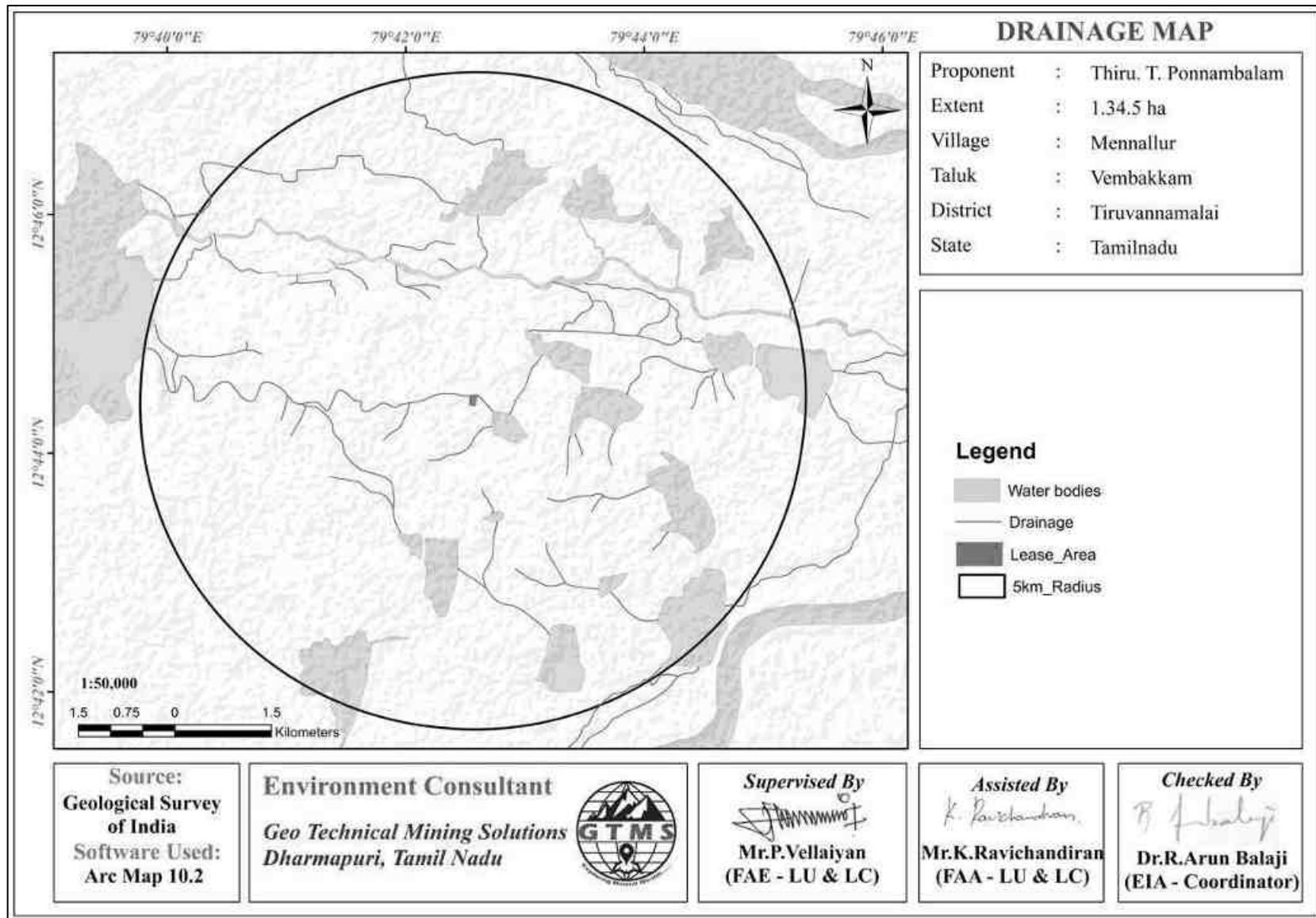


Figure 3.3 LULC Map of 5 km Radius from Proposed Project Site



**Figure 3.4 Drainage Map of 5 km Radius from Proposed Project Site**

### 3.1.6 Soil

Composite soil samples were collected from 4 locations of the study area to determine the baseline soil characteristics of the soil. The locations were selected for soil sampling based on soil types, vegetative cover, and industrial & residential activities including infrastructure facilities. Soil samples were collected up to 90 cm depth, filled in polythene bags, coded and sent to laboratory for analysis. The locations of the sampling sites are shown in Table 3.3 and Figure 3.5. The samples thus collected were analysed for physical and chemical characteristics. The physical and chemical characteristic results of soil samples are provided in Table 3.5.

**Table 3.3 Soil Sampling Locations**

| Sampling ID | Location             | Distance (km) | Direction | Coordinates                  |
|-------------|----------------------|---------------|-----------|------------------------------|
| S01         | Near Mine lease area | 0.35          | SW        | 12°44'13.83"N, 79°42'27.69"E |
| S02         | Poonaihangal         | 1.03          | E         | 12°44'26.46"N,79°43'09.93"E  |
| S03         | Seniyanallur         | 3.37          | E         | 12°44'25.38"N,79°44'27.82"E  |
| S04         | Sithalapakkam        | 3.75          | SE        | 12°43'03.70"N,79°44'09.02"E  |

Source: On-site monitoring/sampling *Creative Engineers and Consultants* in association with GTMS.

#### **Physical Characteristics & Chemical Characteristics**

Soil samples show that the pH values were ranging between 6.55 to 7.49 and Electrical Conductivity values were ranging between 66.48 – 95.7  $\mu\text{mhos/cm}$ . Soils are generally Silty clay loam type. Organic matter values were ranging between 0.66 – 0.86%. Total Nitrogen values were ranging between 172 - 228mg/kg. The soil quality data for the 4 samples collected and analysed are provided in Table No – 3.19.

**Table 3.4 Soil Quality of the Study Area**

| Parameters              | Unit                    | S1    | S2              | S3    | S4    |
|-------------------------|-------------------------|-------|-----------------|-------|-------|
| pH at 25°C              | -                       | 6.55  | 7.01            | 7.49  | 6.94  |
| Electrical Conductivity | ( $\mu\text{mhos/cm}$ ) | 80.2  | 95.7            | 66.48 | 73.25 |
| Dry matter content      | %                       | 96.48 | 97.34           | 96.25 | 95.33 |
| Water Content           | %                       | 3.52  | 2.66            | 3.75  | 4.67  |
| Organic Matter          | %                       | 0.66  | 0.72            | 0.68  | 0.86  |
| Soil texture            | -                       | Loam  | Silty Clay Loam | Loam  | Loam  |
| Sand                    | %                       | 46.89 | 20.33           | 47.64 | 36.59 |
| Silt                    | %                       | 36.57 | 40.24           | 30.26 | 44.22 |
| Clay                    | %                       | 16.54 | 39.43           | 22.10 | 19.19 |
| Phosphorous             | $\mu\text{g/g}$         | 1.54  | 1.69            | 1.31  | 1.19  |

|                        |       |                |                |                |                |
|------------------------|-------|----------------|----------------|----------------|----------------|
| Sodium                 | mg/kg | 622            | 590            | 670            | 564            |
| Potassium              | mg/kg | 425            | 484            | 368            | 326            |
| Total Nitrogen         | mg/kg | 228            | 172            | 184            | 210            |
| Total Sulphur          | %     | BDL (D.L-0.02) | BDL (D.L-0.02) | BDL (D.L-0.02) | BDL (D.L-0.02) |
| Water Holding Capacity | %     | 3.2            | 3.4            | 2.5            | 3.8            |
| Porosity               | %     | 15.8           | 17.5           | 16.6           | 15.8           |

Source: On-site monitoring/sampling *Creative Engineers and Consultants* in association with GTMS.

### 3.2 WATER ENVIRONMENT

The water resources groundwater plays a significant role in the development of the area. The purpose of this study is to assess the baseline quality of ground water.

**Table 3.5 Water Sampling Locations**

| Sampling ID | Location             | Distance (km) | Direction | Coordinates                  |
|-------------|----------------------|---------------|-----------|------------------------------|
| GW1         | Near Mine Lease Area | 0.52          | SW        | 12°44'8.10"N, 79°42'26.74"E  |
| GW2         | Vadakalapakkam       | 2.17          | NW        | 12°45'8.80"N, 79°41'33.34"E  |
| GW3         | Seniyanallur         | 2.81          | E         | 12°44'26.26"N, 79°44'8.56"E  |
| GW4         | Poonathangal         | 0.88          | NE        | 12°44'45.18"N, 79°42'59.55"E |
| GW5         | Narasamangalam       | 4.28          | W         | 12°44'24.99"N, 79°40'10.62"E |
| GW6         | Menallur             | 0.39          | NW        | 12°44'38.83"N, 79°42'24.90"E |
| GW7         | Bhagavanthapuram     | 1.45          | S         | 12°43'37.76"N, 79°42'23.60"E |
| GW8         | Sithalapakkam        | 3.70          | SE        | 12°43'1.50"N, 79°44'4.54"E   |

Source: On-site monitoring/sampling *Creative Engineers and Consultants* in association with GTMS.

#### 3.2.1 Ground Water Resources and Quality

The pH values were ranging in between 7.38 – 7.81. TDS values were in the range of 520 – 1246 mg/L. Chloride values were ranging from 84.50 – 386 mg/L. Iron content was found to be in the range BDL (D.L-0.01)-0.05mg/L. The water quality of ground water is found to be within the prescribed Permissible limits of IS: 10500 standards. The results of the water sample analysis are shown in Table No - 3.6.



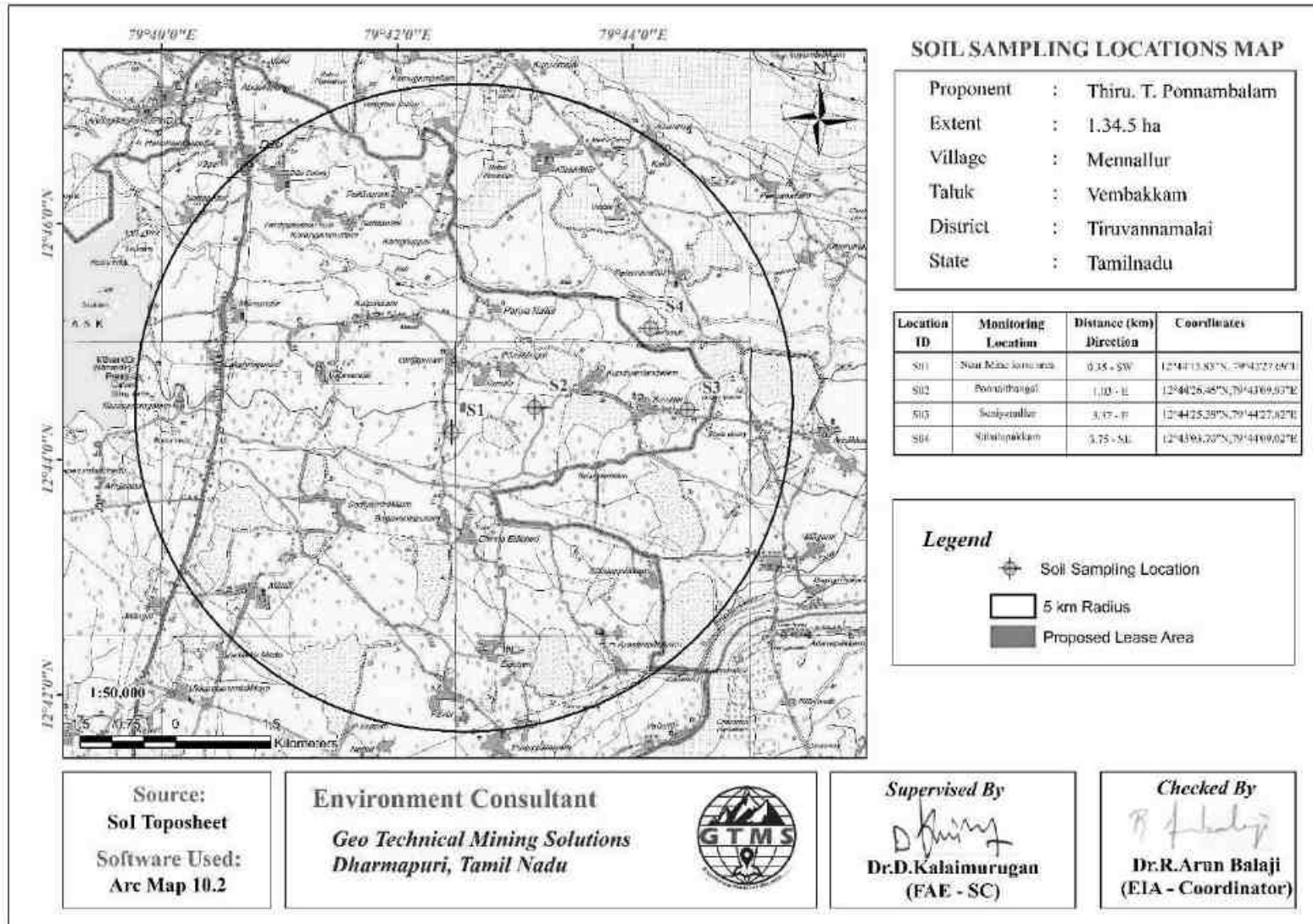


Figure 3.5 Toposheet Showing Soil Sampling Locations within 5 km Radius around Proposed Project Site

**Table 3.6 Ground Water Quality Result**

| S. No. | Parameters                          | Unit  | BW1          | BW2          | BW3          | BW4          | BW5          | BW6          | BW7          | BW8          | Standard  |
|--------|-------------------------------------|-------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----------|
| 1      | pH                                  | -     | 7.64         | 7.38         | 7.69         | 7.38         | 7.81         | 7.52         | 7.57         | 7.63         | 6.5-8.5   |
| 2      | EC                                  | μS/cm | 916          | 1520         | 1502         | 1120         | 1915         | 2074         | 864          | 1345         | 5         |
| 3      | Odor                                | -     | Agreeable    | Agreeable    | Agreeable    | Agreeable    | Agreeable    | Agreeable    | Agreeable    | Agreeable    | Agreeable |
| 4      | Turbidity                           | NTU   | <0.1         | <0.1         | <0.1         | <0.1         | <0.1         | <0.1         | <0.1         | <0.1         | 5.0       |
| 5      | Total hardness as CaCO <sub>3</sub> | mg/l  | 314          | 338          | 394          | 452          | 254          | 485          | 274          | 490          | 600       |
| 6      | Calcium Hardness                    | mg/l  | 210          | 262          | 196          | 310          | 126          | 260          | 132          | 245          | -         |
| 7      | Magnesium Hardness                  | mg/l  | 104          | 76           | 198          | 142          | 128          | 225          | 142          | 245          | -         |
| 8      | Calcium                             | mg/l  | 84           | 105          | 78.4         | 124          | 50.4         | 104          | 52.8         | 98           | 200       |
| 9      | Magnesium                           | mg/l  | 25           | 18.2         | 47.5         | 34.1         | 30.7         | 54           | 34.1         | 58.8         | 100       |
| 10     | Alkalinity                          | mg/l  | 230          | 340          | 385          | 280          | 398          | 414          | 154          | 210          | 600       |
| 11     | Chloride                            | mg/l  | 84.5         | 180          | 246          | 124          | 384          | 386          | 138          | 243          | 1000      |
| 12     | Sulphate                            | mg/l  | 186          | 320          | 238          | 156          | 310          | 392          | 98.6         | 202          | 400       |
| 13     | Iron Fe                             | mg/l  | 0.05         | BDL[DL-0.01] | BDL[DL-0.01] | BDL[DL-0.01] | 0.04         | 0.05         | BDL[DL-0.01] | BDL[DL-0.01] | 1.0       |
| 14     | Nitrate                             | mg/l  | 3.24         | 2.54         | 1.65         | 2.02         | 2.36         | 3.26         | 2.34         | 2.69         | 45        |
| 15     | Fluoride                            | mg/l  | 0.26         | 0.45         | 0.38         | 0.31         | 0.19         | 0.2          | 0.18         | 0.36         | 1.5       |
| 16     | Total Dissolved Solids              | mg/l  | 550          | 920          | 902          | 675          | 1150         | 1246         | 520          | 810          | 2000      |
| 17     | Free Residual Chlorine              | mg/l  | BDL[DL-0.2]  | BDL[DL-0.2]  | BDL[DL-0.2]  | BDL[DL-0.2]  | BDL[DL-0.2]  | BDL[DL-0.2]  | BDL[DL-0.2]  | BDL[DL-0.2]  | 1.0       |
| 18     | Manganese                           | mg/l  | BDL[DL-0.05] | BDL[DL-0.05] | BDL[DL-0.05] | BDL[DL-0.05] | BDL[DL-0.05] | BDL[DL-0.05] | BDL[DL-0.05] | BDL[DL-0.05] | 0.3       |

*Source: On-site monitoring/sampling Creative Engineers and Consultants in association with GTMS.*

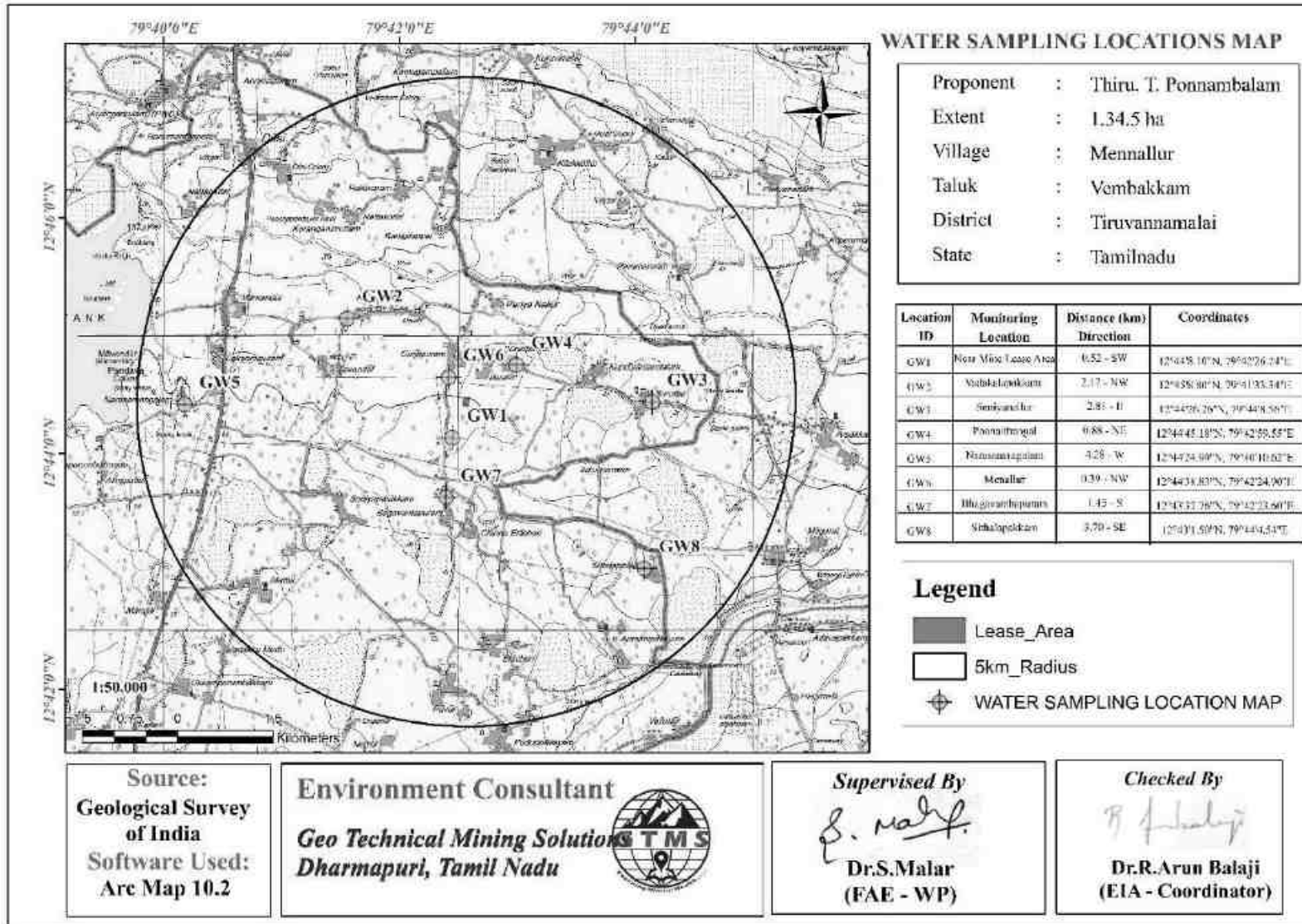


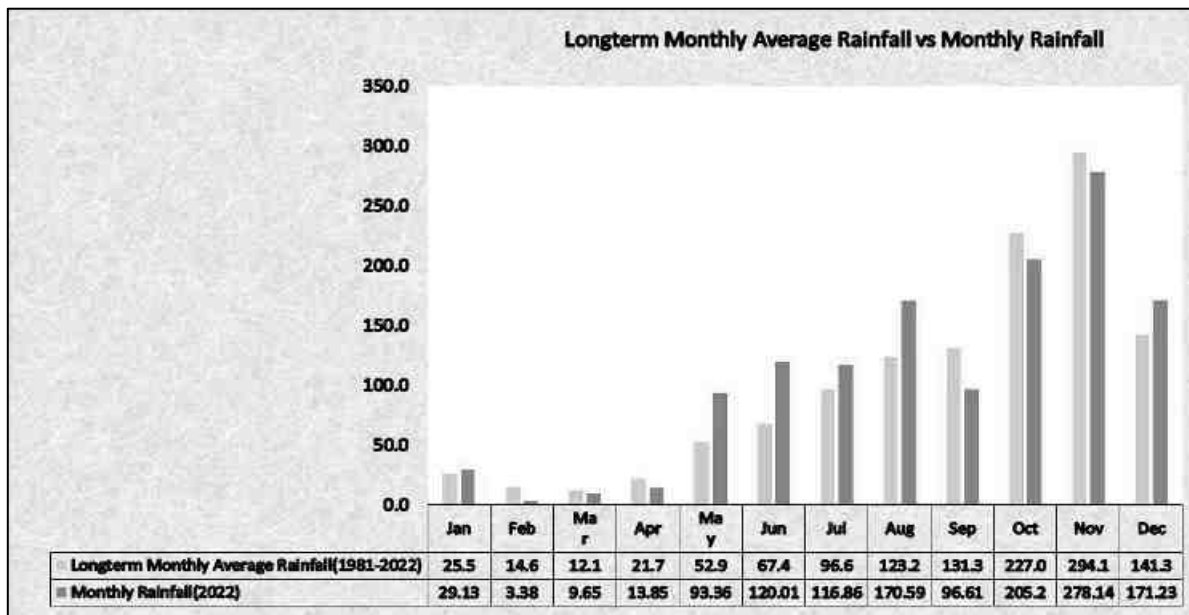
Figure 3.6 Map Showing Water Sampling Locations within 5 km Radius around Proposed Project Site

### 3.2.2 Hydrogeological Studies

The area within 2 km radius consists of numerous open wells and deep wells. Groundwater level data were collected both from open wells and bore wells for two monsoon seasons as discussed in the following section.

#### **Rainfall**

Rainfall data for the study area were collected for the period of 1981-2022 ([POWER Data Access Viewer \(nasa.gov\)](#)). Long term monthly average rainfall was estimated from the data of 1981-2021 and compared with the monthly rainfall for the year 2022, shown in Figure 3.10. The Figure 3.7 shows that rainfall is generally high in the months of August through November in every year. Particularly, rainfall in May through August and December of 2022 is higher than the previous years.



**Figure 3.7 Long-Term Monthly Average Rainfall Vs Monthly Rainfall**

#### 3.2.2.1 Groundwater Levels and Flow Direction

Data regarding depth to groundwater levels are essential to infer the direction of groundwater movement within the study area. Knowledge of groundwater flow direction is must in choosing location for background groundwater quality monitoring well and in locating recharge and discharge areas. Therefore, data regarding groundwater elevations were collected from 8 open wells and 8 bore wells at various locations within 2 km radius around the proposed project sites for the period from March to May 2022 (Pre-Monsoon Season) and from December 2022 to February 2023, (Post Monsoon Season).

The open well water level data thus collected onsite are provided in Tables 3.8 and 3.9. According to the data, average depths to the static water table in open wells range from 9.03 to 12.96 m BGL in pre monsoon and 10.77 to 12.10 m BGL in post monsoon. The bore well data

thus collected onsite are provided in Tables 3.10 and 3.11. The average depths to static potentiometric surface in bore wells for the period of December through February (Post-Monsoon Season) vary from 47.4m to 49.3 and from 54.51 to 58.93 m for the period of March through May, (Pre-Monsoon Season). Data on the depths to static water table and potentiometric surface were used to draw contour lines connecting groundwater elevation (also known as equipotential hydraulic head) to determine the groundwater flow direction perpendicular to the contour lines.

From the maps of open well groundwater flow direction shown in Figures 3.8-3.9, it is understood that most of the open well groundwater for the post- and pre-monsoon seasons flows towards the open well north direction of the proposed project site. The groundwater flow maps in Figures 3.10-3.11 show that most of the bore well groundwater for the post- and pre-monsoon seasons flow towards the bore well number 1 and 5. It is located in northwestern direction of the proposed project site. On the basis of the groundwater flow information, both open wells and bore wells mentioned above can be chosen for water quality monitoring purpose as the wells may get easily affected by the contaminants resulting from the mining activities of the sites in future.

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

| Station ID | Depth to Static Water Table BGL (m) |          |           |         | Latitude      | Longitude     |
|------------|-------------------------------------|----------|-----------|---------|---------------|---------------|
|            | Mar-2022                            | Apr-2022 | May- 2022 | Average |               |               |
| OW01       | 11.9                                | 13.3     | 13.6      | 12.93   | 12°44'17.93"N | 79°42'39.71"E |
| OW02       | 12.5                                | 12.8     | 13.2      | 12.83   | 12°44'35.17"N | 79°42'26.36"E |
| OW03       | 12.2                                | 12.1     | 14.5      | 12.96   | 12°44'34.72"N | 79°42'7.18"E  |
| OW04       | 8.6                                 | 8.9      | 9.6       | 9.03    | 12°44'38.26"N | 79°42'35.13"E |
| OW05       | 9.6                                 | 10.2     | 10.8      | 10.20   | 12°43'53.03"N | 79°42'32.28"E |
| OW06       | 10.1                                | 10.6     | 11.1      | 10.61   | 12°44'33.71"N | 79°42'50.62"E |
| OW07       | 10.4                                | 10.8     | 11.3      | 10.83   | 12°44'49.34"N | 79°42'14.78"E |
| OW08       | 11.1                                | 11.8     | 12.3      | 11.73   | 12°44'25.40"N | 79°43'0.46"E  |

Source: Onsite monitoring data

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

| Station ID | Depth to Static Water Table BGL(m) |           |          |         | Latitude      | Longitude     |
|------------|------------------------------------|-----------|----------|---------|---------------|---------------|
|            | Dec-2022                           | Jan- 2023 | Feb-2022 | Average |               |               |
| OW01       | 12.37                              | 11.88     | 9.35     | 11.20   | 12°44'17.93"N | 79°42'39.71"E |
| OW02       | 13.65                              | 12.55     | 10.11    | 12.10   | 12°44'35.17"N | 79°42'26.36"E |
| OW03       | 14.85                              | 12.62     | 10.25    | 12.57   | 12°44'34.72"N | 79°42'7.18"E  |
| OW04       | 12.12                              | 10.98     | 9.21     | 10.77   | 12°44'38.26"N | 79°42'35.13"E |
| OW05       | 12.22                              | 11.02     | 9.55     | 10.93   | 12°43'53.03"N | 79°42'32.28"E |
| OW06       | 12.65                              | 11.42     | 10.08    | 11.38   | 12°44'33.71"N | 79°42'50.62"E |
| OW07       | 13.01                              | 11.89     | 10.08    | 11.66   | 12°44'49.34"N | 79°42'14.78"E |
| OW08       | 12.44                              | 11.35     | 10.02    | 11.27   | 12°44'25.40"N | 79°43'0.46"E  |

Source: Onsite monitoring data

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

| Station ID | Depth to Static Potentiometric Surface BGL(m) |          |           |         | Latitude      | Longitude     |
|------------|---|----------|-----------|---------|---------------|---------------|
|            | Mar-2022                                      | Apr-2022 | May- 2022 | Average |               |               |
| BW01       | 53.95   | 55.48    | 59.84     | 56.42   | 12°44'38.82"N | 79°42'24.90"E |
| BW02       | 56.45   | 58.23    | 62.12     | 58.93   | 12°44'45.18"N | 79°42'59.55"E |
| BW03       | 54.18   | 55.85    | 59.94     | 56.66   | 12°43'37.76"N | 79°42'23.60"E |
| BW04       | 55.2  | 57.22    | 61.22     | 57.88   | 12°45'9.74"N  | 79°41'45.27"E |
| BW05       | 54.82   | 56.98    | 61.11     | 57.64   | 12°43'35.99"N | 79°42'35.72"E |
| BW06       | 54.55   | 56.22    | 60.35     | 57.04   | 12°44'34.21"N | 79°43'34.28"E |
| BW07       | 54.48   | 56.18    | 60.31     | 56.99   | 12°44'57.00"N | 79°42'1.78"E  |
| BW08       | 51.22   | 54.11    | 58.2      | 54.51   | 12°45'10.83"N | 79°42'9.87"E  |

*Source: Onsite monitoring data*

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

| Station ID | Depth to Static Potentiometric Surface BGL(m) |           |          |         | Latitude      | Longitude     |
|------------|---|-----------|----------|---------|---------------|---------------|
|            | Dec-2022                                      | Jan- 2023 | Feb-2022 | Average |               |               |
| BW01       | 51.85   | 48.12     | 42.45    | 47.47   | 12°44'38.82"N | 79°42'24.90"E |
| BW02       | 55.33   | 47.22     | 45.12    | 49.22   | 12°44'45.18"N | 79°42'59.55"E |
| BW03       | 51.95   | 48.08     | 42.55    | 47.53   | 12°43'37.76"N | 79°42'23.60"E |
| BW04       | 53.22   | 48.15     | 44.22    | 48.53   | 12°45'9.74"N  | 79°41'45.27"E |
| BW05       | 54.12   | 48.95     | 44.85    | 49.31   | 12°43'35.99"N | 79°42'35.72"E |
| BW06       | 55.23   | 47.58     | 43.56    | 48.79   | 12°44'34.21"N | 79°43'34.28"E |
| BW07       | 54.98   | 46.98     | 43.32    | 48.43   | 12°44'57.00"N | 79°42'1.78"E  |
| BW08       | 53.22   | 45.33     | 41.12    | 46.56   | 12°45'10.83"N | 79°42'9.87"E  |

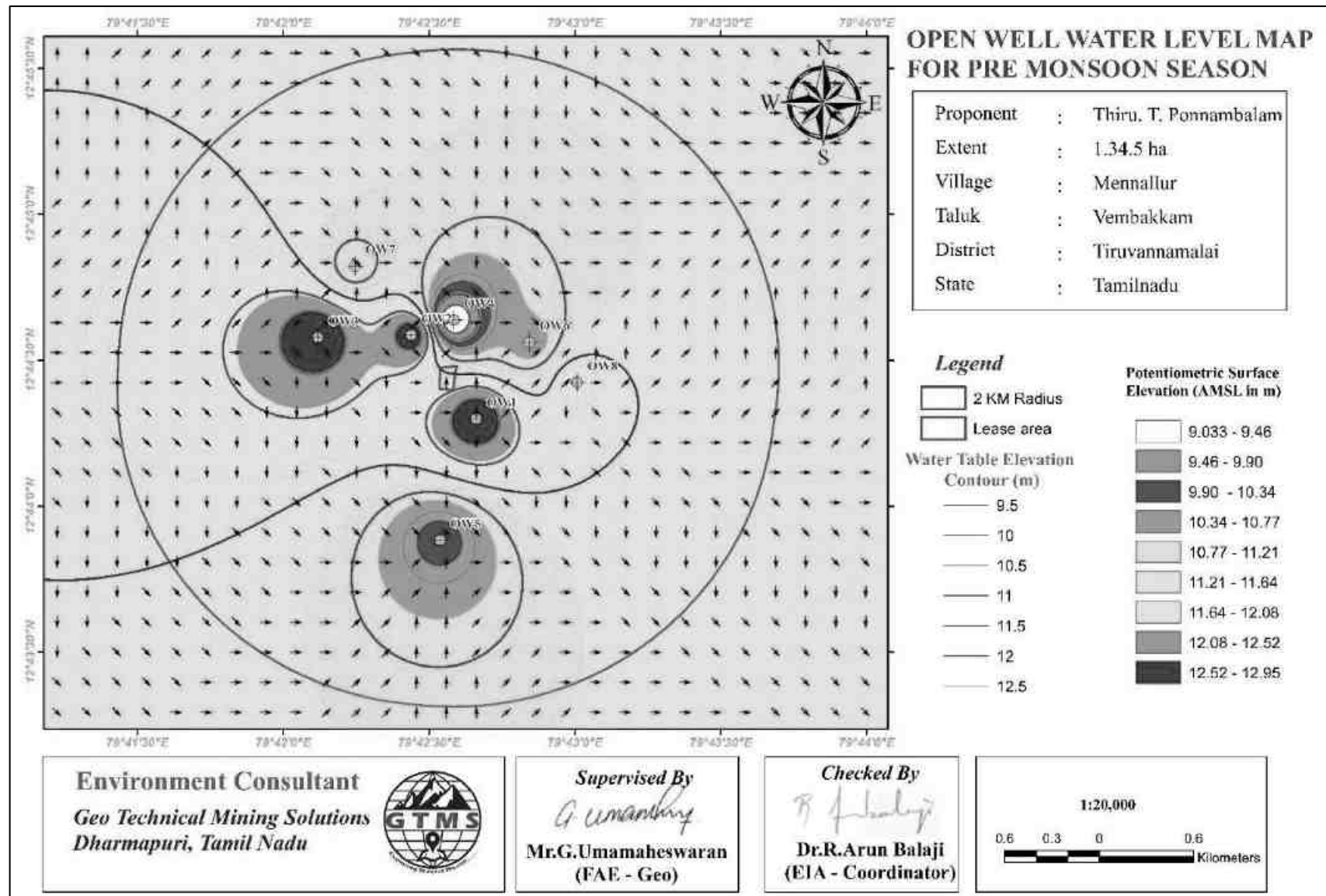
*Source: Onsite monitoring data*

### 3.2.2.2 Electrical Resistivity Investigation

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

#### **Result**

The Geophysical VES data obtained from the project site have been shown in Table 3.12. The field data obtained from a detailed geophysical investigation were plotted using excel spreadsheet for interpretation. The plot for the purpose of interpretation has been shown in Figure 3.12.



**Environment Consultant**  
 Geo Technical Mining Solutions  
 Dharmapuri, Tamil Nadu

*Supervised By*  
*G. Umamaheswaran*  
**Mr.G.Umamaheswaran**  
 (FAE - Geo)

*Checked By*  
*R. Arun Balaji*  
**Dr.R.Arun Balaji**  
 (EIA - Coordinator)

1:20,000

**Figure 3.8 Open Well Static Groundwater Elevation Map Showing Direction of Groundwater Flow during Pre-Monsoon Season**

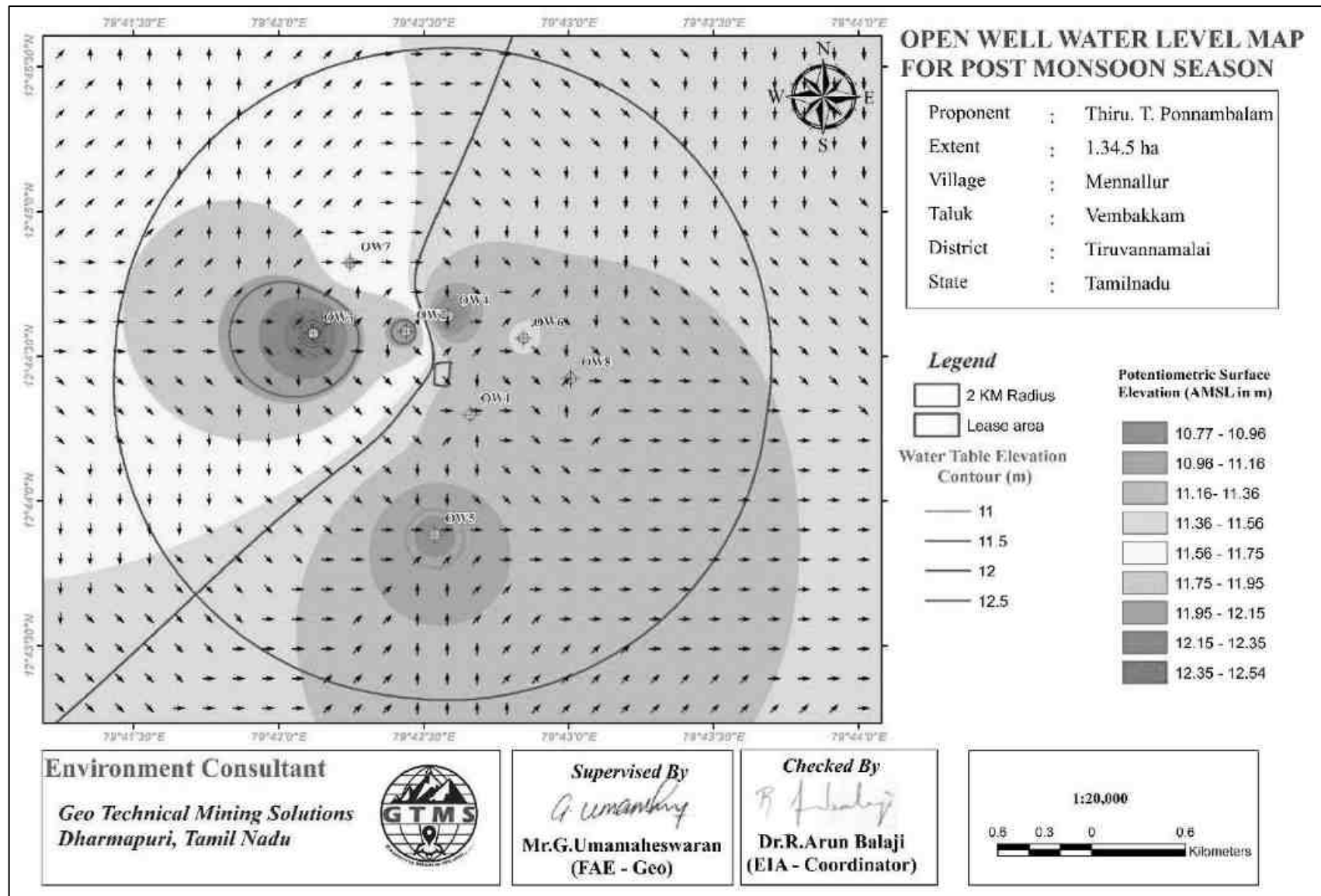


Figure 3.9 Open Well Static Groundwater Elevation Map Showing Direction of Groundwater Flow during Post-Monsoon Season



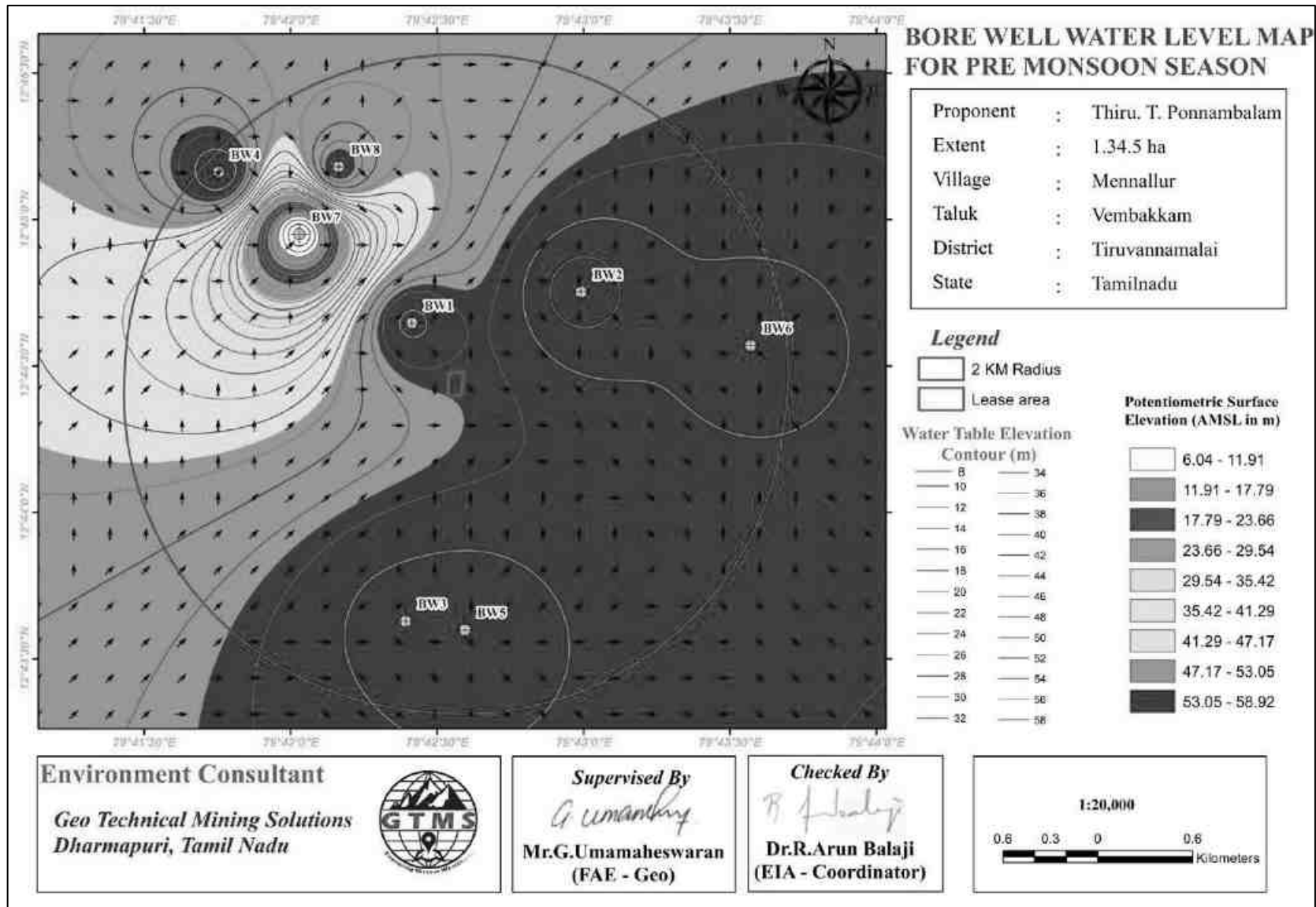


Figure 3.10 Borewell Static Groundwater Elevation Map Showing Direction of Groundwater Flow during Pre-Monsoon Season

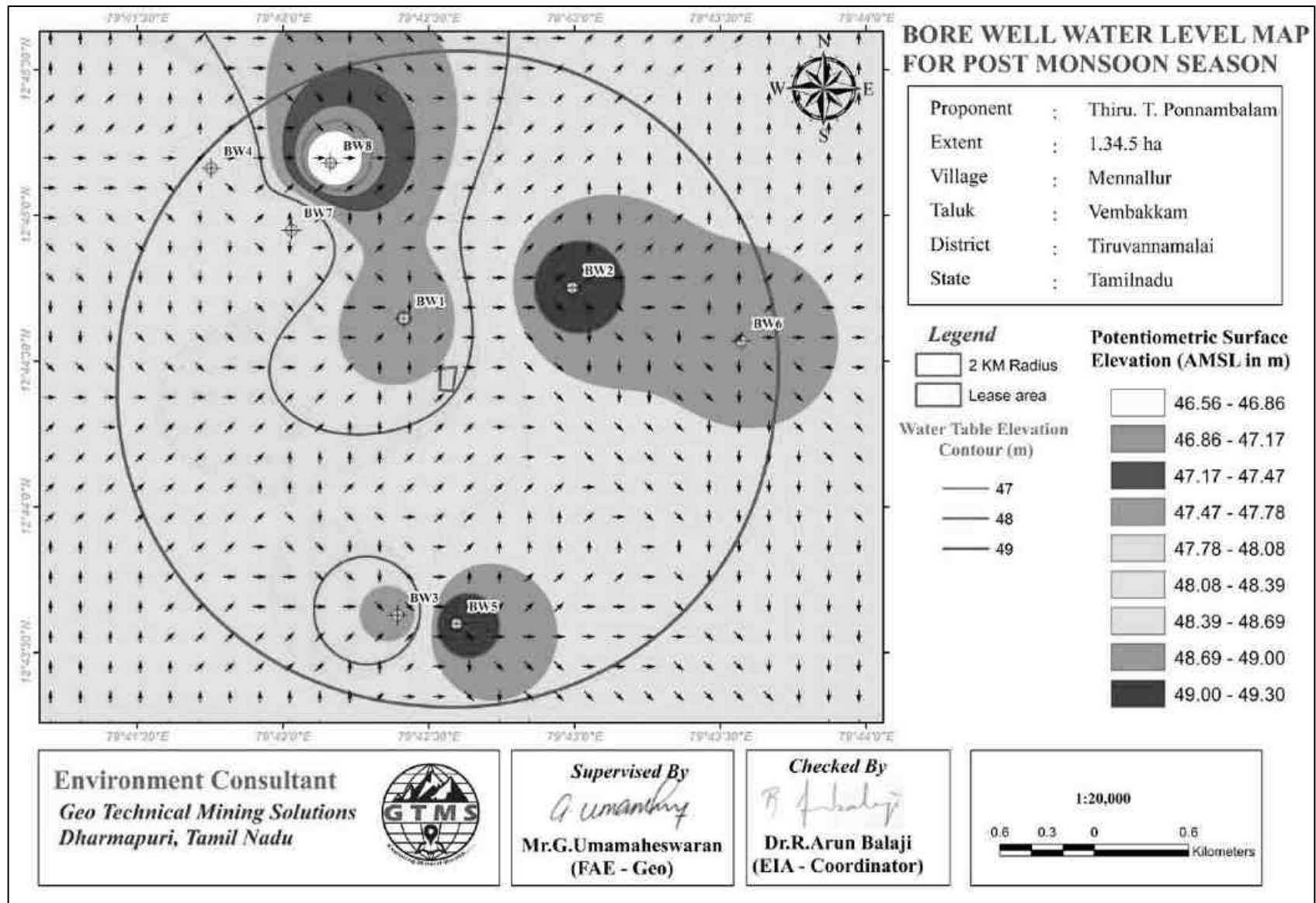
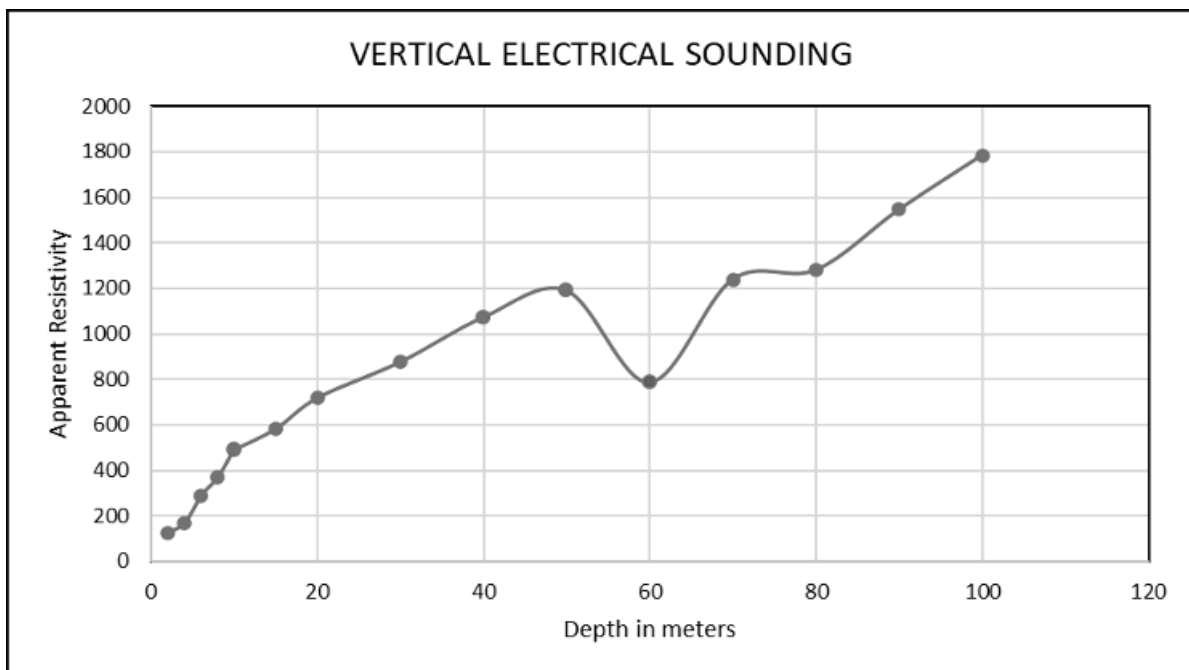


Figure 3.11 Borewell Static Groundwater Elevation Map Showing Direction of Groundwater Flow during Post-Monsoon Season

**Table 3.11 Vertical Electrical Sounding Data**

| Location Coordinates – 12°44'28.27"N, 79°42'34.02"E |          |          |                        |                        |                                    |
|---|----------|----------|------------------------|------------------------|------------------------------------|
| S. No.  | AB/2 (m) | MN/2 (m) | Geometrical Factor (G) | Resistance in $\Omega$ | Apparent Resistivity in $\Omega m$ |
| 1   | 5        | 2        | 16.50                  | 0.741                  | 125.05                             |
| 2   | 10       | 2        | 75.43                  | 0.245                  | 167.91                             |
| 3   | 15       | 5        | 62.86                  | 0.454                  | 288.48                             |
| 4   | 20       | 5        | 117.86                 | 0.326                  | 369.37                             |
| 5   | 25       | 5        | 188.58                 | 0.263                  | 496.74                             |
| 6   | 25       | 10       | 82.50                  | 0.594                  | 490.67                             |
| 7   | 30       | 10       | 125.72                 | 0.580                  | 582.30                             |
| 8   | 35       | 10       | 176.79                 | 0.406                  | 718.27                             |
| 9   | 40       | 10       | 235.73                 | 0.368                  | 876.45                             |
| 10  | 45       | 10       | 302.51                 | 0.355                  | 1073.17                            |
| 11  | 50       | 20       | 165.01                 | 0.278                  | 1189.65                            |
| 12  | 60       | 20       | 251.44                 | 0.272                  | 786.42                             |
| 13  | 70       | 20       | 353.59                 | 0.269                  | 1239.90                            |
| 14  | 80       | 20       | 471.45                 | 0.262                  | 1281.12                            |
| 15  | 90       | 20       | 605.03                 | 0.257                  | 1546.68                            |
| 16  | 100      | 20       | 754.32                 | 0.251                  | 1785.32                            |



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

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

### 3.3 AIR ENVIRONMENT

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

#### 3.3.1 Meteorology

##### 3.3.1.1 Climatic Variables

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

**Table 3.12 Onsite Meteorological Data**

| Parameters |                         | DEC,2022 | JAN,2023 | FEB,2023 |        |
|------------|-------------------------|----------|----------|----------|--------|
| 1          | Temperature (°C)        | Min      | 20.16    | 19.20    | 20.77  |
|            |                         | Max      | 29.03    | 28.55    | 31.08  |
|            |                         | Avg      | 25.23    | 24.34    | 25.43  |
| 2          | Relative Humidity (%)   | Min      | 60.79    | 56.91    | 38.53  |
|            |                         | Max      | 95.48    | 90.53    | 94.68  |
|            |                         | Avg      | 84.49    | 76.07    | 71.24  |
| 3          | Wind Speed (m/s)        | Min      | 0.30     | 1.36     | 0.17   |
|            |                         | Max      | 13.63    | 7.97     | 7.84   |
|            |                         | Avg      | 4.93     | 4.18     | 3.36   |
| 4          | Wind Direction (degree) | Min      | 0.00     | 2.10     | 0.70   |
|            |                         | Max      | 359.90   | 357.90   | 355.60 |
|            |                         | Avg      | 82.77    | 50.44    | 82.54  |
| 5          | Surface Pressure(kPa)   | Min      | 98.35    | 100.50   | 100.52 |
|            |                         | Max      | 101.56   | 101.50   | 101.49 |
|            |                         | Avg      | 100.60   | 101.00   | 100.93 |

Source: On-site monitoring/sampling *Creative Engineers and Consultants* in association with GTMS.

##### 3.3.1.2 Wind Pattern

Wind pattern will largely influence the dispersion pattern of air pollutants and noise from the proposed project site. Analysis of wind pattern requires hourly site-specific data of wind speed and direction. Two types of wind rose were generated: historical seasonal wind rose for the period of December through February of the years from 2018 to 2022 and the seasonal wind rose for the study period of December 2022 to February 2023. The wind rose diagrams thus produced are shown in Figures 3.13-3.13a. Figure 3.14 reveals that:

- ❖ The measured average wind velocity during the study period is 4.22m/s.
- ❖ Predominant wind was dominant in the directions ranging from Northeast to Southwest.

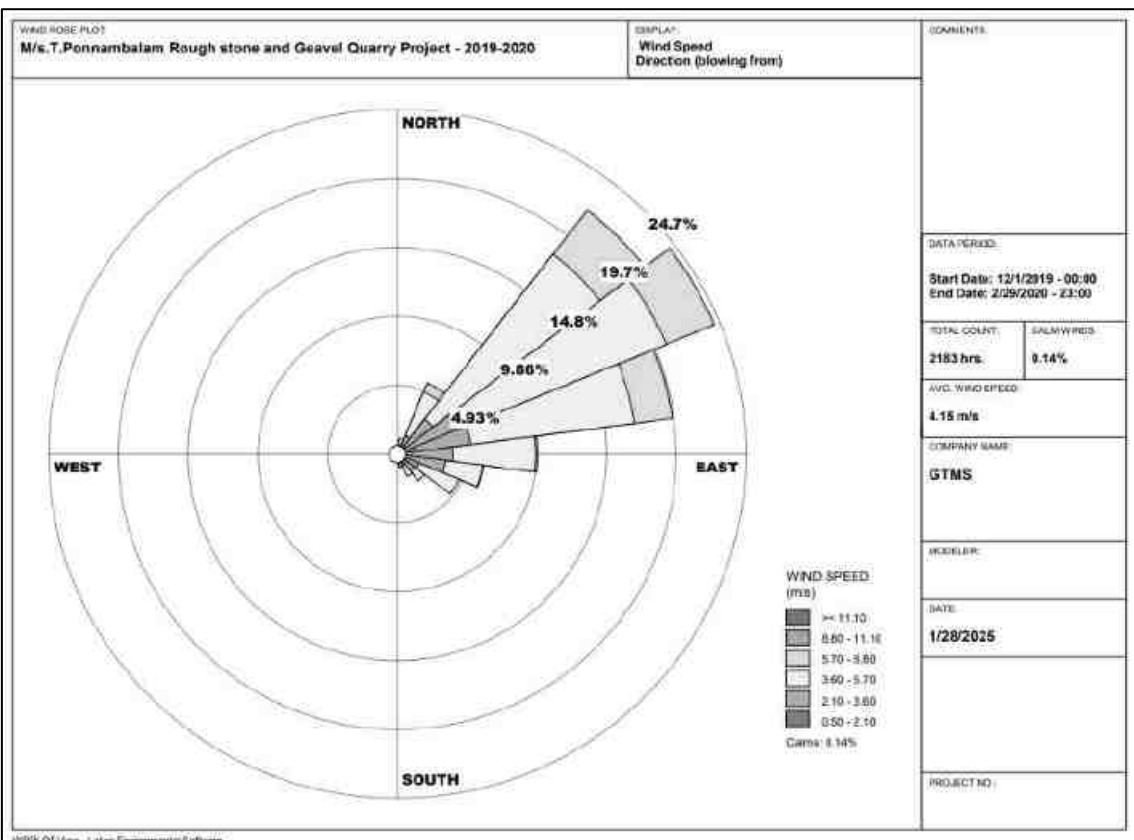
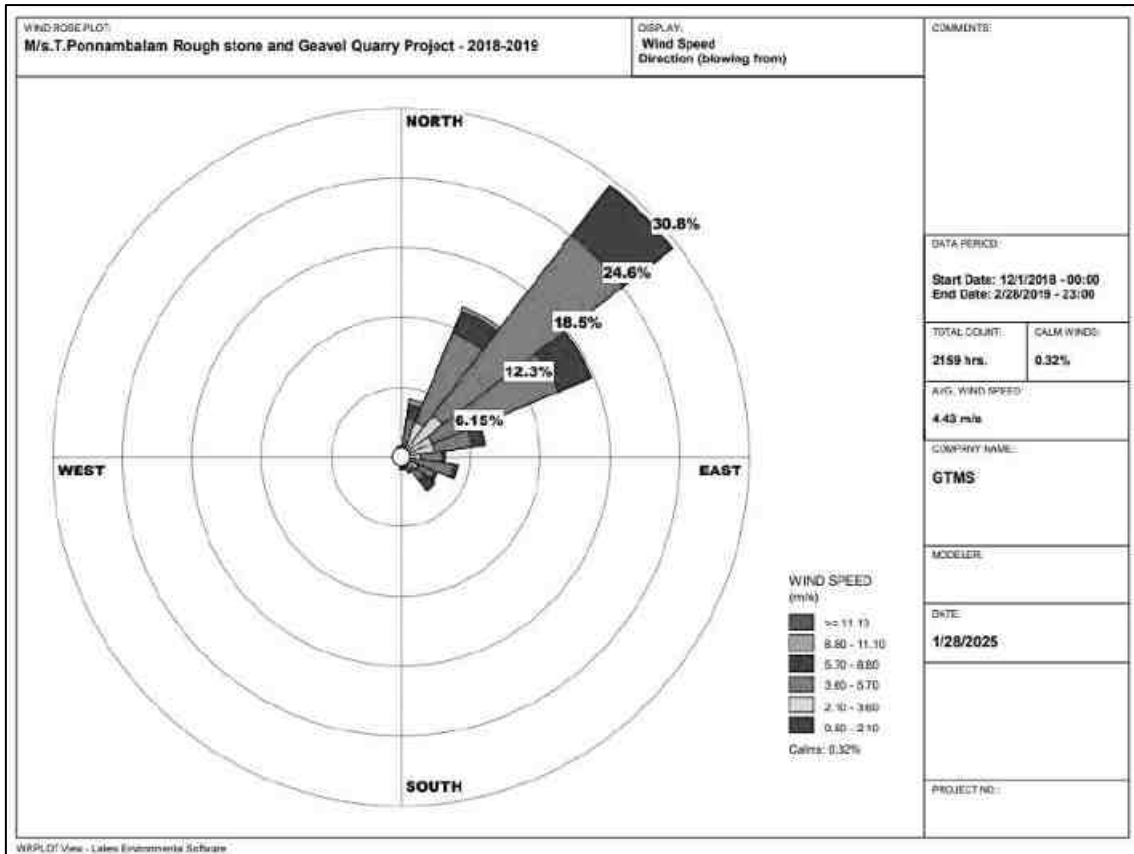


Figure 3.13 Windrose Diagram for 2018-2019 and 2019-2020 (December through February)

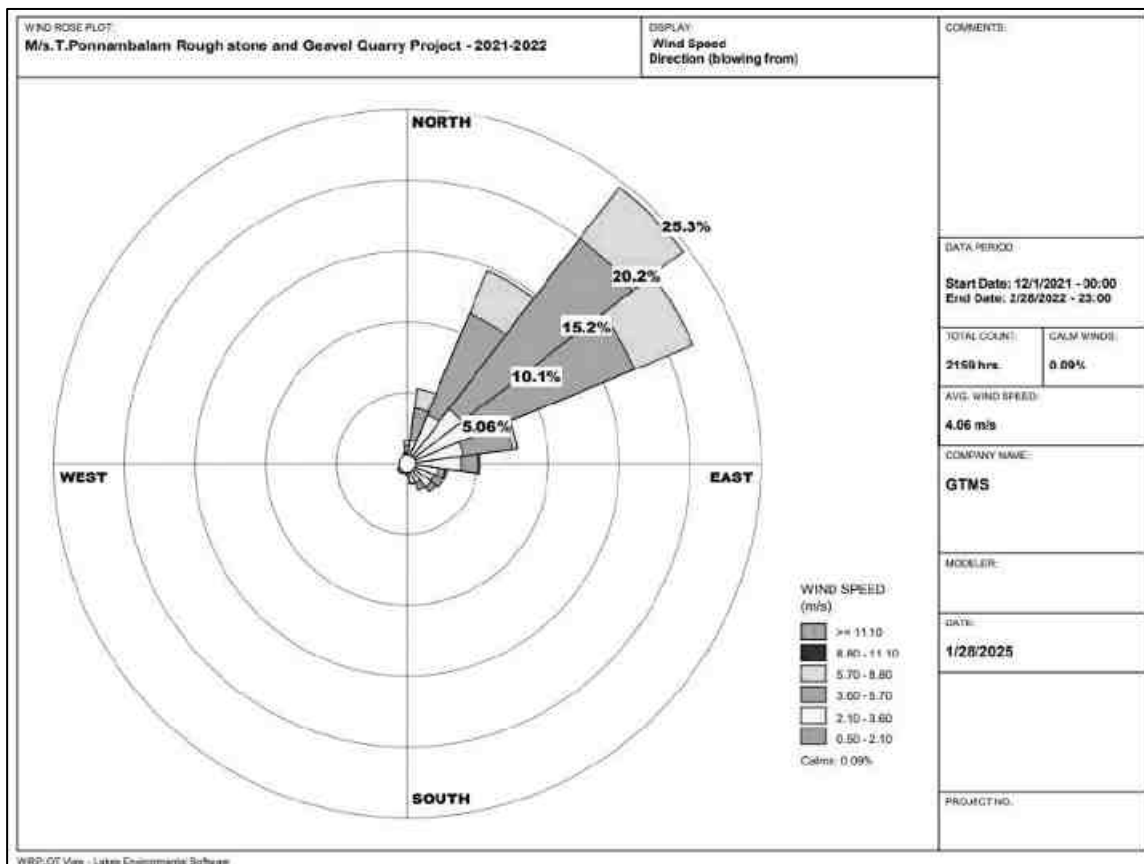
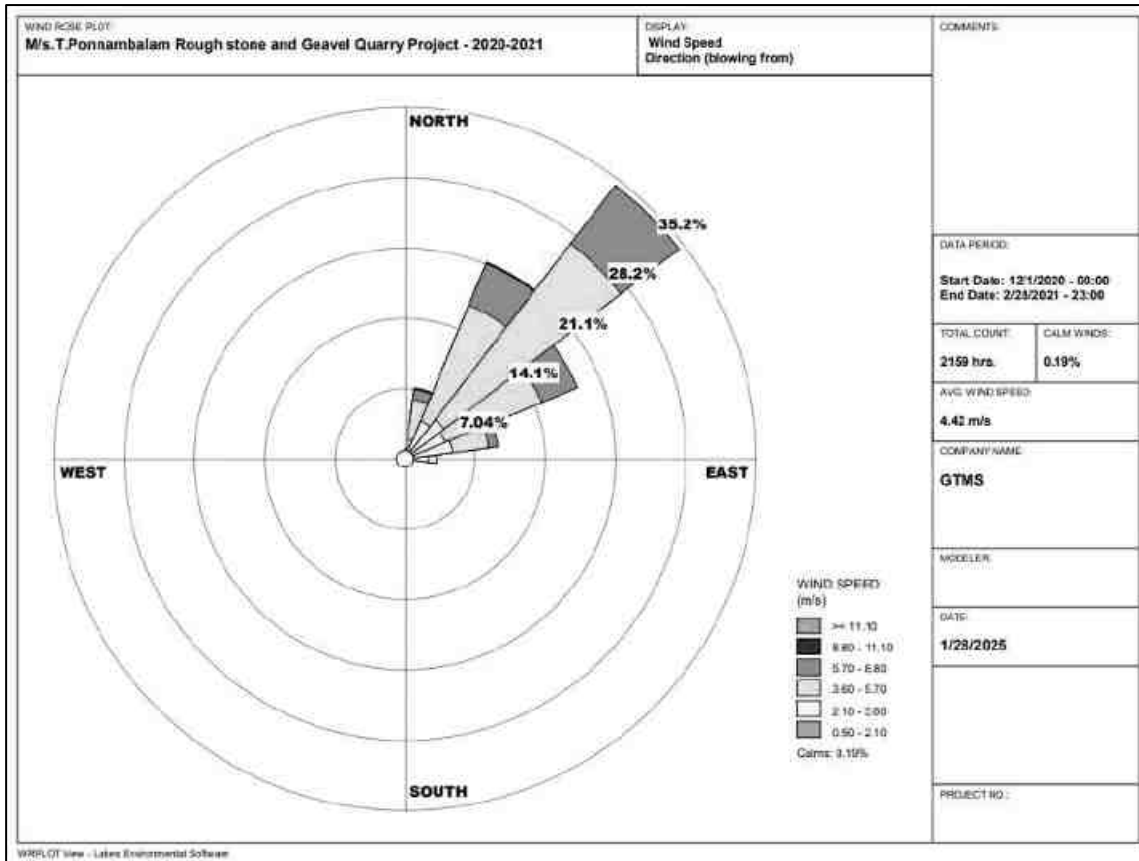
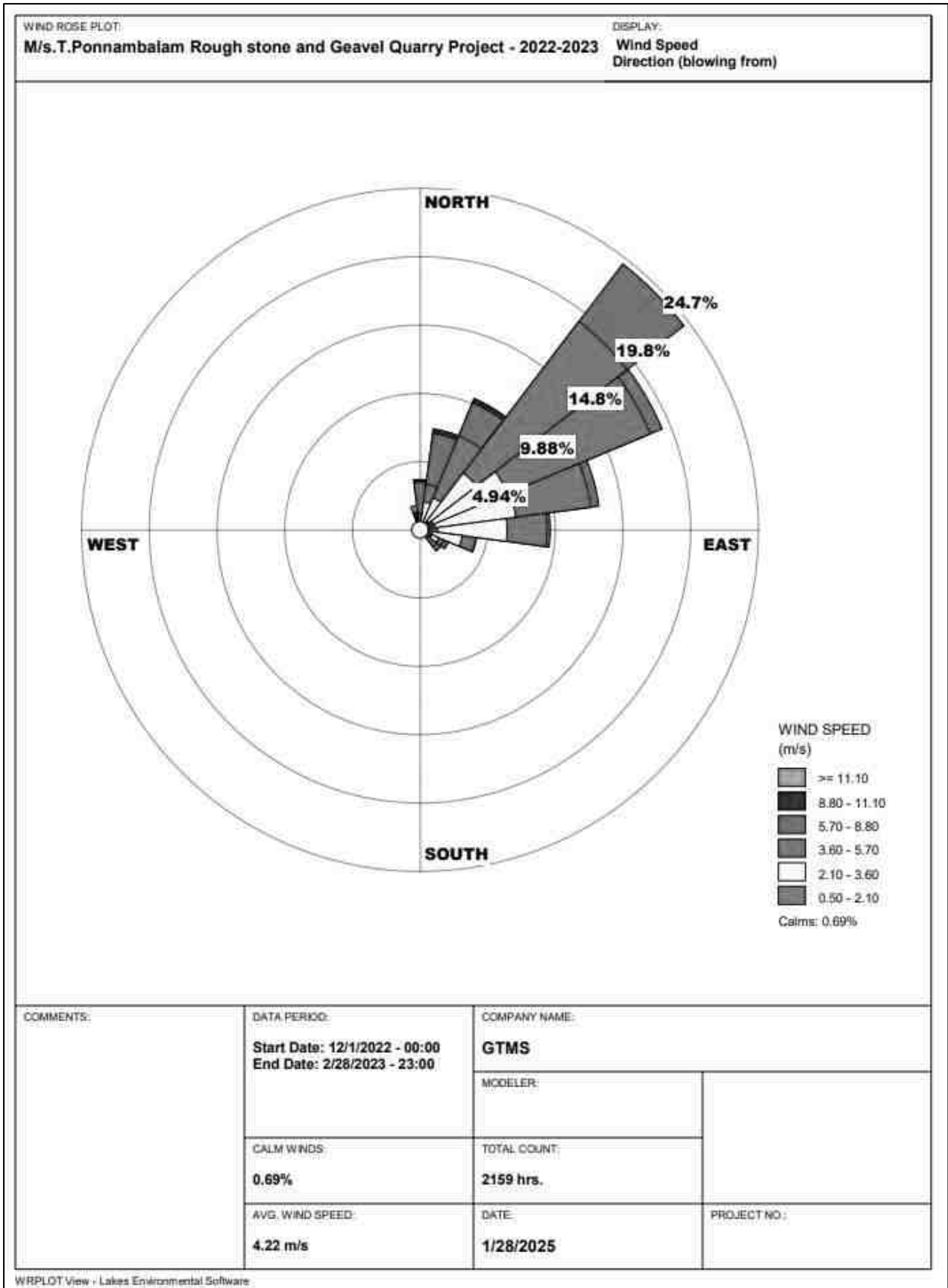


Figure 3.13a Windrose Diagram for 2020-2021 and 2021-2022 (December through February)



**Figure 3.14 Onsite Wind Rose Diagram**

### 3.3.2 Ambient Air Quality Study

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

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

**Table 3.13 Methodology and Instrument Used for AAQ Analysis**

| Parameter         | Method   | Instrument                                      |
|-------------------|--|---|
| PM <sub>2.5</sub> | Gravimetric method<br>Beta attenuation method            | Fine Particulate Sampler                        |
| PM <sub>10</sub>  | Gravimetric method<br>Beta attenuation method            | Respirable Dust Sampler                         |
| SO <sub>2</sub>   | IS-5182 Part II<br>(Improved West & Gaeke method)        | Respirable Dust Sampler with gaseous attachment |
| NO <sub>x</sub>   | IS-5182 Part II<br>(Jacob & Hoch heiser modified method) | Respirable Dust Sampler with gaseous attachment |
| Free Silica       | NIOSH – 7601   | Visible Spectrophotometry                       |

Source: On-site monitoring/sampling *Creative Engineers and Consultants* in association with GTMS.

**Table 3.14 National Ambient Air Quality Standards**

| S. No. | Pollutant                              | Time Weighted Average      | Concentration in ambient air                 |   |
|--------|--|----------------------------|--|---|
|        |  |                            | Industrial, Residential, Rural & other areas | Ecologically Sensitive area (Notified by Central Govt.) |
| 1      | SO <sub>2</sub> (µg/m <sup>3</sup> )   | Annual Avg.*<br>24 hours** | 50.0<br>80.0                                 | 20.0<br>80.0  |
| 2      | NO <sub>x</sub> (µg/m <sup>3</sup> )   | Annual Avg.<br>24 hours    | 40.0<br>80.0                                 | 30.0<br>80.0  |
| 3      | PM <sub>10</sub> (µg/m <sup>3</sup> )  | Annual Avg.<br>24 hours    | 60.0<br>100.0                                | 60.0<br>100.0   |
| 4      | PM <sub>2.5</sub> (µg/m <sup>3</sup> ) | Annual Avg.<br>24 hours    | 40.0<br>60.0                                 | 40.0<br>60.0  |

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



## Methodology

Ambient air quality monitoring was carried out with a frequency of two samples per week at Eight (08) locations, adopting a continuous 24 hourly (3 shift of 8-hour) schedule for the period December 2022 to February 2023 as per the CPCB, MoEF guidelines and notifications.

It was ensured that the equipment was placed preferably at a height of at least  $3 \pm 0.5$ m above the ground level at each monitoring station for negating the effects of wind-blown ground dust. The equipment was placed at space free from trees and vegetation which otherwise act as a sink of pollutants resulting in lower levels in monitoring results. The baseline data of ambient air were generated for PM<sub>2.5</sub>, PM<sub>10</sub>, sulphur dioxide (SO<sub>2</sub>) and nitrogen dioxide (NO<sub>x</sub>). The sampling locations are shown in Figure 3.15 and average concentrations of air pollutants are summarized in Tables 3.17 and are shown in Figures 3.16-3.20.

**Table 3.15 Ambient Air Quality (AAQ) Monitoring Locations**

| Location Code | Monitoring Locations | Distance (km) | Direction | Coordinates                  |
|---------------|----------------------|---------------|-----------|------------------------------|
| AAQ1          | Nearby lease         | 0.45          | SW        | 12°44'10.92"N, 79°42'25.93"E |
| AAQ2          | Poonaihangal         | 0.70          | NE        | 12°44'43.05"N, 79°42'53.98"E |
| AAQ3          | Seniyanallur         | 2.55          | E         | 12°44'13.68"N, 79°43'59.08"E |
| AAQ4          | Sithalapakkam        | 3.75          | SE        | 12°43'0.16"N, 79°44'6.38"E   |
| AAQ5          | Menallur             | 0.37          | NW        | 12°44'38.09"N, 79°42'24.93"E |
| AAQ6          | Vadikalpakkam        | 1.68          | NW        | 12°45'9.55"N, 79°41'55.79"E  |
| AAQ7          | Bhagavanthapuram     | 1.25          | S         | 12°43'44.39"N, 79°42'25.14"E |
| AAQ8          | Narasamangalam       | 4.25          | W         | 12°44'28.90"N, 79°40'11.06"E |

Source: On-site monitoring/sampling *Creative Engineers and Consultants* in association with GTMS.

## Results

As per the monitoring data, PM<sub>2.5</sub> ranges from 23.2µg/m<sup>3</sup> to 29.4µg/m<sup>3</sup>; PM<sub>10</sub> from 50.7µg/m<sup>3</sup> to 64.2µg/m<sup>3</sup>; SO<sub>2</sub> from 4.6µg/m<sup>3</sup> to 6.5µg/m<sup>3</sup>; NO<sub>x</sub> from 6.7µg/m<sup>3</sup> to 12.5g/m<sup>3</sup>. The concentration levels of the pollutants fall within the acceptable limits of NAAQS prescribed by CPCB.

## Air quality Index

The AQI shows that the air quality of the study area falls within good category 57 causing Minor breathing discomfort to sensitive people.

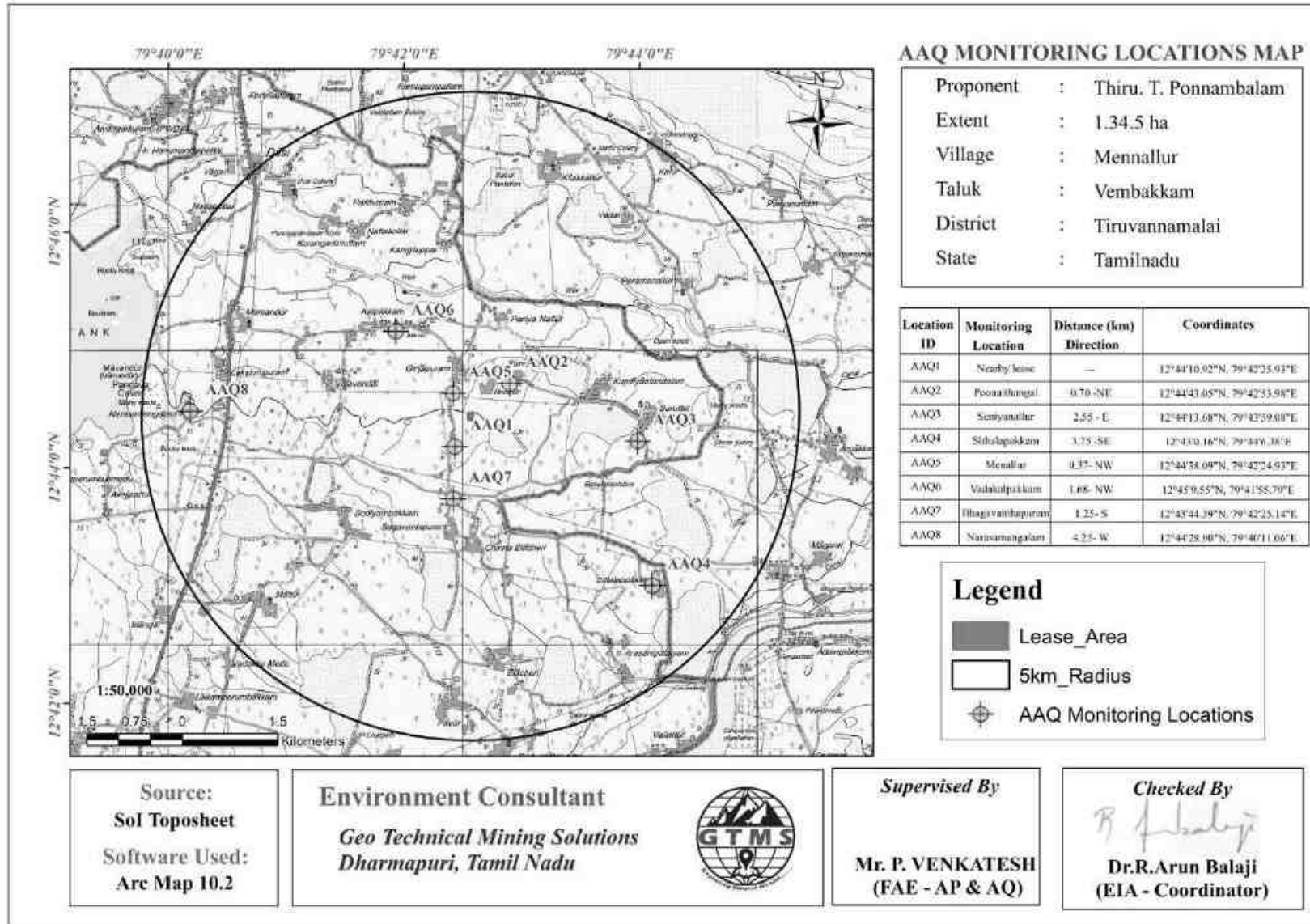
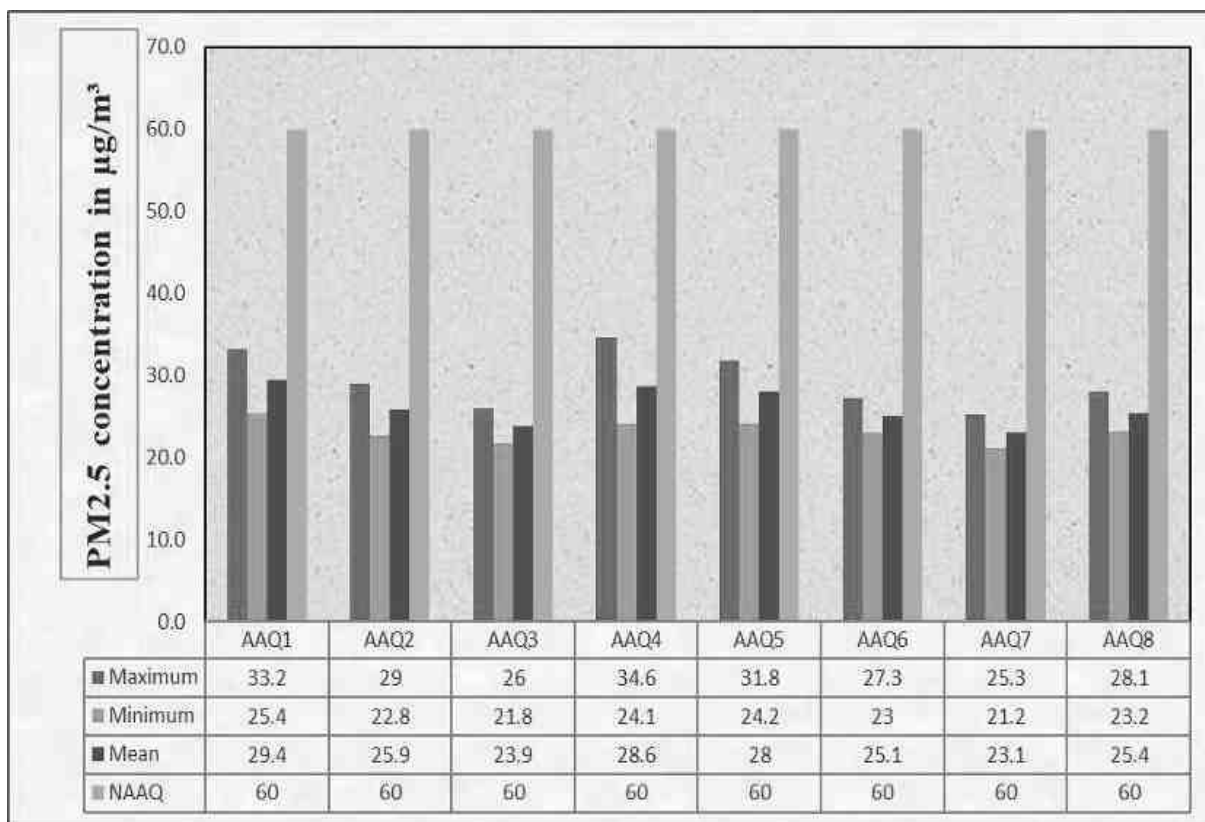


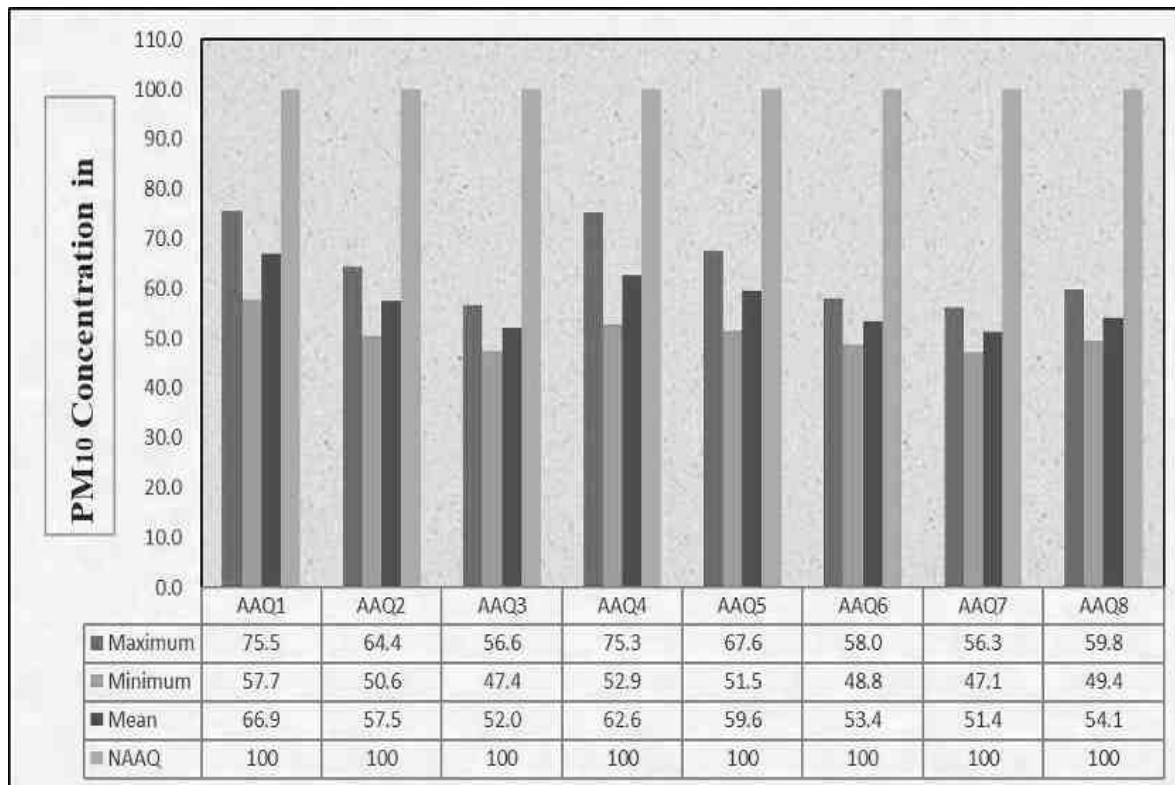
Figure 3.15 Map Showing Ambient Air Quality Monitoring Station Locations Around 5 km Radius from Proposed Project Site

**Table 3.16 Summary of AAQ Result**

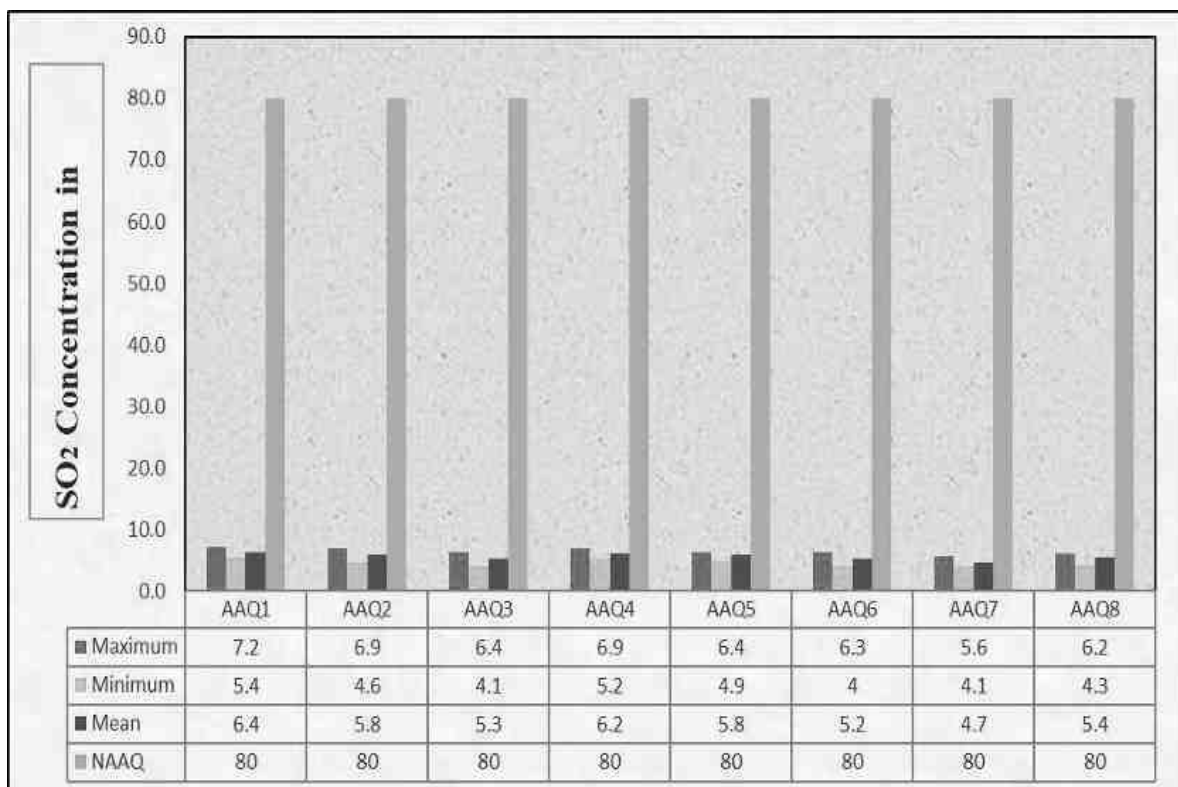
| PM <sub>2.5</sub> |      |      |      | PM <sub>10</sub> |      |      |
|-------------------|------|------|------|------------------|------|------|
| Station ID        | Max  | Min  | Mean | Max              | Min  | Mean |
| AAQ1              | 33.2 | 25.4 | 29.4 | 75.5             | 57.7 | 66.9 |
| AAQ2              | 29   | 22.8 | 25.9 | 64.4             | 50.6 | 57.5 |
| AAQ3              | 26   | 21.8 | 23.9 | 56.6             | 47.4 | 52.0 |
| AAQ4              | 34.6 | 24.1 | 28.6 | 75.3             | 52.9 | 62.6 |
| AAQ5              | 31.8 | 24.2 | 28   | 67.6             | 51.5 | 59.6 |
| AAQ6              | 27.3 | 23   | 25.1 | 58.0             | 48.8 | 53.4 |
| AAQ7              | 25.3 | 21.2 | 23.1 | 56.3             | 47.1 | 51.4 |
| AAQ8              | 28.1 | 23.2 | 25.4 | 59.8             | 49.4 | 54.1 |
| SO <sub>2</sub>   |      |      |      | NO <sub>x</sub>  |      |      |
| AAQ1              | 7.2  | 5.4  | 6.4  | 14.7             | 8.5  | 11.8 |
| AAQ2              | 6.9  | 4.6  | 5.8  | 13.5             | 6.6  | 10.1 |
| AAQ3              | 6.4  | 4.1  | 5.3  | 11               | 5.9  | 8.2  |
| AAQ4              | 6.9  | 5.2  | 6.2  | 14               | 7.6  | 11   |
| AAQ5              | 6.4  | 4.9  | 5.8  | 13.1             | 6.8  | 10   |
| AAQ6              | 6.3  | 4    | 5.2  | 11.6             | 6.3  | 8.7  |
| AAQ7              | 5.6  | 4.1  | 4.7  | 10.8             | 5.9  | 8.2  |
| AAQ8              | 6.2  | 4.3  | 5.4  | 11.2             | 6    | 8.5  |



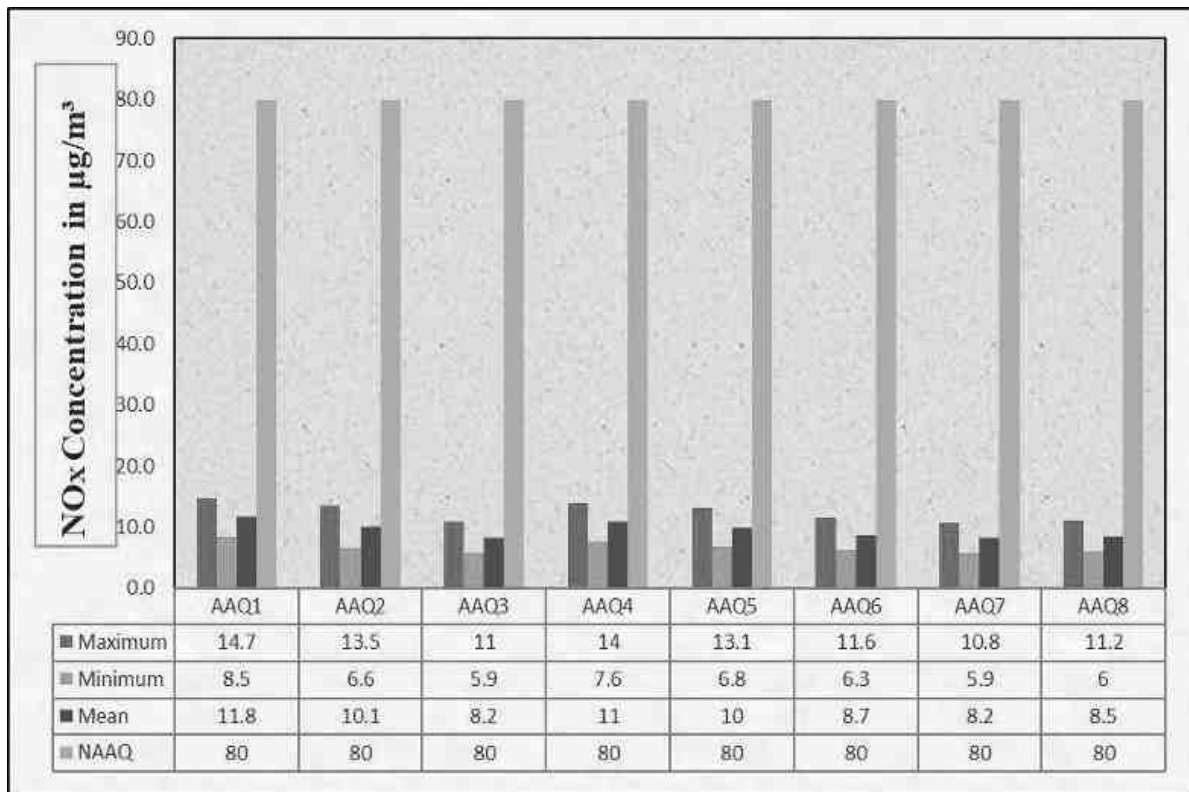
**Figure 3.16 Bar Chart Showing Maximum, Minimum, and Average Concentrations of PM<sub>2.5</sub> Measured from 8 Air Quality Monitoring Stations within 5 km Radius**



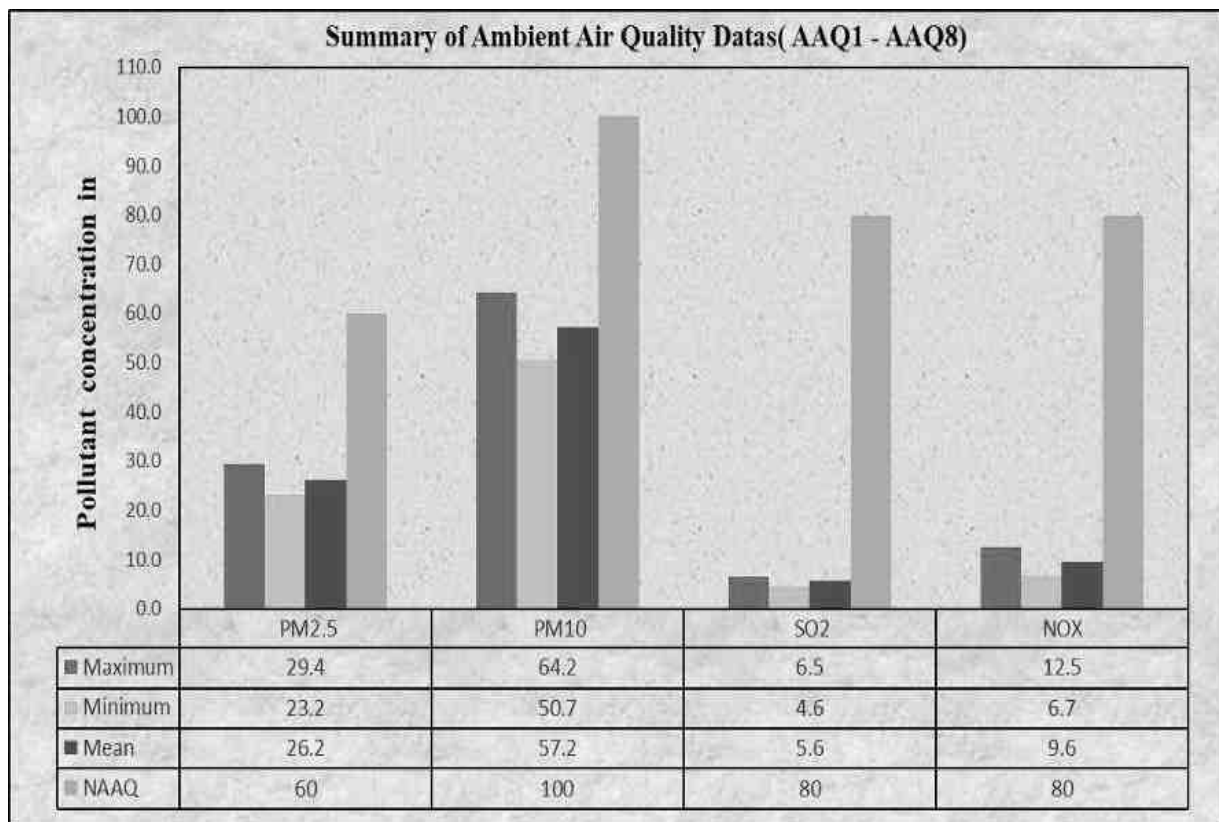
**Figure 3.17 Bar Chart Showing Maximum, Minimum, and Average Concentrations of PM<sub>10</sub> Measured from 8 Air Quality Monitoring Stations within 5 km Radius**



**Figure 3.18 Bar Chart Showing Maximum, Minimum, and Average Concentrations of SO<sub>2</sub> Measured from 8 Air Quality Monitoring Stations within 5 km Radius**



**Figure 3.19 Bar Chart Showing Maximum, Minimum, and Average Concentrations of NO<sub>x</sub> Measured from 8 Air Quality Monitoring Stations within 5km Radius**



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

### 3.4 NOISE ENVIRONMENT

The vehicular movement on road and mining activities is the major sources of noise in the study area. The main objective of noise monitoring in the study area is to establish the baseline noise level, which will in turn be used to assess the impact of the total noise expected to be generated during the project operations around the project site. In order to assess the ambient noise levels within the study area, noise monitoring was carried out at Eight (08) locations covering commercial, residential, rural areas within the radius of 5 km. Details of noise monitoring locations are provided in Table 3.18 and spatial occurrence of the locations are shown in Figure 3.21.

**Table 3.17 Noise Monitoring Locations**

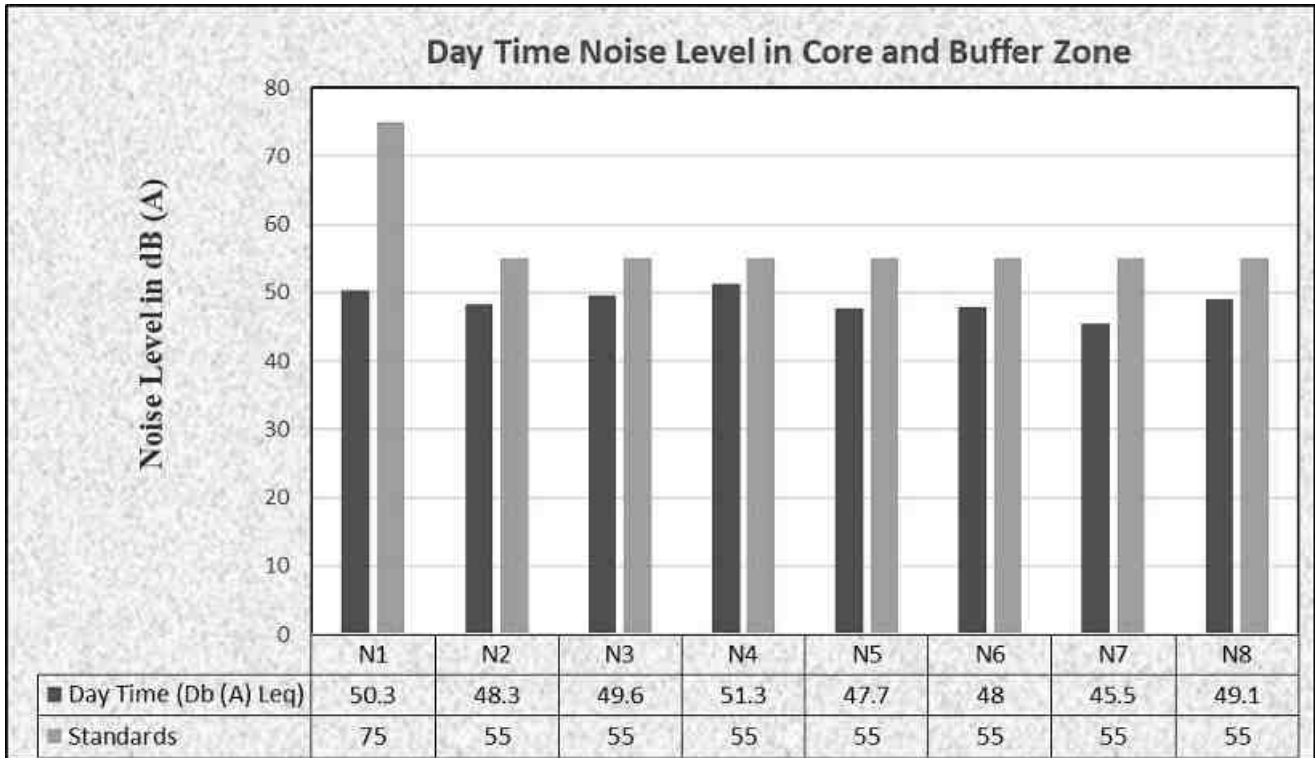
| Location Code | Monitoring Locations | Distance in km | Direction | Coordinates                  |
|---------------|----------------------|----------------|-----------|------------------------------|
| N1            | Nearby lease         | 0.12           | SW        | 12°44'11.62"N, 79°42'29.21"E |
| N2            | Poonathangal         | 0.79           | NE        | 12°44'45.05"N, 79°42'55.86"E |
| N3            | Seniyanallur         | 2.70           | E         | 12°44'12.66"N, 79°44'3.10"E  |
| N4            | Sithalapakkam        | 3.65           | SE        | 12°43'2.40"N, 79°44'3.98"E   |
| N5            | Menallur             | 0.39           | NW        | 12°44'38.71"N, 79°42'24.63"E |
| N6            | Vadikalpakkam        | 1.90           | NW        | 12°45'9.83"N, 79°41'45.74"E  |
| N7            | Bhagavanthapuram     | 1.29           | S         | 12°43'42.90"N, 79°42'25.54"E |
| N8            | Narasamangalam       | 3.70           | W         | 12°44'24.47"N, 79°40'29.75"E |

**Table 3.18 Ambient Noise Quality Result**

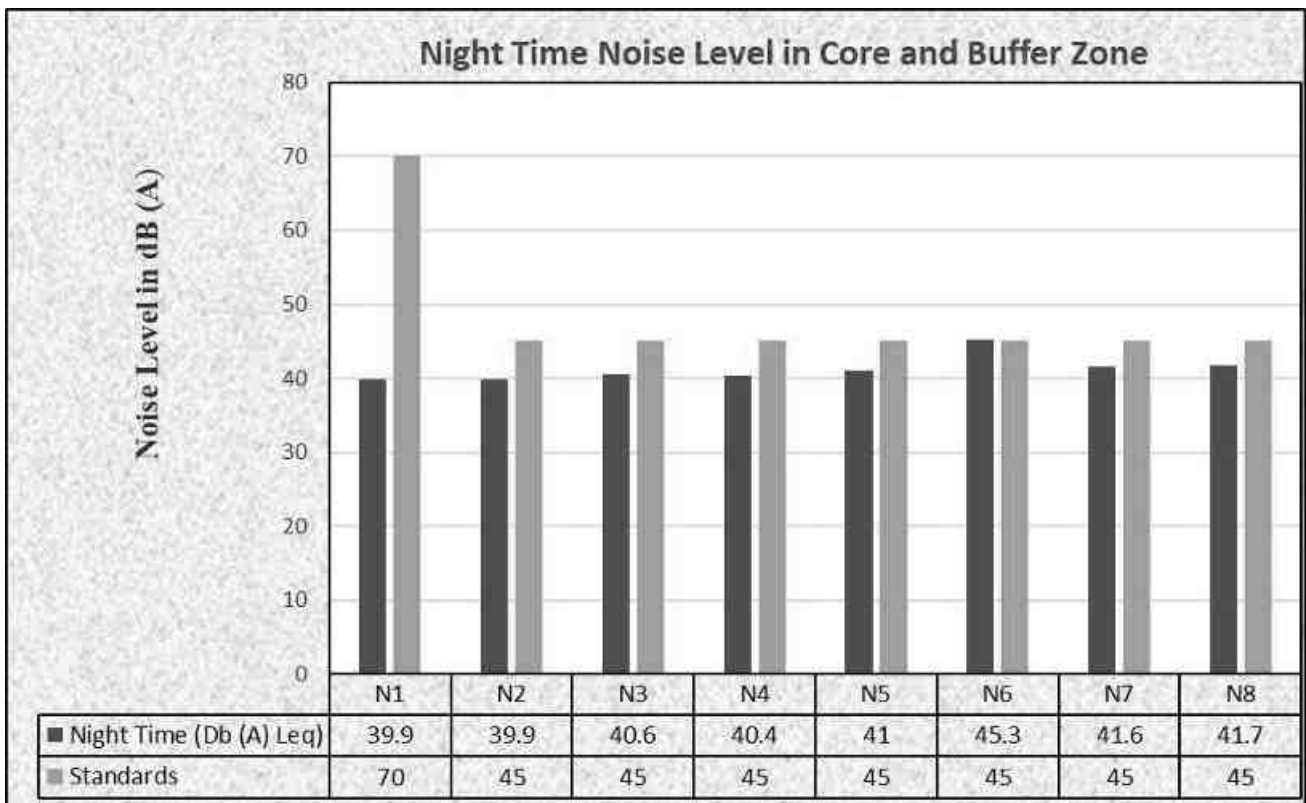
| Station ID | Location         | Environment al setting | Average day noise level (dB(A)) | Average night noise level (dB(A)) | Day time (6.00 AM – 10.00 PM)        | Night time (10.00 PM – 6.00 AM) |
|------------|------------------|------------------------|---------------------------------|-----------------------------------|--------------------------------------|---------------------------------|
|            |                  |                        |                                 |                                   | Standard (L <sub>eq</sub> in dB (A)) |                                 |
| N1         | Nearby lease     | Industrial Area        | 50.3                            | 39.9                              | 75                                   | 70                              |
| N2         | Poonathangal     | Residential area       | 48.3                            | 39.9                              | 55                                   | 45                              |
| N3         | Seniyanallur     |                        | 49.6                            | 40.6                              |                                      |                                 |
| N4         | Sithalapakkam    |                        | 51.3                            | 40.4                              |                                      |                                 |
| N5         | Menallur         |                        | 47.7                            | 41                                |                                      |                                 |
| N6         | Vadikalpakkam    |                        | 48                              | 45.3                              |                                      |                                 |
| N7         | Bhagavanthapuram |                        | 45.5                            | 41.6                              |                                      |                                 |
| N8         | Narasamangalam   |                        | 49.1                            | 41.7                              |                                      |                                 |

Source: On-site monitoring/sampling *Creative Engineers and Consultants* in association with GTMS.

The Table 3.18 shows that noise level in core zone was 50.3 dB (A) Leq during day time and 39.9dB(A) Leq during night time. Noise levels recorded in buffer zone during day time varied from 45.5 to 51.3dB (A) Leq and during night time from 39.9to 45.3dB (A) Leq. Thus, the noise level for industrial and residential area meets the requirements of CPCB. The results are also depicted below in Figures 3.22 and 3.23.



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



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

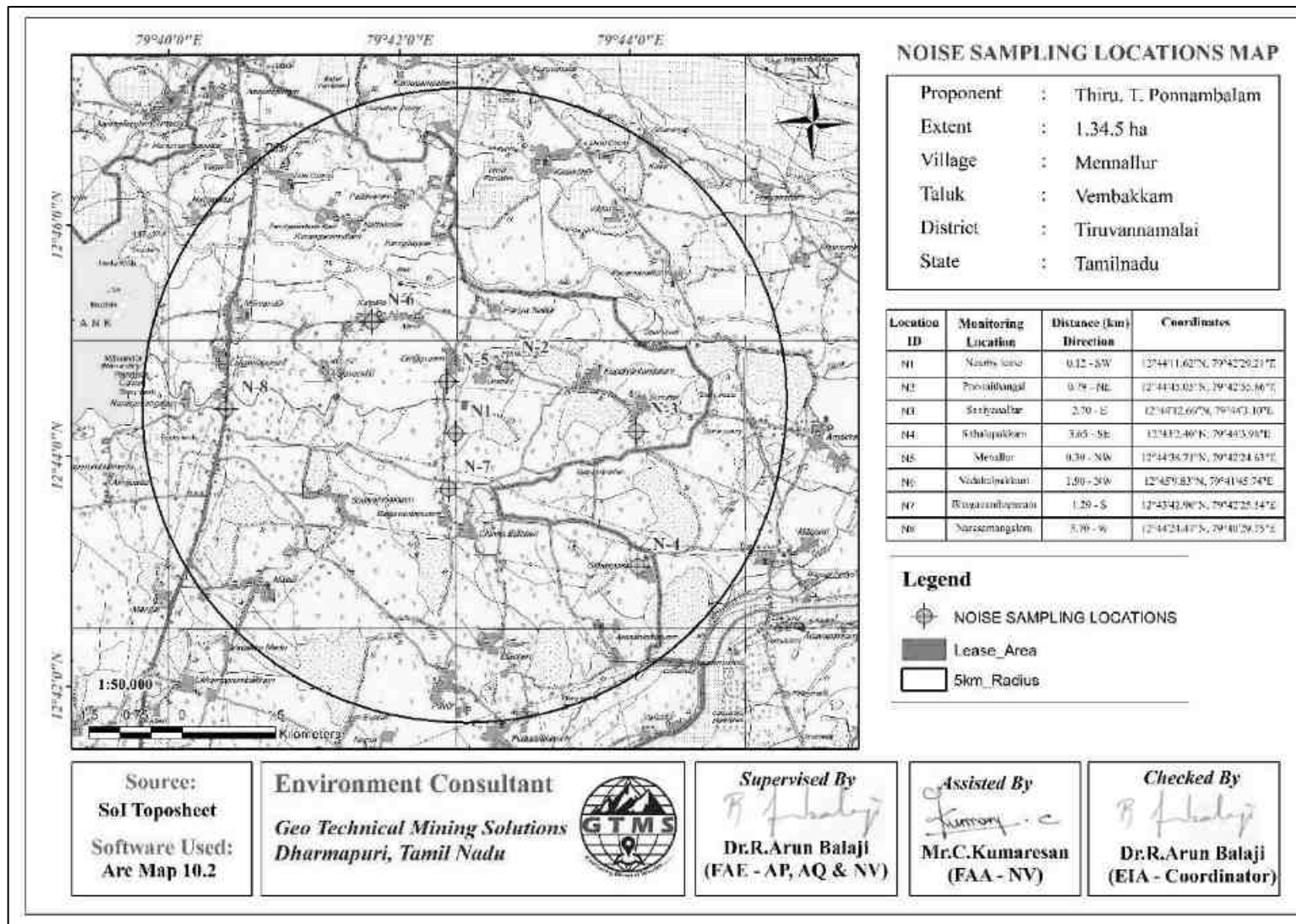


Figure 3.23 Map Showing Noise Level Monitoring Station Locations around 5 km Radius from Proposed Project Site



### 3.5 BIOLOGICAL ENVIRONMENT

An ecological survey was conducted to collect the baseline data regarding flora and fauna in the study area of 10 km radius. Data were collected from different sources, i.e., government departments such as District Forest Office and Government of Tamil Nadu. On the basis of onsite observations as well as forest department records the checklist of flora and fauna was prepared.

#### *Methodology*

Sampling locations were selected with reference to topography, land use, vegetation pattern, etc. In this study, quadrats of 25 m × 25 m were laid down to assess trees and quadrats of 10 m × 10 m were laid down for shrubs, as shown in Figure 3.24.



**Figure 3.24 Quadrates Sampling Methods of Flora**

#### *Phyto-Sociological Studies*

Phyto sociological parameters, such as *Density, Frequency, Abundance and Importance Value Index* of individual species were determined in randomly placed quadrat of different sizes in the study area, as shown in Table 3.20. Relative frequency, and relative density were calculated and the sum of these three represented Importance Value Index (IVI) for various species. For Trees, shrubs, herbs and grasses, *Density, Frequency, Relative Density & Relative Frequency were found*. Sample plots were selected in such a way to get maximum representation of different types of vegetation and plots were laid out in different part of the study area of 10 km radius. Analysis of the vegetation will help in determining the relative

importance of each species in the study area and to reveal if any economically valuable species is threatened in the process.

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

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

**Shannon – Wiener Index, Evenness and Richness**

Biodiversity index is a quantitative measure that reflects how many different types of species, there are in a dataset, and simultaneously takes into account how evenly the basic entities (such as individuals) are distributed among those types of species. The value of biodiversity index increases both when the number of types increases and when evenness increases. For a given number of type of species, the value of a biodiversity index is maximized when all type of species is equally abundant. The corresponding formulas are given in Table 3.21.

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

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

### 3.5.1 Flora

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

#### *Flora in mine lease area (core zone)*

The mine lease area contains total of 16 species belonging to 12 families have been recorded from the mine lease area. 2 shrubs, 14 herbs were identified. There are no trees in mine lease area. The floral analysis indicates that there are no threatened (Vulnerable, Endangered & Critically Endangered) species recorded from the core project site. A list of the IUCN Red List analysed plant species recorded inside the proposed project site. Details of vegetation with scientific name indicated in Table 3.22.

**Table 3.21 Flora in mine lease area**

| S.no                  | Local name        | Scientific name                | Family name    | IUCN Status |
|-----------------------|-------------------|--------------------------------|----------------|-------------|
| <b>Shrubs</b>         |                   |                                |                |             |
| 1                     | Earuku            | <i>Calotropis gigantea</i>     | Apocynaceae    | NL          |
| 2                     | communist pacha   | <i>Chromolaena odorata</i>     | Asteraceae     | NL          |
| <b>Herbs /Climber</b> |                   |                                |                |             |
| 1                     | Thathapondu       | <i>Tridax procumbens</i>       | Asteraceae     | NL          |
| 2                     | Kolunji chadi     | <i>Tephrosia purpurea</i>      | Fabaceae       | NL          |
| 3                     | Nayuruvi          | <i>Achyranthes aspera</i>      | Amaranthaceae  | NL          |
| 4                     | Nearunji mull     | <u><i>Tribulus zeyheri</i></u> | Zygophyllaceae | NL          |
| 5                     | Pulapoo           | <i>Aerva lanata</i>            | Amaranthaceae  | NL          |
| 6                     | American mint     | <i>Hyptis suaveolens</i>       | Lamiaceae      | NL          |
| 7                     | Veetukaayapoondu  | <i>Tridax procumbens</i>       | Asteraceae     | NL          |
| 8                     | Mukkirattai       | <i>Boerhaavia diffusa</i>      | Nyctaginaceae  | NL          |
| 9                     | Kuppaimeni        | <i>Acalypha indica</i>         | Euphorbiaceae  | NL          |
| 10                    | Arivalmanaipoondu | <i>Sida acuta</i>              | Malvaceae      | NL          |
| 11                    | Amman pacharisi   | <i>Euphorbia hirta</i>         | Euphorbiaceae  | NL          |
| 12                    | Keelanelli        | <i>Phyllanthus amarus</i>      | Phyllanthaceae | NL          |
| 13                    | Chevvarakupul     | <i>Chloris barbata</i>         | Poaceae        | NL          |
| 14                    | Vishnukarandi     | <i>Evolvulus alsinoides</i>    | Convolvulaceae | NL          |

#### *The Flora in lease area and 300 m radius (buffer zone)*

The 300m radius It contains a total of 34 species belonging to 21 families have been recorded from the buffer zone. 6 Trees (17%), 5 Shrubs (17%) and 22 Herbs and Climbers, Creeper, Grass & Cactus 20 (64%) were identified. Details of flora with the scientific name details and of diversity species Richness index were mentioned in Table 3.23-25 and Figure 3.26. There is no threatened species in 300 m radius.

Table 3.22 Flora in 300 m Radius

| S. No.       | Local Name     | Scientific name              | Family name    | Total No. of species | Total of Quadrants with | Total No. of Quadrants | Density | Frequency (%) | Abundance | Relative Density | Relative Frequency | IVI   | IUCN Conservation Status |
|--------------|----------------|------------------------------|----------------|----------------------|-------------------------|------------------------|---------|---------------|-----------|------------------|--------------------|-------|--------------------------|
| <b>Trees</b> |                |                              |                |                      |                         |                        |         |               |           |                  |                    |       |                          |
| 1            | Vembu          | <i>Azadirachta indica</i>    | Meliaceae      | 11                   | 9                       | 10                     | 1.1     | 90.0          | 1.2       | 3.29             | 6.47               | 9.77  | LC                       |
| 2            | Pongam oiltree | <i>Pongamia pinnata</i>      | Fabaceae       | 15                   | 8                       | 10                     | 1.5     | 80.0          | 1.9       | 4.49             | 5.76               | 10.25 | LC                       |
| 3            | Thennai maram  | <i>Cocos nucifera</i>        | Arecaceae      | 19                   | 5                       | 10                     | 1.9     | 50.0          | 3.8       | 5.69             | 3.60               | 9.29  | NL                       |
| 4            | Manga          | <i>Mangifera indica</i>      | Anacardiaceae  | 11                   | 7                       | 10                     | 1.1     | 70.0          | 1.6       | 3.29             | 5.04               | 8.33  | NL                       |
| 5            | Puliyamaram    | <i>Tamarindus indica</i>     | Legumes        | 18                   | 5                       | 10                     | 1.8     | 50.0          | 3.6       | 5.39             | 3.60               | 8.99  | LC                       |
| 6            | Vadanarayani   | <i>Delonix elata</i>         | Fabaceae       | 21                   | 7                       | 10                     | 2.1     | 70.0          | 3.0       | 6.29             | 5.04               | 11.32 | LC                       |
| 7            | Thenpazham     | <i>Muntingia calabura</i>    | Tiliaceae      | 25                   | 9                       | 10                     | 2.5     | 90.0          | 2.8       | 7.49             | 6.47               | 13.96 | LC                       |
| 8            | Punnai         | <i>Calophyllu inophyllum</i> | Calophyllaceae | 12                   | 3                       | 10                     | 1.2     | 30.0          | 4.0       | 3.59             | 2.16               | 5.75  | NL                       |
| 9            | Ilanthai       | <i>Ziziphus jujubha</i>      | Rhamnaceae     | 14                   | 8                       | 10                     | 1.4     | 80.0          | 1.8       | 4.19             | 5.76               | 9.95  | NL                       |
| 10           | Karuvelam      | <i>Acacia nilotica</i>       | Mimosaceae     | 17                   | 8                       | 10                     | 1.7     | 80.0          | 2.1       | 5.09             | 5.76               | 10.85 | NL                       |
| 11           | Nettilinkam    | <i>Polylathia longifolia</i> | Annonaceae     | 26                   | 9                       | 10                     | 2.6     | 90.0          | 2.9       | 7.78             | 6.47               | 14.26 | NL                       |
| 12           | Panai maram    | <i>Borassus flabellifer</i>  | Arecaceae      | 15                   | 7                       | 10                     | 1.5     | 70.0          | 2.1       | 4.49             | 5.04               | 9.53  | LC                       |
| 13           | Navalmaram     | <i>Sygygium cumini</i>       | Myrtaceae      | 22                   | 7                       | 10                     | 2.2     | 70.0          | 3.1       | 6.59             | 5.04               | 11.62 | NL                       |

|               |               |                                |                |            |            |    |     |      |     |       |       |       |    |
|---------------|---------------|--------------------------------|----------------|------------|------------|----|-----|------|-----|-------|-------|-------|----|
| 14            | Alamaram      | <i>Ficus benghalensis</i>      | Moraceae       | 12         | 8          | 10 | 1.2 | 80.0 | 1.5 | 3.59  | 5.76  | 9.35  | NL |
| 15            | Vazhaimaram   | <i>Musa</i>                    | Musaceae       | 14         | 5          | 10 | 1.4 | 50.0 | 2.8 | 4.19  | 3.60  | 7.79  | NL |
| 16            | Eucalyptus    | <i>Eucalyptus globules</i>     | Myrtaceae      | 19         | 8          | 10 | 1.9 | 80.0 | 2.4 | 5.69  | 5.76  | 11.44 | NL |
| 17            | Maramalli     | <i>Millingtonia hortensis</i>  | Bignoniaceae   | 11         | 5          | 10 | 1.1 | 50   | 2.2 | 3.29  | 3.60  | 6.89  | LC |
| 18            | Kuduka puli   | <i>Pithecellobium dulce</i>    | Mimosaceae     | 14         | 7          | 10 | 1.4 | 70   | 2.0 | 4.19  | 5.04  | 9.23  | LC |
| 19            | Savukku       | <i>Casuarina L.</i>            | Casuarinaceae  | 21         | 9          | 10 | 2.1 | 90   | 2.3 | 6.29  | 6.47  | 12.76 | NL |
| 20            | Echamaram     | <i>Phoenix sylvestris</i>      | Arecaceae      | 17         | 5          | 10 | 1.7 | 50   | 3.4 | 5.09  | 3.60  | 8.69  | NL |
| <b>Total</b>  |               |                                |                | <b>334</b> | <b>139</b> |    |     |      |     |       |       |       |    |
| <b>Shrubs</b> |               |                                |                |            |            |    |     |      |     |       |       |       |    |
| 1             | Avarai        | <i>Senna auriculata</i>        | Fabaceae       | 17         | 7          | 10 | 1.7 | 70.0 | 2.4 | 11.81 | 13.73 | 25.53 | LC |
| 2             | Sundaika      | <i>Solanum torvum</i>          | Solanaceae     | 22         | 8          | 10 | 2.2 | 80.0 | 2.8 | 15.28 | 15.69 | 30.96 | NL |
| 3             | Vellai Erukku | <i>Calotropis procera</i>      | Asclepiadaceae | 15         | 3          | 10 | 1.5 | 30.0 | 5.0 | 10.42 | 5.88  | 16.30 | LC |
| 4             | Ponnarali     | <i>Thevetia peruviana</i>      | Apocynaceae    | 23         | 9          | 10 | 2.3 | 90.0 | 2.6 | 15.97 | 17.65 | 33.62 | NL |
| 5             | Nochi         | <i>Vitex negundo</i>           | Verbenaceae    | 14         | 5          | 10 | 1.4 | 50.0 | 2.8 | 9.72  | 9.80  | 19.53 | LC |
| 6             | Suraimullu    | <i>Ziziphus oenoplia</i>       | Rhamnaceae     | 11         | 7          | 10 | 1.1 | 70.0 | 1.6 | 7.64  | 13.73 | 21.36 | NL |
| 7             | Kattukkottai  | <i>Jatropha curcas</i>         | Euphorbiaceae  | 25         | 3          | 10 | 2.5 | 30.0 | 8.3 | 17.36 | 5.88  | 23.24 | LC |
| 8             | Karaikai      | <i>Canthium coromandelicum</i> | Rubiaceae      | 17         | 9          | 10 | 1.7 | 90.0 | 1.9 | 11.81 | 17.65 | 29.45 | NL |
| <b>Total</b>  |               |                                |                | <b>144</b> | <b>51</b>  |    |     |      |     |       |       |       |    |
| <b>Herbs</b>  |               |                                |                |            |            |    |     |      |     |       |       |       |    |
| 1             | Perandai      | <i>Cissus quadrangularis</i>   | Vitaceae       | 15         | 9          | 10 | 1.5 | 90.0 | 1.7 | 3.69  | 5.84  | 9.54  | NL |
| 2             | Thathapondu   | <i>Tridax procumbens</i>       | Asteraceae     | 15         | 7          | 10 | 1.5 | 70.0 | 2.1 | 3.69  | 4.55  | 8.24  | NL |
| 3             | Kolunji chadi | <i>Tephrosia purpurea</i>      | Fabaceae       | 21         | 7          | 10 | 2.1 | 70.0 | 3.0 | 5.17  | 4.55  | 9.72  | NL |

|              |                   |                             |                |            |            |    |     |      |     |      |      |       |    |
|--------------|-------------------|-----------------------------|----------------|------------|------------|----|-----|------|-----|------|------|-------|----|
| 4            | Nayuruvi          | <i>Achyranthes aspera</i>   | Amaranthaceae  | 15         | 6          | 10 | 1.5 | 60.0 | 2.5 | 3.69 | 3.90 | 7.59  | NL |
| 5            | Nearunji mull     | <i>Tribulus zeyheri</i>     | Zygophyllaceae | 21         | 8          | 10 | 2.1 | 80.0 | 2.6 | 5.17 | 5.19 | 10.37 | NL |
| 6            | Pulapoo           | <i>Aerva lanata</i>         | Amaranthaceae  | 27         | 6          | 10 | 2.7 | 60.0 | 4.5 | 6.65 | 3.90 | 10.55 | NL |
| 7            | American mint     | <i>Hyptis suaveolens</i>    | Lamiaceae      | 17         | 7          | 10 | 1.7 | 70.0 | 2.4 | 4.19 | 4.55 | 8.73  | NL |
| 8            | Mukkirattai       | <i>Boerhaavia diffusa</i>   | Nyctaginaceae  | 17         | 5          | 10 | 1.7 | 50.0 | 3.4 | 4.19 | 3.25 | 7.43  | NL |
| 9            | Kuppaimeni        | <i>Acalypha indica</i>      | Euphorbiaceae  | 21         | 9          | 10 | 2.1 | 90.0 | 2.3 | 5.17 | 5.84 | 11.02 | NL |
| 10           | Kovaikodi         | <i>Coccinia grandis</i>     | Cucurbitaceae  | 11         | 5          | 10 | 1.1 | 50.0 | 2.2 | 2.71 | 3.25 | 5.96  | NL |
| 11           | Arivalmanaipoondu | <i>Sida acuta</i>           | Malvaceae      | 19         | 8          | 10 | 1.9 | 80.0 | 2.4 | 4.68 | 5.19 | 9.87  | NL |
| 12           | Amman pacharisi   | <i>Euphorbia hirta</i>      | Euphorbiaceae  | 13         | 7          | 10 | 1.3 | 70.0 | 1.9 | 3.20 | 4.55 | 7.75  | NL |
| 13           | Keelanelli        | <i>Phyllanthus amarus</i>   | Phyllanthaceae | 21         | 8          | 10 | 2.1 | 80.0 | 2.6 | 5.17 | 5.19 | 10.37 | NL |
| 14           | Chevvarakupul     | <i>Chloris barbata</i>      | Poaceae        | 15         | 3          | 10 | 1.5 | 30.0 | 5.0 | 3.69 | 1.95 | 5.64  | NL |
| 15           | Mullukkeerai      | <i>Amaranthus spinosus</i>  | Amaranthaceae  | 25         | 7          | 10 | 2.5 | 70.0 | 3.6 | 6.16 | 4.55 | 10.70 | NL |
| 16           | Vishnukarandi     | <i>Evolvulus alsinoides</i> | Convolvulaceae | 17         | 8          | 10 | 1.7 | 80.0 | 2.1 | 4.19 | 5.19 | 9.38  | NL |
| 17           | Thulasi           | <i>Ocimum sanctum</i>       | Lamiaceae      | 15         | 9          | 10 | 1.5 | 90   | 1.7 | 3.69 | 5.84 | 9.54  | NL |
| 18           | Eallu             | <i>Sesamum indicum</i>      | Pedaliaceae    | 14         | 6          | 10 | 1.4 | 60   | 2.3 | 3.45 | 3.90 | 7.34  | NL |
| 19           | Chatai            | <i>Aeschynomene indica</i>  | Fabaceae       | 15         | 7          | 10 | 1.5 | 70   | 2.1 | 3.69 | 4.55 | 8.24  | LC |
| 20           | Yanaikkitti       | <i>Cyperus iria</i>         | Cyperaceae     | 17         | 3          | 10 | 1.7 | 30   | 5.7 | 4.19 | 1.95 | 6.14  | LC |
| 21           | Thuthuvalai       | <i>Solanum trilobatum</i>   | Solanaceae     | 21         | 8          | 10 | 2.1 | 80   | 2.6 | 5.17 | 5.19 | 10.37 | NL |
| 22           | Chirakkuli        | <i>Spermacoce tenuior</i>   | Rubiaceae      | 15         | 7          | 10 | 1.5 | 70   | 2.1 | 3.69 | 4.55 | 8.24  | NL |
| 23           | Naikkatuku        | <i>Cleome viscosa</i>       | Cleomaceae     | 19         | 4          | 10 | 1.9 | 40   | 4.8 | 4.68 | 2.60 | 7.28  | NL |
| <b>Total</b> |                   |                             |                | <b>406</b> | <b>154</b> |    |     |      |     |      |      |       |    |

NL - Not Listed in IUCN Red List Database LC - Least Concern - [Species categorized as Least Concern (LC) is a taxon when it has been evaluated against the Red List criteria and does not qualify for Endangered Near Threatened.] - Data Deficient (DD)

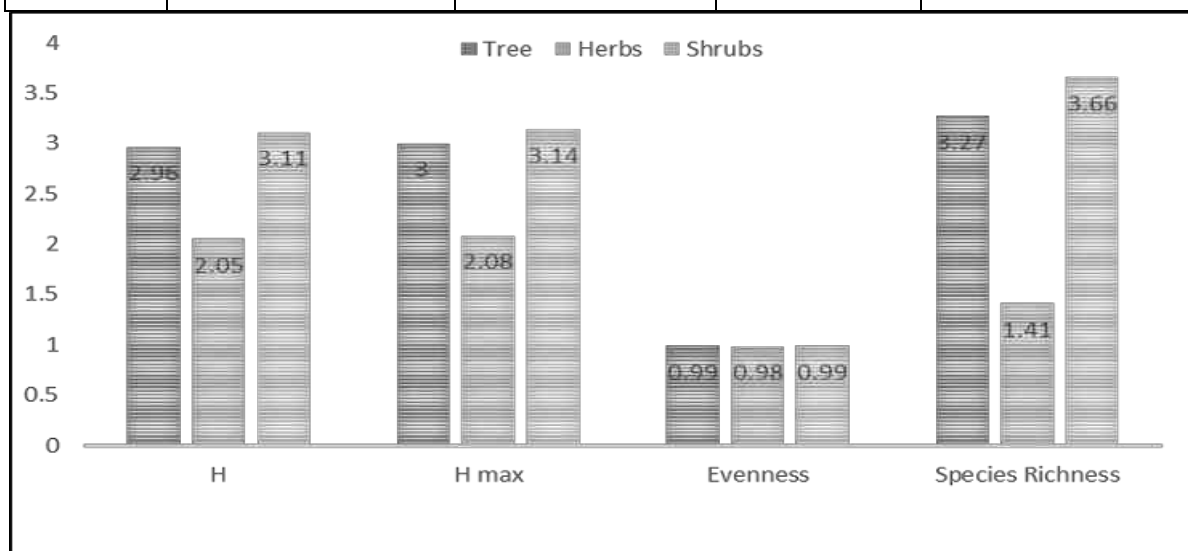
**Table 3.23 Calculation of Species Diversity in 300m Radius**

| S.No.                              | Common name        | Scientific name                | No. of Species | Pi   | In (Pi) | Pi x in (Pi) |
|------------------------------------|--------------------|--------------------------------|----------------|------|---------|--------------|
| <b>Trees</b>                       |                    |                                |                |      |         |              |
| 1                                  | Vembu              | <i>Azadirachta indica</i>      | 11             | 0.03 | -3.41   | -0.11        |
| 2                                  | Pongam oiltree     | <i>Pongamia pinnata</i>        | 15             | 0.04 | -3.10   | -0.14        |
| 3                                  | Thennai maram      | <i>Cocos nucifera</i>          | 19             | 0.06 | -2.87   | -0.16        |
| 4                                  | Manga              | <i>Mangifera indica</i>        | 11             | 0.03 | -3.41   | -0.11        |
| 5                                  | Puliyamaram        | <i>Tamarindus indica</i>       | 18             | 0.05 | -2.92   | -0.16        |
| 6                                  | Vadanarayani       | <i>Delonix elata</i>           | 21             | 0.06 | -2.77   | -0.17        |
| 7                                  | Thenpazham         | <i>Muntingia calabura</i>      | 25             | 0.07 | -2.59   | -0.19        |
| 8                                  | Punnai             | <i>Calophyllum inophyllum</i>  | 12             | 0.04 | -3.33   | -0.12        |
| 9                                  | Ilanthai           | <i>Ziziphus jujubha</i>        | 14             | 0.04 | -3.17   | -0.13        |
| 10                                 | Karuvelam          | <i>Acacia nilotica</i>         | 17             | 0.05 | -2.98   | -0.15        |
| 11                                 | Nettilinkam        | <i>Polylathia longifolia</i>   | 26             | 0.08 | -2.55   | -0.20        |
| 12                                 | Panai maram        | <i>Borassus flabellifer</i>    | 15             | 0.04 | -3.10   | -0.14        |
| 13                                 | Navalmaram         | <i>Syzygium cumini</i>         | 22             | 0.07 | -2.72   | -0.18        |
| 14                                 | Alamaram           | <i>Ficus benghalensis</i>      | 12             | 0.04 | -3.33   | -0.12        |
| 15                                 | Vazhaimaram        | <i>Musa</i>                    | 14             | 0.04 | -3.17   | -0.13        |
| 16                                 | Eucalyptus         | <i>Eucalyptus globules</i>     | 19             | 0.06 | -2.87   | -0.16        |
| 17                                 | Maramalli          | <i>Millingtonia hortensis</i>  | 11             | 0.03 | -3.41   | -0.11        |
| 18                                 | Kuduka puli        | <i>Pithecellobium dulce</i>    | 14             | 0.04 | -3.17   | -0.13        |
| 19                                 | Savukku            | <i>Casuarina L.</i>            | 21             | 0.06 | -2.77   | -0.17        |
| 20                                 | Echamaram          | <i>Phoenix sylvestris</i>      | 17             | 0.05 | -2.98   | -0.15        |
| H (Shannon Diversity Index) = 2.96 |                    |                                |                |      |         |              |
| <b>Shrubs</b>                      |                    |                                |                |      |         |              |
| 1                                  | Avarai             | <i>Senna auriculata</i>        | 17             | 0.12 | -2.14   | -0.25        |
| 2                                  | Sundaika           | <i>Solanum torvum</i>          | 22             | 0.15 | -1.88   | -0.29        |
| 3                                  | Vellai Erukku      | <i>Calotropis procera</i>      | 15             | 0.10 | -2.26   | -0.24        |
| 4                                  | Ponnarali          | <i>Thevetia peruviana</i>      | 23             | 0.16 | -1.83   | -0.29        |
| 5                                  | Nochi              | <i>Vitex negundo</i>           | 14             | 0.10 | -2.33   | -0.23        |
| 6                                  | Suraimullu         | <i>Ziziphus oenoplia</i>       | 11             | 0.08 | -2.57   | -0.20        |
| 7                                  | Kattukkottai       | <i>Jatropha curcas</i>         | 25             | 0.17 | -1.75   | -0.30        |
| 8                                  | Karaikai           | <i>Canthium coromandelicum</i> | 17             | 0.12 | -2.14   | -0.25        |
| H (Shannon Diversity Index) = 2.05 |                    |                                |                |      |         |              |
| <b>Herbs</b>                       |                    |                                |                |      |         |              |
| 1                                  | Perandai           | <i>Cissus quadrangularis</i>   | 15             | 0.04 | -3.30   | -0.12        |
| 2                                  | Thathapondu        | <i>Tridax procumbens</i>       | 15             | 0.04 | -3.30   | -0.12        |
| 3                                  | Kolunji chadi      | <i>Tephrosia purpurea</i>      | 21             | 0.05 | -2.96   | -0.15        |
| 4                                  | Nayuruvi           | <i>Achyranthes aspera</i>      | 15             | 0.04 | -3.30   | -0.12        |
| 5                                  | Nearunji mull      | <i>Tribulus zeyheri</i>        | 21             | 0.05 | -2.96   | -0.15        |
| 6                                  | Pulapoo            | <i>Aerva lanata</i>            | 27             | 0.07 | -2.71   | -0.18        |
| 7                                  | American mint      | <i>Hyptis suaveolens</i>       | 17             | 0.04 | -3.17   | -0.13        |
| 8                                  | Mukkirattai        | <i>Boerhaavia diffusa</i>      | 17             | 0.04 | -3.17   | -0.13        |
| 9                                  | Kuppaimeni         | <i>Acalypha indica</i>         | 21             | 0.05 | -2.96   | -0.15        |
| 10                                 | Kovaikodi          | <i>Coccinia grandis</i>        | 11             | 0.03 | -3.61   | -0.10        |
| 11                                 | Arivalmanaiipoondu | <i>Sida acuta</i>              | 19             | 0.05 | -3.06   | -0.14        |
| 12                                 | Amman pacharisi    | <i>Euphorbia hirta</i>         | 13             | 0.03 | -3.44   | -0.11        |

|                                    |               |                             |    |      |       |       |
|------------------------------------|---------------|-----------------------------|----|------|-------|-------|
| 13                                 | Keelanelli    | <i>Phyllanthus amarus</i>   | 21 | 0.05 | -2.96 | -0.15 |
| 14                                 | Chevvarakupul | <i>Chloris barbata</i>      | 15 | 0.04 | -3.30 | -0.12 |
| 15                                 | Mullukkeerai  | <i>Amaranthus spinosus</i>  | 25 | 0.06 | -2.79 | -0.17 |
| 16                                 | Vishnukarandi | <i>Evolvulus alsinoides</i> | 17 | 0.04 | -3.17 | -0.13 |
| 17                                 | Thulasi       | <i>Ocimum sanctum</i>       | 15 | 0.04 | -3.30 | -0.12 |
| 18                                 | Eallu         | <i>Sesamum indicum</i>      | 14 | 0.03 | -3.37 | -0.12 |
| 19                                 | Chatai        | <i>Aeschynomene indica</i>  | 15 | 0.04 | -3.30 | -0.12 |
| 20                                 | Yanaikkitti   | <i>Cyperus iria</i>         | 17 | 0.04 | -3.17 | -0.13 |
| 21                                 | Thuthuvalai   | <i>Solanum trilobatum</i>   | 21 | 0.05 | -2.96 | -0.15 |
| 22                                 | Chirakkuli    | <i>Spermacoce tenuior</i>   | 15 | 0.04 | -3.30 | -0.12 |
| 23                                 | Naikkatuku    | <i>Cleome viscosa</i>       | 19 | 0.05 | -3.06 | -0.14 |
| H (Shannon Diversity Index) = 3.05 |               |                             |    |      |       |       |

**Table 3.24 Species Richness (Index) in 300m radius**

| Details       | H    | H max | Evenness | Species Richness |
|---------------|------|-------|----------|------------------|
| <b>Trees</b>  | 2.96 | 3.00  | 0.99     | 3.27             |
| <b>Shrubs</b> | 2.05 | 2.08  | 0.98     | 1.41             |
| <b>Herbs</b>  | 3.11 | 3.14  | 0.99     | 3.66             |



**Figure 3.25 Species Richness (Index) in 300m radius Flora in 10 km radius buffer zone**

Similar type of environment occurs in both core and buffer zone but more floral diversity noticed in buffer zone compared with core zone area. Buffer area contains a total species belonging to 40 families have been recorded. The floral (130) varieties among them 52 Trees, 34 Shrubs, 29 Herbs, 8 Climbers, 7 Grass were identified. Details of flora with the scientific name mentioned in Table 3.26.

**Table 3.25 Flora in Buffer Zone**

| S. No        | Species name                 | Family   | Local name  |
|--------------|------------------------------|----------|-------------|
| <b>Trees</b> |                              |          |             |
| 1            | <i>Acacia auriculiformis</i> | Fabaceae | Pencil tree |
| 2            | <i>Acacia catechu</i>        | Fabaceae | Khair       |



|    |                                |                 |                 |
|----|--------------------------------|-----------------|-----------------|
| 3  | <i>Acacia leucophloea</i>      | Fabaceae        | Valvelam        |
| 4  | <i>Acacia nilotica</i>         | Fabaceae        | Karuvelan       |
| 5  | <i>Acacia planifrons</i>       | Fabaceae        | Umbrella thorn  |
| 6  | <i>Acras sapota</i> L.         | Sapotaceae      | Sapota          |
| 7  | <i>Aegle marmelos</i>          | Rutaceae        | Vivam           |
| 8  | <i>Albizia amara</i>           | Fabaceae        | Vagai           |
| 9  | <i>Albizia lebebeck</i>        | Fabaceae        | Siris           |
| 10 | <i>Annona squamosa</i>         | Annonaceae      | Sithapalzham    |
| 11 | <i>Areca catechu</i>           | Arecaceae       | Pakku maram     |
| 12 | <i>Artocarpus integrifolia</i> | Moraceae        | Pala maram      |
| 13 | <i>Atalantia monophylla</i>    | Rutaceae        | Kattu Elumeachi |
| 14 | <i>Bauhinia purpurea</i>       | Caesalpiniaceae | Mantharai       |
| 15 | <i>Borassus flabellifer</i>    | Arecaceae       | Panna-maram     |
| 16 | <i>Butea monosperma</i>        | Fabaceae        | Palasu          |
| 17 | <i>Caesalpinia pulcherrima</i> | Fabaceae        | Mayilkondrai    |
| 18 | <i>Carica papaya</i>           | Caricaceae      | Pappali         |
| 19 | <i>Cassia fistula</i>          | Caesalpinaceae  | Konnai          |
| 20 | <i>Casuarina equisetifolia</i> | Casuarinaceae   | Savukku         |
| 21 | <i>Citrus limon</i>            | Rutaceae        | Lemon           |
| 22 | <i>Cocus nucifera</i>          | Arecaceae       | Tennai          |
| 23 | <i>Delonix regia</i>           | Fabaceae        | Gulmohar        |
| 24 | <i>Ficus benghalensis</i>      | Moraceae        | Aalamaram       |
| 25 | <i>Ficus racemosa</i>          | Moraceae        | Atthi           |
| 26 | <i>Ficus religiosa</i>         | Moraceae        | Arasamaram      |
| 27 | <i>Gmelina arborea</i>         | Verbenaceae     | Kumalaamaram    |
| 28 | <i>Lepisanthes tetraphylla</i> | Sapindaceae     | Nekota          |
| 29 | <i>Leucaena leucocephala</i>   | Fabaceae        | Subabul         |
| 30 | <i>Madhuca longifolia</i>      | Sapotaceae      | Iluppai         |
| 31 | <i>Mangifera indica</i>        | Anacardiaceae   | Mango           |
| 32 | <i>Manilkara zapota</i>        | Sapotaceae      | Sappota         |
| 33 | <i>Mimusops elengi</i>         | Sapotaceae      | Magizhamboo     |
| 34 | <i>Morinda tinctoria</i>       | Rubiaceae       | Nuna            |
| 35 | <i>Moringa oleifera</i>        | Moringaceae     | Murungai        |
| 36 | <i>Murriya koengii</i>         | Rutaceae        | Kariveppilai    |
| 37 | <i>Musa paradisiaca</i>        | Musaceae        | Valzhlai        |
| 38 | <i>Peltophorum pterocarpum</i> | Fabaceae        | Kilukiluppai    |
| 39 | <i>Phoenix sylvestris</i>      | Arecaceae       | Eachamaram      |
| 40 | <i>Phyllanthus emblica</i>     | Euphorbiaceae   | Nelli           |
| 41 | <i>Pithecellobium dulce</i>    | Mimosaceae      | kodukkappuli    |
| 42 | <i>Polyalthia longifolia</i>   | Annonaceae      | Nettilingam     |
| 43 | <i>Pongamia pinnata</i>        | Fabaceae        | Pungai          |

|               |                                  |                 |                    |
|---------------|----------------------------------|-----------------|--------------------|
| 44            | <i>Prosopis juliflora</i>        | Fabaceae        | Seemai karuvel     |
| 45            | <i>Psidium guava</i>             | Myrtaceae       | Koyya              |
| 46            | <i>Samanea saman</i>             | Fabaceae        | Amaivagai          |
| 47            | <i>Saraca asoca</i>              | Caesalpiniaceae | Asogam             |
| 48            | <i>Syzygium cumuni</i>           | Myrtaceae       | Naval              |
| 49            | <i>Tamarindus indica</i>         | Caesalpiniaceae | Puli               |
| 50            | <i>Tectona grandis</i>           | Verbenaceae     | Tekku              |
| 51            | <i>Terminalia arjuna</i>         | Combretaceae    | Marudha Maram      |
| 52            | <i>Thespesia populnea</i>        | Malvaceae       | Puvarasu           |
| <b>Shurbs</b> |                                  |                 |                    |
| 1             | <i>Abutilon indicum</i>          | Malvaceae       | Thutti             |
| 2             | <i>Aloe vera</i>                 | Liliaceae       | Kathalai           |
| 3             | <i>Anisomeles indica</i>         | Lamiaceae       | Indian Catmint     |
| 4             | <i>Anisomeles malabarica</i>     | Lamiaceae       | Peyameratti        |
| 5             | <i>Boerhaavia diffusa</i>        | Nyctaginaceae   | Kagithapoo         |
| 6             | <i>Bougainvillea spectabilis</i> | Nyctaginaceae   | Kagithapoo         |
| 7             | <i>Caesalpinia pulcherrima</i>   | Caesalpiniaceae | Mayilkonnai        |
| 8             | <i>Calotropis gigantea</i>       | Apocynaceae     | Earukku            |
| 9             | <i>Canthium parviflorum</i>      | Rubiaceae       | Karaiceti          |
| 10            | <i>Carissa carandas</i>          | Apocynaceae     | Kala/Kila          |
| 11            | <i>Carissa spinarum</i>          | Apocynaceae     | Chirukila          |
| 12            | <i>Cassia auriculata</i>         | Fabaceae        | Aavarampoo         |
| 13            | <i>Datura metel</i>              | Solanaceae      | Umatai             |
| 14            | <i>Dodonaea viscosa</i>          | Sapindaceae     | Velari             |
| 15            | <i>Euphorbia tirucalli</i>       | Euphorbiaceae   | Thiru- kalli       |
| 16            | <i>Grewia tiliifolia</i>         | Tiliaceae       | Dhaman             |
| 17            | <i>Hibiscus rosa-sinensis</i>    | Malvaceae       | Semparuthi         |
| 18            | <i>Ipomoea carnea</i>            | Convolvulaceae  | Bush morning glory |
| 19            | <i>ixora coccinea</i>            | Rubiaceae       | Idlipoo            |
| 20            | <i>Jatropha glandulifera</i>     | Euphorbiaceae   | Vellaikattukottai  |
| 21            | <i>Justicia adhatoda</i>         | Acanthaceae     | Adathoda           |
| 22            | <i>Lantana camara</i>            | Verbenaceae     | Unichedi           |
| 23            | <i>Lawsonia inermis</i>          | Lythraceae      | Henna              |
| 24            | <i>Ocimum sanctarum</i>          | Amaranthaceae   | Thulasi            |
| 25            | <i>Opuntia stricta</i>           | Cactaceae       | Sappathikalli      |
| 26            | <i>Ricinus communis</i>          | Euphorbiaceae   | Amanakku           |
| 27            | <i>Solanum pubescens</i>         | Solanaceae      | Kattusundai        |
| 28            | <i>Tarenna asiatica</i>          | Rubiaceae       | Thaerani           |
| 29            | <i>Tecoma stans</i>              | Bignoniaceae    | Yellow trumpetbush |
| 30            | <i>Tephrosia purpurea</i>        | Fabaceae        | Kolinji            |

|                 |                                 |                 |                                   |
|-----------------|---------------------------------|-----------------|-----------------------------------|
| 31              | <i>Vitex negundo</i>            | Verbenaceae     | Nochi                             |
| 32              | <i>Vitex trifolia</i>           | Verbenaceae     | Nili / Karu nocci                 |
| 33              | <i>Wrightia tinctoria</i>       | Apocynaceae     | Nilapalai                         |
| 34              | <i>Ziziphus jujuba</i>          | Rhamnaceae      | Elanthai                          |
| <b>Herbs</b>    |                                 |                 |                                   |
| 1               | <i>Abutilon indicum</i>         | Malvaceae       | Thuththi                          |
| 2               | <i>Acalypha indica</i>          | Amaranthaceae   | Kupaimeni keeri                   |
| 3               | <i>Achyranthes aspera</i>       | Amaranthaceae   | Nayuruvi                          |
| 4               | <i>Aloe vera</i>                | Asphodelaceae   | Chotthu kathalai                  |
| 5               | <i>Alternanthera sesilis</i>    | Amaranthaceae   | Joy weed                          |
| 6               | <i>Amaranthus tricolor</i>      | Amaranthaceae   | Sirukkeerai                       |
| 7               | <i>Amaranthus viridis</i>       | Amaranthaceae   | Kuppaikeerai                      |
| 8               | <i>Andrographis echinoides</i>  | Acanthaceae     | Gopuram tangi                     |
| 9               | <i>Anisomeles malabarica</i>    | Lamiaceae       | Peyimarutti                       |
| 10              | <i>Argemone mexicana</i>        | Papaveraceae    | Mexican poppy                     |
| 11              | <i>Boerhavia diffusa</i>        | Nyctaginaceae   | Erect spiderling<br>(Mukkirattai) |
| 12              | <i>Boerhavia erecta</i>         | Nyctaginaceae   | Erect Spiderling                  |
| 13              | <i>Cassia occidentalis</i>      | Caesalpinaceae  | Pei- avarai                       |
| 14              | <i>Cassia tora</i> L.           | Caesalpiniaceae | Thagarai                          |
| 15              | <i>Catharanthus roseus</i>      | Apocynaceae     | Nithyakalyani                     |
| 16              | <i>Cleome viscosa</i>           | Amaranthaceae   | Ajagandha                         |
| 17              | <i>Cleome viscosa</i>           | Cleomaceae      | Naai velai                        |
| 18              | <i>Commelina benghalensis</i>   | Commelinaceae   | Kanavaazhai                       |
| 19              | <i>Leucas aspera</i>            | Lamiaceae       | Thumbai                           |
| 20              | <i>Ocimum tenuiflorum</i>       | Lamiaceae       | Thulasi                           |
| 21              | <i>Parthenium hysterophorus</i> | Asteraceae      | Parthenium                        |
| 22              | <i>Phyllanthus niruri</i>       | Phyllanthaceae  | Keelzhaneeli                      |
| 23              | <i>Sida acuta</i>               | Malvaceae       | Palambasi                         |
| 24              | <i>Sida cordifolia</i>          | Malvaceae       | Nila –thuthi                      |
| 25              | <i>Sida rhombifolia</i>         | Malvaceae       | Chitramutti                       |
| 26              | <i>Solanum xanthocarpum</i>     | Solanaceae      | Kandangkattari                    |
| 27              | <i>Tephrosia purpuria</i>       | Fabaceae        | Poondu sedi                       |
| 28              | <i>Tridax procumbens</i>        | Asteraceae      | Vettukai poondu                   |
| 29              | <i>Waltheria indica</i>         | Sterculiaceae   | shembudu                          |
| <b>Climbers</b> |                                 |                 |                                   |
| 1               | <i>Abrus precatorius</i>        | Fabaceae        | Kundumani                         |
| 2               | <i>Asparagus racemosus</i>      | Asparagaceae    | Tannir-vittan                     |
| 3               | <i>Cissus quadrangularis</i>    | Vitaceae        | Pirandai                          |
| 4               | <i>Clitoria ternatea</i>        | Fabaceae        | Butterfly Pea                     |

|                |                               |              |                   |
|----------------|-------------------------------|--------------|-------------------|
| 5              | <i>Coccinia indica</i>        | Cucubitaceae | Kovai             |
| 6              | <i>Jasminum angustifolium</i> | Oleaceae     | Kattumalligai     |
| 7              | <i>Luffa cylindrica</i>       | Cucubitaceae | Peirkkai          |
| 8              | <i>Ziziphus oenoplia</i>      | Rhamnaceae   | Kottai-ilanthai   |
| <b>Grasses</b> |                               |              |                   |
| 1              | <i>Cenchrus ciliaris</i>      | Poaceae      | Kolukkattai-pullu |
| 2              | <i>Chloris barbata</i>        | Poaceae      | Chevvarakupul     |
| 3              | <i>Chloris bournei</i>        | Poaceae      | Peria kuruttu pul |
| 4              | <i>Chloris inflata</i>        | Poaceae      | Kodai pullu       |
| 5              | <i>Chrysopogon fulvus</i>     | Poaceae      | Cholappullu       |
| 6              | <i>Cynodon dactylon</i>       | Poaceae      | Arugam pullu      |
| 7              | <i>Cyperus rotundus</i>       | Cyperaceae   | korai pullu       |

### ***Aquatic Vegetation***

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

**Table 3.26 Aquatic Vegetation**

| <b>S. No.</b> | <b>Scientific Name</b>    | <b>Common Name</b>  | <b>Vernacular Name (Tamil)</b> | <b>IUCN Red List of Threatened Species</b> |
|---------------|---------------------------|---------------------|--------------------------------|--|
| 1             | <i>Eichornia Crassipe</i> | Water Hyacinth      | Agayatamarai                   | NA   |
| 2             | <i>Aponogeton natans</i>  | Floating Lace Plant | Kottikizhangu                  | NA   |
| 3             | <i>Nymphaea Nouchali</i>  | Blue Water Lily     | Nellambal                      | LC   |
| 4             | <i>Carex Crucjata</i>     | Cross Grass         | Koraipullu                     | NA   |
| 5             | <i>Cynodon Dactylon</i>   | Scutch Grass        | Arugampullu                    | LC   |
| 6             | <i>Cyperus Exaltatus</i>  | Tall Flat Sedge     | Koraikizhangu                  | LC   |

\*Lc- Least Concern, Na-Not Yet Assessed

### ***Food chain***

The food chain in aquatic ecosystems often begins with the algae or phytoplankton producers, and then the zooplankton that feed on them. This type of food chain is found in Noyal River by phytoplankton, zooplankton, fish and Artiola gray.

Ex: Phytoplankton→Zooplankton→small fish→large fish

### ***Endangered and endemic species as per the IUCN Red List***

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

### **3.5.2 Fauna**

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

**Table 3.27 Methodology applied during survey of fauna**

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

***Fauna in Core Zone:***

There are no faunal species in mine lease area. It is an existing mine lease.

***Fauna in 300m radius***

The 25 varieties of species observed in the core zone. Among them numbers of Insects 8 (32%), Reptiles 3 (12%), Mammals 5 (20%) and Avian 9 (36%). A total of 25 species belonging to 22 families have been recorded from the core mining lease area. Number of species decreases towards the mining area this might be due the lack of vegetation. None of these species are threatened or endemic. There is no Schedule I species and eight species are under schedule IV according to Indian wild life Act 1972. A total 9 species of birds were sighted in the mining lease area. There are no critically endangered, endangered, vulnerable and endemic species were observed. Details of fauna in core zone with the scientific name were mentioned in Table. 3.29.

***Fauna in 10km radius***

A total of 47 species belonging to 34 families were recorded in the buffer zone. Based on habitat classification the majority of species were Birds 18 (40%), followed by Insects 15 (31%), Reptiles 7 (15%), 4 Mammals (8%) and amphibians 3 (6%). There are 4 schedule II species and 24 schedule IV species according to Indian wild life Act 1972. There are no critically endangered, vulnerable and endemic species observed. List of fauna in the buffer zone is provided in Table 3.30.

**Table 3.28 Fauna in 300m radius from the mine lease area**

| S. No          | Common name/English Name | Family Name  | Scientific Name               | Schedule list wildlife Protection act 1972 | IUCN Red List data |
|----------------|--------------------------|--------------|-------------------------------|--|--------------------|
| <b>INSECTS</b> |                          |              |                               |  |                    |
| 1              | Common Tiger             | Nymphalidae  | <i>Danaus genutia</i>         | NL   | NL                 |
| 2              | Red-veined darter        | Libellulidae | <i>Sympetrum fonscolombii</i> | NL   | LC                 |

|                 |                       |             |                               |             |    |
|-----------------|-----------------------|-------------|-------------------------------|-------------|----|
| 3               | Grasshopper           | Acrididae   | <i>Hieroglyphus sp</i>        | NL          | LC |
| 4               | Blue tiger            | Nymphalidae | <i>Tirumala limniace</i>      | Schedule IV | LC |
| 5               | Stick insect          | Lonchodidae | <i>carausius morosus</i>      | NL          | LC |
| 6               | Mottled emigrant      | Peridae     | <i>Catopsilia pyranthe</i>    | NL          | LC |
| 7               | Striped tiger         | Nymphalidae | <i>Danaus plexippus</i>       | Schedule IV | LC |
| 8               | <i>Acraea violae</i>  | Nymphalidae | <i>Acraea violae</i>          | NL          | LC |
| <b>REPTILES</b> |                       |             |                               |             |    |
| 1               | Garden lizard         | Agamidae    | <i>Calotes versicolor</i>     | NL          | LC |
| 2               | Common house gecko    | Gekkonidae  | <i>Hemidactylus frenatus</i>  | NL          | LC |
| 3               | Fan-Throated Lizard   | Agamidae    | <i>Sitanaponticeriana</i>     | NL          | LC |
| <b>MAMMALS</b>  |                       |             |                               |             |    |
| 1               | Indian Field Mouse    | Muridae     | <i>Mus booduga</i>            | Schedule IV | NL |
| 2               | Cow                   | Bovidae     | <i>Bos taurus</i>             | NL          | NL |
| 3               | Common dog            | Canidae     | <i>Canis lupus familiaris</i> | NL          | NL |
| 4               | Common cat            | Felidae     | <i>Felis silvestris catus</i> | NL          | NL |
| 5               | Squirrel              | Sciuridae   | <i>Funambulus palmarum</i>    | NL          | NL |
| <b>AVES</b>     |                       |             |                               |             |    |
| 1               | Asian green bee-eater | Meropidae   | <i>Meropsorientalis</i>       | NL          | LC |
| 2               | Koel                  | Cuculidae   | <i>Eudynamys</i>              | Schedule IV | LC |
| 3               | Common myna           | Sturnidae   | <i>Acridotheres tristis</i>   | NL          | LC |
| 4               | Cattle egret          | Ardeidae    | <i>Bubulcus ibis</i>          | NL          | LC |
| 5               | House crow            | Corvidae    | <i>Corvus splendens</i>       | NL          | LC |
| 6               | Koel                  | Cuculidae   | <i>Eudynamys scolopaceus</i>  | Schedule IV | LC |
| 7               | Crow Pheasant         | Cuculidae   | <i>Centropus sinensis</i>     | Schedule IV | LC |
| 8               | Indian pond heron     | Ardeidae    | <i>Ardeola grayii</i>         | Schedule IV | LC |
| 9               | Grey drongo           | Dicruridae  | <i>Dicrurus leucophaeus</i>   | Schedule IV | LC |

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

**Table 3.29 Fauna in 10km radius**

| S. No.         | Common Name/English Name | Family Name | Scientific Name | Schedule List Wildlife Protection Act 1972 | IUCN Red List Data |
|----------------|--------------------------|-------------|-----------------|--|--------------------|
| <b>INSECTS</b> |                          |             |                 |  |                    |

|                 |                            |                |                               |                  |    |
|-----------------|----------------------------|----------------|-------------------------------|------------------|----|
| 1               | Blue tiger                 | Nymphalidae    | <i>Tirumala limniace</i>      | Schedule IV      | LC |
| 2               | Milkweed butterfly         | Nymphalidae    | <i>Danainae</i>               | NL               | LC |
| 3               | Tawny coster               | Nymphalidae    | <i>Danaus chrysippus</i>      | Schedule IV      | LC |
| 4               | Indian honey bee           | Apidae         | <i>Apis cerana</i>            | Schedule IV      | LC |
| 5               | Grasshopper                | Acrididae      | <i>Hieroglyphus sp</i>        | NL               | LC |
| 6               | Red-veined darter          | Libellulidae   | <i>Sympetrum fonscolombii</i> | NL               | LC |
| 7               | Lime butterfly             | Papilionidae   | <i>Papilio demoleus</i>       | Schedule IV      | LC |
| 8               | Ant                        | Formicidae     | <i>Camponotus Vicinus</i>     | NL               | NL |
| 9               | Dragonfly                  | Gomphidae      | <i>Ceratogomphus pictus</i>   | Schedule IV      | LC |
| 10              | Common Tiger               | Nymphalidae    | <i>Danaus genutia</i>         | Schedule IV      | LC |
| 11              | Common Indian crow         | Nymphalidae    | <i>Euploea core</i>           | Schedule IV      | LC |
| 12              | Praying mantis             | Mantidae       | <i>mantis religiosa</i>       | NL               | NL |
| 13              | Striped tiger              | Nymphalidae    | <i>Danaus plexippus</i>       | Schedule IV      | LC |
| 14              | Lesser grass blue          | Lycaenidae     | <i>Zizina otis indica</i>     | Schedule IV      | LC |
| 15              | Jewel beetle               | Buprestidae    | <i>Eurythyrea austriaca</i>   | Schedule IV      | NA |
| <b>REPTILES</b> |                            |                |                               |                  |    |
| 16              | Garden lizard              | Agamidae       | <i>Calotes versicolor</i>     | NL               | LC |
| 17              | Common house gecko         | Gekkonidae     | <i>Hemidactylus frenatus</i>  | NL               | LC |
| 18              | Indian chameleon           | Chamaeleonidae | <i>Chamaeleo zeylanicus</i>   | Sch II (Part I)  | LC |
| 19              | Olive keelback water snake | Natricidae     | <i>Atretium schistosum</i>    | Sch II (Part II) | LC |
| 20              | Brahminy skink             | Scincidae      | <i>Eutropis carinata</i>      | NL               | LC |
| 21              | Rat snake                  | Colubridae     | <i>Ptyas mucosa</i>           | Sch II (Part II) | LC |
| 22              | Common skink               | Scincidae      | <i>Mabuya carinatus</i>       | NL               | LC |
| <b>MAMMALS</b>  |                            |                |                               |                  |    |
| 23              | Indian palm squirrel       | Sciuridae      | <i>Funambulus palmarum</i>    | Schedule IV      | LC |
| 24              | Indian hare                | Leporidae      | <i>Lepus nigricollis</i>      | Schedule IV      | LC |
| 25              | Indian Field Mouse         | Muridae        | <i>Mus booduga</i>            | Schedule IV      | LC |

|                   |                         |                |   |                    |    |
|-------------------|-------------------------|----------------|---|--------------------|----|
| 26                | Asian Small Mongoose    | Herpestidae    | <i>Herpestes javanicus</i>                      | Schedule (Part II) | LC |
| <b>AVES</b>       |                         |                |   |                    |    |
| 27                | Indian pond heron       | Ardeidae       | <i>Ardeola grayii</i>                           | Schedule IV        | LC |
| 28                | Black drongo            | Dicruridae     | <i>Dicrurus macrocercus</i>                     | Schedule IV        | LC |
| 29                | Asian green bee-eater   | Meropidae      | <i>Meropsorientalis</i>                         | NL                 | LC |
| 30                | Red-breasted parakeet   | Psittaculidae  | <i>Psittacula alexandri</i>                     | NL                 | LC |
| 31                | Common Coot             | Rallidae       | <i>Fulica atra</i>                              | Schedule IV        | LC |
| 32                | Common myna             | Sturnidae      | <i>Acridotheres tristis</i>                     | NL                 | LC |
| 33                | Shikra                  | Accipitridae   | <i>Accipiter badius</i>                         | NL                 | LC |
| 34                | Koel                    | Cucalidae      | <i>Eudynamys</i>                                | Schedule IV        | LC |
| 35                | Common Quail            | Phasianidae    | <i>Coturnix coturnix</i>                        | Schedule IV        | LC |
| 36                | Red-vented Bulbul       | Pycnonotidae   | <i>Pycnonotuscafer</i>                          | Schedule IV        | LC |
| 37                | Brahminy starling       | Sturnidae      | <i>Sturnia pagodarum</i>                        | Schedule IV        | LC |
| 38                | golden oriole           | Oriolidae      | <i>Oriolus kundoo</i>                           | Schedule IV        | LC |
| 39                | Rose-ringed parakeet    | Psittaculidae  | <i>Psittacula krameria</i>                      | NL                 | LC |
| 40                | Common quail            | Phasianidae    | <i>Coturnix coturnix</i>                        | Schedule IV        | LC |
| 41                | White-breasted waterhen | Rallidae       | <i>Amaurornis phoenicurus</i>                   | NL                 | LC |
| 42                | Two-tailed Sparrow      | Dicruridae     | <i>Dicrurus macrocercus</i>                     | Schedule IV        | LC |
| 43                | Grey Francolin          | Phasianidae    | <i>Francolinus pondicerianus</i>                | Schedule IV        | LC |
| 44                | House crow              | Corvidae       | <i>Corvussplendens</i>                          | NL                 | LC |
| <b>AMPHIBIANS</b> |                         |                |   |                    |    |
| 45                | Indian Burrowing frog   | Dicroglossidae | <i>Sphaerotheca breviceps</i>                   | Schedule IV        | LC |
| 46                | Green Pond Frog         | Ranidae        | <i>Rana hexadactyla</i>                         | Schedule IV        | LC |
| 47                | Tiger Frog              | Chordata       | <i>Hoplobatrachus tigerinus (Rana tigerina)</i> | Schedule IV        | LC |

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



### 3.5.3 Agriculture & Horticulture in Tiruvanamalai district:

Thiruvannamalai district is coming under North Eastern Zone region and the total area under cultivation is 192174.70 ha. In that, Horticultural crops have been cultivated in about 27103.90 ha and the prominent crops under cultivation are Banana, Mango, Tapioca, Tomato, Chillies, Brinjal, Bhendi, Watermelon, Muskmelon, Gourds, Turmeric, Medicinal coleus, lemongrass, Palmarosa, Jamine, Chrysanthemum and Tuberose and other vegetables. In tiruvannamalai district Seetha and Jackfruit are producing in Jawadhu hills. Banana plantation is widely practiced in Padavedu region. Approximately 56 % of people are depended on Agriculture related works.

#### *Major Agricultural Crops 1km radius*

Major horticulture crops cultivated in this district are vegetables crops like paddy, groundnuts, cereals, millets, and pulse. Details of major field crops and horticulture in 1km radius is given in Table. 3.31.

**Table 3.30 Major Crops in 1km radius**

| S. No | Major crops          | Scientific name | Families   |
|-------|----------------------|-----------------|------------|
| 1     | Gossypium hirsutum   | Malvaceae       | Paruththi  |
| 2     | Sesbania grandiflora | Fabaceae        | Agati      |
| 3     | Capsicum annum       | Solanaceae      | Red chilli |
| 4     | Musa paradisiaca     | Musaceae        | Valzhai    |
| 5     | Sorghum vulgare      | Poaceae         | Solam      |

#### *Results*

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

### 3.6 SOCIO ECONOMIC ENVIRONMENT

The major developmental activities in mining/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 rough stone and granite 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 socio economics and parameters of human interest due to the project.

### **3.6.1 Objectives of the Study**

*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 project.
- b) To identify the basic needs of the nearby villages within the study area.
- c) To assess the impact on socio-economic environment due to the project.
- d) To provide the employment and improved living standards.
- e) To analysis of impact of socio economic and Environmental Infrastructure facilities and road accessibility.

#### ***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

### **3.6.2 Scope of Work**

- To study the Socio-economic Environment of area from the secondary sources
- Primary and secondary Data Collection and Analysis
- Identification of impacts due to the mining projects
- Mitigation Measures

### **3.6.3 Methodology**

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

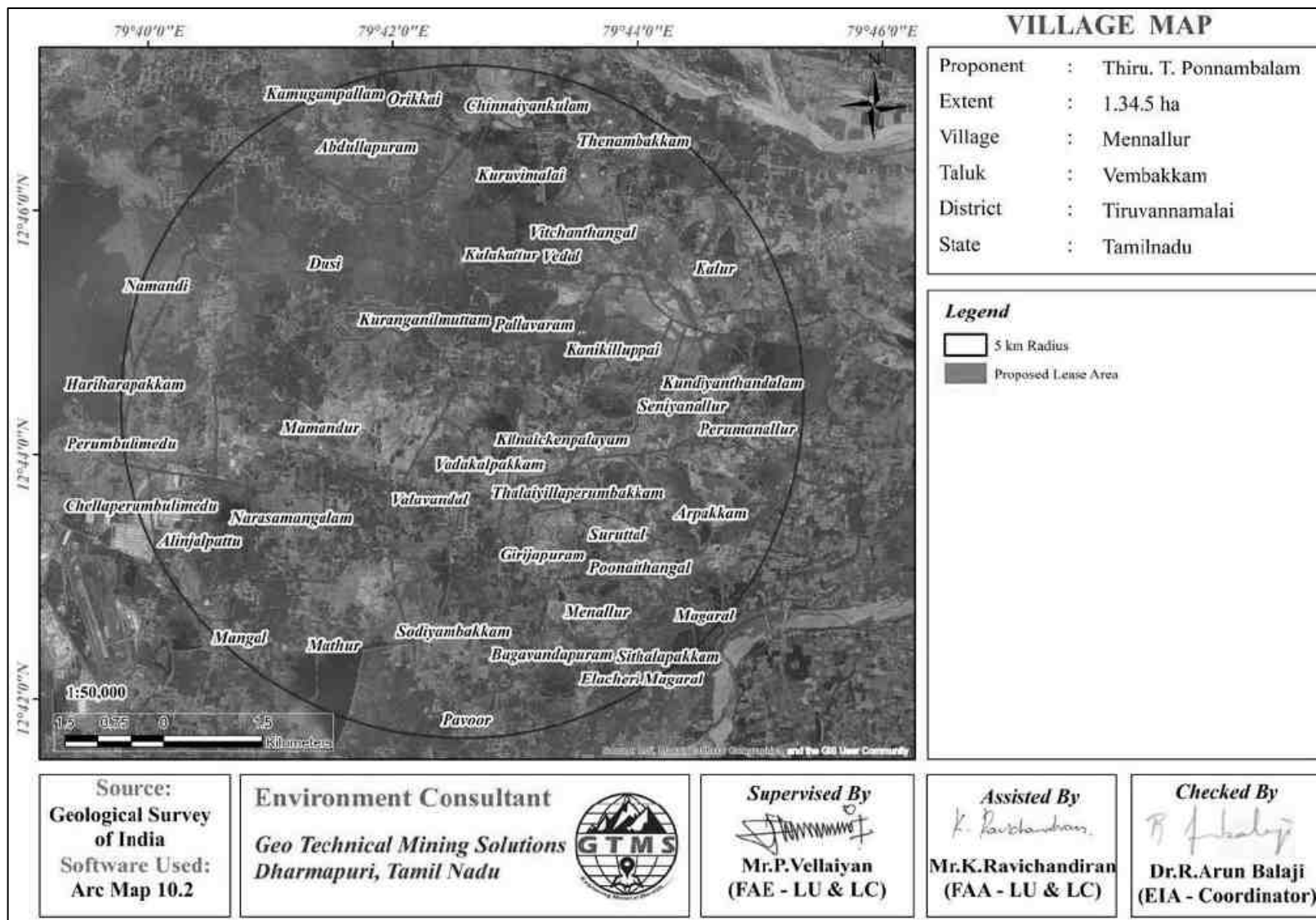
- a) Data such as number of houses, population, literacy, employment opportunities etc. will be collected directly from local people and analysed.
- b) The details of the activities and population structure have been obtained from Census 2011 and analysed.
- c) Based on the above data, impacts due to plant operation on the community have been assessed and recommendations for further improvement have been made.

#### **3.6.4 Sources of Information and Data Base**

To achieve the above objectives, the information has been collected from both primary and secondary sources. Both primary data and secondary data have been analysed by means of suitable statistical techniques for the purpose of verifying the above selected hypotheses concerned with the surrounding area.

#### **3.6.5 Primary Survey**

The primary data collection includes the collection of data through a structured interview schedule by direct observation method. The questionnaire survey includes both open and closed methods. The sample size is limited respondents, who were selected on the basis of simple random sampling from Mennallur Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu State, in the field survey has been divided into two major segments namely Primary Zone (0 -2 km) and Secondary Zone (2 - 5 km). The questionnaires were designed to suit the subjects considering their rural background enabling to furnish correct information and data as par as possible. Data were collected at village level and household level by questionnaires and focused group discussions.



**Figure 3.26 Socio Economic Village Map**

### 3.6.6 Collection of Data from Secondary Sources

Data from secondary sources were collected on following aspects:

- Demographic profile of the area
- Economic profile of the area

**Table 3.31 Type of Information and Sources**

| Information                  | Source                                   |
|------------------------------|--|
| Demography                   | District Census Handbook, Govt. of India |
| Economic profile of the area | Census of India, Tamil Nadu State        |

### 3.6.7 Tiruvannamalai District

Tiruvannamalai District was created from erstwhile North Arcot District on 30-09-1989. The district is surrounded by Kanchipuram district in the East, Villupuram district in the south, Dharmapuri and Krishnagiri Districts in the West and Vellore District in the North as its boundaries. Tiruvannamalai District is divided into 3 Revenue Divisions namely Tiruvannamalai, Arni and Cheyyar and 12 Taluks namely Tiruvannamalai, Kilpennathur, Chengam, Thandarampattu, Kalasapakkam Polur, Arni, Chetput, Cheyyar, Vembakkam, Vandavasi and Jamanamarathur. They are further sub-divided into 18 development blocks, 4 Municipalities and 10 Town Panchayats and 860 Village Panchayats.

Out of the total Tiruvannamalai population for 2011 census, 20.08 percent lives in urban regions of district. In total 494,945 people lives in urban areas of which males are 246,163 and females are 248,782. Sex Ratio in urban region of Tiruvannamalai district is 1011 as per 2011 census data. Similarly, child sex ratio in Tiruvannamalai district was 943 in 2011 census. Child population (0-6) in urban region was 52,185 of which males and females were 26,856 and 25,329. This child population figure of Tiruvannamalai district is 10.91 % of total urban population. Average literacy rate in Tiruvannamalai district as per census 2011 is 84.41 % of which males and females are 90.80 % and 78.13 % literates respectively. In actual number 373,715 people are literate in urban region of which males and females are 199,138 and 174,577 respectively.

Average literacy rate of Tiruvannamalai in 2011 were 74.21 compared to 74.21 of 2001. If things are looked out at gender wise, male and female literacy were 83.11 and 65.32 respectively. For 2001 census, same figures stood at 79.17 and 55.63 in Tiruvannamalai District. Total literate in Tiruvannamalai District were 1,626,813 of which male and female were 909,803 and 717,010 respectively. In 2001, Tiruvannamalai District had 1,297,151 in its district

Source: <https://www.census2011.co.in/census/district/26-tiruvannamalai.html>

### 3.6.8 Study area- Mennallur Village, Vembakkam Taluk

Menallur is a medium size village located in Vembakkam Taluk of Tiruvannamalai district, Tamil Nadu with total 363 families residing. The Menallur village has population of 1444 of which 711 are males while 733 are females as per Population Census 2011.

In Menallur village population of children with age 0-6 is 153 which makes up 10.60 % of total population of village. Average Sex Ratio of Mennallur village is 1031 which is higher than Tamil Nadu state average of 996. Child Sex Ratio for the Menallur as per census is 987, higher than Tamil Nadu average of 943. Menallur village has lower literacy rate compared to Tamil Nadu. In 2011, literacy rate of Menallur village was 73.35 % compared to 80.09 % of Tamil Nadu. In Menallur Male literacy stands at 80.13 % while female literacy rate was 66.82 %.

**Table. 3.32 Mennallur Village Population Facts**

| Particulars         | Total  | Male   | Female |
|---------------------|--------|--------|--------|
| Total No. of Houses | 363    | -      | -      |
| Population          | 1444   | 711    | 733    |
| Child (0-6)         | 153    | 77     | 76     |
| Schedule Caste      | 650    | 322    | 328    |
| Schedule Tribe      | 0      | 0      | 0      |
| Literacy            | 73.35% | 80.13% | 66.82% |
| Total Workers       | 584    | 418    | 166    |
| Main Worker         | 458    | -      | -      |
| Marginal Worker     | 126    | 95     | 31     |

Source: <https://www.census2011.co.in/data/village/631259-menallur-tamil-nadu.html>

### 3.6.9 Working Population- Mennallur Village, Vembakkam Taluk

In Menallur village out of total population, 584 were engaged in work activities. 78.42 % of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 21.58 % were involved in Marginal activity providing livelihood for less than 6 months. Of 584 workers engaged in Main Work, 67 were cultivators (owner or co-owner) while 170 were Agricultural labourer.

#### **Benefits:**

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 medical facilities, conveyance, free education, drinking water supply etc. The number of villages and settlements within a radius of 5 km from the project site along with population, their education level etc. are given in the table 3.34.

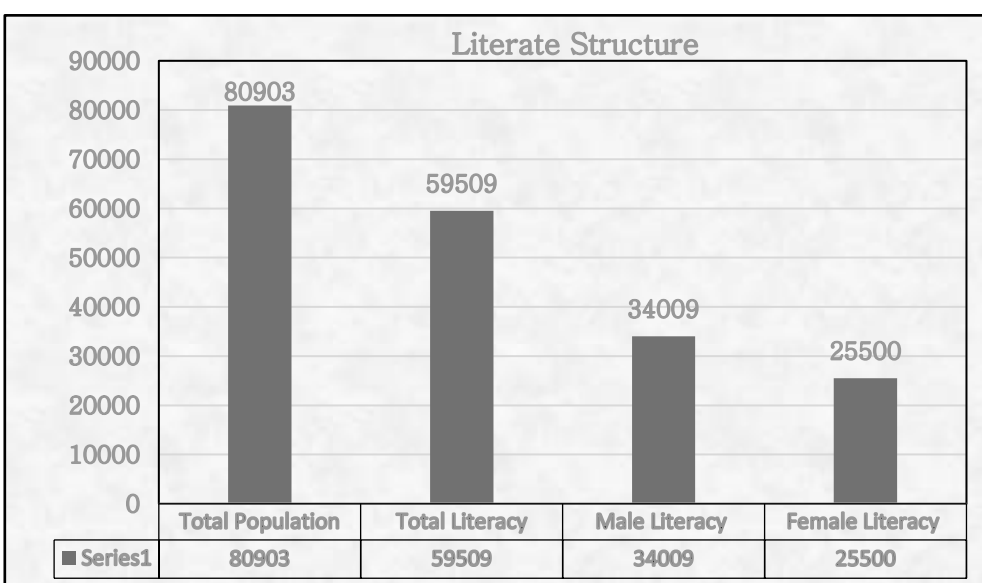
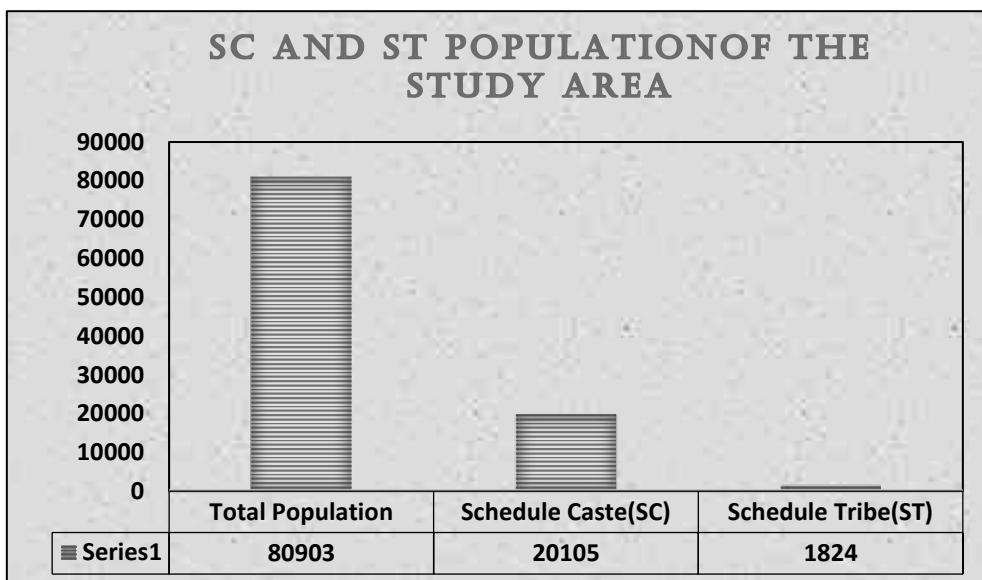
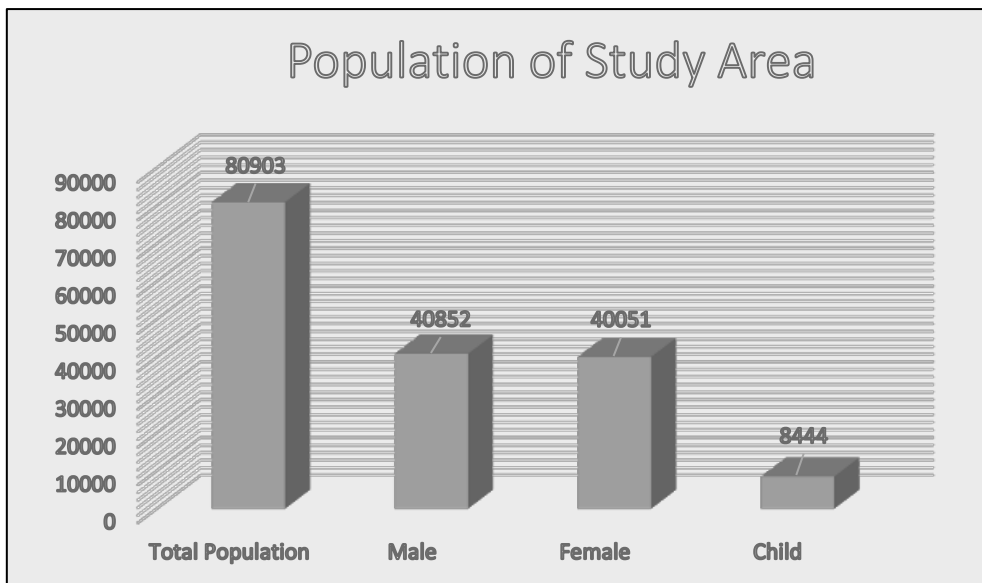
**Table 3.33 Population and Literacy Data of Study Area**

| Village Name        | No. of Houses | Total Population |        | Child (0-6) |        | Schedule Caste |        | Schedule Tribe |        | Literacy % |        | Total Workers |        |
|---------------------|---------------|------------------|--------|-------------|--------|----------------|--------|----------------|--------|------------|--------|---------------|--------|
|                     |               | Male             | Female | Male        | Female | Male           | Female | Male           | Female | Male       | Female | Male          | Female |
| Vadakalpakkam       | 291           | 628              | 594    | 69          | 56     | 310            | 295    | 28             | 18     | 86.40      | 63.75  | 388           | 348    |
| Kuranganilmuttam    | 187           | 365              | 337    | 30          | 27     | 297            | 276    | 2              | 4      | 86.27      | 64.84  | 247           | 203    |
| Pallavaram          | 423           | 865              | 878    | 101         | 113    | 200            | 184    | 14             | 11     | 84.16      | 65.49  | 561           | 302    |
| Valavandal          | 115           | 229              | 215    | 27          | 30     | 40             | 28     | 58             | 46     | 82.18      | 60.54  | 128           | 104    |
| Kanikilluppai       | 187           | 380              | 391    | 40          | 25     | 310            | 308    | 0              | 0      | 83.82      | 63.39  | 240           | 236    |
| Vedal               | 508           | 1036             | 1056   | 82          | 82     | 174            | 185    | 51             | 51     | 88.05      | 68.07  | 718           | 561    |
| Kalakattur          | 664           | 1288             | 1251   | 25          | 34     | 25             | 34     | 89             | 83     | 72.58      | 58.65  | 897           | 728    |
| Vitchanthangal      | 254           | 517              | 499    | 64          | 56     | 175            | 168    | 4              | 9      | 81.46      | 59.82  | 294           | 159    |
| Kuruvimalai         | 332           | 688              | 683    | 57          | 52     | 303            | 308    | 0              | 0      | 82.25      | 59.59  | 415           | 200    |
| Thenambakkam        | 185           | 340              | 327    | 27          | 25     | 58             | 51     | 0              | 0      | 95.21      | 75.17  | 209           | 163    |
| Orikkai             | 3183          | 6318             | 6320   | 676         | 632    | 994            | 1054   | 113            | 121    | 90.0       | 77.43  | 3071          | 978    |
| Kamugampallam       | 49            | 107              | 110    | 12          | 19     | 0              | 0      | 35             | 39     | 82.11      | 53.85  | 63            | 6      |
| Abdullapuram        | 624           | 1312             | 1282   | 149         | 137    | 230            | 233    | 0              | 0      | 97.33      | 89.78  | 763           | 337    |
| Dusi                | 1384          | 2811             | 2766   | 292         | 267    | 43             | 40     | 28             | 21     | 81.04      | 66.57  | 1694          | 959    |
| Namandi             | 318           | 1185             | 846    | 78          | 71     | 283            | 259    | 0              | 1      | 85.46      | 62.58  | 431           | 350    |
| Mamandur            | 1305          | 2829             | 2674   | 258         | 284    | 1412           | 1432   | 33             | 41     | 88.88      | 75.10  | 1501          | 827    |
| Chellaperumbulimedu | 130           | 277              | 268    | 44          | 32     | 4              | 1      | 0              | 0      | 83.26      | 53.39  | 148           | 101    |
| Alinjapattu         | 226           | 426              | 466    | 47          | 64     | 47             | 64     | 133            | 153    | 81.00      | 64.93  | 275           | 169    |

|                        |              |              |              |             |             |              |              |            |            |              |              |              |              |
|------------------------|--------------|--------------|--------------|-------------|-------------|--------------|--------------|------------|------------|--------------|--------------|--------------|--------------|
| Narasamangalam         | 392          | 856          | 847          | 88          | 100         | 3            | 4            | 44         | 51         | 79.82        | 57.83        | 547          | 431          |
| Mangal                 | 174          | 377          | 390          | 26          | 35          | 204          | 203          | 9          | 10         | 84.62        | 64.23        | 180          | 29           |
| Mathur                 | 509          | 1066         | 1081         | 112         | 126         | 148          | 143          | 0          | 0          | 83.33        | 61.47        | 670          | 526          |
| Sodiyambakkam          | 288          | 599          | 586          | 59          | 64          | 189          | 186          | 0          | 0          | 86.67        | 59.58        | 377          | 334          |
| Elacheri               | 491          | 1065         | 1015         | 122         | 120         | 399          | 371          | 15         | 10         | 77.31        | 56.54        | 655          | 479          |
| Bagavandapuram         | 182          | 386          | 391          | 49          | 54          | 0            | 0            | 3          | 4          | 71.51        | 51.04        | 237          | 108          |
| Sithalapakkam          | 3461         | 6857         | 6685         | 891         | 834         | 1095         | 1010         | 105        | 108        | 93.04        | 85.51        | 4101         | 1374         |
| Mennallur              | 363          | 711          | 733          | 77          | 76          | 322          | 328          | 0          | 0          | 80.13        | 66.82        | 418          | 166          |
| Poonaitthangal         | 80           | 132          | 145          | 15          | 18          | 0            | 0            | 0          | 0          | 95.73        | 76.38        | 89           | 19           |
| Girijapuram            | 61           | 122          | 121          | 15          | 12          | 0            | 0            | 0          | 0          | 85.05        | 58.72        | 75           | 81           |
| Thalaiyillaperumbakkam | 382          | 780          | 751          | 99          | 58          | 279          | 272          | 5          | 5          | 77.83        | 60.89        | 481          | 387          |
| Suruttal               | 304          | 659          | 607          | 66          | 60          | 5            | 2            | 0          | 2          | 85.50        | 61.61        | 637          | 325          |
| Pavoor                 | 308          | 688          | 682          | 74          | 66          | 530          | 520          | 0          | 0          | 71.34        | 65.75        | 413          | 194          |
| Arpakkam               | 861          | 1715         | 1749         | 166         | 176         | 683          | 727          | 72         | 82         | 81.86        | 52.93        | 1104         | 953          |
| Magaral                | 709          | 1399         | 1435         | 154         | 149         | 895          | 882          | 16         | 20         | 75.50        | 63.30        | 821          | 680          |
| Perumanallur           | 257          | 494          | 510          | 56          | 70          | 52           | 67           | 40         | 37         | 80.82        | 55.00        | 308          | 225          |
| Kundiyanthandalam      | 170          | 351          | 352          | 36          | 35          | 182          | 199          | 0          | 0          | 83.17        | 66.25        | 200          | 54           |
| Seniyanallur           | 91           | 183          | 190          | 19          | 11          | 0            | 0            | 0          | 0          | 72.68        | 47.37        | 100          | 25           |
| Kalur                  | 387          | 811          | 818          | 86          | 86          | 175          | 205          | 0          | 0          | 83.03        | 61.75        | 509          | 389          |
| <b>Total</b>           | <b>19835</b> | <b>40852</b> | <b>40051</b> | <b>4288</b> | <b>4156</b> | <b>10066</b> | <b>10039</b> | <b>897</b> | <b>927</b> | <b>83.25</b> | <b>63.67</b> | <b>23965</b> | <b>13510</b> |

Source: <https://www.census2011.co.in/census/city/474-tiruvannamalai.html>





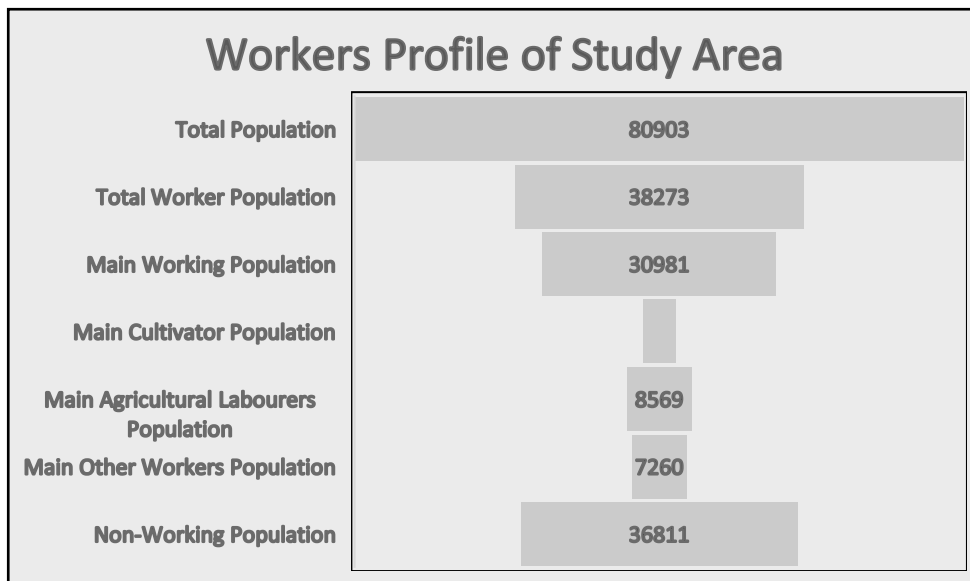
**Figure 3.27 Chart Diagram about Population, SC, ST and Literacy in Surrounding Villages**

**Table 3.34 Workers Profile of Study Area**

| <b>Village</b>      | <b>Total Worker Population</b> | <b>Total Worker Population Male</b> | <b>Total Worker Population Female</b> | <b>Main Working Population Person</b> | <b>Main Cultivator Population Person</b> | <b>Main Agricultural Labourers Population Person</b> | <b>Main Other Workers Population Person</b> | <b>Non-Working Population Person</b> |
|---------------------|--------------------------------|-------------------------------------|---------------------------------------|---------------------------------------|--|--|---|--------------------------------------|
| Vadikalpakkam       | 736                            | 388                                 | 348                                   | 508                                   | 10                                       | 285  | 228   | 486                                  |
| Kuranganilmuttam    | 450                            | 247                                 | 203                                   | 450                                   | 33                                       | 345  | 0   | 252                                  |
| Pallavaram          | 836                            | 561                                 | 302                                   | 648                                   | 172                                      | 187  | 215   | 880                                  |
| Valavandal          | 232                            | 128                                 | 104                                   | 48                                    | 6  | 13   | 184   | 155                                  |
| Kanikilluppai       | 476                            | 240                                 | 236                                   | 469                                   | 30                                       | 367  | 7   | 230                                  |
| Vedal               | 1279                           | 718                                 | 561                                   | 1260                                  | 262                                      | 619  | 19  | 813                                  |
| Kalakattur          | 1625                           | 897                                 | 728                                   | 1321                                  | 268                                      | 343  | 304   | 914                                  |
| Vitchanthalangal    | 453                            | 294                                 | 159                                   | 239                                   | 46                                       | 34   | 214   | 443                                  |
| Kuruvimalai         | 615                            | 415                                 | 200                                   | 578                                   | 177                                      | 245  | 37  | 647                                  |
| Thenambakkam        | 372                            | 209                                 | 163                                   | 169                                   | 122                                      | 20   | 203   | 243                                  |
| Orikkai             | 4962                           | 3527                                | 1435                                  | 4049                                  | 85                                       | 167  | 913   | 7676                                 |
| Kamugampallam       | 69                             | 63                                  | 6                                     | 65                                    | 10                                       | 8  | 4   | 117                                  |
| Abdullapuram        | 1100                           | 763                                 | 337                                   | 1001                                  | 18                                       | 147  | 99  | 1208                                 |
| Dusi                | 2653                           | 1694                                | 959                                   | 2324                                  | 98                                       | 249  | 329   | 2365                                 |
| Namandi             | 781                            | 431                                 | 350                                   | 777                                   | 137                                      | 419  | 4   | 1101                                 |
| Mamandur            | 2328                           | 1501                                | 827                                   | 1523                                  | 87                                       | 409  | 805   | 3175                                 |
| Chellaperumbulimedu | 249                            | 148                                 | 101                                   | 247                                   | 99                                       | 95   | 2   | 220                                  |

|                        |      |      |      |      |     |     |      |      |
|------------------------|------|------|------|------|-----|-----|------|------|
| Alinjapattu            | 444  | 275  | 169  | 173  | 16  | 32  | 271  | 337  |
| Narasamangalam         | 978  | 547  | 431  | 947  | 188 | 399 | 31   | 537  |
| Mangal                 | 209  | 180  | 29   | 122  | 6   | 77  | 87   | 497  |
| Mathur                 | 1196 | 670  | 526  | 1104 | 327 | 343 | 92   | 713  |
| Sodiyambakkam          | 711  | 377  | 334  | 704  | 171 | 281 | 7    | 351  |
| Elacheri               | 1134 | 655  | 479  | 1130 | 259 | 584 | 4    | 704  |
| Bagavandapuram         | 345  | 237  | 108  | 341  | 116 | 97  | 4    | 329  |
| Sithalapakkam          | 5478 | 4104 | 1374 | 4444 | 89  | 97  | 1034 | 6339 |
| Mennallur              | 584  | 418  | 166  | 458  | 67  | 170 | 126  | 860  |
| Poonaitthangal         | 108  | 89   | 19   | 99   | 13  | 44  | 9    | 136  |
| Girijapuram            | 156  | 75   | 81   | 148  | 45  | 48  | 8    | 60   |
| Thalaiyillaperumbakkam | 868  | 481  | 387  | 838  | 136 | 452 | 30   | 506  |
| Suruttal               | 762  | 437  | 325  | 599  | 104 | 309 | 163  | 378  |
| Pavoor                 | 607  | 413  | 194  | 601  | 85  | 265 | 6    | 623  |
| Arpakkam               | 2057 | 1104 | 953  | 1836 | 760 | 774 | 221  | 1065 |
| Magaral                | 1501 | 821  | 680  | 427  | 53  | 182 | 1074 | 1030 |
| Perumanallur           | 533  | 308  | 225  | 523  | 125 | 151 | 10   | 345  |
| Kundiyanthandalam      | 254  | 200  | 54   | 97   | 4   | 2   | 157  | 378  |
| Senyanallur            | 234  | 120  | 114  | 125  | 59  | 13  | 47   | 139  |
| Kalur                  | 898  | 509  | 389  | 589  | 98  | 297 | 312  | 559  |

Source: <https://www.census2011.co.in/census/city/474-tiruvannamalai.html>



**Figure 3.28 Chart Diagram about Workers Profile in Surrounding Villages**

As per SEAC recommendation the project proponent should spend minimum of 5 lakh to the nearby school from the proposed project site as part of CER cost. Also, the village panchayat will get direct benefit from the government through District mineral Resource fund (DMF) for infrastructure development activities.

Awareness and opinion of the people about the project for the assessment of awareness about the project activities and opinion about it, following salient observations were recorded, During survey it was observed that only nearby villagers are aware and other villagers are not aware about the proposed project.

People in the region expect job opportunities and improvement in educational, transportation and sanitation facility from project authority.

### **3.6.10 Recommendation and Suggestions**

The village development plans are made in consultation with the community through Gram Sabha; these appear to address the needs of the community. However, it may be noted that at the implementation stage these plans often are fraught with problem of inadequate funds, lack of proper planning, corruption, vested interests and political agendas. Hence while ascertaining the scope for convergence with the government activities, care must be taken to ascertain realistic possibilities for implementation.

- Women empowerment– Home based income generation activities, vocational training programs and common education centre for increasing the literacy rate.
- Education – Free uniform, construction of common rooms and library, computer education and physical education, additional schools for girls, furniture and equipment in schools, up-gradation of existing school infrastructure.

- Agriculture/livestock – Infrastructure such as agricultural practices, electricity connections, assistance with buying improved tools and equipment, capacity building, supply and/or knowledge of better variety of seeds, pasture land development and trainings on animal husbandry & facility of veterinary doctor.
- Health – Improvements in sanitary conditions of villages, assistance with construction of latrines, improvement in drainage system, health camps and awareness campaigns for diseases like common cold, malaria, typhoid, tuberculosis, yellow fever and pneumonia. Repairing of PHCs and Anganwadi centres.
- People with disability – Establishment of centre for special education, sensitization of the community towards disabled and awareness on Government schemes.
- While Developing an Action Plan, it is very important to identify the population who falls under the marginalized and vulnerable groups. So that special attention can be given to these groups with special provisions while making action plans.
- Connectivity – Transport connectivity to easiness accessibility to the region.

### **3.6.11 Conclusion**

The socio-economic study of surveyed villages gives a clear picture of its population, average household size, literacy rate and sex ratio etc. It is also found that a part of population is suffering from lack of permanent job to run their day-to-day life. To evaluate the impacts of proposed quarry project on the surrounding area, it is vital to assess the baseline status of the environmental quality in the locality of the site. Hence, it can be concluded that the present environment status of the study area will not be affected by the Mennallur rough stone and gravel cluster Quarries project. Hence, we adopt adequate control measures to protect the surrounding environment and will contribute in development of the study areas. The proposed project will provide preferential of employment to the local people there by the livelihood standards will be improved.

### **3.7 TRAFFIC DENSITY**

The traffic survey conducted based on the transportation route of material, the Rough Stone and gravel is proposed to be transported mainly through Village Road (Mamandur - Magaral) and SH-116 (Tiruvanamalai - Kanchipuram) as shown in Table 3.35 and in Figure 3.26. Traffic density measurements were made continuously for 24 hours by visual observation and counting of vehicles under three categories, viz., Heavy motor vehicles, light motor vehicles and two/three wheelers. As traffic densities on the roads are high, two skilled persons were deployed simultaneously at each station. During each shift one person on either direction were deployed for counting the traffic. At the end of each hour, fresh counting and recording was undertaken.

Direction for counting the traffic. At the end of each hour, fresh counting and recording was undertaken.

**Table 3.35 Traffic Survey Locations**

| Station Code | Road Name                                 | Distance and Direction |
|--------------|---|------------------------|
| TS1          | Village Road (Mennallur - Bagavandapuram) | 0.15km W               |
| TS2          | Village Road (Mamandur - Magaral)         | 1.15km S               |
| TS3          | SH-116 (Tiruvanamalai - Kanchipuram)      | 3.73km W               |

Source: On-site monitoring by GTMS FAE & TM

**Table 3.36 Existing Traffic Volume**

| Station code | HMV |     | LMV |     | 2/3 Wheelers |     | Total PCU |
|--------------|-----|-----|-----|-----|--------------|-----|-----------|
|              | No  | PCU | No  | PCU | No           | PCU |           |
| TS1          | 89  | 267 | 71  | 71  | 107          | 54  | 392       |
| TS2          | 152 | 456 | 102 | 102 | 125          | 63  | 621       |
| TS3          | 189 | 567 | 125 | 125 | 137          | 69  | 761       |

Source: On-site monitoring by GTMS FAE & TM

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

**Table 3.37 Rough Stone Transportation Requirement**

| Transportation of Rough Stone Per day |                      |               |
|---------------------------------------|----------------------|---------------|
| Capacity of trucks                    | No. of Trips per day | Volume in PCU |
| 15 tonnes                             | 53                   | 159           |

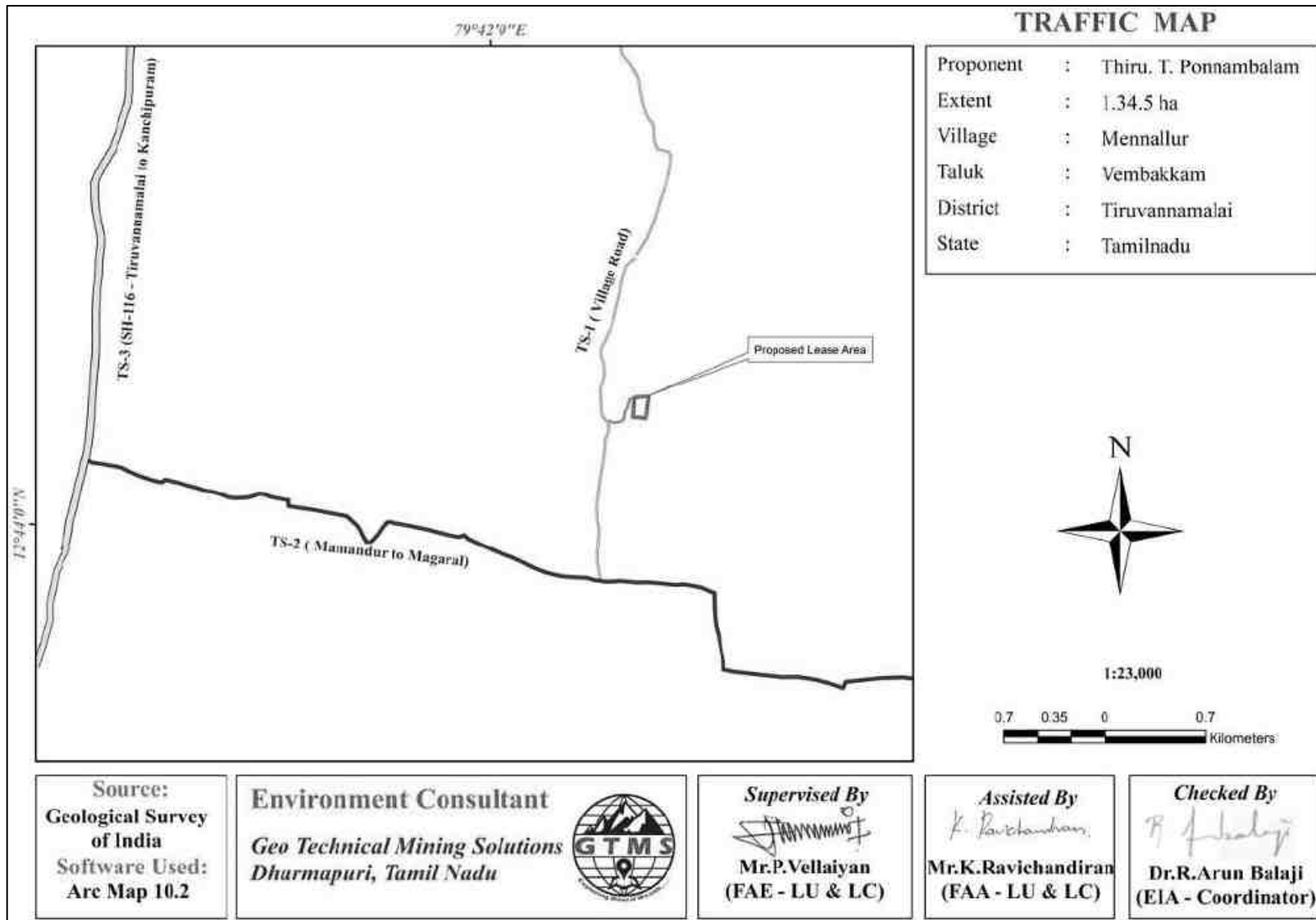
Source: Approved Mining Plan

**Table 3.38 Summary of Traffic Volume**

| Route                                     | Existing traffic volume in PCU | Incremental traffic due to the project | Total traffic volume | Hourly Capacity in PCU as per IRC – 1960 guidelines |
|---|--------------------------------|--|----------------------|---|
| Village Road (Mennallur - Bagavandapuram) | 392                            | 20                                     | 412                  | 1200  |
| Village Road (Mamandur - Magaral)         | 621                            | 20                                     | 641                  | 1200  |
| SH-116 (Tiruvanamalai - Kanchipuram)      | 761                            | 20                                     | 781                  | 1200  |

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

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



**Figure 3.29 Traffic Density Map**

### 3.8 SITE SPECIFIC FEATURES

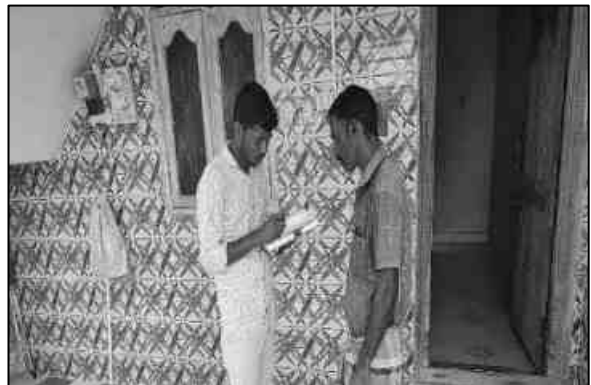
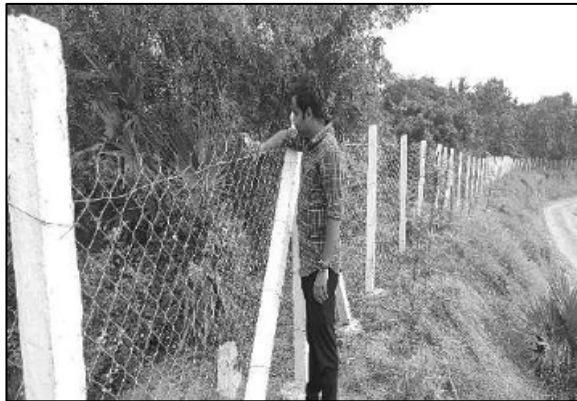
There are no Wildlife Sanctuaries and National Park within 25 km radius. Therefore, there will be no need of acquisition/diversion of forest land. The details related to the environmentally sensitive areas around the proposed mine lease area i.e., 25 km radius and the nearby water bodies are given in the Table 3.39.

**Table 3.39 Details of Environmentally Sensitive Ecological Features in the Study Area**

| S. No. | Sensitive Ecological Features                           | Name                    | Areal Distance in km    |
|--------|---|-------------------------|-------------------------|
| 1      | National Park /<br>Wild life Sanctuaries                | None                    | Nil within 10 km radius |
|        |   | Karikili Bird Sanctuary | 20.57km -SE             |
| 2      | Reserve Forest  | Marudham                | 10.1km SE               |
|        |   | Edamachi                | 17.24km E               |
|        |   | Kavanipakkam            | 17.7km E                |
|        |   | Perugoli R.F            | 17.81km SE              |
|        |   | Thandappan thangal R.F  | 18.77km NW              |
|        |   | Pullavakkam R.F         | 23.18km W               |
|        |   | Koliyalam R.F           | 23.95km SE              |
| 3      | Lakes/ Reservoirs/<br>Dams/Streams/Rivers               | Vengunam R.F            | 24.78km SW              |
|        |   | Poonathangal Tank       | 313m E                  |
|        |   | Kundiyanthandalam Tank  | 1.1km NE                |
|        |   | Cheyyar River           | 5.26km SE               |
| 4      | Tiger Reserve/Elephant<br>Reserve/ Biosphere<br>Reserve | Palar River             | 5.44km N                |
|        |   | None                    | Nil within 10 km radius |
| 5      | Densely Polluted Areas                                  | None                    | Nil within 10 km radius |
| 6      | Mangroves   | None                    | Nil within 10 km radius |
| 7      | Mountains/Hills   | None                    | Nil within 10 km radius |
| 8      | Centrally Protected<br>Archaeological Sites             | None                    | Nil within 10 km radius |
| 9      | Industries/<br>Thermal Power Plants                     | None                    | Nil within 10 km radius |
| 10     | Defence Installation                                    | None                    | Nil within 10 km radius |

Source: Survey of India Toposheet





**Figure 3.30 Field Study Photographs**

## CHAPTER IV

### ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

#### 4.0 GENERAL

In order to maintain the environmental commensuration with the mining operation, it is essential to undertake studies on the existing environmental scenario and assess the impact on different environmental components. This would help in formulating suitable management plans sustainable resource extraction. This chapter discusses the anticipated impacts on soil, land, water, air, noise, biological, and socioeconomic environments.

#### 4.1 LAND ENVIRONMENT

##### 4.1.1 Anticipated Impact

- ❖ Permanent or temporary change on land use and land cover.
- ❖ Change in topography of the mine lease area will change at the end of the life of the mine.
- ❖ Problems to agricultural land and human habitations due to dust, and noise caused by movement of heavy vehicles
- ❖ Degradation of the aesthetic environment of the core zone due to quarrying
- ❖ Soil erosion and sediment deposition in the nearby water bodies due to earthworks during the rainy season
- ❖ Siltation of water course due to wash off from the exposed working area

##### 4.1.2 Mitigation Measures from Proposed Project

- ❖ The mining activity will be gradual confined in blocks and excavation will be undertaken progressively along with other mitigate measures like phase wise development of greenbelt etc.
- ❖ Construction of garland drains all around the quarry pits and construction of check dam at strategic location in lower elevations to prevent erosion due to surface runoff during rainfall and also to collect the storm water for various uses within the proposed area.
- ❖ Green belt development along the boundary within safety zone. The small quantity of water stored in the mined-out pit will be used for greenbelt
- ❖ Thick plantation will be carried out on unutilized area, top benches of mined out pits, on safety barrier, etc.,
- ❖ At conceptual stage, the land use pattern of the quarry will be changed into Greenbelt area and temporary reservoir.
- ❖ In terms of aesthetics, natural vegetation surrounding the quarry will be retained (such as in a buffer area i.e., 7.5 m, 10m safety barrier and other safety provided) so as to help minimize dust emissions.

- ❖ Proper fencing will be carried out at the conceptual stage, Security will be posted round the clock, to prevent inherent entry of the public and cattle.

## **4.2 SOIL ENVIRONMENT**

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

Following impacts are anticipated due to mining operations:

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

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

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

## **4.3 WATER ENVIRONMENT**

### **4.3.1 Anticipated Impact**

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

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

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

- ❖ The garland drainage will be connected to settling tank and sediments will be trapped in the settling tanks and only clear water will be discharged to the natural drainage
- ❖ Periodic (every 6 month once) analysis of ground water quality of quarry pit water and ground water of nearby villages will be conducted
- ❖ Artificial recharge structures will be established in suitable locations as part of the rainwater harvesting management program.

#### 4.4 AIR ENVIRONMENT

##### 4.4.1 Anticipated Impact from proposed project

- ❖ During mining at various stages of activities such as excavation, drilling and transportation of materials, particular matter (PM<sub>10</sub> and PM<sub>2.5</sub>) are the main air pollutants.
- ❖ Emissions of noxious gases due to incomplete detonation of explosive may sometimes pollute the air.
- ❖ The fugitive dust released from the mining operations may cause effect on the mine workers who are directly exposed to the fugitive dust.
- ❖ Simultaneously, the air-borne dust may travel to longer distances and settle in the villages located near the mine lease area.

##### 4.4.2 Emission Estimation

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

**Table 4.1 Empirical Formula for Emission Rate from Overall Mine**

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

The emission rate thus calculated using the empirical formula is used as one of the inputs in the AERMOD modelling. It is important to note that PM<sub>10</sub> emission rate is derived from the SPM estimation in the background that PM<sub>10</sub> constitutes 52% of SPM emission. The PM<sub>2.5</sub> and PM<sub>10</sub> emission results have been given in Table 4.2.

**Table 4.2 Estimated Emission Rate**

| Activity     | Pollutant         | Calculated Value (g/s) | Lease Area in m <sup>2</sup> | Calculated Value (g/s/m <sup>2</sup> ) |
|--------------|-------------------|------------------------|------------------------------|--|
| Overall Mine | PM <sub>2.5</sub> | 0.631733793            | 13450                        | 4.69691E-05                            |
| Overall Mine | PM <sub>10</sub>  | 1.263467586            |                              | 9.39381E-05                            |

#### 4.4.2.1 Modelling of Incremental Concentration

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

#### 4.4.2.2 Model Results

The post project resultant concentrations of PM<sub>10</sub> and PM<sub>2.5</sub> (GLC) is given in Tables 4.3-4.4.

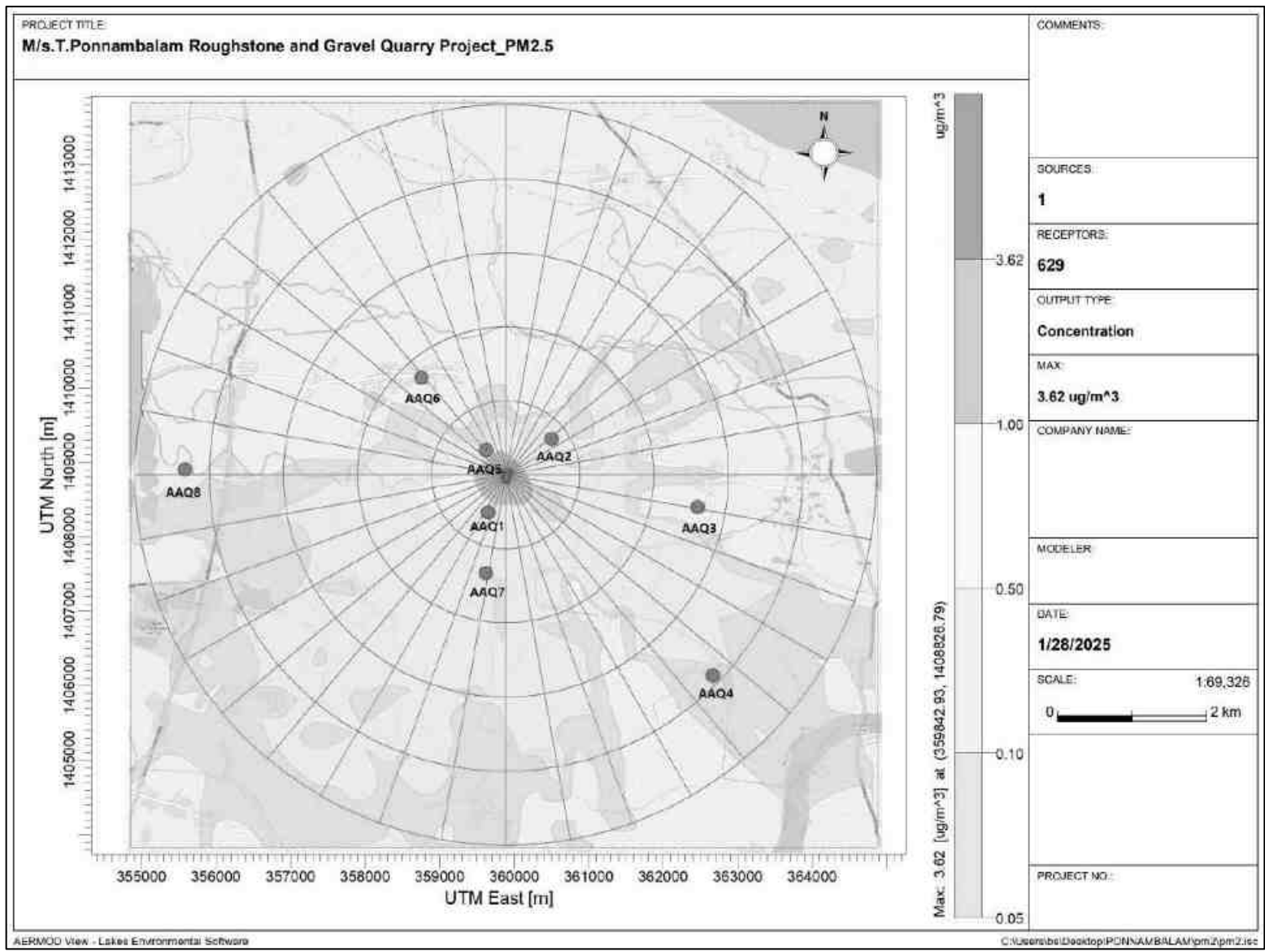
**Table 4.3 Incremental & Resultant GLC of PM<sub>2.5</sub>**

| Station ID | Distance to core area (km) | Direction | PM <sub>2.5</sub> concentrations(µg/m <sup>3</sup> ) |           |       | Comparison against air quality standard (60 µg/m <sup>3</sup> ) | Magnitude of change (%) | Significance    |
|------------|----------------------------|-----------|--|-----------|-------|---|-------------------------|-----------------|
|            |                            |           | Baseline   | Predicted | Total |   |                         |                 |
| AAQ1       | --                         | --        | 29.4   | 0.5       | 29.9  | Below standard  | 1.70                    | Not significant |
| AAQ2       | 0.70                       | NE        | 25.9   | 0.5       | 26.4  |   | 1.93                    |                 |
| AAQ3       | 2.55                       | E         | 23.9   | 0         | 23.9  |   | 0.00                    |                 |
| AAQ4       | 3.75                       | SE        | 28.6   | 0.1       | 28.7  |   | 0.35                    |                 |
| AAQ5       | 0.37                       | NW        | 28   | 0.5       | 28.5  |   | 1.79                    |                 |
| AAQ6       | 1.68                       | NW        | 25.1   | 0         | 25.1  |   | 0.00                    |                 |
| AAQ7       | 1.25                       | S         | 23.1   | 0.5       | 23.6  |   | 2.16                    |                 |
| AAQ8       | 4.25                       | W         | 25.4   | 0         | 25.4  |   | 0.00                    |                 |

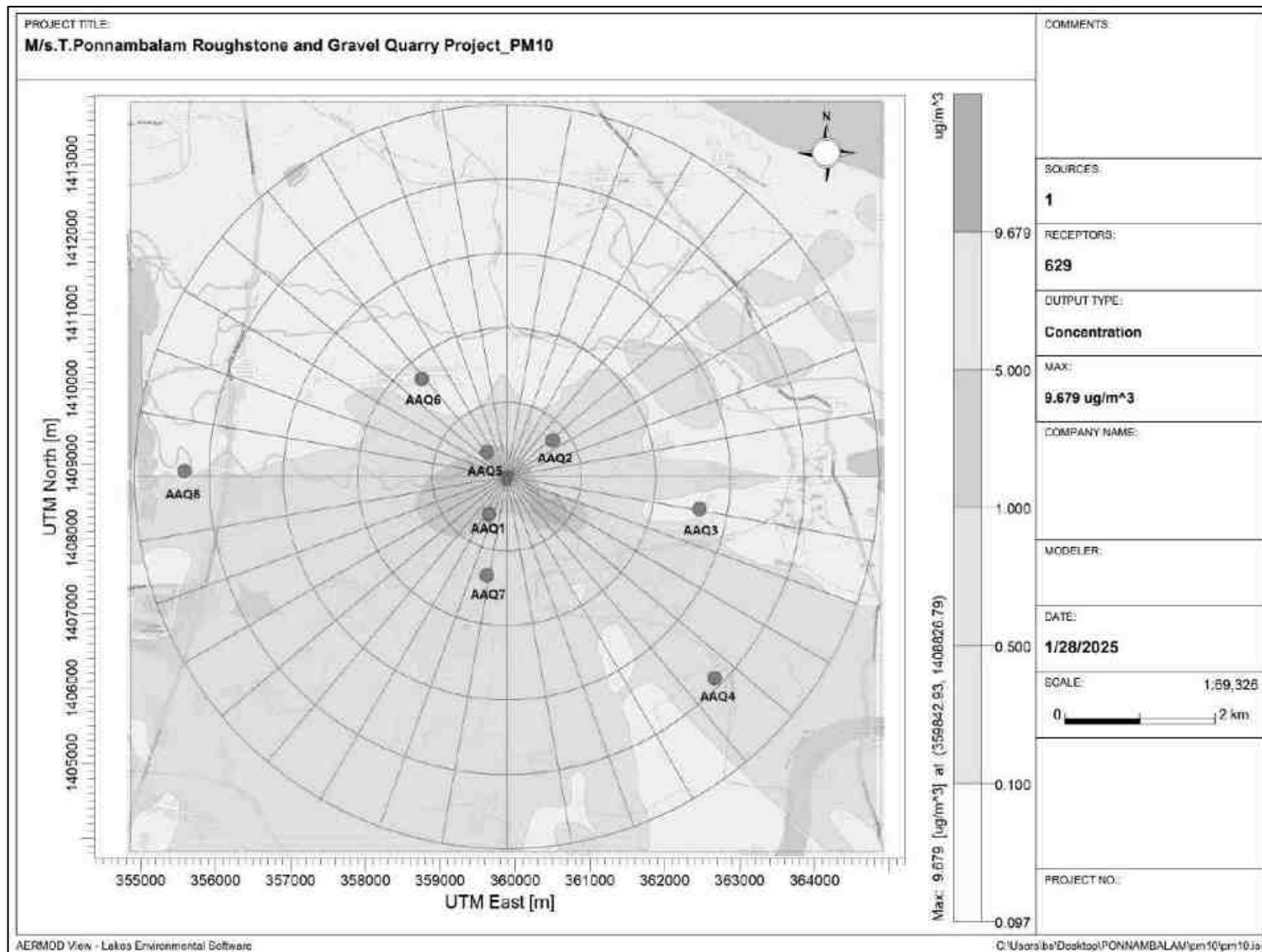
**Table 4.4 Incremental & Resultant GLC of PM<sub>10</sub>**

| Station ID | Distance to core area (km) | Direction | PM <sub>10</sub> concentrations(µg/m <sup>3</sup> ) |           |       | Comparison against air quality standard (100 µg/m <sup>3</sup> ) | Magnitude of change (%) | Significance    |
|------------|----------------------------|-----------|---|-----------|-------|--|-------------------------|-----------------|
|            |                            |           | Baseline  | Predicted | Total |  |                         |                 |
| AAQ1       | --                         | --        | 66.9  | 5         | 71.9  | Below standard   | 7.47                    | Not significant |
| AAQ2       | 0.70                       | NE        | 57.5  | 1         | 58.5  |  | 1.74                    |                 |
| AAQ3       | 2.55                       | E         | 52.0  | 0         | 52    |  | 0.00                    |                 |
| AAQ4       | 3.75                       | SE        | 62.6  | 0.5       | 63.1  |  | 0.80                    |                 |
| AAQ5       | 0.37                       | NW        | 59.6  | 1         | 60.6  |  | 1.68                    |                 |
| AAQ6       | 1.68                       | NW        | 53.4  | 0         | 53.4  |  | 0.00                    |                 |
| AAQ7       | 1.25                       | S         | 51.4  | 0.5       | 51.9  |  | 0.97                    |                 |
| AAQ8       | 4.25                       | W         | 54.1  | 0         | 54.1  |  | 0.00                    |                 |

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



**Figure 4.1 Predicted Incremental Concentration of PM<sub>2.5</sub>**



**Figure 4.2 Predicted Incremental Concentration of PM<sub>10</sub>**

### 4.4.3 Mitigation Measures

#### Drilling

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

#### Haul Road and Transportation

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

#### Green Belt

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

#### Occupational Health

- ❖ Dust mask will be provided to the workers and their use will be strictly monitored
- ❖ Annual medical checkups, trainings and campaigns will be arranged to ensure awareness about importance of wearing dust masks among all mine workers and tipper drivers.

Ambient air quality monitoring will be conducted every six months to assess effectiveness of mitigation measures proposed

### 4.5 NOISE ENVIRONMENT

Noise modelling has been carried out to assess the impact on surrounding ambient noise levels. Basic phenomenon of the model is the geometric attenuation of sound. Noise at a point generates spherical waves which are propagated outwards from the source through the air at a speed



of 1, 100 ft/sec with the first wave making an ever-increasing sphere with time. As the wave spreads the intensity of noise diminishes as the fixed amount of energy is spread over an increasing surface area of the sphere. The assumption of the model is based on point source relationship i.e., for every doubling of the distance the noise levels are decreased by 6 dB (A).

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

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

Where,

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

$A_{e1,2}$  is the excess attenuation due to environmental conditions.

Combined effect of all sources can be determined at various locations by logarithmic addition.

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

#### 4.5.1 Anticipated Impact

The attenuation due to several factors including ground reflection, atmosphere, wind speed, temperature, trees, and buildings as 35.5 dB (A), the barrier effect. Attenuation due to Green Belt has been taken to be 4.9 dB (A). The inputs required for the model are: source data, receptor data, and attenuation factor. Source data has been computed taking into account of all the machinery and activities used in the mining process. Same has been listed in Table 4.5.

**Table 4.5 Activity and Noise Level Produced by Machinery**

| S. No.       | Machinery / activity | Impact on environment? | Noise produced in dB(A) at 50 ft from source* |
|--------------|----------------------|------------------------|---|
| 1            | Blasting             | Yes                    | 94  |
| 2            | Jack hammer          | Yes                    | 88  |
| 3            | Compressor           | No                     | 81  |
| 4            | Excavator            | No                     | 85  |
| 5            | Tipper               | No                     | 84  |
| <b>Total</b> |                      |                        | <b>95.8</b>                                   |

The total noise to be produced by mining activity is calculated to be 95.8 dB (A). Generally, most mining operations produce noise between 95.8 dB (A).

**Table 4.6 Predicted Noise Incremental Values**

| Noise Monitoring Location | Distance From Project Site(m) | Baseline Noise Level (dBA)m During Day Time | Predicted Noise Level (dBA) | Total (dBA) |
|---------------------------|-------------------------------|---|-----------------------------|-------------|
| Nearby lease              | 200                           | 50.3  | 37.9                        | 50.5        |
| Poonathangal              | 790                           | 48.3  | 26.0                        | 48.3        |

|                  |  |      |       |       |
|------------------|--|------|-------|-------|
| Seniyanallur     | 2700   | 49.6 | 15.3  | 49.6  |
| Sithalapakkam    | 3650   | 51.3 | 12.7  | 51.3  |
| Menallur         | 390  | 47.7 | 32.1  | 47.8  |
| Vadakalpakkam    | 1900   | 48   | 18.4  | 48.0  |
| Bhagavanthapuram | 1290   | 45.5 | 21.75 | 45.52 |
| Narasamangalam   | 3700   | 49.1 | 12.60 | 49.10 |
| NAAQ Standards   | Industrial Day Time - 75 dB (A) & Night Time- 70 dB (A)<br>Residential Day Time -55 dB (A) & Night Time- 45 dB (A) |      |       |       |

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

#### 4.5.2 Common Mitigation Measures

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

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

### 4.5.3 Ground Vibrations

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

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

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

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

Where,

V = peak particle velocity (mm/s)

K = site and rock factor constant (500)

Q = maximum instantaneous charge (kg)

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

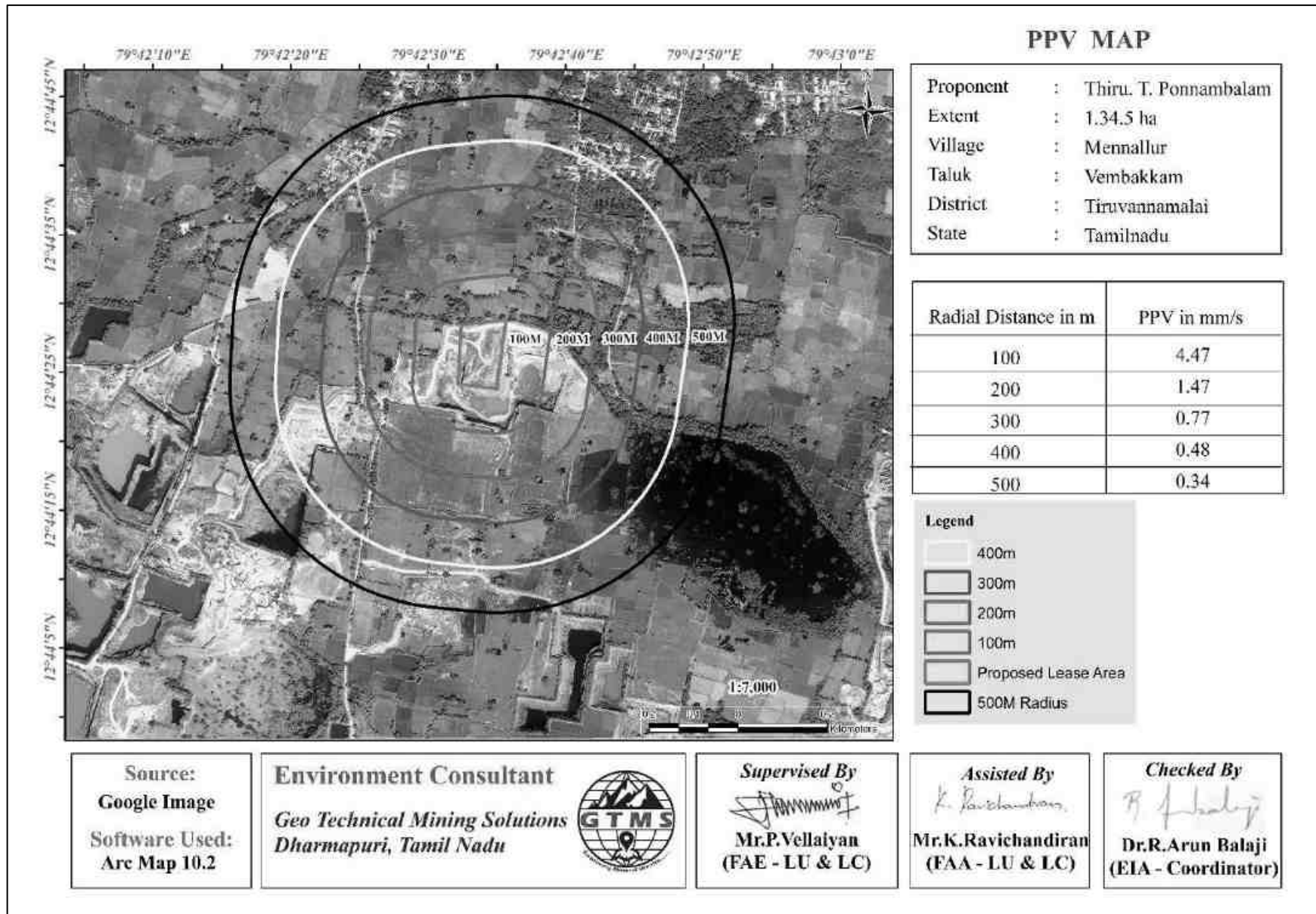
R = distance from charge (m)

**Table 4.7 Predicted PPV Values due to Blasting**

| Location ID | Maximum Charge in kgs | Nearest Habitation in m | PPV in mm/s | Fly rock distance in m | Air Blast      |                  |
|-------------|-----------------------|-------------------------|-------------|------------------------|----------------|------------------|
|             |                       |                         |             |                        | Pressure (kPa) | Sound Level (dB) |
| P1          | 27.5                  | 390                     | 0.50        | 19                     | 0.14           | 137              |

**Table 4.8 Predicted PPV Values due to Blasting at 100-500 m radius**

| Location ID | Maximum Charge in kgs | Radial Distance in m | PPV in mm/s | Fly rock distance in m | Air Blast      |                  |
|-------------|-----------------------|----------------------|-------------|------------------------|----------------|------------------|
|             |                       |                      |             |                        | Pressure (kPa) | Sound Level (dB) |
| P1          | 27.5                  | 100                  | 4.47        | 19                     | 0.70           | 151              |
|             |                       | 200                  | 1.47        |                        | 0.31           | 141              |
|             |                       | 300                  | 0.77        |                        | 0.19           | 139              |
|             |                       | 400                  | 0.48        |                        | 0.13           | 136              |
|             |                       | 500                  | 0.34        |                        | 0.10           | 134              |



**Figure 4.3: Predicted PPV Values due to Blasting at 100-500 m radius**

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

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

#### **4.6 ECOLOGY AND BIODIVERSITY**

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

- ❖ There shall be negligible air emissions or effluents from the project site. During loading the truck, dust generation will be likely. This shall be a temporary effect and not anticipated to affect the surrounding vegetation significantly
- ❖ Most of the land in the buffer area is undulating terrain with crop lands, grass patches and small shrubs. Hence, there will be no effect on flora of the region. There are no trees in mine lease area.

- ❖ Carbon released from quarrying machineries and tippers during quarrying would be 3406kg per day, 919506kg per year and 4597530kg over five years, as provided in Table 4.9.

**Table 4.9 Carbon Released During Five Years of Rough Stone and Gravel Production**

|                                  | Per day | Per year | Per five years |
|----------------------------------|---------|----------|----------------|
| Fuel consumption of excavator    | 232     | 62561    | 312803         |
| Fuel consumption of compressor   | 27.6    | 7452     | 37260          |
| Fuel consumption of tipper       | 1011    | 273087   | 1365433        |
| Total fuel consumption in liters | 1271    | 343099   | 1715496        |
| CO <sub>2</sub> emission in kg   | 3406    | 919506   | 4597530        |

#### 4.6.2 Mitigation Measures on Flora

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

#### Carbon Sequestration

- ❖ To mitigate carbon emission due to mining activities, we recommend planting trees around the quarry to offset the carbon emission during quarrying. A tree can sequester 16124kg of carbon per year. Therefore, we recommend planting large number of trees around the quarry and near school campuses, government wasteland, roadsides etc.
- ❖ As per the greenbelt development plan as recommended by SEAC (Table 4.11), about 670 trees will be planted within three months from the beginning of mining. These trees, when grown up would sequester carbon of about 37641kg of the total carbon, as provided in Table 4.10.

**Table 4.10 CO<sub>2</sub> Sequestration**

|  |       |        |         |
|--|-------|--------|---------|
| CO <sub>2</sub> sequestration in kg                      | 60    | 16124  | 80619   |
| Remaining CO <sub>2</sub> not sequestered in kg          | 3346  | 903382 | 4516911 |
| Trees required for environmental compensation            | 37641 |        |         |
| Area required for environmental compensation in hectares | 75    |        |         |

**Table 4.11 Recommended Species for Greenbelt Development Plan**

| S. No | Botanical Name of the Plant  | Family Name | Common Name     | Category | Dust Capturing Efficiency Features   |
|-------|------------------------------|-------------|-----------------|----------|--|
| 1     | <i>Azadirachta indica</i>    | Meliaceae   | Neem, Vembu     | Tree     | Well distinct thick at both the layer Well distinct in Palisade & Spongy parenchyma. Spongy parenchyma is present at lower epidermis Many vascular bundles |
| 2     | <i>Tectona grandis</i>       | Lamiaceae   | Teak            | Tree     |  |
| 3     | <i>Polyalthia longifolia</i> | Annonaceae  | Nettilling      | Tree     |  |
| 4     | <i>Albizia lebbek</i>        | Fabaceae    | Vagai           | Tree     |  |
| 5     | <i>Delonix regia</i>         | Fabaceae    | Cemmayir-konrai | Tree     |  |
| 6     | <i>Bauhinia racemose</i>     | Fabaceae    | Aathi           | Tree     |  |
| 7     | <i>Cassia fistula</i>        | Fabaceae    | Sarakondrai     | Tree     |  |

|    |                           |           |          |      |                                 |
|----|---------------------------|-----------|----------|------|---------------------------------|
| 8  | <i>Aegle marmelos</i>     | Rutaceae  | Vilvam   | Tree | arranged almost parallel series |
| 9  | <i>Pongamia pinnata</i>   | Fabaceae  | Pungam   | Tree |                                 |
| 10 | <i>Thespesia populnea</i> | Malvaceae | Puvarasu | Tree |                                 |

**Table 4.12 Greenbelt Development Plan**

|   | No. of trees proposed for plantation         | No. of trees expected to survive @ 80% | Area to be covered(m <sup>2</sup> ) |
|---|--|--|-------------------------------------|
| Plantation in the construction phase (3 months) | Number of plants inside the mine lease area  |  |                                     |
|   | 593  | 474                                    | 5337                                |
|   | Number of plants outside the mine lease area |  |                                     |
|   | 890  | 712                                    | 8006                                |
| <b>Total</b>                                    | <b>1483</b>                                  | <b>1186</b>                            | <b>13343</b>                        |

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

#### 4.6.3. Anticipated Impact on Fauna

- ❖ Direct impact is anticipated on fauna of core zone
- ❖ Insignificant impact is anticipated on fauna in the buffer area due to air emissions, noise, vibration, transportation, waste water discharges, and changes in land use. There is no fauna in mine lease area.

#### 4.6.4 Mitigation Measures on Fauna

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

#### 4.6.5 Impact on agriculture and horticulture crops in 1km Radius

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

#### 4.6.6 Mitigation Measures on agriculture and horticulture crops.

- ❖ The main objective of the green belt is to provide a barrier between the source of pollution and the surrounding areas. In order to compensate the loss of vegetation cover, it is suggested to carry out afforestation program mainly inside and outside of the lease area in different phases.
- ❖ Quarry approach roads are sprayed with water 3 times a day to control dust. Thus, the damage to the nearby farmlands is controlled.
- ❖ A green belt will be created in 7.5 safety zone around the quarry to contain the dust from the quarry and prevent the dust from spreading to the adjacent agricultural land.
- ❖ Transportation of material will be carried out during day time and material will be covered with tarpaulin
- ❖ The speed of tippers plying on the haul road will be limited to < 20 km/hr to avoid generation of dust.

### ***Aquatic Biodiversity***

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

## **4.7 SOCIO ECONOMIC ENVIRONMENT**

### **4.7.1 Anticipated Impact from Proposed and Existing Projects**

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

### **4.7.2 Common Mitigation Measures for Proposed Project**

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



## **4.8 OCCUPATIONAL HEALTH AND SAFETY**

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

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

### **4.8.1 Respiratory Hazards**

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

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

### **4.8.2 Noise**

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

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

### **4.8.3 Physical Hazards**

The following measures are proposed for control of physical hazards

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

### **4.8.4 Occupational Health Survey**

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

- ❖ General physical tests
- ❖ Audiometric tests
- ❖ Full chest, X-ray, Lung function tests, Spirometric tests

- ❖ Periodic medical examination – yearly
- ❖ Lung function test – yearly, those who are exposed to dust
- ❖ Eye test

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

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

No waste is anticipated from any of the proposed quarries.

#### **4.10 MINE CLOSURE**

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

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

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

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

The criteria involved in mine closure are discussed below:

###### **4.10.1.1 Physical Stability**

All anthropogenic structures, which include mine workings, buildings, rest shelters etc., remaining after mine decommissioning should be physically stable. They should present no hazard to public health and safety as a result of failure or physical deterioration and they should continue to perform the functions for which they were designed. The design periods and factors of safety proposed

should take full account of extreme events such as floods, hurricane, winds or earthquakes, etc. and other natural perpetual forces like erosion, etc.,

#### **4.10.1.2 Chemical Stability**

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

#### **4.10.1.3 Biological Stability**

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

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

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

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

## **CHAPTER V**

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

#### **5.0 INTRODUCTION**

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

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

The proposed project is site specific and has the following advantages:

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

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

No alternatives are suggested as the mine site is mineral specific.

#### **5.3 FACTORS BEHIND SELECTION OF PROPOSED TECHNOLOGY**

Manual open cast mining method with secondary blasting will be applied to extract rough stone and gravel in the area. The proposed mining lease areas have following advantages:

- ❖ As the mineral deposition is homogeneous and batholith formation, opencast method of working is preferred over underground method.
- ❖ The material will be loaded with the help of excavators into tractors/tippers and transported to the need by customers.
- ❖ Semi-skilled labours fit for quarrying operations are easily available around the nearby villages.

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

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

## **CHAPTER VI**

### **ENVIRONMENTAL MONITORING PROGRAMME**

#### **6.0 GENERAL**

The monitoring and evaluation of environmental parameters indicates potential changes occurring in the environment, which paves way for implementation of rectifying measures wherever required to maintain the status of the natural environment. Evaluation is also a very effective tool to judge the effectiveness or deficiency of the measures adopted and provides insight for future corrections. The main objective of environmental monitoring is to ensure that the obtained results in respect of environmental attributes and prevailing conditions during operation stage are in conformity with the prediction during the planning stage. In case of substantial deviation from the earlier prediction of results, this forms as base data to identify the cause and suggest remedial measures. Environmental monitoring is mandatory to meet compliance of statutory provisions under the Environment (Protection) Act, 1986, relevant conditions regarding monitoring covered under EC orders issued by the SEIAA-TN as well as the conditions set forth under the order issued by Tamil Nadu Pollution Control Board while granting CTE/CTO.

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

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

An Environment monitoring cell (EMC) will be constituted to monitor the implementation of EMP and other environmental protection measures in the proposed quarry.

The responsibilities of this cell will be:

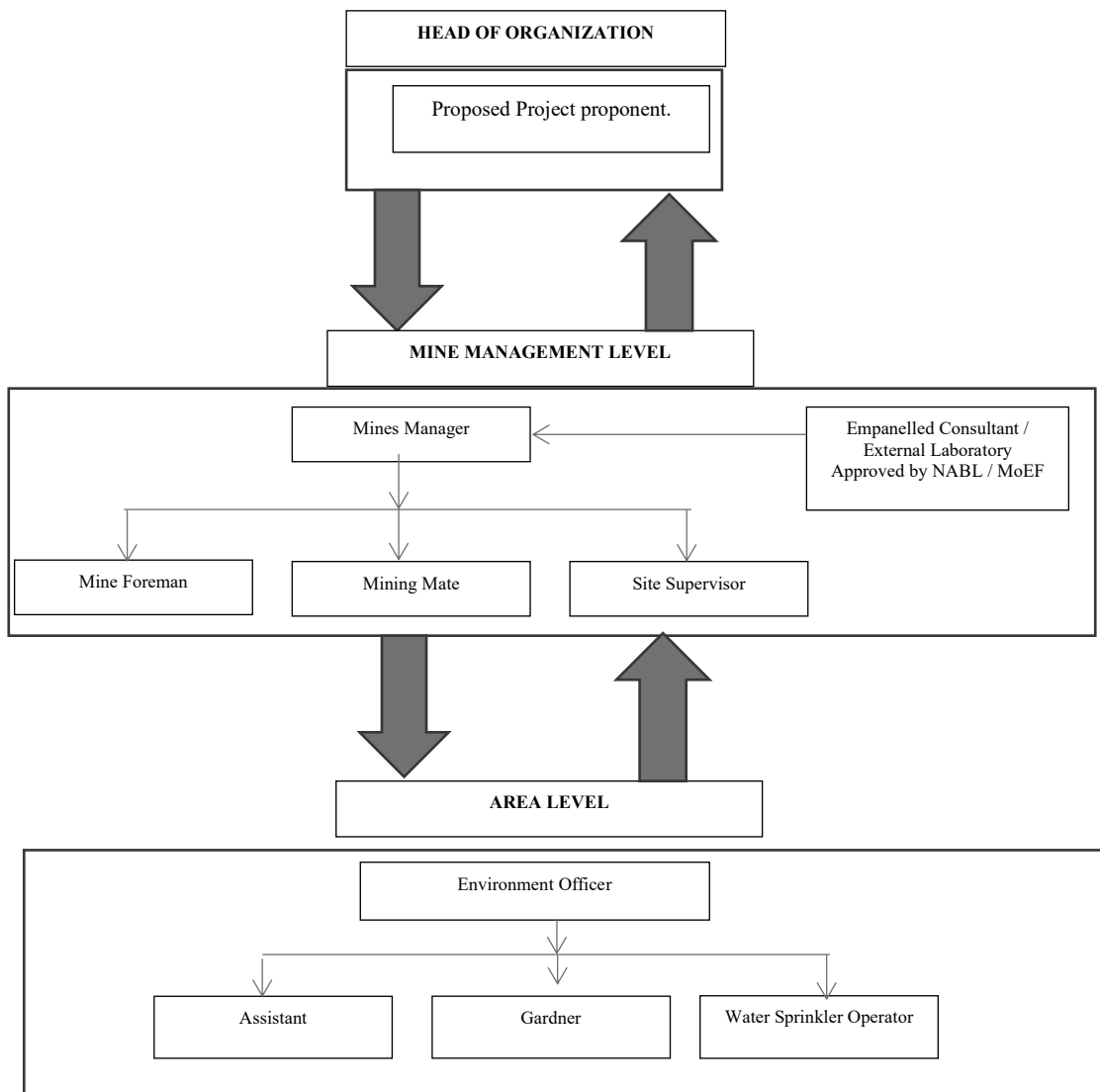
- ❖ Implementation of pollution control measures
- ❖ Monitoring programme implementation
- ❖ Post-plantation care
- ❖ To check the efficiency of pollution control measures taken
- ❖ Any other activity as may be related to environment

- ❖ Seeking expert's advice when needed.

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

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

The sampling and analysis of the environmental attributes will be as per the guidelines of Central Pollution Control Board (CPCB)/Ministry of Environment, Forest and Climate Change (MoEF & CC). The Environmental Monitoring Cell will be formed for the proposed project. The structure of the cell will be as shown in Figure 6.1.



**Figure 6.1 Proposed environmental monitoring chart**

## 6.2 IMPLEMENTATION SCHEDULE OF MITIGATION MEASURES

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

**Table 6.1 Implementation Schedule for Proposed Project**

| S. No. | Recommendations                   | Time Period   | Schedule                                      |
|--------|-----------------------------------|---|---|
| 1      | Land Environment Control Measures | Before commissioning of the project                                 | Immediately after the commencement of project |
| 2      | Soil Quality Control Measures     | Before commissioning of the project                                 | Immediately after the commencement of project |
| 3      | Water Pollution Control Measures  | Before commissioning of the project and along with mining operation | Immediately and as project progress           |
| 4      | Air Pollution Control Measures    | Before commissioning of the project and along with mining operation | Immediately and as project progress           |
| 5      | Noise Pollution Control measures  | Before commissioning of the project and along with mining operation | Immediately and as project progress           |
| 6      | Ecological Environment            | Phase wise implementation every year along with mine operations     | Immediately and as project progress           |

## 6.3 MONITORING SCHEDULE AND FREQUENCY

Monitoring shall confirm that commitments are being met. This may take the form of direct measurement and recording of quantitative information, such as amounts and concentrations of discharges, emissions and wastes, for measurement against statutory standards. Monitoring may include socio-economic interaction, through local liaison activities or even assessment of complaints.

The environmental monitoring will be conducted in the mine operations as follows:

- ❖ Air quality
- ❖ Water and wastewater quality
- ❖ Noise levels
- ❖ Soil quality and

❖ Greenbelt development

The details of proposed monitoring schedule have been provided in Table 6.2.

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

| S. No. | Environment Attributes   | Location   | Monitoring     |                              | Parameters  |
|--------|--------------------------|--|----------------|------------------------------|---|
|        |                          |  | Duration       | Frequency                    |   |
| 1      | Air Quality              | 2 Locations (1 Core & 1 Buffer)  | 24 hours       | Once in 6 months             | Fugitive Dust, PM <sub>2.5</sub> , PM <sub>10</sub> , SO <sub>2</sub> and NO <sub>x</sub> . |
| 2      | Meteorology              | At mine site before start of Air Quality Monitoring & IMD Secondary Data | Hourly / Daily | Continuous online monitoring | Wind speed, Wind direction, Temperature, Relative humidity and Rainfall                     |
| 3      | Water Quality Monitoring | 2 Locations (1SW & 1 GW)   | -              | Once in 6 months             | Parameters specified under IS:10500, 1993 & CPCB Norms                                      |
| 4      | Hydrology                | Water level in open wells in buffer zone around 1 km at specific wells   | -              | Once in 6 months             | Depth in m BGL  |
| 5      | Noise                    | 2 Locations (1 Core & 1 Buffer)  | Hourly – 1 Day | Once in 6 months             | Leq, Lmax, Lmin, Leq Day & Leq Night  |
| 6      | Vibration                | At the nearest habitation (in case of reporting)                         | –              | During blasting operation    | Peak particle velocity  |
| 7      | Soil                     | 2 Locations (1 Core & 1 Buffer)  | –              | Once in six months           | Physical and chemical characteristics   |
| 8      | Greenbelt                | Within the project area  | Daily          | Monthly                      | Maintenance   |

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



#### 6.4 BUDGETARY PROVISION FOR ENVIRONMENT MONITORING PROGRAM

The cost in respect of monitoring of environmental attributes, parameter to be monitored, sampling/monitoring locations with frequency and cost provision against each proposal is shown in Table 6.3. Monitoring work will be outsourced to external laboratory approved by NABL / MoEF. The proposed recurring cost for Environmental Monitoring Programme is Rs 2,95,000 /- per annum for the proposed project site.

**Table 6.3 Environment Monitoring Budget**

| S. No.       | Parameter              | Capital Cost | Recurring Cost per annum |
|--------------|------------------------|--------------|--------------------------|
| 1            | Air Quality            | -            | Rs 60,000/-              |
| 2            | Meteorology            | -            | Rs 15,000/-              |
| 3            | Water Quality          | -            | Rs 20,000/-              |
| 4            | Water Level Monitoring |              | Rs 10,000/-              |
| 5            | Soil Quality           | -            | Rs 20,000/-              |
| 6            | Noise Quality          | -            | Rs 10,000/-              |
| 7            | Vibration Study        | -            | Rs 1,50,000/-            |
| 8            | Greenbelt              | -            | Rs 10,000/-              |
| <b>Total</b> |                        | -            | <b>Rs 2,95,000 /-</b>    |

Source: Field Data

#### 6.5 REPORTING SCHEDULES OF MONITORED DATA

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

Periodical reports to be submitted to:

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

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

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

## CHAPTER VII

### ADDITIONAL STUDIES

#### 7.0 GENERAL

Additional studies deal with:

- ❖ Public Consultation for Proposed Project
- ❖ Risk Assessment
- ❖ Disaster Management Plan
- ❖ Cumulative Impact Study
- ❖ Plastic Waste Management

#### 7.1 PUBLIC CONSULTATION FOR PROPOSED PROJECT

Application to the Member Secretary of the Tamil Nadu Pollution Control Board (TNPCB) to conduct Public Hearing in a systematic, time bound and transparent manner ensuring widest possible public participation at the project site or in its close proximity in the district was made and the public opinions on the proposed project will be updated in the final EIA/EMP report.

#### 7.2 RISK ASSESSMENT FOR PROPOSED PROJECT

Risk Assessment is all about prevention of accidents and to take necessary steps to prevent it from happening. The methodology for the risk assessment is based on the specific risk assessment guidance issued by the Directorate General of Mine Safety (DGMS), Dhanbad, vide circular No.13 of 2002, dated 31<sup>st</sup> December, 2002. The DGMS risk assessment process is intended to identify existing and probable hazards in the work environment and all operations and assess the risk levels of those hazards in order to prioritize those that need immediate attention. Further, mechanisms responsible for these hazards are identified and their control measures, set to timetable are recorded along with pinpointed responsibilities. The whole quarry operation will be carried out under the direction of a Qualified Competent Mine Manager holding certificate of competency to manage a metalliferous mine granted by the DGMS, Dhanbad for proposed project. Factors of risks involved due to human induced activities in connection with these proposed mining & allied activities with detailed analysis of causes and control measures for the mine is given in Table 7.1.

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

| S. No. | Risk factors  | Causes of risk                                | Control measures  |
|--------|---|---|---|
| 1      | Accidents due to explosives and heavy mining machineries. | Improper handling and unsafe working practice | ✓ All safety precautions and provisions of Mine Act, 1952, Metalliferous Mines Regulation, 1961 and Mines Rules, 1955 will be strictly followed during all mining operations. |

|   |          |  |  |
|---|----------|--|--|
|   |          |  | <ul style="list-style-type: none"> <li>✓ Workers will be sent to the Training in the nearby Group Vocational Training Centre Entry of unauthorized persons will be prohibited.</li> <li>✓ Fire-fighting and first-aid provisions in the mine office complex and mining area.</li> <li>✓ Provisions of all the safety appliances such as safety boot, helmets, goggles etc. will be made available to the employees and regular check for their use.</li> <li>✓ Working of quarry, as per approved plans and regularly updating the mine plans.</li> <li>✓ Cleaning of mine faces on daily basis shall be daily done in order to avoid any overhang or undercut.</li> <li>✓ Handling of explosives, charging and firing shall be carried out by competent persons only under the supervision of a Mine Manager.</li> <li>✓ Maintenance and testing of all mining equipment as per manufacturer's guidelines.</li> </ul> |
| 2 | Drilling | Improper and unsafe practices; Due to high pressure of compressed air, hoses may burst; Drill Rod may break; | <ul style="list-style-type: none"> <li>✓ Safe operating procedure established for drilling (SOP) will be strictly followed.</li> <li>✓ Only trained operators will be deployed.</li> <li>✓ No drilling shall be commenced in an area where shots have been fired until the blaster/blasting foreman has made a thorough Examination of all places,</li> <li>✓ Drilling shall not be carried on simultaneously on the benches at places directly one above the other.</li> <li>✓ Periodical preventive maintenance and replacement of worn-out accessories in the compressor and drill equipment as per operator manual.</li> <li>✓ All drills unit shall be provided with wet drilling shall be maintained in efficient working in condition.</li> <li>✓ Operator shall regularly use all the personal protective equipment.</li> </ul>  |
| 3 | Blasting | Fly rock, ground vibration, Noise and dust. Improper charging, stemming & Blasting/fining                    | <ul style="list-style-type: none"> <li>✓ The maximum charge per delay and by optimum blast hole pattern, vibrations will be controlled within the permissible limit and blast can be conducted safely.</li> <li>✓ SOP for Charging, Stemming &amp; Blasting/Firing of Blast Holes will be followed by blasting crew during initial stage of operation</li> </ul>   |

|   |                                       |   |  |
|---|---------------------------------------|---|--|
|   |                                       | of blast holes<br>Vibration due to<br>movement of<br>vehicles   | <ul style="list-style-type: none"> <li>✓ Shots are fired during daytime only.</li> <li>✓ All holes charged on any one day shall be fired on the same day.</li> <li>✓ The danger zone is and will be distinctly demarcated (by means of red flags)</li> </ul>   |
| 4 | Transportation                        | <p>Potential hazards and unsafe workings contributing to accident and injuries</p> <p>Overloading of material</p> <p>While reversal &amp; overtaking of vehicle</p> <p>Operator of truck leaving his cabin when it is loaded.</p> | <ul style="list-style-type: none"> <li>✓ Before commencing work, drivers personally check the truck/tipper for oil(s), fuel and water levels, tyre inflation, general cleanliness and inspect the brakes, steering system, warning devices including automatically operated audio-visual reversing alarm, rear view mirrors, side indicator lights etc., are in good condition.</li> <li>✓ Not allow any unauthorized person to ride on the vehicle nor allow any unauthorized person to operate the vehicle.</li> <li>✓ Concave mirrors should be kept at all corners</li> <li>✓ All vehicles should be fitted with reverse horn with one spotter at every tipping point</li> <li>✓ Loading according to the vehicle capacity</li> <li>✓ Periodical maintenance of vehicles as per operator manual</li> </ul> |
| 5 | Natural calamities                    | Unexpected happenings   | <ul style="list-style-type: none"> <li>✓ Escape Routes will be provided to prevent inundation of storm water</li> <li>✓ Fire Extinguishers &amp; Sand buckets</li> </ul>   |
| 6 | Failure of Mine Benches and Pit Slope | Slope geometry, Geological structure  | <ul style="list-style-type: none"> <li>✓ Ultimate or over all pit slope shall be below 60° and each bench height shall be 5m.</li> </ul>   |

*Source: Analysed and proposed by FAE & EC*

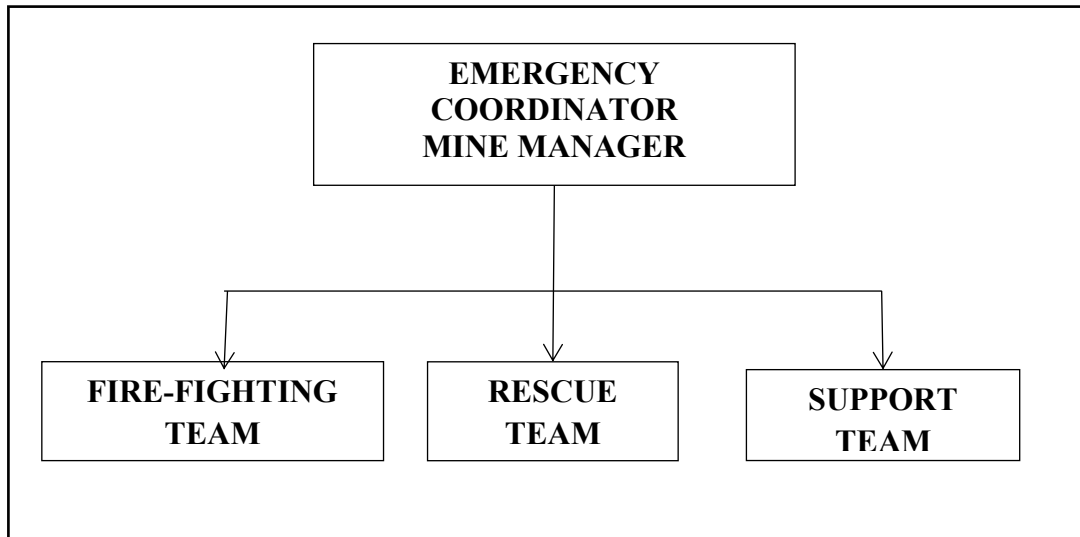
### **7.3 DISASTER MANAGEMENT PLAN FOR PROPOSED PROJECT**

Natural disasters like Earthquake, Landslides have not been recorded in the past history as the terrain is categorized under seismic zone III. The area is far away from the sea. Hence, the disaster due to heavy floods and tsunamis are not anticipated. The Disaster Management Plan is aimed to ensure safety of life, protection of environment, protection of installation, restoration of production and salvage operations in this same order of priorities. The objective of the Disaster Management Plan is to make use of the combined resources of the mine and the outside services to achieve the following:

- ❖ Rescue and medical treatment of casualties;
- ❖ Safeguard other people;
- ❖ Minimize damage to property and the environment;

- ❖ Initially contain and ultimately bring the incident under control;
- ❖ Secure the safe rehabilitation of affected area; and
- ❖ Preserve relevant records and equipment for the subsequent inquiry into the cause and circumstances of the emergency.

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



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

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

### **7.3.1 Emergency Control Procedure**

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

- ❖ On site fire crew led by a fireman will arrive at the site of incident with fire foam tenders and necessary equipment.
- ❖ Emergency security controller will commence his role from main gate office

- ❖ Incident controller shall rush to the site of emergency and with the help of rescue team and will start handling the emergency.
- ❖ Site main controller will arrive at MECR with members of his advisory and communication team and will assume absolute control of the site.
- ❖ He will receive information continuously from incident controller and give decisions and directions to:
  - ❖ Incident controller
  - ❖ Mine control rooms
  - ❖ Emergency security controller

#### 7.4 CUMULATIVE IMPACT STUDY

The Cumulative Impact is mainly anticipated due to drilling & blasting and excavation and transportation activities in all the projects within the cluster and major impact anticipated is on Air & Noise Environment and Ground Vibrations due to blasting. For this cumulative study, two proposed projects known as P1, P2 are taken into consideration. The details of P1 have been given in Table 1.3 and P2 is given in the Table 7.2.

**Table 7.2 Salient Features of the Proposed Project 'P1'**

|                                  |  |                          |
|----------------------------------|--|--------------------------|
| Name of the Quarry               | <b>Tvl. Sri Tirumala Blue Metals, Rough stone and gravel quarry</b>  |                          |
| Type of Land                     | Patta Land   |                          |
| Extent                           | 1.34.5 Ha  |                          |
| S.F. No                          | 148/16, 148/17, 148/18, 148/19, 148/20, 148/21, 148/22, 148/23,148/24, 148/25,148/38A, 148/39A1, 146/39B, 146/46, 148/1, 148/10, 148/2, 148/26, 148/27, 148/28, 148/29, 148/3, 148/30, 48/39A2, 148/39B2A, 148/39B1, 148/4, 148/5, 148/6,148/7, 148/9, 149/1A, 149/2A and 150/1A |                          |
| Toposheet No                     | 57 P/10  |                          |
| Location of Project Site         | Latitude: 12°43'58.99"N to 12°44'09.61"N<br>Longitude: 79°42'32.68"E to 79°42'40.25"E  |                          |
| Highest Elevation                | 100m AMSL  |                          |
| Proposed depth of mining         | 49m BGL  |                          |
| Geological Resources             | Rough Stone in m <sup>3</sup>  | Gravel in m <sup>3</sup> |
|                                  | 1997415  | 133161                   |
| Mineable Reserves                | Rough Stone in m <sup>3</sup>  | Gravel in m <sup>3</sup> |
|                                  | 807050   | 113073                   |
| Proposed reserves for five years | Rough Stone in m <sup>3</sup>  | Gravel in m <sup>3</sup> |
|                                  | 807050   | 113073                   |

|                              |   |    |
|------------------------------|---|----|
| Method of Mining             | Open-Cast Mechanized mining   |    |
| Topography                   | Flat Topography   |    |
| Machinery proposed           | Jack Hammer   | 20 |
|                              | Compressor  | 5  |
|                              | Tipper  | 4  |
|                              | Excavator   | 2  |
| Blasting Method              | The quarrying operation is proposed to carried out by open cast, using jack hammer drilling followed by manual breaking will be adopted to release the rough stone and nonel blasting is proposed in this lease area. |    |
| Proposed Manpower Deployment | 33 Nos  |    |
| Project Cost                 | Rs.1,07,76,100/-  |    |
| CER Cost                     | Rs. 5,00,000/-  |    |
| Proposed Water Requirement   | KLD   |    |

#### 7.4.1 Air Environment

As the production of rough stone and gravel plays a vital role in affecting the air environment. The data on the cumulative production resulting from two proposed project have been given in Tables 7.3 and 7.4.

**Table 7.3 Cumulative Production Load of Rough Stone**

| Quarry             | 5 Years in m <sup>3</sup> | Per Year in m <sup>3</sup> | Per Day in m <sup>3</sup> | Number of Lorry Load Per Day |
|--------------------|---------------------------|----------------------------|---------------------------|------------------------------|
| P1                 | 386102                    | 77220                      | 286                       | 48                           |
| P2                 | 807050                    | 161410                     | 598                       | 100                          |
| <b>Grand Total</b> | <b>1193152</b>            | <b>238630</b>              | <b>884</b>                | <b>148</b>                   |

**Table 7.4 Cumulative Production Load of Gravel**

| Quarry             | Production for Years (m <sup>3</sup> ) | Yearly Production (m <sup>3</sup> ) | Daily Production (m <sup>3</sup> ) | Number of Lorry Loads Per Day |
|--------------------|--|-------------------------------------|------------------------------------|-------------------------------|
| P1<br>(3 years)    | 23528                                  | 7843                                | 29                                 | 5                             |
| P2<br>(2 years)    | 113073                                 | 56537                               | 209                                | 34                            |
| <b>Grand Total</b> | <b>136601</b>                          | <b>64380</b>                        | <b>238</b>                         | <b>39</b>                     |

The cumulative study shows that the overall production of rough stone from two quarry is 884m<sup>3</sup> per day with a capacity of 148 trips of rough stone per day and that production of gravel from two proposed quarries is 238m<sup>3</sup> per day accounting for 39 trips/day.

#### 7.4.1.1 Cumulative Impact of Air Pollutants

The results on the cumulative impact of the two proposed projects on air environment of the cluster have been provided in Table 7.5 The cumulative values resulting from the two projects for each pollutant do not exceed the permissible limits set by CPCB.

**Table 7.5 Cumulative impact results from the two proposed projects**

| Pollutants        | Baseline Data<br>(µg/m <sup>3</sup> ) | Incremental Values (µg/m <sup>3</sup> ) |       | Cumulative Value (µg/m <sup>3</sup> ) |
|-------------------|---------------------------------------|---|-------|---------------------------------------|
|                   |                                       | P1                                      | P2    |                                       |
| PM <sub>2.5</sub> | 26.2                                  | 3.62                                    | 4.92  | <b>34.74</b>                          |
| PM <sub>10</sub>  | 57.2                                  | 9.67                                    | 11.65 | <b>78.52</b>                          |

#### 7.4.2 Noise Environment

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

**Table.7.6 Cumulative impact of noise from two proposed projects**

| Location ID                      | Distance (m) | Direction | Background Value (Day) dB(A) | Incremental Value dB(A) | Total Predicted dB(A) | Residential Area Standards dB(A) |
|----------------------------------|--------------|-----------|------------------------------|-------------------------|-----------------------|----------------------------------|
| Habitation Near P1               | 390          | NW        | 47.7                         | 32.1                    | 47.8                  | <b>55</b>                        |
| Habitation Near P2               | 950          | NW        |                              | 24.4                    | 47.7                  |                                  |
| <b>Cumulative Noise (dB (A))</b> |              |           |                              |                         | <b>47.8</b>           |                                  |

Source: Lab Monitoring Data

The cumulative analysis of noise due to two proposed projects shows that habitation will receive about 47.8dB (A) respectively. The cumulative results for all the villages in consideration do not exceed the limit set by CPCB for residential areas for day time.

#### Ground Vibrations

Cumulative results of ground vibrations due to mining activities in the all the three projects have been shown in Table 7.7.



**Table 7.7 Cumulative effect of ground vibrations resulting from two projects**

| Location ID  | Maximum Charge in kgs | Nearest Habitation in m | PPV in mm/s |
|--------------|-----------------------|-------------------------|-------------|
| P1           | 27.5                  | 390                     | 0.50        |
| P2           | 57.5                  | 950                     | 0.22        |
| <b>Total</b> |                       |                         | <b>0.72</b> |

Results from the above tables 7.8 indicate that the cumulative PPV value of each habitation is well below the peak particle velocity of 8 mm/s as per Directorate General of Mines Safety for safe level criteria through Circular No.7 dated 29/8/1997.

#### 7.4.3 Socio Economic Environment

Socio Economic benefits of the two proposed project were calculated and the results have been shown in Table 7.8 the two projects together will contribute Rs. 10,00,000/-towards CER fund.

**Table 7.8 Socio Economic benefits from two proposed projects**

| Location ID        | Project Cost        | CER Cost            |
|--------------------|---------------------|---------------------|
| P1                 | Rs.386102           | Rs. 500000          |
| P2                 | Rs.807050           | Rs. 500000          |
| <b>Grand Total</b> | <b>Rs.11,93,152</b> | <b>Rs.10,00,000</b> |

**Table 7.9 Employment benefits from two proposed projects**

| Location ID        | Employment |
|--------------------|------------|
| P1                 | 20         |
| P2                 | 33         |
| <b>Grand Total</b> | <b>53</b>  |

A total of 53 people will get employment due to two proposed Projects in cluster

#### 7.4.4 Ecological Environment

**Table 7.10 Greenbelt Development Benefits from two Projects**

| Code         | Number of Trees proposed | Area to be covered (m <sup>2</sup> ) | No. of Trees expected to be grown @ 80% survival rate | Species recommended  |
|--------------|--------------------------|--------------------------------------|---|--|
| P1           | 673                      | 6053                                 | 538   | <i>Azadirachta indica,</i><br><i>Albizia lebbeck,</i><br><i>Delonix regia,</i><br><i>Techtona grandis, etc.,</i> |
| P2           | 2222                     | 19996                                | 1777  |  |
| <b>Total</b> | <b>2895</b>              | <b>26049</b>                         | <b>2315</b>   |  |

Cumulative studies show that the two proposed Projects will plant about 2895 native tree species like *Azadirachta indica*, *Albizia lebbeck*, *Delonix regia*, *Tectona grandis*, etc inside and outside the lease area. It is expected that 80 % of trees, i.e., 2315 trees will survive in this green belt development program.

## 7.5 PLASTIC WASTE MANAGEMENT PLAN FOR PROPOSED PROJECT

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

### 7.5.1 Objective

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

A detailed action plan to manage plastic waste has been provided in Table 7.11.

**Table 7.11 Action Plan to Manage Plastic Waste**

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

Source: Proposed by FAEs and EC.

## **CHAPTER VIII**

### **PROJECT BENEFITS**

#### **8.0 GENERAL**

The proposed project at Mennallur Village aims to produce **386102m<sup>3</sup>** of rough stone and **23528m<sup>3</sup>** of gravel over a period of 5 years. This will enhance the socio-economic activities in the adjoining areas and will result in the following benefits:

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

#### **8.1 EMPLOYMENT POTENTIAL**

It is proposed to provide employment to about 20 persons for carrying out mining operations and give preference to the local people in providing employment in this cluster. In addition, there will be an opportunity for indirect employment to the form of contractual jobs, business opportunities, and service facilities etc. Because of this, the economic status of the local people will improve.

#### **8.2 SOCIO-ECONOMIC WELFARE MEASURES PROPOSED**

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

#### **8.3 IMPROVEMENT IN PHYSICAL INFRASTRUCTURE**

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

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

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

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

#### **8.5 OTHER TANGIBLE BENEFITS**

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

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

#### **8.6 CORPORATE SOCIAL RESPONSIBILITY**

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

Under this programme, the project proponents will take-up following programmes for social and economic development of villages within 5 km of the project site. For this purpose, separate budget will be provided every year. For finalization of these schemes, proponent will interact with LSG. The schemes will be selected from the following broad areas

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

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

## 8.7 CORPORATE ENVIRONMENT RESPONSIBILITY

Allocation for Corporate Environment Responsibility (CER) shall be made as per Government of India, MoEF & CC Office Memorandum F.No.22-65/2017-IA.III dated 01.05.2018. As per para 6 (II) of the office memorandum, being a green field project & capital investment is  $\leq 100$  crores, the proposed project shall contribute 2% of capital investment towards CER as per directions of EAC/SEAC. However, the SEAC has suggested to allocate CER fund on the basis of the extent of the project. Therefore, Rs. 5,00,000 is allocated for CER. The proposed utilization of the budget of CER activities is given in Table 8.1.

**Table 8.1 CER Action Plan**

| S. No. | Activity  | Budget (Rs.in Lakh) |
|--------|---|---------------------|
| 1      | The applicant Indents to involve in corporate environment responsibilities (CER) activities such as renovation of existing toilet, plantation within the school premises, donating environment related books to the nearby school library, etc. | Rs.5,00,000         |
|        | <b>Total</b>  | <b>Rs.5,00,000</b>  |

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

## 8.8 SUMMARY OF PROJECT BENEFITS

The project would pay about Rs.4,37,80,098 to the state government through various ways, as provided in Table 8.2.

**Table 8.2 Project Benefits to the State Government**

| Particulars   | Budget for Rough Stone (Rs.) | Budget for Gravel (Rs.) |
|---|------------------------------|-------------------------|
| CER   | 5,00,000                     |                         |
| Seigniorage @ Rs.90/m <sup>3</sup> of rough stone<br>Rs.56/m <sup>3</sup> of gravel | 3,47,49,180                  | 13,17,568               |
| District Mineral Foundation Tax @ 10% of Seigniorage                                | 34,74,918                    | 1,31,757                |
| Green Tax @ 10% of Seigniorage  | 34,74,918                    | 1,31,757                |
| <b>Total</b>  | <b>4,21,99,016</b>           | <b>15,81,082</b>        |

**CHAPTER IX**  
**ENVIRONMENTAL COST BENEFIT ANALYSIS**

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

## **CHAPTER X**

### **ENVIRONMENTAL MANAGEMENT PLAN**

#### **10.0 GENERAL**

Environment Management Plan (EMP) aims at the preservation of ecological system by considering in-built pollution abatement facilities at the proposed site. Good practices of environmental management plan will ensure to keep all the environmental parameters of the project in respect of ambient air quality, water quality, socio economic improvement standards. Mitigation measures at the source level and an overall environment management plan at the study area are elicited so as to improve the supportive capacity of the receiving bodies. The EMP presented in this chapter discusses the administrative aspects ensuring that mitigative measures are implemented and their effectiveness monitored after approval of the EIA.

#### **10.1 ENVIRONMENTAL POLICY**

The project proponent is committed to conduct all its operations and activities in an environmentally responsible manner and to continually improve environmental performance.

The Proponent Mr. T. Ponnambalam will:

- ❖ Meet the requirements of all laws, acts, regulations, and standards relevant to its operations and activities.
- ❖ Implement a program to train employees in general environmental issues and individual workplace environmental responsibilities.
- ❖ Allocate necessary resources to ensure the implementation of the environmental policy.
- ❖ Ensure that an effective closure strategy is in place at all stages of project development and that progressive reclamation is undertaken as early as possible to reduce potential long-term environmental and community impacts.
- ❖ Implement monitoring programs to provide early warning of any deficiency or unanticipated performance in environmental safeguards.
- ❖ Conduct periodic reviews to verify environmental performance and to continuously strive towards improvement.

##### **10.1.1 Description of the Administration and Technical Setup**

The environment monitoring cell discussed under Chapter VI will ensure effective implementation of environment management plan and to ensure compliance of environmental statutory guidelines through mine management level of each proposed quarry. The said team will be responsible for:

- ❖ Monitoring of the water/ waste water quality, air quality and solid waste generated.

- ❖ Analysis of the water and air samples collected through external laboratory.
- ❖ Implementation and monitoring of the pollution control and protective measures/ devices which shall include financial estimation, ordering, installation of air pollution control equipment, waste water treatment plant, etc.
- ❖ Co-ordination of the environment related activities within the project as well as with outside agencies.
- ❖ Collection of health statistics of the workers and population of the surrounding villages.
- ❖ Green belt development.
- ❖ Monitoring the progress of implementation of the environmental monitoring program.
- ❖ Compliance to statutory provisions, norms of State Pollution Control Board, Ministry of Environment and Forests and the conditions of the environmental clearance as well as the consents to establish and consents to operate.

## 10.2 Budgetary Provision for Environmental Management

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

**Table 10.1 EMP Budget for Proposed Project**

| Attribute              | Mitigation measures  | Provision for Implementation   | Capital Cost | Recurring Cost/annu m |
|------------------------|--|--|--------------|-----------------------|
|                        |  |  | (Rs.)        | (Rs.)                 |
| <b>Air Environment</b> | Compaction, gradation and drainage on both sides                                   | Rental Dozer & drainage construction on haul road @ Rs. 10,000/- per hectare and yearly maintenance @ Rs. 10,000/- per hectare | 13450        | 13450                 |
|                        | Fixed Water Sprinkling Arrangements + Water sprinkling by own water tankers        | Fixed sprinkler installation and new water tanker cost for capital; and water sprinkling (thrice a day) cost for recurring     | 800000       | 50000                 |
|                        | Air quality will be regularly monitored as per norms within ML area & ambient area | Yearly compliance as per CPCB norms  | 0            | 50000                 |
|                        | Muffle blasting – To control fly rocks during blasting                             | Blasting face will be covered with sand bags / steel mesh / old tyres / used conveyor belts                                    | 0            | 5000                  |



|                              |  |   |               |               |
|------------------------------|--|---|---------------|---------------|
|                              | Wet drilling procedure / latest eco-friendly drill machine with separate dust extractor unit                               | Dust extractor @ Rs. 25,000/- per unit deployed as capital & @ Rs. 2500 per unit recurring cost for maintenance | 50000         | 5000          |
|                              | No overloading of trucks/tippers/tractors  | Manual Monitoring through Security guard  | 0             | 5000          |
|                              | Stone carrying trucks will be covered by tarpaulin to avoid escape of fines to the atmosphere                              | Monitoring if trucks will be covered by tarpaulin   | 0             | 10000         |
|                              | Enforcing speed limits of 20 km/hr within ML area  | Installation of Speed Governors @ Rs. 5000/- per tipper/dumper deployed   | 45000         | 0             |
|                              | Regular monitoring of exhaust fumes as per RTO norms   | Monitoring of Exhaust Fumes   | 0             | 11250         |
|                              | Regular sweeping and maintenance of roads for at least about 200 m from quarry entrance                                    | Provision for 2 labours @ Rs.10,000/labour (Contractual) / hectare  | 0             | 26900         |
|                              | Installing wheel wash system near exit gate of quarry  | Installation + Maintenance + Supervision  | 50000         | 20000         |
| <b>Total Air Environment</b> |  |   | <b>958450</b> | <b>196600</b> |
| <b>Noise Environment</b>     | Source of noise will be transportation vehicles, and HEMM. For this, proper maintenance will be done at regular intervals. | Provision made in Operating Cost  | 0             | 0             |
|                              | Oiling & greasing of Transport vehicles and HEMM at regular interval will be done.   | Provision made in Operating Cost  | 0             | 0             |
|                              | Adequate silencers will be provided in all the diesel engines of vehicles.   | Provision made in Operating Cost  | 0             | 0             |
|                              | It will be ensured that all transportation vehicles carry a fitness certificate.   | Provision made in Operating Cost  | 0             | 0             |
|                              | Safety tools and implementations that are required will be kept adequately near  | Provision made in OHS part  | 0             | 0             |

|   |   |   |              |                |
|---|---|---|--------------|----------------|
|   | blasting site at the time of charging.  |   |              |                |
|   | Line Drilling all along the boundary to reduce the PPV from blasting activity and implementing controlled blasting. | Provision made in Operating Cost  | 0            | 0              |
|   | Proper warning system before blasting will be adopted and clearance of the area before blasting will be ensured.    | Blowing Whistle by Mining Mate / Blaster / Competent Person   | 0            | 0              |
|   | Provision for Portable blaster shed   | Installation of portable blasting shelter   | 50000        | 2000           |
|   | NONEL Blasting will be practiced to control Ground vibration and fly rocks  | Rs. 30/- per 6 tons of blasted material   | 0            | 1081086        |
| <b>Total Noise Environment</b>                                |   |   | <b>50000</b> | <b>1083086</b> |
| <b>Water Environment</b>                                      | Water Management  | Provision for garland drain @ Rs. 10,000/- per hectare with maintenance of Rs. 5,000/- per annum  | 13450        | 6725           |
| <b>Total Water Environment</b>                                |   |   | <b>13450</b> | <b>6725</b>    |
| <b>Waste Management</b>                                       | Waste management (Spent Oil, Grease etc.,)  | Provision for domestic waste collection and disposal through authorized agency (capital cost, recurring cost for collection /disposal). | 25000        | 20000          |
|   |   | Installation of dust bins   | 5000         | 2000           |
|   | Bio toilets will be made available outside mine lease on the land of owner itself                                   | Provision made in Operating Cost  | 0            | 0              |
| <b>Total Waste Management</b>                                 |   |   | <b>30000</b> | <b>22000</b>   |
| <b>Implementation of EC, Mining Plan &amp; DGMS Condition</b> | Size 6' X 5' with blue background and white letters as mentioned in MoM Appendix II by the SEAC TN                  | Fixed display board at the quarry entrance as permanent structure   | 10000        | 1000           |
| <b>Total Implementation of EC, Mining Plan</b>                |   |   | <b>10000</b> | <b>1000</b>    |
| <b>Occupational Health</b>                                    | Workers will be provided with Personal Protective Equipment   | Provision of PPE @ Rs. 4000/- per employee with recurring based on wear   | 80000        | 20000          |

|   |  |  |               |               |
|---|--|--|---------------|---------------|
| <b>and Safety</b>                           |  | and tear (say, @ Rs. 1000/- per employee)  |               |               |
|   | Health checkup for workers will be provisioned   | IME & PME Health checkup @ Rs. 1000/- per employee   | 0             | 20000         |
|   | First aid facility will be provided  | Provision of 2 Kits per Hectare @ Rs. 2000/-   | 0             | 5380          |
|   | Mine will have safety precaution signages, boards.   | Provision for signages and boards made   | 10000         | 2000          |
|   | Barbed Wire Fencing to quarry area will be provisioned.  | Per Hectare fencing Cost @ Rs. 2,00,000/- with Maintenance of Rs 10,000/- per annum  | 269000        | 13450         |
|   | No parking will be provided on the transport routes. Separate provision on the south side of the hill will be made for vehicles /HEMMs. Flaggers will be deployed for traffic management | Parking area with shelter and flags @ Rs. 50,000/- per hectare project and Rs. 10,000/- as maintenance cost  | 67250         | 13450         |
|   | Installation of CCTV cameras in the mines and mine entrance  | Camera 4 Nos, DVR, Monitor with internet facility  | 30000         | 5000          |
|   | Implementation as per Mining Plan and ensure safe quarry working   | Mines Manager (1 <sup>st</sup> Class / 2 <sup>nd</sup> Class / Mine Foreman) under regulation 34 / 34 (6) of MMR, 1961 and Mining Mate under regulation 116 of MMR,1961 @ 40,000/- for Manager & @ 25,000/- for Foreman / Mate | 0             | 780000        |
| <b>Total Occupational Health and Safety</b> |  |  | <b>456250</b> | <b>859280</b> |
| <b>Development of Green Belt</b>            | Green belt development - 500 trees per hectare (200 Inside Lease Area & 300 Outside Lease Area)  | Site clearance, preparation of land, digging of pits /trenches, soil amendments, transplantation of saplings @ 200 per plant (capital) for plantation inside the lease area and @ 30 per plant maintenance (recurring))"       | 53800         | 8070          |
|   |  | Avenue Plantation @ 300 per plant (capital) for  | 121050        | 12105         |

|  |   |  |                |                |
|--|---|--|----------------|----------------|
|  |   | plantation outside the lease area and @ 30 per plant maintenance (recurring)                   |                |                |
| <b>Total Development of Green Belt</b> |   |  | <b>174850</b>  | <b>20175</b>   |
| <b>Mine Closure</b>                    | Closure includes 10% of the amount allotted for Greenbelt development, wire fencing, and garland drainage (Rule 27 in MCDR 2017 for Cat B mines will pay 2 lakhs per hectare or minimum amount of financial assurance of 5 lakhs) |  | 45730          | 0              |
|  | G.O.(Ms)No.23, Dated: 28.09.2021  | Section IVA of TNMMCR 1959 (@10% of Seigniorage Fee) (Seigniorage Fee for rough stone = Rs.90) | 3606675        | 0              |
| <b>TOTAL</b>                           |   |  | <b>5345405</b> | <b>2188866</b> |

**Table 10.2 Estimation of Overall EMP Budget after Adjusting 5% Annual Inflation**

| I <sup>st</sup> Year | II <sup>nd</sup> Year | III <sup>rd</sup> Year | IV <sup>th</sup> Year | V <sup>th</sup> Year | Total Recurring Cost | Total EMP Cost |
|----------------------|-----------------------|------------------------|-----------------------|----------------------|----------------------|----------------|
| 2188866              | 2298309               | 2413224                | 2533886               | 2660580              | 12094864             | 17440269       |

In order to implement the environmental protection measures, an amount of **Rs.5345405** as capital cost and recurring cost as **Rs.2188866** as recurring cost/annum is proposed considering present market price considering present market scenario for the proposed project. After the adjustment of 5% inflation per year, the overall EMP cost for 5 years will be **Rs.17440269** as shown in Table 10.2.

### 10.3 CONCLUSION

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

## CHAPTER XI

### SUMMARY AND CONCLUSION

#### 11.1 INTRODUCTION

As the proposed rough stone and gravel mining project (B1) falls within the quarry cluster of 500 m radius with the total extent of 15.15.85ha, it requires submission of EIA report for grant of Environmental Clearance (EC) after conducting public hearing. The proposed project falling in S.F.No. S.F.No. 135/1, 135/2, 135/3A, 135/3B, 135/4 & 135/5 over the extent of 1.34.50ha is situated in the cluster falling in Mennallur Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu. The projects involved in the calculation of cluster extent are of two proposed quarries and three existing quarries.

#### 11.2 PROJECT DESCRIPTION

The proposed project area is located between Latitudes 12°44'23.84"N to 12°44'28.80"N and Longitudes from 79°42'32.15"E to 79°42'35.65"E in Mennallur Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu. According to the approved mining plan, about 386102m<sup>3</sup> of rough stone and 23528m<sup>3</sup> of gravel will be mined up to the depth of 50 m BGL in the five years. The quarrying operation is proposed to be carried out by open cast semi-mechanized mining method involving drilling and formation of benches of the prescribed dimensions.

#### 11.3 DESCRIPTION OF THE ENVIRONMENT

This chapter presents a regional background to the baseline data at the very onset, which will help in better appreciation of micro-level field data, generated on several environmental and ecological attributes of the study area. The baseline status of the project environment is described section wise for better understanding of the broad-spectrum conditions. The baseline environment quality represents the background environmental scenario of various environmental components such as land, water, air, noise, biological and socio-economic status of the study area. The monitoring of ambient air quality, noise levels, water quality and soil analysis for the nearby cluster were done in pre monsoon season from December 2022 to February 2023 through the third party NABL accredited laboratory. The baseline monitoring done for 5km radius (TERMS OF REFERENCE [TOR] FOR EIA REPORT FOR ACTIVITIES / PROJECTS REQUIRING ENVIRONMENTAL CLEARANCE Prepared by Administrative Staff College of India, Bellavista, Khairatabad, AUGUST 2009, Page No.86) not varied as much. Therefore, we utilize the baseline data for this cluster which is collected for the adjacent cluster in the year 2022 & 2023 between December 2022 to February 2023 as per the Office Memorandum F. No. IA3-22/10/2022IA.III

[E 177258] issued by Government of India Ministry of Environment, Forest and Climate Change (IA Division) dated 8<sup>th</sup> June 2022. Field monitoring studies to evaluate the base line status of the project site were carried out covering **December 2022 to February 2023** with CPCB guidelines. Environmental baseline data were collected by an NABL accredited and MoEF notified Creative Engineers and Consultants for the environmental attributes soil, water, air, noise and FAEs of Geo Technical Mining Solutions for ecology and biodiversity, geology, hydrogeology, traffic, and socio-economy.

### 11.3.1 Land Environment

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

**Table.11.1 LULC Statistics of the Study Area**

| S. No.       | Classification         | Area (ha)      | Area (%)     |
|--------------|------------------------|----------------|--------------|
| 1            | Crop lands             | 5850.58        | 66.70        |
| 2            | Built area             | 955.7          | 11.07        |
| 3            | Water bodies           | 70.2           | 0.81         |
| 4            | Mining Industrial area | 91.14          | 1.06         |
| 5            | Plantation             | 103.11         | 1.19         |
| 6            | Bare ground            | 36.2           | 0.42         |
| 7            | Rangeland              | 1619.5         | 18.75        |
| <b>Total</b> |                        | <b>8726.43</b> | <b>100.0</b> |

### 11.3.2 Soil Environment

Soil samples show that the pH values were ranging between 6.55 to 7.49 and Electrical Conductivity values were ranging between 66.48 – 95.7  $\mu\text{mhos/cm}$ . Soils are generally Silty clay loam type. Organic matter values were ranging between 0.66 – 0.86%. Total Nitrogen values were ranging between 172 - 228mg/kg.

### 11.3.3 Water Environment

#### Ground Water Resources and Quality

The pH values were ranging in between 7.38 – 7.81 TDS values were in the range of 520 – 1246 mg/L. Chloride values were ranging from 84.50 – 386mg/L. Iron content was found to be in the range BDL (D.L-0.01)-0.05mg/L. The water quality of ground water is found to be within the prescribed Permissible limits of IS: 10500 Norms in the absence of an alternative source as per Drinking Water Specifications

### 11.3.4 Air Environment

As per the monitoring data, PM<sub>2.5</sub> ranges from 23.2 $\mu\text{g/m}^3$  to 29.4 $\mu\text{g/m}^3$ ; PM<sub>10</sub> from 50.7 $\mu\text{g/m}^3$  to 64.2 $\mu\text{g/m}^3$ ; SO<sub>2</sub> from 4.6 $\mu\text{g/m}^3$  to 6.5 $\mu\text{g/m}^3$ ; NO<sub>x</sub> from 6.7 $\mu\text{g/m}^3$  to 12.5 $\mu\text{g/m}^3$ . The

concentration levels of the pollutants fall within the acceptable limits of NAAQS prescribed by CPCB.

#### ***Air quality Index***

The AQI shows that the air quality of the study area falls within good category 57 causing Minor breathing discomfort to sensitive people.

#### **11.3.5 Noise Environment**

Noise level in core zone was 50.3 dB (A) Leq during day time and 39.9dB(A) Leq during night time. Noise levels recorded in buffer zone during day time varied from 45.5 to 51.3dB (A) Leq and during night time from 39.9to 45.3dB (A) Leq. Thus, the noise level for industrial and residential area meets the requirements of CPCB

#### **11.3.6 Biological Environment**

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

#### ***Flora in core zone***

The mine lease area contains total of 16 species belonging to 12 families have been recorded from the mine lease area. 2 shrubs, 14 herbs were identified. There are no trees in mine lease area. The floral analysis indicates that there are no threatened (Vulnerable, Endangered & Critically Endangered) species recorded from the core project site

#### ***Flora in 300 m radius zone***

The 300m radius It contains a total of 34 species belonging to 21 families have been recorded from the buffer zone. 6 Trees (17%), 5 Shrubs (17%) and 22 Herbs and Climbers, Creeper, Grass & Cactus 20 (64%) were identified. Details of flora with the scientific name details and of diversity species Richness index were mentioned in Table 3.23-25 and Figure 3.26. There is no threatened species in 300 m radius.

#### ***Flora in 10 km radius buffer zone***

Similar type of environment occurs in both core and buffer zone but more floral diversity noticed in buffer zone compared with core zone area. Buffer area contains a total species belonging to 40 families have been recorded. The floral (130) varieties among them 52 Trees, 34 Shrubs, 29 Herbs, 8 Climbers, 7 Grass were identified.

#### ***Fauna in Core Zone***

There are no faunal species in mine lease area. It is an existing mine lease

### ***Fauna in 300m radius***

The 25 varieties of species observed in the core zone. Among them numbers of Insects 8 (32%), Reptiles 3 (12%), Mammals 5 (20%) and Avian 9 (36%). A total of 25 species belonging to 22 families have been recorded from the core mining lease area. Number of species decreases towards the mining area this might be due the lack of vegetation. None of these species are threatened or endemic. There is no Schedule I species and eight species are under schedule IV according to Indian wild life Act 1972. A total 9 species of birds were sighted in the mining lease area. There are no critically endangered, endangered, vulnerable and endemic species were observed.

### ***Fauna in 10km radius***

A total of 47 species belonging to 34 families were recorded in the buffer zone. Based on habitat classification the majority of species were Birds 18 (40%), followed by Insects 15 (31%), Reptiles 7 (15%), 4 Mammals (8%) and amphibians 3 (6%). There are 4 schedule II species and 24 schedule IV species according to Indian wild life Act 1972. There are no critically endangered, vulnerable and endemic species observed.

### **11.3.7 Socio Economic Environment**

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

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

### **11.4.1 Land Environment**

#### **Anticipated Impact**

- ✚ Permanent or temporary change on land use and land cover.
- ✚ Change in topography of the mine lease area will change at the end of the life of the mine.
- ✚ Problems to agricultural land and human habitations due to dust, and noise caused by movement of heavy vehicles
- ✚ Degradation of the aesthetic environment of the core zone due to quarrying
- ✚ Soil erosion and sediment deposition in the nearby water bodies due to earthworks during the rainy season
- ✚ Siltation of water course due to wash off from the exposed working area

#### **Mitigation Measures**

- ✚ The mining activity will be gradual confined in blocks and excavation will be undertaken progressively along with other mitigate measures like phase wise development of greenbelt etc.



- ✚ Construction of garland drains all around the quarry pits and construction of check dam at strategic location in lower elevations to prevent erosion due to surface runoff during rainfall and also to collect the storm water for various uses within the proposed area.
- ✚ Green belt development along the boundary within safety zone. The small quantity of water stored in the mined-out pit will be used for greenbelt
- ✚ Thick plantation will be carried out on unutilized area, top benches of mined out pits, on safety barrier, etc.,
- ✚ At conceptual stage, the land use pattern of the quarry will be changed into Greenbelt area and temporary reservoir.
- ✚ In terms of aesthetics, natural vegetation surrounding the quarry will be retained (such as in a buffer area i.e., 7.5 m, 10m safety barrier and other safety provided) so as to help minimize dust emissions.
- ✚ Proper fencing will be carried out at the conceptual stage, Security will be posted round the clock, to prevent inherent entry of the public and cattle.

#### **11.4.2 Soil Environment**

##### **Anticipated Impact**

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

##### **Mitigation Measures**

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

### **11.4.3 Water Environment**

#### **Anticipated Impact**

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

#### **Mitigation Measures**

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

### **11.4.4 AIR ENVIRONMENT**

#### **Anticipated Impact**

Anticipated increase of the air pollutants due to quarrying activities have been predicted using AERMOD software. The values of cumulative concentration i.e., background + incremental concentration of pollutant in all the receptor locations are still within the prescribed NAAQ limits without effective mitigation measures. By adopting suitable mitigation measures, the pollutant levels in the atmosphere can be controlled further

#### **Mitigation Measures**

- ✚ To control dust at source, wet drilling will be practiced. Where there is a scarcity of water, suitably designed dust extractor will be provided for dry drilling along with dust hood at the mouth of the drill-hole collar
- ✚ Controlled blasting will be carried out using suitable explosive charge and short delay detonators, adequate stemming of holes at collar zone

- ✚ Blasting will be restricted to a particular time of the day i.e., at the time of lunch hours
- ✚ Before loading of material water will be sprayed on blasted material
- ✚ Dust mask will be provided to the workers and their use will be strictly monitored
- ✚ Water will be sprinkled on haul roads twice a day to avoid dust generation during transportation
- ✚ Transportation of material will be carried out during day time and material will be covered with tarpaulin
- ✚ The speed of tippers plying on the haul road will be limited to < 20 km/hr to avoid generation of dust
- ✚ The un-metalled haul roads will be compacted weekly before being put into use
- ✚ It will be ensured that all transportation vehicles carry a valid PUC certificate
- ✚ Haul roads and service roads will be graded to clear accumulation of loose materials
- ✚ Planting of trees all along main mine haul roads and around the project site will be practiced to prevent the generation of dust
- ✚ Dust mask will be provided to the workers and their use will be strictly monitored

#### **11.4.5 Noise Environment**

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

Total noise level in all the sampling areas is well below the CPCB standards for industrial and residential areas. The peak particle velocity produced by the charge of 27.5kg is well below that of 0.3 mm/s as per Directorate General of Mines Safety for safe level criteria through Circular No. 7 dated 29/8/1997.

##### ***Mitigation Measures***

- ✚ The blasting operations in the cluster quarries will use shallow holes and delay detonators to reduce the ground vibrations
- ✚ Proper quantity of explosives, suitable stemming materials and appropriate delay system will be used during blasting
- ✚ Adequate safe distance from blasting will be maintained as per DGMS guidelines
- ✚ Blasting shelter will be provided as per DGMS guidelines
- ✚ Blasting operations will be carried out only during day time
- ✚ During blasting, other activities in the immediate vicinity will be temporarily stopped
- ✚ Drilling parameters like depth, diameter and spacing will be properly designed to give proper blast
- ✚ A fully trained explosives blast man (Mining Mate, Mines Foreman, 2<sup>nd</sup> Class Mines Manager/ 1<sup>st</sup> Class Mines Manager) will be appointed

- ✦ A set of shot firing rules will be drawn up and blasting shall commence outlining the detailed operating procedures that will be followed to ensure that shot firing operations on site take place without endangering the workforce or public
- ✦ Sufficient angular stemming material will be used to confine the explosive force and minimise environmental disturbance caused by venting / misfire
- ✦ The detonators will be connected in a predetermined sequence to ensure that only one charge is detonated at any one time and a NONEL or similar type initiation system will be used
- ✦ The detonation delay sequence shall be designed so as to ensure that firing of the holes is in the direction of free faces so as to minimise vibration effects
- ✦ Vibration monitoring will be carried out every 6 months to check the efficacy of blasting practices.

#### **11.4.6 Biological Environment**

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

- ✦ During loading the truck, dust generation will be likely. This shall be a temporary effect and not anticipated to affect the surrounding vegetation significantly
- ✦ The Number of plants in the mining lease area is given in Chapter 3 which vegetation in the lease area may be removed during mining.
- ✦ Carbon released from quarrying machineries and tippers during quarrying would be 3406kg per day, 919506kg per year and 4597530kg over five years

##### ***Mitigation Measures***

- ✦ During conceptual stage, the top bench will be re-vegetated by planting local /native species and lower benches will be converted into rainwater harvesting structure following completion of mining activities, which will replace habitat resources for fauna species in this locality over a longer time.
- ✦ Existing roads will be used; new roads will not be constructed to reduce impact on flora.
- ✦ To mitigate carbon emission due to mining activities, we recommend planting trees around the quarry to offset the carbon emission during quarrying. A tree can sequester 16124kg of carbon per year. Therefore, we recommend planting large number of trees around the quarry and near school campuses, government wasteland, roadsides etc.
- ✦ As per the greenbelt development plan as recommended by SEAC (Table 4.11), about 670 trees will be planted within three months from the beginning of mining. These trees, when grown up would sequester carbon of about 37641kg of the total carbon.

### **11.4.7 Socio Economic Environment**

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

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

#### ***Mitigation Measures***

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

### **11.4.8 Occupational Health**

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

## 11.5 Environment Monitoring Program

**Table 11.2 Environment Monitoring Program**

| S. No. | Environment Attributes   | Location   | Monitoring     |                              | Parameters  |
|--------|--------------------------|--|----------------|------------------------------|---|
|        |                          |  | Duration       | Frequency                    |   |
| 1      | Air Quality              | 2 Locations (1 Core & 1 Buffer)  | 24 hours       | Once in 6 months             | Fugitive Dust, PM <sub>2.5</sub> , PM <sub>10</sub> , SO <sub>2</sub> and NO <sub>x</sub> . |
| 2      | Meteorology              | At mine site before start of Air Quality Monitoring & IMD Secondary Data | Hourly / Daily | Continuous online monitoring | Wind speed, Wind direction, Temperature, Relative humidity and Rainfall                     |
| 3      | Water Quality Monitoring | 2 Locations (1SW & 1 GW)   | -              | Once in 6 months             | Parameters specified under IS:10500, 1993 & CPCB Norms                                      |
| 4      | Hydrology                | Water level in open wells in buffer zone around 1 km at specific wells   | -              | Once in 6 months             | Depth in m BGL  |
| 5      | Noise                    | 2 Locations (1 Core & 1 Buffer)  | Hourly – 1 Day | Once in 6 months             | Leq, Lmax, Lmin, Leq Day & Leq Night  |
| 6      | Vibration                | At the nearest habitation (in case of reporting)                         | –              | During blasting operation    | Peak particle velocity  |
| 7      | Soil                     | 2 Locations (1 Core & 1 Buffer)  | –              | Once in six months           | Physical and chemical characteristics   |
| 8      | Greenbelt                | Within the project area  | Daily          | Monthly                      | Maintenance   |

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

## 11.6 ADDITIONAL STUDIES

### 11.6.1 Risk Assessment

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

### 11.6.2 Disaster Management Plan

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

- ✚ Rescue and treat casualties;
- ✚ Safeguard other people;

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

### 11.6.3 Cumulative Impact Study

- ✚ The results on the cumulative impact of the two proposed projects on air environment of the cluster do not exceed the permissible limits set by CPCB for air pollutants.
- ✚ The cumulative results of noise for the habitation in consideration do not exceed the limit set by CPCB for residential areas for day time
- ✚ PPV resulting from two proposed project is well below the permissible limit of Peak Particle Velocity of 5 mm/s
- ✚ The proposed two projects will allocate Rs. 10,00,000/- towards CER as recommended by SEAC
- ✚ The proposed two projects will directly provide jobs to 53 local people, in addition to indirect jobs
- ✚ The proposed two projects will plant 2895 about trees in and around the lease area.
- ✚ The proposed two projects will add 561PCU per day to the nearby roads.

### 11.7 Project Benefits

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

- ✚ Direct employment to 20 local people
- ✚ Creation of community assets (infrastructure) like school buildings, village roads/ linked roads, dispensary & health Centre, community Centre, market place etc.,
- ✚ Strengthening of existing community facilities through the Community Development Program
- ✚ Skill development & capacity building like vocational training.
- ✚ Rs. 5,00,000 will be allocated for CER

### 11.8 ENVIRONMENT MANAGEMENT PLAN

In order to implement the environmental protection measures, an amount of **Rs.5345405** as capital cost and recurring cost as **Rs.2188866** as recurring cost/annum is proposed considering present market price considering present market scenario for the proposed project. After the adjustment of 5% inflation per year, the overall EMP cost for 5 years will be **Rs.17440269**

## CHAPTER XII

### DISCLOSURES OF CONSULTANT

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

**Address of the consultancy:**

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

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

| S.No   | Name of the expert  | In house/ Empanelled             | Sector  | Functional Area | Category |
|--|---------------------|----------------------------------|---------|-----------------|----------|
| <b>Approved Functional Area Experts &amp; EC</b> |                     |                                  |         |                 |          |
| 1  | Dr.R.Arunbalaji     | EIA Coordinator (EC)<br>In-house | 1(a)(i) | AQ, AP & NV     | B        |
| 2  | P. Vellaiyan        | In-house, FAE                    | 1(a)(i) | GEO             | B        |
| 3  | R. Elavarasan       | In-house, FAE                    | 1(a)(i) | EB              | B        |
| 4  | Dr. G. Prabakaran   | In-house, FAE                    | 1(a)(i) | SE              | B        |
| 5  | Dr. D. Kalaimurugan | In-house, FAE                    | 1(a)(i) | SC              | B        |
| 6  | J.N. Manikandan     | Empanelled FAE                   | 1(a)(i) | RH, SHW, AP     | B        |
| 7  | R. Revathy          | In-house, FAE                    | 1(a)(i) | WP              | B        |
| 8  | G. Umamaheswaran    | In-house, FAE                    | 1(a)(i) | HG              | B        |
| 9  | P. Venkatesh        | In-house, FAE                    | 1(a)(i) | AP              | B        |
| 10   | C. Kumaresan        | In-house, FAE                    | 1(a)(i) | NV              | B        |
| 11   | G. Prithiviraj      | In-house, FAE                    | 1(a)(i) | LU & LC         | B        |
| <b>Approved Functional Area Associates</b>       |                     |                                  |         |                 |          |
| 12   | V.Malavika          | FAA                              | 1(a)(i) | NV              | B        |
| 13   | P. Dhatchayini      | FAA                              | 1(a)(i) | AQ              | B        |
| 14   | M.Arunkumar         | FAA                              | 1(a)(i) | WP              | B        |
| 15   | C.Ragul             | FAA                              | 1(a)(i) | LU & LC         | B        |



|                      |  |     |  |       |   |
|----------------------|--|-----|--|-------|---|
| 16                   | K.Ravichandiran                                    | FAA | 1(a)(i)  | GEO   | B |
| 17                   | K.Prithivi   | FAA | 1(a)(i)  | HG    | B |
| 18                   | G. Kavitha   | FAA | 1(a)(i)  | EB,SC | B |
| <b>Abbreviations</b> |  |     |  |       |   |
| EC                   | EIA Coordinator                                    | NV  | Noise and Vibration                            |       |   |
| FAE                  | Functional Area Expert                             | SE  | Socio Economics                                |       |   |
| FAA                  | Functional Area Associates                         | HG  | Hydrology, ground water and water conservation |       |   |
| TM                   | Team Member  | SC  | Soil conservation                              |       |   |
| GEO                  | Geology  | RH  | Risk assessment and hazard management          |       |   |
| WP                   | Water pollution monitoring, prevention and control | SHW | Solid and hazardous wastes                     |       |   |
| AP                   | Air pollution monitoring, prevention and control   | MSW | Municipal Solid Wastes                         |       |   |
| LU                   | Land Use   | ISW | Industrial Solid Wastes                        |       |   |
| AQ                   | Meteorology, air quality modelling, and prediction | HW  | Hazardous Wastes                               |       |   |
| EB                   | Ecology and bio-diversity                          | GIS | Geographical Information System                |       |   |

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

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

Signature :  
  
Date :  
Name : **Dr. R. Arun Balaji**  
Designation : EIA Coordinator  
Name of the EIA Consultant Organization : Geo Technical Mining Solutions  
Period of Involvement : Till date

We, the FAEs and FAAs hereby declare that information furnished in this EIA/EMP report for **T. Ponnambalam**, rough stone and gravel quarry project with the extent of 1.34.5 ha situated in the cluster with the extent of 15.15.85ha in Mennallur Village, Vembakkam Taluk, Tiruvannamalai District Tamil Nadu is true and correct to the best of our knowledge.

**List of Functional Area Experts Engaged in this Project**

| <b>S. No.</b> | <b>Functional Area</b> | <b>Involvement</b>  | <b>Name of the Experts</b> | <b>Signature</b> |
|---------------|------------------------|---|----------------------------|------------------|
| 1             | AP                     | <ul style="list-style-type: none"> <li>○ Identification of different sources of air pollution due to the proposed mine activity</li> <li>○ Prediction of air pollution and propose mitigation measures / control measures</li> </ul>  | J.N. Manikandan            |                  |
|               |                        |   | P. Venkatesh               |                  |
| 2             | WP                     | <ul style="list-style-type: none"> <li>○ Suggesting water treatment systems, drainage facilities</li> <li>○ Evaluating probable impacts of effluent/waste water discharges into the receiving environment/water bodies and suggesting control measures.</li> </ul>          | R. Revathy                 |                  |
| 3             | HG                     | <ul style="list-style-type: none"> <li>○ Interpretation of ground water table and predict impact and propose mitigation measures.</li> <li>○ Analysis and description of aquifer Characteristics</li> </ul>   | G.Umamaheshwaran           |                  |
| 4             | GEO                    | <ul style="list-style-type: none"> <li>○ Field Survey for assessing the regional and local geology of the area.</li> <li>○ Preparation of mineral and geological maps.</li> <li>○ Geology and Geo morphological analysis/description and Stratigraphy/Lithology.</li> </ul> | P. Vellaiyan               |                  |
| 5             | SE                     | <ul style="list-style-type: none"> <li>○ Revision in secondary data as per Census of India, 2011.</li> <li>○ Impact Assessment &amp; Preventive Management Plan</li> <li>○ Corporate Environment Responsibility.</li> </ul>   | Dr. G. Prabhakaran         |                  |
| 6             | EB                     | <ul style="list-style-type: none"> <li>○ Collection of Baseline data of Flora and Fauna.</li> <li>○ Identification of species labelled as Rare, Endangered and threatened as</li> </ul>   | R. Elavarasan              |                  |

|    |     |  |                    |  |
|----|-----|--|--------------------|--|
|    |     | <p>per IUCN list.</p> <ul style="list-style-type: none"> <li>○ Impact of the project on flora and fauna.</li> <li>○ Suggesting species for greenbelt development.</li> </ul>   |                    |  |
| 7  | RH  | <ul style="list-style-type: none"> <li>○ Identification of hazards and hazardous substances</li> <li>○ Risks and consequences analysis</li> <li>○ Vulnerability assessment</li> <li>○ Preparation of Emergency Preparedness Plan</li> <li>○ Management plan for safety.</li> </ul> | J.N. Manikandan    |  |
| 8  | LU  | <ul style="list-style-type: none"> <li>○ Construction of Land use Map</li> <li>○ Impact of project on surrounding land use</li> <li>○ Suggesting post closure sustainable land use and mitigative measures.</li> </ul>   | G. Prithviraj      |  |
| 9  | NV  | <ul style="list-style-type: none"> <li>○ Identify impacts due to noise and vibrations</li> <li>○ Suggesting appropriate mitigation measures for EMP.</li> </ul>  | C. Kumaresan       |  |
| 10 | AQ  | <ul style="list-style-type: none"> <li>○ Identifying different source of emissions and propose predictions of incremental GLC using AERMOD.</li> <li>○ Recommending mitigations measures for EMP</li> </ul>  | Dr.R. Arun Balaji  |  |
| 11 | SC  | <ul style="list-style-type: none"> <li>○ Assessing the impact on soil environment and proposed mitigation measures for soil conservation</li> </ul>  | Dr. D.Kalaimurugan |  |
| 12 | SHW | <ul style="list-style-type: none"> <li>○ Identify source of generation of non-hazardous solid waste and hazardous waste.</li> <li>○ Suggesting measures for minimization of generation of waste and how it can be reused or recycled.</li> </ul>                                   | J.N. Manikandan    |  |

**List of Functional Area Associate Engaged in this Project**

| <b>S.No.</b> | <b>Name</b>     | <b>Functional Area</b> | <b>Involvement</b>   | <b>Signature</b> |
|--------------|-----------------|------------------------|--|------------------|
| 1            | V. Malavika     | NV, SHW                | <ul style="list-style-type: none"> <li>○ Site visit along with FAE Assistance in report preparation.</li> <li>○ Assistance to FAE in both primary and secondary data collection</li> <li>○ Assistance in noise prediction modelling</li> </ul> |                  |
| 2            | P. Dhatchayini  | AQ                     | <ul style="list-style-type: none"> <li>○ Site visit with FAE</li> <li>○ Assistance to FAE in collection of both primary and secondary data</li> </ul>  |                  |
| 3            | K.Prithivi      | HG                     | <ul style="list-style-type: none"> <li>○ Site visit with FAE</li> <li>○ Provide inputs &amp; Assisting FAE for HG</li> </ul>   |                  |
| 4            | K.Ravichandiran | GEO                    | <ul style="list-style-type: none"> <li>○ Field visits along with FAE</li> <li>○ Assistance to FAE in both primary and secondary data collection</li> </ul>   |                  |
| 5            | C.Ragul         | LU & LC                | <ul style="list-style-type: none"> <li>○ Field visits along with FAE Assistance to FAE in both primary and secondary data collection</li> </ul>  |                  |
| 6            | G.Kavitha       | EB, SC                 | <ul style="list-style-type: none"> <li>○ Site visit with FAE</li> <li>○ Collection of Baseline data of Flora and Fauna.</li> <li>○ Impact of the project on flora and fauna.</li> </ul>  |                  |
| 7            | M. Arunkumar    | WP                     | <ul style="list-style-type: none"> <li>○ Field visits along with FAE</li> <li>○ Assistance to FAE in both primary and secondary data collection</li> </ul>   |                  |

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

I, **Dr. S. KARUPPANNAN**, Managing Partner, **Geo Technical Mining Solutions**, hereby, confirm that the above-mentioned functional area experts and team members prepared the EIA/EMP report for **T. Ponnambalam**, rough stone and gravel quarry project with the extent of 1.34.5 ha situated in the cluster with the extent of 15.15.85ha in Mennallur Village, Vembakkam Taluk, Tiruvannamalai District of Tamil Nadu is true and correct to the best of my knowledge.

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



**File No: 11530**  
**Government of India**  
**Ministry of Environment, Forest and Climate Change**  
**(Issued by the State Environment Impact Assessment Authority(SEIAA),**  
**TAMIL NADU)**

\*\*\*



Dated 12/01/2025



To,

Thiru. T. Ponnambalam  
No.12, Balakrishnan Street, Srinivasa Nagar, Chennai - 600063., Chennai, CHENNAI, TAMIL NADU,  
600063  
tponnambalam03@gmail.com

**Subject:** Grant of Terms of Reference along with Public Hearing under the provision of the EIA Notification 2006-as amended regarding.

**Sir/Madam,**

**Sub: SEIAA, Tamil Nadu** – Proposed Rough Stone & Gravel quarry over an extent of 1.34.5 Ha in S.F.Nos. 135/1, 135/2, 135/3A, 135/3B, 135/4 & 135/5 of Mennallur Village, Vembakkam Taluk, Tiruvannamalai District Tamil Nadu by Thiru. T. Ponnambalam - under project category – “B1” and Schedule S.No.1(a) “Mining of Minerals Projects” of EIA Notification, 2006, as amended – ToR issued along with Public Hearing - preparation of EIA report – Regarding.

**Ref:** 1. Online proposal No. SIA/TN/MIN/509861/2024, Dated: 30/11/2024.  
2. Your application submitted for Terms of Reference dated:03.12.2024.  
3. Minutes of the 523rd SEAC meeting held on 27.12.2024.  
4. Minutes of the 787th SEAC meeting held on 08.01.2025.

2. The particulars of the proposal are as below :

|   |   |
|---|---|
| (i) TOR Identification No.                  | TO24B0108TN5158721N                             |
| (ii) File No.                               | 11530   |
| (iii) Clearance Type                        | TOR   |
| (iv) Category                               | B1  |
| (v) Project/Activity Included Schedule No.  | 1(a) Mining of minerals                         |
| (vii) Name of Project                       | Mennallur Village Rough Stone and Gravel Quarry |
| (viii) Name of Company/Organization         | PONNAMBALAM                                     |
| (ix) Location of Project (District, State)  | TIRUVANNAMALAI, TAMIL NADU                      |
| (x) Issuing Authority                       | SEIAA   |
| (xii) Applicability of General Conditions   | no  |
| (xiii) Applicability of Specific Conditions | no  |

1. In view of the particulars given in the Para 1 above, the project proposal interalia including Form-1 (Part A and B) were submitted to the SEIAA for an appraisal by the SEAC under the provision of EIA notification 2006 and its subsequent amendments.

2. The above-mentioned proposal has been considered by (SEIAA) Appraisal Committee of SEIAA in the meeting held on 08.01.2025. The minutes of the meeting and all the Application and documents submitted [(viz. Form-1 Part A, Part B,)] are available on PARIVESH portal which can be accessed by scanning the QR Code above.

3. The State Expert Appraisal Committee (SEAC), based on the information & clarifications provided by the project proponent and after detailed deliberations on all technical aspects recommended the proposal for grant of Terms of Reference with Public Hearing under the provision of EIA Notification, 2006 and as amended thereof subject to the stipulation of specific and general conditions as detailed in Annexure (2).

4. The SEIAA has examined the proposal in accordance with the Environment Impact Assessment (EIA) Notification, 2006 & further amendments thereto and after accepting the recommendations of the SEAC hereby decided to issue the following Terms of Reference with Public Hearing for instant proposal of Thiru.T.Ponnambalam under the provisions of EIA Notification, 2006 and as amended thereof.

5. The Ministry/SEIAA-TN reserves the right to stipulate additional conditions, if found necessary.

6. The Terms of Reference with Public Hearing to the aforementioned project is under provisions of EIA Notification, 2006. It does not tantamount to approvals/consent/permissions etc. required to be obtained under any other Act/Rule/regulation. The Project Proponent is under obligation to obtain approvals /clearances under any other Acts/Regulations or Statutes, as applicable, to the project.

7. This issues with the approval of the Competent Authority.

#### **Copy To**

1. The Principal Secretary to Government, Environment & Forests Department, Govt. of Tamil Nadu, Fort St. George, Chennai - 9.
2. The Chairman, Central Pollution Control Board, Parivesh Bhavan, CBD Cum-Office Complex, East Arjun Nagar, New Delhi 110032.
3. The Member Secretary, Tamil Nadu Pollution Control Board, 76, Mount Salai, Guindy, Chennai-600 032.
4. Monitoring Cell, IA Division, Ministry of Environment, Forests & CC, Paryavaran Bhavan, CGO Complex, New Delhi 110003
5. The District Collector, Tiruvannamalai District.
6. Stock File.

**Annexure 1**

#### **Specific Terms of Reference for (Mining Of Minerals)**

##### **1. Seiaa Specific Conditions:**

| S. No | Terms of Reference  |
|-------|---|
| 1.1   | <p>After detailed discussions, the Authority accepts the recommendation of SEAC and decided to grant <b>Terms of Reference (ToR) along with Public Hearing for the quantity of 3,86,102m<sup>3</sup> of rough stone and 23,528m<sup>3</sup> of gravel upto the depth of 50m BGL and the annual peak production of 93,310m<sup>3</sup> of rough stone and 10,920m<sup>3</sup> of gravel for the period of 5 years as per approved mining plan</b> under cluster for undertaking the combined Environment Impact Assessment Study and preparation of separate Environment Management Plan subject to the conditions as recommended by SEAC, standard conditions stipulated by MoEF&amp;CC &amp; the following conditions.</p> <ol style="list-style-type: none"> <li>1. The PP shall carry out the studies assessing the impact of mining on drainage pattern and agricultural activities and submit the study report and the mitigation measures along with the EIA Report.</li> <li>2. It was noted from the KML, agricultural activity is carried out around the proposed site. Hence the PP is requested to furnish the No Objection Certificate (NOC) from the competent Authority of</li> </ol> |

| S. No | Terms of Reference  |
|-------|---|
|       | Agricultural Department and submit along with the EIA Report. |

## 2. Seac Conditions - Site Specific

| S. No | Terms of Reference  |
|-------|---|
| 2.1   | <p>1. A Cluster Management Committee (CMC) shall be constituted including all the mines in the cluster as Committee Members for the effective management of the mining operation in the cluster through systematic &amp; scientific approach with appointment of statutory personnel, appropriate environmental monitoring, good maintenance of haul roads and village/panchayat roads, authorized blasting operation etc. The PP shall submit the following details in the form of an Affidavit during the EIA appraisal:</p> <p>(i) Copy of the agreement forming CMC.</p> <p>(ii) The Organisation chart of the Committee with defining the role of the members</p> <p>(iii) The ‘Standard Operating Procedures’ (SoP) executing the planned activities.</p> <p>2. The PP shall erect the DGPS reference pillars painted with blue &amp; white colour indicating the safety barrier of 7.5 m to be left under the Rule 13 (1) of MCDR, 1988 within the lease boundary and protective bunds and submit the photographic/videographic evidence along with the EIA report.</p> <p>3. The details of enumeration of structures including schools, colleges, primary health centres should be submitted along with the EIA report.</p> <p>4. The structures within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m and (iv) 300 m &amp; upto 1km shall be enumerated with details such as dwelling houses with number of occupants, whether it belongs to the owner (or) not, places of worship, industries, factories, sheds, etc. and spell out the mitigation measures to be proposed for the protection of the above structures, if any during the quarrying operations.</p> <p>5. The proponent shall furnish photographs of adequate fencing, garland drainage built with siltation tank &amp; green belt along the periphery including replantation of existing trees; maintaining the safety distance between the adjacent quarries &amp; water bodies nearby provided as per the approved mining plan.</p> <p>6. Since the structures and village roads are situated within a radial distance of 500 m, the PP shall design the controlled blast parameters for reducing the blast-induced ground/air- vibrations and eliminating the fly rock from the blasting operations and a copy of such scientific study report shall be submitted during the EIA appraisal without any deviation.</p> <p>7. The PP shall furnish the Standard Operating Procedures (SoP) for carrying out the ‘Best Mining Practices’ in the areas of drilling, blasting, loading/excavation, transportation, and green belt development, in securing the safety of the persons living within a radial distance of 500 m (danger zone) at the time of EIA appraisal.</p> <p>8. The Proponent shall carry out Bio diversity study as a part of EIA study and the same shall be included in the Report.</p> <p>9. The PP shall prepare the EMP for the entire life of mine and also furnish the sworn affidavit stating to abide the EMP for the entire life of mine.</p> <p>10. The PP shall carry out the comprehensive studies on the cumulative environmental impacts of the existing &amp; proposed quarries which included drilling &amp; blasting, loading &amp; hauling on the surrounding village and structures.</p> <p>11. The PP shall prepare a conceptual working plan accommodating the inclusion of haul road accessibility keeping the benches intact, by ensuring the slope stability of the working benches to be constructed and existing quarry wall.</p> |

## 3. Seac Standard Conditions



| S. No | Terms of Reference  |
|-------|---|
| 3.1   | <p>1. In the case of existing/operating mines, a letter obtained from the concerned AD (Mines) shall be submitted and it shall include the following:</p> <ul style="list-style-type: none"> <li>(i) Original pit dimension</li> <li>(ii) Quantity achieved Vs EC Approved Quantity</li> <li>(iii) Balance Quantity as per Mineable Reserve calculated.</li> <li>(iv) Mined out Depth as on date Vs EC Permitted depth</li> <li>(v) Details of illegal/illicit mining</li> <li>(vi) Violation in the quarry during the past working.</li> <li>(vii) Quantity of material mined out outside the mine lease area</li> <li>(viii) Condition of Safety zone/benches</li> <li>(ix) Revised/Modified Mining Plan showing the benches of not exceeding 6 m height and ultimate depth of not exceeding 50m.</li> </ul> <p>2. Details of habitations around the proposed mining area and latest VAO certificate regarding the location of habitations within 300m radius from the periphery of the site.</p> <p>3. The proponent is requested to carry out a survey and enumerate on the structures located within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m and (iv) 300 m (v) 500m shall be enumerated with details such as dwelling houses with number of occupants, whether it belongs to the owner (or) not, places of worship, industries, factories, sheds, etc with indicating the owner of the building, nature of construction, age of the building, number of residents, their profession and income, etc.</p> <p>4. The PP shall submit a detailed hydrological report indicating the impact of proposed quarrying operations on the waterbodies like lake, water tanks, etc are located within 1 km of the proposed quarry.</p> <p>5. The Proponent shall carry out Bio diversity study through reputed Institution and the same shall be included in EIA Report.</p> <p>6. The DFO letter stating that the proximity distance of Reserve Forests, Protected Areas, Sanctuaries, Tiger reserve etc., up to a radius of 25 km from the proposed site.</p> <p>7. In the case of proposed lease in an existing (or old) quarry where the benches are not formed (or) partially formed as per the approved Mining Plan, the Project Proponent (PP) shall the PP shall carry out the scientific studies to assess the slope stability of the working benches to be constructed and existing quarry wall, by involving any one of the reputed Research and Academic Institutions - CSIR-Central Institute of Mining &amp; Fuel Research / Dhanbad, NIRM/Bangalore, Division of Geotechnical Engineering-IIT-Madras, NIT-Dept of Mining Engg, Surathkal, and Anna University Chennai-CEG Campus. The PP shall submit a copy of the aforesaid report indicating the stability status of the quarry wall and possible mitigation measures during the time of appraisal for obtaining the EC.</p> <p>8. However, in case of the fresh/virgin quarries, the Proponent shall submit a conceptual 'Slope Stability Plan' for the proposed quarry during the appraisal while obtaining the EC, when the depth of the working is extended beyond 30 m below ground level.</p> <p>9. The PP shall furnish the affidavit stating that the blasting operation in the proposed quarry is carried out by the statutory competent person as per the MMR 1961 such as blaster, mining mate, mine foreman, II/I Class mines manager appointed by the proponent.</p> <p>10. The PP shall present a conceptual design for carrying out only controlled blasting operation involving line drilling and muffle blasting in the proposed quarry such that the blast-induced ground vibrations are controlled as well as no fly rock travel beyond 30 m from the blast site.</p> <p>11. The EIA Coordinators shall obtain and furnish the details of quarry/quarries operated by the proponent in the past, either in the same location or elsewhere in the State with video and photographic evidences.</p> <p>12. If the proponent has already carried out the mining activity in the proposed mining lease area after 15.01.2016, then the proponent shall furnish the following details from AD/DD, mines,</p> <p>13. What was the period of the operation and stoppage of the earlier mines with last work permit</p> |

| S. No | Terms of Reference   |
|-------|--|
|       | <p>issued by the AD/DD mines?</p> <p>14. Quantity of minerals mined out.<br/> Highest production achieved in any one year<br/> Detail of approved depth of mining.<br/> Actual depth of the mining achieved earlier.<br/> Name of the person already mined in that leases area.<br/> If EC and CTO already obtained, the copy of the same shall be submitted.<br/> Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches.</p> <p>15. All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/Topo sheet, topographic sheet, geomorphology, lithology and geology of the mining lease area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).</p> <p>16. The PP shall carry out Drone video survey covering the cluster, green belt, fencing, etc.,</p> <p>17. The proponent shall furnish photographs of adequate fencing, green belt along the periphery including replantation of existing trees &amp; safety distance between the adjacent quarries &amp; water bodies nearby provided as per the approved mining plan.</p> <p>18. The Project Proponent shall provide the details of mineral reserves and mineable reserves, planned production capacity, proposed working methodology with justifications, the anticipated impacts of the mining operations on the surrounding environment, and the remedial measures for the same.</p> <p>19. The Project Proponent shall provide the Organization chart indicating the appointment of various statutory officials and other competent persons to be appointed as per the provisions of the Mines Act' 1952 and the MMR, 1961 for carrying out the quarrying operations scientifically and systematically in order to ensure safety and to protect the environment.</p> <p>20. The Project Proponent shall conduct the hydro-geological study considering the contour map of the water table detailing the number of groundwater pumping &amp; open wells, and surface water bodies such as rivers, tanks, canals, ponds, etc. within 1 km (radius) along with the collected water level data for both monsoon and non-monsoon seasons from the PWD / TWAD so as to assess the impacts on the wells due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided.</p> <p>21. The proponent shall furnish the baseline data for the environmental and ecological parameters with regard to surface water/ground water quality, air quality, soil quality &amp; flora/fauna including traffic/vehicular movement study.</p> <p>22. The Proponent shall carry out the Cumulative impact study due to mining operations carried out in the quarry specifically with reference to the specific environment in terms of soil health, biodiversity, air pollution, water pollution, climate change and flood control &amp; health impacts. Accordingly, the Environment Management plan should be prepared keeping the concerned quarry and the surrounding habitations in the mind.</p> <p>23. Rain water harvesting management with recharging details along with water balance (both monsoon &amp; non-monsoon) be submitted.</p> <p>24. Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.</p> <p>25. Details of the land for storage of Overburden/Waste Dumps (or) Rejects outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&amp;R issues, if any, should be provided.</p> <p>26. Proximity to Areas declared as 'Critically Polluted' (or) the Project areas which attracts the court restrictions for mining operations, should also be indicated and where so required,</p> |

| S. No | Terms of Reference  |
|-------|---|
|       | <p>clearance certifications from the prescribed Authorities, such as the TNPCB (or) Dept. of Geology and Mining should be secured and furnished to the effect that the proposed mining activities could be considered.</p> <p>27. Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.</p> <p>28. Impact on local transport infrastructure due to the Project should be indicated.</p> <p>29. A tree survey study shall be carried out (nos., name of the species, age, diameter etc.,) both within the mining lease applied area &amp; 300m buffer zone and its management during mining activity.</p> <p>30. A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.</p> <p>31. As a part of the study of flora and fauna around the vicinity of the proposed site, the EIA coordinator shall strive to educate the local students on the importance of preserving local flora and fauna by involving them in the study, wherever possible.</p> <p>32. The purpose of Green belt around the project is to capture the fugitive emissions, carbon sequestration and to attenuate the noise generated, in addition to improving the aesthetics. A wide range of indigenous plant species should be planted as given in the appendix-I in consultation with the DFO, State Agriculture University. The plant species with dense/moderate canopy of native origin should be chosen. Species of small/medium/tall trees alternating with shrubs should be planted in a mixed manner.</p> <p>33. Taller/one year old Saplings raised in appropriate size of bags, preferably ecofriendly bags should be planted as per the advice of local forest authorities/botanist/Horticulturist with regard to site specific choices. The proponent shall earmark the greenbelt area with GPS coordinates all along the boundary of the project site with at least 3 meters wide and in between blocks in an organized manner</p> <p>34. A Disaster management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.</p> <p>35. A Risk Assessment and management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.</p> <p>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.</p> <p>37. Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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&amp;CC, Regional Office, Chennai (or) the concerned DEE/TNPCB.</p> <p>42. The PP shall prepare the EMP for the entire life of mine and also furnish the sworn affidavit stating to abide the EMP for the entire life of mine.</p> <p>43. Concealing any factual information or submission of false/fabricated data and failure to</p> |

| S. No | Terms of Reference  |
|-------|---|
|       | 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. |

**Standard Terms of Reference for (Mining of minerals)**

**1.**

| S. No | Terms of Reference  |
|-------|---|
| 1.1   | 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   |
| 1.2   | A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given   |
| 1.3   | 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  |
| 1.4   | All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/toposheet, topographic sheet, geomorphology and geology of the areashould 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)  |
| 1.5   | Information should be provided in Survey of India Toposheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics   |
| 1.6   | Details about the land proposed for mining activities should be givenwith 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  |
| 1.7   | 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 |
| 1.8   | 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  |
| 1.9   | The study rea 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  |

| S. No | Terms of Reference   |
|-------|--|
| 1.10  | 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  |
| 1.11  | 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   |
| 1.12  | A Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the State Expert Appraisal Committees   |
| 1.13  | 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   |
| 1.14  | 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  |
| 1.15  | The vegetation in the RF / PF areas in the study area, with necessary details, should be given   |
| 1.16  | 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   |
| 1.17  | 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   |
| 1.18  | 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 alongwith 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 |
| 1.19  | Proximity to Areas declared as Critically Polluted or the Project areas likely to come under the Aravali Range, (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or   |

| S. No | Terms of Reference  |
|-------|---|
|       | State Mining Dept. Should be secured and furnished to the effect that the proposed mining activities could be considered  |
| 1.20  | Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the mine lease w.r.t CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority)  |
| 1.21  | 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  |
| 1.22  | 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 |
| 1.23  | Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map  |
| 1.24  | 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   |
| 1.25  | Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided  |
| 1.26  | 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   |
| 1.27  | 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  |
| 1.28  | 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   |

| S. No | Terms of Reference   |
|-------|--|
|       | of mining activities on these aquifers. Necessary permission from State Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished   |
| 1.29  | 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  |
| 1.30  | 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  |
| 1.31  | 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 |
| 1.32  | 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   |
| 1.33  | Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report   |
| 1.34  | 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   |
| 1.35  | 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  |
| 1.36  | 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   |
| 1.37  | 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  |
| 1.38  | 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   |
| 1.39  | Public Hearing points raised and commitment of the Project Proponent on the same along with time   |

| S. No | Terms of Reference  |
|-------|---|
|       | 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   |
| 1.40  | Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given   |
| 1.41  | The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out   |
| 1.42  | A Disaster management Plan shall be prepared and included in the EIA/EMP Report   |
| 1.43  | 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  |
| 1.44  | Besides the above, the below mentioned general points are also to be followed:- a) All documents to be properly referenced with index and continuous page numbering. b) Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated. c) 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. d) Where the documents provided are in a language other than English, an English translation should be provided. e) The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted. f) While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF 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. g) 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. h) As per the circular no. J-11011/618/2010-IA.II(I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the environment clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable. i) 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 |



## **SEIAA STANDARD CONDITIONS:**

### **Cluster Management Committee**

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

### **Agriculture & Agro-Biodiversity**

9. Impact on surrounding agricultural fields around the proposed mining Area.
10. Impact on soil flora & vegetation around the project site.
11. Details of type of vegetation including no. of trees & shrubs within the proposed mining area and. If so, transplantation of such vegetation all along the boundary of the proposed mining area shall committed mentioned in EMP.

12. The Environmental Impact Assessment should study the agro-biodiversity, agro-forestry, horti-cultural plantations, the natural ecosystem, the soil micro flora, fauna and soil seed banks and suggest measures to maintain the natural Ecosystem.
13. Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.
14. The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock.

### **Forests**

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

### **Water Environment**

19. 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.
20. Erosion Control measures.
21. 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.
22. The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir.
23. The project proponent shall study and furnish the details on potential fragmentation impact on natural environment, by the activities.

24. 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.
25. The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components.
26. The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites.
27. The EIA shall include the impact of mining activity on the following:
  - a) Hydrothermal/Geothermal effect due to destruction in the Environment.
  - b) Bio-geochemical processes and its foot prints including environmental stress.
  - c) Sediment geochemistry in the surface streams.

#### **Energy**

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

#### **Climate Change**

29. 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.
30. The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock, soil health and physical, chemical & biological soil features.
31. Impact of mining on pollution leading to GHGs emissions and the impact of the same on the local livelihood.

#### **Mine Closure Plan**

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

#### **EMP**

33. Detailed Environment Management Plan along with adaptation, mitigation & remedial strategies covering the entire mine lease period as per precise area communication order issued and the scope for achieving SDGs.

34. The Environmental Impact Assessment should hold detailed study on EMP with budget for Green belt development and mine closure plan including disaster management plan.

#### **Risk Assessment**

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

#### **Disaster Management Plan**

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

#### **Others**

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

38. 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.

39. 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.

### **STANDARD CONDITIONS**

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

- 1) Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t. the highest production achieved prior to 1994.
- 2) A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.

- 3) All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.
- 4) All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/ topo sheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).
- 5) Information should be provided in Survey of India Topo sheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.
- 6) Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.
- 7) It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report.
- 8) Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.
- 9) The study area will comprise of 10 km zone around the mine lease from lease periphery and the data contained in the EIA such as waste generation etc. should be for the life of the mine / lease period.
- 10) Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be

prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.

- 11) Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.
- 12) Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.
- 13) Status of forestry clearance for the broken up area and virgin forestland involved in the Project including deposition of Net Present Value (NPV) and Compensatory Afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.
- 14) Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.
- 15) The vegetation in the RF / PF areas in the study area, with necessary details, should be given.
- 16) A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.
- 17) Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/(existing as well as proposed), if any, within 10 km of the mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.
- 18) A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna

present. In case of any scheduled-I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.

- 19) Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravali Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Department should be secured and furnished to the effect that the proposed mining activities could be considered.
- 20) Similarly, for Coastal Projects, a CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the mine lease with respect to CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).
- 21) R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s) including their R&R and socio-economic aspects should be discussed in the Report.
- 22) One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon season) ; December-February (winter season)] primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-

dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.

- 23) Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of Vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.
- 24) The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.
- 25) Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.
- 26) Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.
- 27) Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.
- 28) Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.
- 29) Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out.
- 30) Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.
- 31) A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form



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

- 32) Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.
- 33) Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.
- 34) Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.
- 35) Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.
- 36) Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.
- 37) Measures of socio economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.
- 38) Detailed Environmental Management Plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and

grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.

- 39) Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.
- 40) Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.
- 41) The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.
- 42) A Disaster management Plan shall be prepared and included in the EIA/EMP Report.
- 43) Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.
- 44) Besides the above, the below mentioned general points are also to be followed:-
  - a) Executive Summary of the EIA/EMP Report
  - b) All documents to be properly referenced with index and continuous page numbering.
  - c) Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated.
  - d) Project Proponent shall enclose all the analysis/testing reports of water, air, soil, noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project.
  - e) Where the documents provided are in a language other than English, an English translation should be provided.
  - f) The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.
  - g) While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF&CC vide O.M. No. J-11013/41/2006-IA.II(I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed.
  - h) Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the ToR may also

have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation.

- i) As per the circular no. J-11011/618/2010-IA.II(I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the Environment Clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.
- j) The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.

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

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

1. Project name and location (Village, District, State, Industrial Estate (if applicable)).
2. Process description in brief, specifically indicating the gaseous emission, liquid effluent and solid and hazardous wastes.
3. Measures for mitigating the impact on the environment and mode of discharge or disposal.
4. Capital cost of the project, estimated time of completion.
5. The proponent shall furnish the contour map of the water table detailing the number of wells located around the site and impacts on the wells due to mining activity.
6. A detailed study of the lithology of the mining lease area shall be furnished.
7. Details of village map, "A" register and FMB sketch shall be furnished.
8. Detailed mining closure plan for the proposed project approved by the Geology of Mining department shall be submitted along with EIA report.
9. Obtain a letter /certificate from the Assistant Director of Geology and Mining standing that there is no other Minerals/resources like sand in the quarrying area within the approved depth of mining and below depth of mining and the same shall be furnished in the EIA report.
10. EIA report should strictly follow the Environmental Impact Assessment Guidance Manual for Mining of Minerals published February 2010.
11. Detail plan on rehabilitation and reclamation carried out for the stabilization and restoration

of the mined areas.

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

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

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

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

- The TORs with public hearing prescribed shall be **valid for a period of three years** from the date of issue, for submission of the EIA/EMP report as per OMNo.J-11013/41/2006-IA-II(I)(part) dated 29<sup>th</sup> August, 2017.



Signature Not Verified

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

Date: 12/01/2025

From

Thiru.A.Arumuganainar. M.Sc.,  
Joint Director (A/c),  
O/o. Assistant Director,  
Geology and Mining,  
Tiruvannamalai - 4.

To

Thiru.T.Poonambalam,  
S/o. Thangavelu,  
No.12, Balakrishnan Street,  
Srinivasa Nagar,  
Chennai-63.

Rc.No.270/Kanimam/2024, dated:25.11.2024.

Sir,

Sub: Quarries and Minerals – Minor Mineral - Rough stone and Gravel - Tiruvannamalai District – Vembakkam Taluk – Menallur village Patta Land in SF.Nos.135/1 (0.10.0), 135/2 (0.10.5), 135/3A (0.22.5), 135/3B (0.02.0), 135/4 (0.23.5) & 135/5 (0.66.0) over an extent of 1.34.5 hectcs., – Application preferred by **Thiru.T.Ponnambalam** - **Precise area communicated** – **Submission of three copies of draft Mining Plan for approval** - Approval accorded - regarding.

- Ref: 1. Application from Thiru.T.Poonambalam, S/o, Thangavelu, No.12, Balakrishnan Street, Srinivasa Nagar, Chennai-63 dated 16.08.2024.
2. Precise Area Communication Notice Rc.No.270/Kanimam/2024, dated 12.11.2024.
3. Mining Plan submitted by Thiru.T.Poonambalam, S/o. Thangavelu, Chennai dated.13.11.2024.

\*\*\*\*\*

Thiru.T.Poonambalam, S/o. Thangavelu, Chennai has preferred an application for the grant of Rough Stone and Gravel quarry lease over an extent of 1.34.5 Hectare of Patta land in SF.Nos.135/1 (0.10.0), 135/2 (0.10.5), 135/3A (0.22.5), 135/3B (0.02.0), 35/4 (0.23.5) & 135/5 (0.66.0) of Menallur Village, Vembakkam Taluk, Tiruvannamalai District for a period of 10 years vide the reference 1<sup>st</sup> cited and the precise area has been communicated to the applicant, vide the reference 2<sup>nd</sup> cited with a direction to submit the approved mining plan and Environmental Clearance.

2. As directed, the applicant has submitted three copies of mining plan for approval vide the reference 3<sup>rd</sup> cited. The Mining Plan has been verified in detail and found that it has been prepared in accordance with the

T. Poonambalam

guidelines / instructions issued by the Commissioner of Geology and Mining in letter RC. No. 3868 / LC / 2012 dated 19.11.2012.

i) The reserves estimated in the mining plan is

| Depth in Mts. | Geological Resources in Cu.m |                        | Mineable Reserves in Cu.m |                        |
|---------------|------------------------------|------------------------|---------------------------|------------------------|
|               | 50m below ground level       | Rough Stone : 6,26,618 | Weathered rock : 13,444   | Rough Stone : 3,86,102 |
|               | Gravel : 26,888              |                        | Gravel : 23,528           |                        |

3. Therefore in exercise of the powers conferred under Rule 41(2) of Tamil Nadu Minor Mineral Concession Rules, 1959, the mining plan is hereby approved, subject to the following conditions:

- i. The applicant has submitted a mining plan with above mentioned mineable reserve without providing any benches; however, the plan does not incorporate the mandatory 7.5-meter safety distance from the adjacent quarry. **As stipulated under Section 111 of the Metalliferous Mines Regulations, 1961, the applicant is should obtain prior permission from the concerned department before the grant of the lease.**
- ii. 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.
- iii. This approval of the mining plan does not in any way convey the approval of the Government in terms or 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, Explosives Act, 1884 (Central Act IV of 1884) Minor Mineral Concession and Development Rules, 2010 and the Rules made there under and the Tamil Nadu Minor Mineral Concession Rules, 1959.
- iv. The mining plan is approved without prejudice to any other order or direction from any court of competent jurisdiction.
- v. The validity of the mining plan is co-terminus with the lease period.
- vi. Quarrying shall be done in accordance with the approved Mining Plan.
- vii. If anything is found to be concealed in the contents of the mining plan which are required by the mines act or if any proposed for rectification has not been made, the approval shall be deemed to have been withdrawn with immediate effect.
- viii. 10m (Set Back) should be left as a safety distance for the channel leading to poonathangal lake in SF.No.122 on north of the applied lease are a according to Executive Engineer (WRD), kilpalaru Basin Division, Kanchipuram in the letter No.EVA.2/G.22 (Mines - Menallur) / 2024 dated.12.09.2024 all the stated conditions must be strictly followed.

T. Perambalan



- ix. A safety distance of 7.5m and 10m should be provided to the adjoining patta and Poramboke lands respectively.
- x. A safety distance of 50m should be provided to the permanent structures (Water bodies, Highways, Electrical lines and Railway tracks).
- xi. The applicant should not cause any hindrance to adjacent lands and public while quarrying operation.
- xii. Barbed wire fencing should be erected all along the boundary of the lease granted area before quarrying operation.
- xiii. The applicant should use jackhammer and mild explosive during blasting in quarry.
- xiv. Quarrying operation should be done proper scientific method only.

**4. Further, other quarries situated within 500m radial distance are as follows.**

**1) Existing Quarries**

| Sl. No. | Name of the Owner   | Village & S.F. Nos.  | Extent in Hect. | Lease Period                | Remarks         |
|---------|---|--|-----------------|-----------------------------|-----------------|
| 1       | T.Ponnambalam,<br>S/o.Thangavelu,<br>No.12 Balakrishnan Street,<br>Srinivasa Nagar, Chennai   | Menallur,<br>134/15A,15B,<br>17,18,19,136/1,2,3A,<br>3B,3C,4,5,6,7,8,9,10,<br>143/1A,1B,1C,1D,2,3,<br>4,5,6,7A,7B,8,10,11,<br>144/2,3,4,5  | 4.295           | 06-10-2022 to<br>05-10-2032 | Existing quarry |
| 2       | M/s.Sri Ganesh Blue<br>Metals-II<br>SF.No.127/2B & 129,<br>Menallur village,<br>Vembakkam Taluk,<br>Tiruvannamalai District                         | Menallur,<br>123/10, 11, 12, 14A,<br>14B, 15, 16, 17,<br>131/1, 2, 3, 4, 5A,<br>5B, 6, 7, 8, 9, 10A,<br>10B, 10C & 132/4B  | 3.260           | 08-02-2023 to<br>07-02-2033 | Existing quarry |
| 3       | Thiru.R.Monishkumar<br>S/o. Rajendiran, residing at<br>No.24/25/122V, Vadivel<br>Nagar, JCK Nagar, JS<br>Hospital, Chengalpattu<br>Taluk & District | Menallur,<br>139/21A, 139/21B,<br>139/21C, 139/22A,<br>139/22B, 139/23,<br>139/24, 139/25A,<br>139/25B, 139/25C,<br>139/26, 139/27,<br>139/28, 139/29,<br>140/1, 140/2, 140/3,<br>141/42A, 141/43A,<br>141/44, 141/45,<br>141/46, 141/47,<br>141/48, 141/49,<br>148/11, 148/12A,<br>148/12B, 148/14,<br>148/15A, 148/15B,<br>148/8 | 3.160           | 25-10-2024 to<br>24-10-2029 | Existing quarry |

T. Ponnambalam


## II) Abandoned quarries

| Sl. No.   | Name of the Owner | Village & S.F. Nos. | Extent in Hect. | Lease Period | Remarks |
|-----------|-------------------|---------------------|-----------------|--------------|---------|
| ...Nil... |                   |                     |                 |              |         |

## III) Present Proposed Quarries

| Sl. No | Name of the Owner   | Village & S.F. Nos.  | Extent in Hect. |
|--------|---|--|-----------------|
| 1      | Thiru.T.Poonambalam,<br>S/o. Thangavelu,<br>No.12. Balakrishnan Street,<br>Srinivasa Nagar,<br>Chennai-63.  | Menallur<br>135/1, 135/2, 135/3A, 135/3B,<br>135/4 & 135/5   | 1.34.5          |
| 2      | M/s.Sri Thirumala Blue<br>Metal,<br>Represented its partner<br>Thiru.N.R.Anandhababu,<br>No.90, Ottakuthur Street,<br>Mamallaan nagar,<br>Kanchipuram | Menallur<br>148/16, 148/17, 148/18,<br>148/19, 148/20, 148/21,<br>148/22, 148/23, 148/24,<br>148/25, 148/38A, 148/39A1,<br>146/39B, 146/46, 148/1,<br>148/10, 148/2, 148/26, 148/27,<br>148/28, 148/29, 148/3,<br>148/30, 148/39A2, 148/39B2A,<br>148/39B1, 148/4, 148/5, 148/6,<br>148/7, 148/9, 149/1A, 149/2A<br>& 150/1A | 4.44.35         |

Encl: 2 Copies of Approved Mining Plan.

  
Joint Director (Add. Ch.),  
Geology and Mining,  
Tiruvannamalai.

Copy submitted to:

1. The Chairman, SEIAA,  
Tamil Nadu, 3<sup>rd</sup> Floor, Panagal Maaligai,  
No.1, Jeenis Road, Saidapet, Chennai-15.
2. The Commissioner of Geology and Mining, Chennai-32.
3. The District Collector, Tiruvannamalai.

  
T. Poonambalam

From

Thiru.A.Arumuganainar, M.Sc.,  
Joint Director (A/c),  
O/o. Assistant Director,  
Geology and Mining,  
Tiruvannamalai - 4.

To

Thiru.T.Poonambalam,  
S/o. Thangavelu,  
No.12, Balakrishnan Street,  
Srinivasa Nagar,  
Chennai-63.

Rc.No.270/Kanimam/2024, dated:25.11.2024.

Sir,

Sub: Quarries and Minerals – Minor Mineral - Rough stone and Gravel - Tiruvannamalai District – Vembakkam Taluk – Menallur village Patta Land in SF.Nos.135/1 (0.10.0), 135/2 (0.10.5), 135/3A (0.22.5), 135/3B (0.02.0), 135/4 (0.23.5) & 135/5 (0.66.0) over an extent of 1.34.5 hecets., – Application preferred by **Thiru.T.Ponnambalam** - **Precise area communicated** – **Submission of three copies of draft Mining Plan for approval** - Approval accorded - regarding.

- Ref: 1. Application from Thiru.T.Poonambalam, S/o. Thangavelu, No.12, Balakrishnan Street, Srinivasa Nagar, Chennai-63 dated 16.08.2024.
2. Precise Area Communication Notice Rc.No.270/Kanimam/2024, dated 12.11.2024.
3. Mining Plan submitted by Thiru.T.Poonambalam, S/o. Thangavelu, Chennai dated.13.11.2024.

\*\*\*\*\*

Thiru.T.Poonambalam, S/o. Thangavelu, Chennai has preferred an application for the grant of Rough Stone and Gravel quarry lease over an extent of 1.34.5 Hectare of Patta land in SF.Nos.135/1 (0.10.0), 135/2 (0.10.5), 135/3A (0.22.5), 135/3B (0.02.0), 35/4 (0.23.5) & 135/5 (0.66.0) of Menallur Village, Vembakkam Taluk, Tiruvannamalai District for a period of 10 years vide the reference 1<sup>st</sup> cited and the precise area has been communicated to the applicant, vide the reference 2<sup>nd</sup> cited with a direction to submit the approved mining plan and Environmental Clearance.

2. As directed, the applicant has submitted three copies of mining plan for approval vide the reference 3<sup>rd</sup> cited. The Mining Plan has been verified in detail and found that it has been prepared in accordance with the

T. Poonambalam,

guidelines / instructions issued by the Commissioner of Geology and Mining in letter RC. No. 3868 / LC / 2012 dated 19.11.2012.

i) The reserves estimated in the mining plan is

| Depth in Mts.          | Geological Resources in Cu.m | Mineable Reserves in Cu.m |
|------------------------|------------------------------|---------------------------|
| 50m below ground level | Rough Stone : 6,26,618       | Rough Stone : 3,86,102    |
|                        | Weathered rock : 13,444      | Weathered rock : 11,410   |
|                        | Gravel : 26,888              | Gravel : 23,528           |

3. Therefore in exercise of the powers conferred under Rule 41(2) of Tamil Nadu Minor Mineral Concession Rules, 1959, the mining plan is hereby approved, subject to the following conditions:

- i. The applicant has submitted a mining plan with above mentioned mineable reserve without providing any benches; however, the plan does not incorporate the mandatory 7.5-meter safety distance from the adjacent quarry. **As stipulated under Section 111 of the Metalliferous Mines Regulations, 1961, the applicant is should obtain prior permission from the concerned department before the grant of the lease.**
- ii. 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.
- iii. This approval of the mining plan does not in any way convey the approval of the Government in terms or 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, Explosives Act, 1884 (Central Act IV of 1884) Minor Mineral Concession and Development Rules, 2010 and the Rules made there under and the Tamil Nadu Minor Mineral Concession Rules, 1959.
- iv. The mining plan is approved without prejudice to any other order or direction from any court of competent jurisdiction.
- v. The validity of the mining plan is co-terminus with the lease period.
- vi. Quarrying shall be done in accordance with the approved Mining Plan.
- vii. If anything is found to be concealed in the contents of the mining plan which are required by the mines act or if any proposed for rectification has not been made, the approval shall be deemed to have been withdrawn with immediate effect.
- viii. 10m (Set Back) should be left as a safety distance for the channel leading to poonaihangal lake in SF.No.122 on north of the applied lease are according to Executive Engineer (WRD), kilpalaru Basin Division, Kanchipuram in the letter No.EVA.2/G.22 (Mines - Menallur) / 2024 dated.12.09.2024 all the stated conditions must be strictly followed.



- ix. A safety distance of 7.5m and 10m should be provided to the adjoining patta and Poramboke lands respectively.
- x. A safety distance of 50m should be provided to the permanent structures (Water bodies, Highways, Electrical lines and Railway tracks).
- xi. The applicant should not cause any hindrance to adjacent lands and public while quarrying operation.
- xii. Barbed wire fencing should be erected all along the boundary of the lease granted area before quarrying operation.
- xiii. The applicant should use jackhammer and mild explosive during blasting in quarry.
- xiv. Quarrying operation should be done proper scientific method only.

4. Further, other quarries situated within 500m radial distance are as follows.

1) Existing Quarries

| Sl. No. | Name of the Owner   | Village & S.F. Nos.  | Extent in Hect. | Lease Period                | Remarks         |
|---------|---|--|-----------------|-----------------------------|-----------------|
| 1       | T.Ponnambalam,<br>S/o.Thangavelu,<br>No.12 Balakrishnan Street,<br>Srinivasa Nagar, Chennai   | Menallur,<br>134/15A,15B,<br>17,18,19,136/1,2,3A,<br>3B,3C,4,5,6,7,8,9,10,<br>143/1A,1B,1C,1D,2,3,<br>4,5,6,7A,7B,8,10,11,<br>144/2,3,4,5  | 4.295           | 06-10-2022 to<br>05-10-2032 | Existing quarry |
| 2       | M/s.Sri Ganesh Blue<br>Metals-II<br>SF.No.127/2B & 129,<br>Menallur village,<br>Vembakkam Taluk,<br>Tiruvannamalai District                         | Menallur,<br>123/10, 11, 12, 14A,<br>14B, 15, 16, 17,<br>131/1, 2, 3, 4, 5A,<br>5B, 6, 7, 8, 9, 10A,<br>10B, 10C & 132/4B  | 3.260           | 08-02-2023 to<br>07-02-2033 | Existing quarry |
| 3       | Thiru.R.Monishkumar<br>S/o. Rajendiran, residing at<br>No.24/25/122V, Vadivel<br>Nagar, JCK Nagar, JS<br>Hospital, Chengalpattu<br>Taluk & District | Menallur,<br>139/21A, 139/21B,<br>139/21C, 139/22A,<br>139/22B, 139/23,<br>139/24, 139/25A,<br>139/25B, 139/25C,<br>139/26, 139/27,<br>139/28, 139/29,<br>140/1, 140/2, 140/3,<br>141/42A, 141/43A,<br>141/44, 141/45,<br>141/46, 141/47,<br>141/48, 141/49,<br>148/11, 148/12A,<br>148/12B, 148/14,<br>148/15A, 148/15B,<br>148/8 | 3.160           | 25-10-2024 to<br>24-10-2029 | Existing quarry |

T. Ponnambalam


## ii) Abandoned quarries

| Sl. No.   | Name of the Owner | Village & S.F. Nos. | Extent In Hect. | Lease Period | Remarks |
|-----------|-------------------|---------------------|-----------------|--------------|---------|
| ...Nil... |                   |                     |                 |              |         |

## iii) Present Proposed Quarries

| Sl. No | Name of the Owner  | Village & S.F. Nos.  | Extent In Hect. |
|--------|--|--|-----------------|
| 1      | Thiru.T.Poonambalam,<br>S/o. Thangavelu,<br>No.12. Balakrishnan Street,<br>Srinivasa Nagar,<br>Chennai-63.   | Menallur<br>135/1, 135/2, 135/3A, 135/3B,<br>135/4 & 135/5   | 1.34.5          |
| 2      | M/s.Sri Thirumala Blue<br>Metal,<br>Represented its partner<br>Thiru.N.R.Anandhababu,<br>No.90, Ottakuthur Street,<br>Mamallan nagar,<br>Kanchipuram | Menallur<br>148/16, 148/17, 148/18,<br>148/19, 148/20, 148/21,<br>148/22, 148/23, 148/24,<br>148/25, 148/38A, 148/39A1,<br>146/39B, 146/46, 148/1,<br>148/10, 148/2, 148/26, 148/27,<br>148/28, 148/29, 148/3,<br>148/30, 148/39A2, 148/39B2A,<br>148/39B1, 148/4, 148/5, 148/6,<br>148/7, 148/9, 149/1A, 149/2A<br>& 150/1A | 4.44.35         |

**Encl:** 2 Copies of Approved Mining Plan.

  
Joint Director (Add. Ch.),  
Geology and Mining,  
Tiruvannamalai.

**Copy submitted to:**

1. The Chairman, SEIAA,  
Tamil Nadu, 3<sup>rd</sup> Floor, Panagal Madilgai,  
No.1, Jeenis Road, Saidapet, Chennai-15.
2. The Commissioner of Geology and Mining, Chennai-32.
3. The District Collector, Tiruvannamalai.

  
T. Poonambalam.

# MINING PLAN

FOR

MENNALLUR VILLAGE ROUGH STONE AND GRAVEL MINING LEASE WITH  
PROGRESSIVE QUARRY CLOSURE PLAN

Patta land /Open Cast-Semi-Mechanized mining/Non- Forest/Non-Captive Use

Lease period 5 Years from the date of lease execution

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

## LOCATION OF THE LEASE AREA

STATE : TAMILNADU  
DISTRICT : TIRUVANNAMALAI  
TALUK : VEMBAKKAM  
VILLAGE : MENNALLUR  
S.F.No's : 135/1, 135/2, 135/3A, 135/3B,  
135/4 & 135/5  
EXTENT : 1.34.5 Hectares

## ADDRESS OF THE APPLICANT

**Mr. T.Ponnambalam,**  
S/o. Thangavelu,  
No.12, Balakrishnan Street,  
Srinivasa Nagar,  
Chennai - 600063.

## PREPARED BY

Dr.S.KARUPPANNAN.M.Sc., Ph.D.,

RQP/MAS/263/2014/A

## **GEO TECHNICAL MINING SOLUTIONS**

No: 1/213 -B, Ground Floor, Natesan Complex,

Oddapatti, Collectorate Post office,

Dharmapuri-636705. Tamil Nadu.

Mob. : +91 9443937841, +917010076633,

E-mail: [info.gtmsdpi@gmail.com](mailto:info.gtmsdpi@gmail.com) ,

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



T. Ponnambalam



## CONTENTS

| Sl. No.              | Description  | Page No. |
|----------------------|--|----------|
| -                    | Certificates   | 5-8      |
| -                    | Introductory notes                                   | 9        |
| 1.0                  | General  | 11       |
| 2.0                  | Location and Accessibility                           | 12       |
| <b><u>PART-A</u></b> |  |          |
| 3.0                  | Geology and Mineral reserves                         | 15       |
| 4.0                  | Mining   | 19       |
| 5.0                  | Blasting   | 25       |
| 6.0                  | Mine Drainage  | 27       |
| 7.0                  | Stacking of Mineral rejects and disposal of waste    | 28       |
| 8.0                  | Uses of Mineral                                      | 28       |
| 9.0                  | Others   | 28       |
| 10.0                 | Mineral processing/Beneficiations                    | 29       |
| <b><u>PART-B</u></b> |  |          |
| 11.0                 | Environmental management plan                        | 31       |
| 12.0                 | Progressive quarry closure plan                      | 36       |
| 13.0                 | Financial assurance                                  | 38       |
| 14.0                 | Certificates   | 38       |
| 15.0                 | Plan and sections, etc                               | 38       |
| 16.0                 | Any other details intend to furnish by the applicant | 38       |
| 17.0                 | CSR Expenditure                                      | 39       |





### ANNEXURES

| Sl. No. | Description                                     | Annexure No. |
|---------|---|--------------|
| 1.      | Copy of precise area communication letter       | I            |
| 2.      | Copy of <b>FMB</b> (Field Measurement book)     | II           |
| 3.      | Copy of "A" register                            | III          |
| 4.      | Copy of Chitta                                  | IV           |
| 5.      | Photo copy of the applied lease area            | V            |
| 6.      | Copy of ID Proof of the authorized signatory    | VI           |
| 7.      | Copy of Recognized Qualified Person Certificate | VII          |



**LIST OF PLATES**

| Sl. No. | Description                                       | Plate No. | Scale   |
|---------|---|-----------|---|
| 1       | Key Map   | I         | Not to scale  |
| 2       | Location Plan                                     | I-A       | Not to scale  |
| 3       | Toposheet Map                                     | I-B       | 1:1,00,000  |
| 4       | Satellite Imagery Map                             | I-C       | 1: 5,000  |
| 5       | Environmental Plan                                | I-D       | 1: 5,000  |
| 6       | Mine Lease Plan                                   | II        | 1:1000  |
| 7       | Surface, Geological Plan & Sections               | III       | Plan 1:1000<br><b>Sections</b><br>Hor 1:1000<br>Ver 1:500 |
| 8       | Conceptual Plan & Sections                        | IV        | Plan 1:1000<br><b>Sections</b><br>Hor 1:1000<br>Ver 1:500 |
| 9       | Mine Layout Plan and Land Use Pattern             | V         | Plan 1:1000   |
| 10      | Year wise Development, Production Plan & Sections | VI        | Plan 1:1000<br><b>Sections</b><br>Hor 1:1000<br>Ver 1:500 |

*Panambalam*

147  
Mr. T.Ponnambalam,  
S/o. Thangavelu,  
No.12, Balakrishnan Street,  
Srinivasa Nagar,  
Chennai - 600063.



**CONSENT LETTER FROM THE APPLICANT**

The Mining Plan in respect of rough stone and gravel quarry lease in patta land at S.F.No's: 135/1, 135/2, 135/3A, 135/3B, 135/4 & 135/5 over an extent of 1.34.5hectares of Mennallur, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu State has been prepared by

**Dr. S. KARUPPANNAN. M.Sc., Ph.D. (Regn. No. RQP/MAS/263/2014/A)**

I request "The Regional Joint Director (i/c)," Assistant Director office, Department of Geology and Mining, Tiruvannamalai District to make further correspondence regarding modifications of the Mining Plan with the said Recognized Qualified Person on this following address,


**Dr. S. KARUPPANNAN. M.Sc., Ph.D.**  
(Regn. No. RQP/MAS/263/2014/A)  
**GEO TECHNICAL MINING SOLUTIONS**  
(A NABET accredited & ISO certified Company)

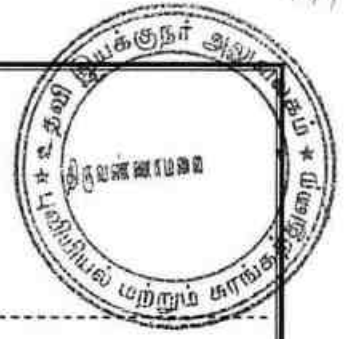
No: 1/213-B, Natesan Complex,  
Oddapatti, Collectorate Post office, Dharmapuri-636705  
Ph: +91 9443937841, +91 7010076633  
E-mail: [info.gtmsdpi@gmail.com](mailto:info.gtmsdpi@gmail.com),  
Website: [www.gtmsind.com](http://www.gtmsind.com)

I hereby undertake that all modifications so made in the Mining Plan by the Recognized Qualified Person may be deemed to have been made with my knowledge and consent and shall be acceptable to me and binding on me in all respects.

Place: Chennai, TN.

Date:

  
Signature of the applicant  
(T.Ponnambalam)




**Mr. T.Ponnambalam,**  
S/o. Thangavelu,  
No.12, Balakrishnan Street,  
Srinivasa Nagar,  
Chennai - 600063.

**DECLARATION**

The Mining Plan in respect of rough stone and gravel quarry lease in Patta land at S.F.No's: 135/1, 135/2, 135/3A, 135/3B, 135/4 & 135/5 over an extent of 1.34.5hectares of Mennallur Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu State have been prepared with my consultation and I have understood the contents and agree to implement the same in accordance with the Mining Laws.

**Place:** Kancheepuram, TN.  
**Date:**

  
Signature of the applicant  
**(T.Ponnambalam)**

T. Ponnambalam

Dr. S. KARUPPANNAN. M.Sc., Ph.D.

(Regn. No. RQP/MAS/263/2014/A)

**GEO TECHNICAL MINING SOLUTIONS**

(A NABET accredited & ISO certified Company)

No: 1/213-B, Natesan Complex,

Oddapatti, Collectorate Post office, Dharmapuri-636705

Ph: +91 9443937841, +91 7010076633

E-mail: [info.gtmsdpi@gmail.com](mailto:info.gtmsdpi@gmail.com),

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



### CERTIFICATE

This is to certify that, the provisions of 19(1) & 20 Tamil Nadu Minor Minerals Concession Rules, 1959 have been observed in the Mining Plan for the grant of rough stone and gravel quarry lease in S.F.No's: 135/1, 135/2, 135/3A, 135/3B, 135/4 & 135/5 over an extent of 1.34.5hectares of Mennallur Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu State granted to **Mr.T.Ponnambalam**, Chennai District.

Wherever specific permission / exemptions / relaxations or approvals are required, the applicant will approach the concerned authorities of State and Central governments for granting such permissions etc.

Place: Dharmapuri, TN

Date:

Signature of the Recognized Qualified Person

Dr.S.KARUPPANNAN,M.Sc,Ph.D.,  
RQP/MAS/263/2014/A  
GEO TECHNICAL MINING SOLUTIONS  
A NABET Accredited and ISO Certified Company  
1/213-B, Ground Floor, Natesan Complex,  
Collectorate Post Office, Oddapatti,  
Dharmapuri-636705, TamilNadu, India

T. Ponnambalam

**Dr. S. KARUPPANNAN. M.Sc., Ph.D.**

(Regn. No. RQP/MAS/263/2014/A)

**GEO TECHNICAL MINING SOLUTIONS**

(A NABET accredited & ISO certified Company)

No: 1/213-B, Natesan Complex,

Oddapatti, Collectorate Post office, Dharmapuri-636705

Ph: +91 9443937841, +91 7010076633

E-mail: [info.gtmsdpi@gmail.com](mailto:info.gtmsdpi@gmail.com),

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



### CERTIFICATE

I certify that, in preparation of Mining Plan for rough stone and gravel quarry lease in S.F.No's: 135/1, 135/2, 135/3A, 135/3B, 135/4 & 135/5 over an extent of 1.34.5hectares of Mennallur Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu State prepared to **Mr.T.Ponnambalam**, Chennai District, covers all the provisions of Mines Act, Rules, and Regulations etc., made there under and whenever specific permission are required, the applicant will approach the Director General of Mines Safety, Chennai. The standards prescribed by DGMS in respect of Mines Health will be strictly implemented.

Place: Dharmapuri, TN

Date:

Signature of the Recognized Qualified Person

**Dr.S.KARUPPANNAN,M.Sc,Ph.D.,**  
RQP/MAS/263/2014/A  
**GEO TECHNICAL MINING SOLUTIONS**  
A NABET Accredited and ISO Certified Company  
1/213-B, Ground Floor, Natesan Complex,  
Collectorate Post Office, Oddapatti,  
Dharmapuri-636705, TamilNadu, India

T. Ponnambalam

# MINING PLAN

FOR MENNALLUR VILLAGE ROUGH STONE AND GRAVEL MINING LEASE WITH  
PROGRESSIVE QUARRY CLOSURE PLAN

Patta land / Open cast-Semi-Mechanized mining/Non-forest/Non-Captive Use

Lease period 5 Years from the date of lease execution

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

## INTRODUCTORY NOTES:

- a) **Introduction:** The Mining plan with progressive quarry closure plan is prepared for **Mr.T.Ponnambalam**, S/o.Thangavelu, No.12, Balakrishnan Street, Srinivasa Nagar, Chennai District – 600063, Tamilnadu State and filed with application for new proposals has submitted to the Department of Geology and Mining, Tiruvannamalai dated 16.08.2024 had requested to grant the quarry lease for rough stone and gravel in S.F.No's: 135/1, 135/2, 135/3A, 135/3B, 135/4 & 135/5 over an extent of 1.34.5hectares of Mennallur Village, Vembakkam Taluk, Tiruvannamalai District, Tamil Nadu State.
- b) **The Precise area communication letter:** The Regional Joint Director (i/c), Department of Geology and mining, Tiruvannamalai has directed to the applicant **Mr.T.Ponnambalam** through his precise area communication letter vide **Roc.No.270/Mines/2024 Dated 12.11.2024**, for quarrying lease rough stone and gravel at Tamil Nadu State, Tiruvannamalai District, Vembakkam Taluk, Mennallur Village in S.F.No's: 135/1, 135/2, 135/3A, 135/3B, 135/4 & 135/5 over an extent of 1.34.5hectares has recommended as following conditions for a period of five (5) years under Rule 19(1) & 20 Tamil Nadu Minor Mineral concession rules, 1959.
- 10m (set back) should be left as a safety distance for the channel leading to Poonathangal lake in S.F.No.122 on north of the applied lease area, according to Executive Engineer (WRD), Kilpalaru Basin Division, Kanchipuram in the letter No.EVA.2/G.22 (Mines - Mennallur)/2024 dated 12.09.2024 all the stated conditions must be strictly followed.
  - A safety distance of 7.5m should be provided for adjacent patta lands and 10m for government lands.
  - Do not cause any harm to the public or the adjacent lands.
  - Before commencement of quarrying, barbed wire fencing should be erected around the quarry and quarrying should commence.



- v. Mining should be done methodically and scientifically.
- vi. Quarrying should be done by certified foreman, blaster and mine manager respectively.
- vii. The Director of Mine Safety, Chennai should be informed before commencement of quarrying.
- viii. Quarrying shall be carried out following the instructions laid down in Rule 36(1- A)(b) of the Tamil Nadu Mineral Concession Rules, 1959 for crushing rocks.

c) **Preparation and Submission of Mining Plan:** The Mining Plan with progressive quarry closure plan has been prepared under rule 41 and submitted under rule 42 of Tamil Nadu Minor Mineral Concession Rules, 1959 for mining lease as per conditions mentioned in the precise area communication letter **Roc.No.270/Mines/2024 Dated 12.11.2024.**

d) **Geological resources and Mineable reserves:** Geological resource of estimated as **666950m<sup>3</sup>** including the resources of safety zone, gravel, Weathered rock etc. Of which, rough stone resources of about **626618m<sup>3</sup>**, gravel is **26888m<sup>3</sup>** and Weathered rock is **13444m<sup>3</sup>**. The total mineable reserve is estimated to be **421040m<sup>3</sup>** by deducting the reserve safety zone, block in benches from the total Geological resources. of which, rough stone is about **386102m<sup>3</sup>**, gravel is **23528m<sup>3</sup>** and Weathered rock is **11410m<sup>3</sup>** up to a depth of 50m below ground level (Refer Plate No. III& IV).

e) **Proposed Production Schedule:** Total proposed production of rough stone is **386102m<sup>3</sup>**, gravel is **23528m<sup>3</sup>** and Weathered rock is **11410m<sup>3</sup>** up to a depth of 50m below ground level for five years plan period. (Refer Plate No.VI).

- f) **Environmental Sensitivity of the proposed lease area: -**
- i). **Interstate boundary:** There is no interstate boundary around 10Km radius periphery of proposed lease area.
  - ii). **Wildlife Sanctuaries any:** There are no notified wildlife sanctuaries within the radius of 10km from the project site under the wildlife (Protection) Act, 1972.
  - iii). **Forest (conservation) Act, 1980:** No forest land granted for quarrying and there is no reserve forest around 60m radius.
  - iv). **CRZ Notification, 2019:** There is no Sea coastal zone found within radius of 10km and this project site doesn't attract CRZ Notification, 2019.

*Handwritten signature: P. Ramasubramanian*



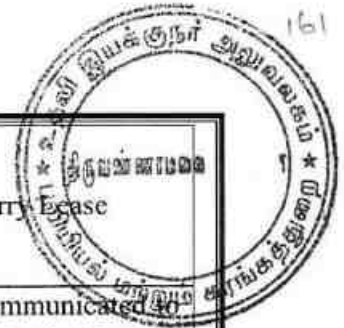


- h) **Environmental measures to be adopted during the ongoing activity period,**
- a. Usage of sharp drill bits while drilling which will help in reducing noise.
  - b. Secondary blasting will be totally avoided and hydraulic rock breaker will be used for breaking boulders.
  - c. Controlled blasting with proper spacing, burden, stemming and optimum charge/delay will be maintained.
  - d. Green Belt/Plantation will be developed around the project area and along the haul roads. The plantation minimizes propagation of noise.
  - e. Water will be sprinkled on haul roads twice a day to avoid dust generation during transportation.
  - f. Transportation of material will be carried out during day time and material will be covered with tarpaulin.
  - g. The speed of tippers plying on the haul road will be limited below 20 km/hr to avoid generation of dust.
  - h. And any other conditions as stipulated by the concerned authorities should be followed to protect the environment.

**1.0 GENERAL:**

|    |                           |   |   |
|----|---------------------------|---|---|
| a. | Name of the Applicant     | : | <b>Mr. T.Ponnambalam</b>  |
|    | Applicant address         | : | S/o. Thangavelu,<br>No.12, Balakrishnan Street,<br>Srinivasa Nagar, |
|    | District                  | : | Chennai   |
|    | State                     | : | Tamilnadu   |
|    | Pin code                  | : | 600063  |
|    | Phone                     | : | Nil   |
|    | Fax                       | : | Nil   |
|    | Gram                      | : | Nil   |
|    | Telex                     | : | Nil   |
|    | E-mail                    | : | .....   |
| b. | Status of the Applicant   |   |   |
|    | Private individual        | : | Private Individual  |
|    | Cooperative Association   | : | ---   |
|    | Private company           | : | ---   |
|    | Public Company            | : | --  |
|    | Public Sector Undertaking | : | ---   |
|    | Joint Sector Undertaking  | : | ---   |
|    | Other (pl. specify)       | : | ---   |

*T. Ponnambalam*



|    |  |   |   |
|----|--|---|---|
| c. | Mineral(s) Which are occurring in the area and which the applicant intends to mine | : | Rough Stone and Gravel Quarry Lease   |
| d. | Period for which the mining lease granted /renewed/ proposed to be applied         | : | The precise area has been communicated to the applicant for quarrying period of five (5) years.   |
|    | Name of the RQP preparing the Mining Plan  | : | <b>Dr. S.KARUPPANNAN.M.Sc.,Ph.D.,</b>   |
|    | Address  | : | <b>Geo Technical Mining Solutions</b><br>(A NABET Accredited & ISO certified Company)<br>No: 1/213-B, Natesan Complex,<br>Oddapatti, Collectorate Post office,<br>Dharmapuri-636705<br>Web site: <a href="http://www.gtmsind.com">www.gtmsind.com</a> |
|    | Phone  | : | +91 9443937841, 7010076633  |
|    | Fax  | : | Nil   |
|    | e-mail   | : | <a href="mailto:info.gtmsdpi@gmail.com">info.gtmsdpi@gmail.com</a>  |
|    | Telex  | : | Nil   |
|    | Registration number  | : | RQP/MAS/263/2014/A  |
|    | Date of grant/renewal  | : | 16.12.2014  |
|    | Valid upto   | : | 15.12.2024  |
| f. | Name of the prospecting agency   | : | <b>Geo Technical Mining Solutions</b><br>GSR 286(E) No:272, Ministry of Mines<br>Notification 7th April 2022.   |
|    | Address  | : | No: 1/213-B, Natesan Complex,<br>Oddapatti,<br>Collectorate Post office,<br>Dharmapuri-636705<br>Web site: <a href="http://www.gtmsind.com">www.gtmsind.com</a>   |
|    | Phone  | : | +91 9443937841, 7010076633  |
| g. | Reference No. and date of consent letter from the state government                 | : | The precise area communication letter issued by the Regional Joint Director (i/c), Assistant Director office, Department of Geology and Mining, Tiruvannamalai vide <b>Roc.No.270/Mines/2024 Dated 12.11.2024</b>                                     |

**2.0 LOCATION AND ACCESSIBILITY:**

|    |                      |   |                            |
|----|----------------------|---|----------------------------|
| a. | Details of the Area: | : | Refer plate no: IA & IB    |
|    | District & State     | : | Tiruvannamalai, Tamil Nadu |
|    | Taluk                | : | Vembakkam                  |
|    | Village              | : | Mennallur                  |

*T. Perambalam.*



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

| Survey No           | Sub Division | Total Extent in Hect | Patta No.                        | Village and Name of the Land Owner  | Mine lease Applied S.F.No. | Mine lease Applied area out of total area in hect. |
|---------------------|--------------|----------------------|----------------------------------|-------------------------------------|----------------------------|--|
| 135                 | 1            | 0.10.0               | 832                              | Mr.T.Ponnambalam<br>S/o. Thangavelu | 135/1                      | 0.10.0   |
| 135                 | 2            | 0.10.5               |                                  |                                     | 135/2                      | 0.10.5   |
| 135                 | 3A           | 0.22.5               | 821                              |                                     | 135/3A                     | 0.22.5   |
| 135                 | 3B           | 0.02.0               | 832                              |                                     | 135/3B                     | 0.02.0   |
| 135                 | 4            | 0.23.5               |                                  |                                     | 135/4                      | 0.23.5   |
| 135                 | 5            | 0.66.0               | 744                              |                                     | 135/5                      | 0.66.0   |
| <b>Total Extent</b> |              | <b>1.34.5</b>        | <b>Applied lease area extent</b> |                                     |                            | <b>1.34.5</b>                                      |

|  |   |  |
|--|---|--|
| Lease area (hectares)  | : | 1.34.5 Hectares  |
| Whether the area is recorded to be in forest (please specify whether protected, reserved, etc) | : | The proposed lease area is recorded as patta land. (Ref.Anne.No's: IV)   |
| Ownership / Occupancy  | : | This is a patta land S.F.No's: 135/1, 135/2, 135/3A, 135/3B, 135/4 & 135/5 is registered on the name of Mr.T.Ponnambalam, S/o. Thangavelu as patta no.832, 821 & 744.  |
| Existence of Public Road / Railway line if any nearby and approximate distance                 | : | <ul style="list-style-type: none"> <li>✓ Exploited quarry materials will be transported through the approach road is situated on the northwest side.</li> <li>✓ There is an SH-116 is situated on the western side about 3.7km from the lease area.</li> <li>✓ There is no NH road situated around 5km radius from the lease area.</li> <li>✓ There is no railway line is situated around 5km radius from the lease area.</li> </ul> |
| Toposheet No. with latitude and longitude  | : | Toposheet No. <b>57 P/10</b><br>Latitude: From 12°44'23.84"N to 12°44'28.80"N<br>Longitude: From 79°42'32.15"E to 79°42'35.65"E  |

Geo-Coordinates of the lease boundary:

| SLNo | LATITUDE      | LONGITUDE     |
|------|---------------|---------------|
| 1    | 12°44'28.80"N | 79°42'35.65"E |
| 2    | 12°44'23.84"N | 79°42'34.94"E |
| 3    | 12°44'24.12"N | 79°42'32.15"E |
| 4    | 12°44'28.18"N | 79°42'32.38"E |
| 5    | 12°44'28.47"N | 79°42'32.50"E |

T. Ponnambalam

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



**i) INFRASTRUCTURE AND COMMUNICATION:**

| S.No | Description              | Place           | Distance | Direction |
|------|--------------------------|-----------------|----------|-----------|
| a.   | Nearest post office      | Mamandur        | 3.8Km    | Northwest |
| b.   | Nearest police station   | Magaral         | 5.2km    | Southeast |
| c.   | Nearest fire station     | Kancheepuram    | 10.4km   | North     |
| d.   | Nearest medical facility | Mamandur        | 3.7km    | West      |
| e.   | Nearest school           | Kuruvimalai     | 4.2km    | North     |
| f.   | Nearest railway station  | Kancheepuram    | 11.0km   | North     |
| g.   | Nearest port facility    | Chennai         | 74.2km   | Northeast |
| h.   | Nearest airport          | Chennai         | 56.8km   | Northeast |
| i.   | Nearest DSP office       | Kancheepuram    | 11.5km   | North     |
| j.   | Nearest villages         | Mennallur       | 0.4km    | North     |
|      |                          | Suruttal        | 2.0km    | East      |
|      |                          | Chinna Elacheri | 1.5km    | South     |
|      |                          | Bagavandapuram  | 2.3km    | West      |

T. Perambalur.



**PART - A**

**3.0 GEOLOGY AND MINERAL RESERVES:**

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

|     |            |   |
|-----|------------|---|
| (i) | Topography | : The proposed lease area is flat topography. The maximum elevation (93m) was observed north side of the site. The slope is towards south side and falls in Toposheet no. 57 P/10 |
|-----|------------|---|

(ii) **General Geology of the District:**

The Entire district is underlain by the rocks belonging to hard crystalline rock masses of Archaean age. The Archaean rocks in this area are represented by rocks of eastern Ghat complex comprising charnockites, Migmatite complex of composite gneiss. The district is covered by metamorphic crystalline rocks of charnockite, composite gneiss of Archaean age. These rocks are highly metamorphosed and have been subjected to sever folding, crushing and faulting. Charnockites group is occupied by North and Southern part of the basin. The other rock type is encountered by composite granitic gneiss of Epidote hornblende biotite gneiss and hornblende biotite gneiss are occupy in the middle portion of the basin. Charnockite group occupies the high ground as well as plain and it is poorly weathered and jointed. They are generally black grey to dark grey in colour medium to coarse grained texture, and generally massive and un-foliated. A gneissic rock occurs as linear bands in the middle portion of the area and is highly migmatised. Mostly, micaccous with bands of granites, pegmatites, quartz veins the rock is well foliated. The Hornblende biotite gneiss forms the country rock of the area and epidote hornblende gneiss (Proterozoic age) occurs as small isolated outcrops. The crystalline formations are charnockite, granitic gneiss of Archean age have been intrude by dolerite dykes and pegmatite veins. These rocks are highly metamorphosed and have been subjected to very severe folding, crushing and faulting. The crystalline rocks are subjected to tectonic activities under various orogenic cycles resulting in the development of secondary structures such as joints, fissures and cleavages. The intensity of weathering varies from place to place. Highly weathered zones and granitic rock occurs in masses are around some of the villages like Ariyanallur, Mukkunam, Kaarunkuli Tondur, vedal,) Melokkur, Pennagar,

T. Ramesh Kumar



Chinngam(57p/7). The general geological sequence of formation is given in the Table

| Age     | Stage             | Lithology                         |
|---------|-------------------|-----------------------------------|
| Recent  | Migmatite         | Biotite Gneiss, Hornblende gneiss |
| Archean | Charnockite Group | Magnetite                         |

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

**Topography of the proposed lease area:**

The applied lease area exhibits an flat topography and the maximum elevation 93m was observed north of the site. The rocks exhibits layered, medium to coarse grained hornblende biotite, orthopyroxene charnockite gneiss.

The Gravel is obtained the average of 0-2.0m, Weathered rock is 2-3.0m a rough stone starts from 3.0m to 50m (R.L.93-43m) from the surface level. The Surface plan showing elevation, contour, accessibility road and Geological map was prepared the proposed lease area.

**Mode of origin:**

The Charnockite series originally was assumed to have developed by the fractional crystallization of silicate magma. Subsequent studies have shown, however, that many, if not all, of the rocks are metamorphic, formed by recrystallization at high pressures and moderately high temperatures.

**Physiography of the rocks:**

General characteristics of the rocks of this series has recorded that the rocks are in general bluish gray or darkish in colour and extremely fresh in appearance with an even grained granular structure.

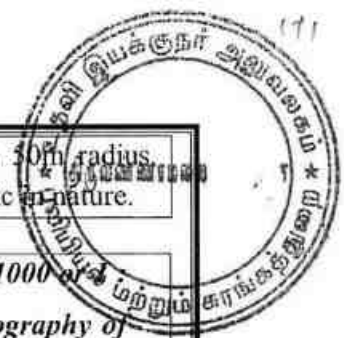
**Chemical composition of rocks:**

Charnockite, any member of a series of metamorphic rocks with variable chemical composition, the term is often limited to the characteristic ortho pyroxene granite of the series. The alkali feldspar may be intermediate between microcline and orthoclase, the fine micro perthitic texture being common.

**Order of superposition of the proposed lease area,**

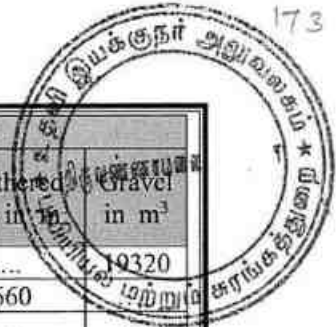
| Age                  | Group             | Rock Formation          |
|----------------------|-------------------|-------------------------|
| Recent to Sub recent | ---               | Gravel & Weathered Rock |
| Archaean             | Charnockite Group | Charnockites.           |

T. Perambalan



|   |   |  |
|---|---|--|
| (iv)  | Drainage Pattern  | : There is no major river found within 50m radius. The drainage in the area is sub-dendritic in nature.  |
| (b)   | <p><i>The topographic plan of the lease area prepared on a scale of 1 :1000 or 1 :2000 with contour interval of 3 to 10m depending upon the topography of the area should be taken as the base plan for preparation of geological plan. The details of exploration already carried out including evidences of mineral existence should be shown on the geological plan:</i></p> |  |
|   | a. Present status:  | : The RQP examined the surface features during survey. It is a fresh quarry lease.   |
|   | b. Surface Plan   | : Surface plan showing elevation contour and accessibility road was prepared at the scale of 1: 1000, as shown in Plate No. III.                                       |
| (c)   | Geological sections should be prepared at suitable intervals on a scale of 1: 1000 / 1: 2000:   | : Longitudinal and transverse geological cross sections were prepared at the horizontal scale of 1: 1000 and at the vertical scale of 1:500, as shown in Plate No. III |
| (d)   | <p><i>Broadly indicate the Yearwise future programme of exploration, taking into consideration the future production programme planned in next five years as in table below:-</i></p> <p>No future programmed proposed in this area. Its massive homogeneous parent rock. Hence exploration proposal is not required to this mining project.</p>                                |  |
| <p><i>(e) Indicate geological and recoverable reserves and grade, duly supported by standard method of estimation and calculations along with required sections (giving split up of various categories i.e. proved, probable, possible). Indicate cut-off grade. Availability of resources should also be indicated for the entire leasehold.</i></p>   |   |  |
| <p>The geological resources were computed by cross section method with respect to the boundaries of the lease area. In this method, the lease area was divided into one longitudinal and two transverse section to calculate the volume of material up to the depth of 50m below ground level for five years plan period. (Refer Plate No. III). The one longitudinal and two transverse cross section were assigned XY-AB &amp; XY-CD as respectively. Using the cross-sectional method, total reserve is estimated to be <b>666950m<sup>3</sup></b> including the resources of safety zone, gravel, weathered rock etc. Of which, rough stone resources of about <b>626618m<sup>3</sup></b>, gravel is <b>26888m<sup>3</sup></b> and Weathered rock is <b>13444m<sup>3</sup></b>.</p> |   |  |

T. Ramasubramanian



| GEOLOGICAL RESOURCES |       |               |              |              |                          |                               |                                  |                          |
|----------------------|-------|---------------|--------------|--------------|--------------------------|-------------------------------|----------------------------------|--------------------------|
| Section              | Bench | Length in (m) | Width in (m) | Depth in (m) | Volume In m <sup>3</sup> | Rough Stone in m <sup>3</sup> | Weathered Rock in m <sup>3</sup> | Gravel in m <sup>3</sup> |
| XY-AB                | I     | 105           | 92           | 2            | 19320                    | .....                         | .....                            | 19320                    |
|                      | I     | 105           | 92           | 1            | 9660                     | .....                         | 9660                             | .....                    |
|                      | I     | 105           | 92           | 2            | 19320                    | 19320                         | .....                            | .....                    |
|                      | II    | 105           | 92           | 5            | 48300                    | 48300                         | .....                            | .....                    |
|                      | III   | 105           | 92           | 5            | 48300                    | 48300                         | .....                            | .....                    |
|                      | IV    | 105           | 92           | 5            | 48300                    | 48300                         | .....                            | .....                    |
|                      | V     | 105           | 92           | 5            | 48300                    | 48300                         | .....                            | .....                    |
|                      | VI    | 105           | 92           | 5            | 48300                    | 48300                         | .....                            | .....                    |
|                      | VII   | 105           | 92           | 5            | 48300                    | 48300                         | .....                            | .....                    |
|                      | VIII  | 105           | 92           | 5            | 48300                    | 48300                         | .....                            | .....                    |
| IX                   | 105   | 92            | 5            | 48300        | 48300                    | .....                         | .....                            |                          |
| X                    | 105   | 82            | 5            | 43050        | 43050                    | .....                         | .....                            |                          |
| <b>TOTAL</b>         |       |               |              | <b>50</b>    | <b>477750</b>            | <b>448770</b>                 | <b>9660</b>                      | <b>19320</b>             |
| XY-CD                | I     | 43            | 88           | 2            | 7568                     | .....                         | .....                            | 7568                     |
|                      | I     | 43            | 88           | 1            | 3784                     | .....                         | 3784                             | .....                    |
|                      | I     | 43            | 88           | 2            | 7568                     | 7568                          | .....                            | .....                    |
|                      | II    | 43            | 88           | 5            | 18920                    | 18920                         | .....                            | .....                    |
|                      | III   | 43            | 88           | 5            | 18920                    | 18920                         | .....                            | .....                    |
|                      | IV    | 43            | 88           | 5            | 18920                    | 18920                         | .....                            | .....                    |
|                      | V     | 43            | 88           | 5            | 18920                    | 18920                         | .....                            | .....                    |
|                      | VI    | 43            | 88           | 5            | 18920                    | 18920                         | .....                            | .....                    |
|                      | VII   | 43            | 88           | 5            | 18920                    | 18920                         | .....                            | .....                    |
|                      | VIII  | 43            | 88           | 5            | 18920                    | 18920                         | .....                            | .....                    |
| IX                   | 43    | 88            | 5            | 18920        | 18920                    | .....                         | .....                            |                          |
| X                    | 43    | 88            | 5            | 18920        | 18920                    | .....                         | .....                            |                          |
| <b>TOTAL</b>         |       |               |              | <b>50</b>    | <b>189200</b>            | <b>177848</b>                 | <b>3784</b>                      | <b>7568</b>              |
| <b>GRAND TOTAL</b>   |       |               |              |              | <b>666950</b>            | <b>626618</b>                 | <b>13444</b>                     | <b>26888</b>             |

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

The total mineable reserve is estimated to be **421040m<sup>3</sup>** by deducting the reserve safety zone, block in benches from the total Geological resources up to a depth of 50m below ground level. Of which, rough stone is about **386102m<sup>3</sup>**, gravel is **23528m<sup>3</sup>** and Weathered rocks is **11410m<sup>3</sup>**. The commercially viable rough stone has been prepared on 1:1000 scale and sections are prepared in a scale of 1:1000 in horizontal axis and 1:500 as vertical axis (Refer plate no's IV)

| MINEABLE RESERVES |       |               |              |              |                          |                               |                                  |                          |
|-------------------|-------|---------------|--------------|--------------|--------------------------|-------------------------------|----------------------------------|--------------------------|
| Section           | Bench | Length in (m) | Width in (m) | Depth in (m) | Volume In m <sup>3</sup> | Rough Stone in m <sup>3</sup> | Weathered Rock in m <sup>3</sup> | Gravel in m <sup>3</sup> |
| XY-AB             | I     | 95            | 84           | 2            | 15960                    | .....                         | .....                            | 15960                    |
|                   | I     | 93            | 82           | 1            | 7626                     | .....                         | 7626                             | .....                    |
|                   | I     | 92            | 81           | 2            | 14904                    | 14904                         | .....                            | .....                    |
|                   | II    | 90            | 79           | 5            | 35550                    | 35550                         | .....                            | .....                    |
|                   | III   | 85            | 74           | 5            | 31450                    | 31450                         | .....                            | .....                    |

T. Ramanathan



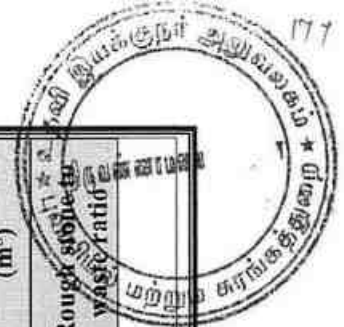


|       |                    |    |    |           |               |               |              |              |
|-------|--------------------|----|----|-----------|---------------|---------------|--------------|--------------|
|       | IV                 | 80 | 69 | 5         | 27600         | 27600         | .....        | .....        |
|       | V                  | 75 | 64 | 5         | 24000         | 24000         | .....        | .....        |
|       | VI                 | 70 | 59 | 5         | 20650         | 20650         | .....        | .....        |
|       | VII                | 65 | 54 | 5         | 17550         | 17550         | .....        | .....        |
|       | VIII               | 60 | 49 | 5         | 14700         | 14700         | .....        | .....        |
|       | IX                 | 55 | 44 | 5         | 12100         | 12100         | .....        | .....        |
|       | X                  | 50 | 39 | 5         | 9750          | 9750          | .....        | .....        |
|       | <b>TOTAL</b>       |    |    | <b>50</b> | <b>231840</b> | <b>208254</b> | <b>7626</b>  | <b>15960</b> |
| XY-CD | I                  | 43 | 88 | 2         | 7568          | .....         | .....        | 7568         |
|       | I                  | 43 | 88 | 1         | 3784          | .....         | 3784         | .....        |
|       | I                  | 43 | 88 | 2         | 7568          | 7568          | .....        | .....        |
|       | II                 | 43 | 88 | 5         | 18920         | 18920         | .....        | .....        |
|       | III                | 43 | 88 | 5         | 18920         | 18920         | .....        | .....        |
|       | IV                 | 43 | 88 | 5         | 18920         | 18920         | .....        | .....        |
|       | V                  | 43 | 88 | 5         | 18920         | 18920         | .....        | .....        |
|       | VI                 | 43 | 88 | 5         | 18920         | 18920         | .....        | .....        |
|       | VII                | 43 | 88 | 5         | 18920         | 18920         | .....        | .....        |
|       | VIII               | 43 | 88 | 5         | 18920         | 18920         | .....        | .....        |
|       | IX                 | 43 | 88 | 5         | 18920         | 18920         | .....        | .....        |
|       | X                  | 43 | 88 | 5         | 18920         | 18920         | .....        | .....        |
|       | <b>TOTAL</b>       |    |    | <b>50</b> | <b>189200</b> | <b>177848</b> | <b>3784</b>  | <b>7568</b>  |
|       | <b>GRAND TOTAL</b> |    |    |           | <b>421040</b> | <b>386102</b> | <b>11410</b> | <b>23528</b> |

**4.0 MINING:**

|    |  |   |  |
|----|--|---|--|
| a) | Briefly describe the existing / proposed method for developing / working the deposit with all design parameters.<br><br>(Note: In case of pocket deposits, sequence of development/working may be indicated on the same plan)  | : | The mining operation is open-cast, semi-mechanized method are adopted and on single shift basis only. Under the regulation 106 of the Metalliferous Mines Regulations, 1961, in all open cast workings in hard rock, the benches and sides should be properly benched and sloped. The bench height should not exceed 6m and the bench width should not less than the bench height. The slope of the benches should not exceed 45° from horizontal. |
| b) | <p><i>Indicate quantum of development and tonnage and grade of production expected pit wise as in table below.</i></p> <p>Total proposed production rough stone is about <b>386102m<sup>3</sup></b>, gravel is <b>23528m<sup>3</sup></b> and Weathered rock is <b>11410m<sup>3</sup></b> up to a depth of 50m below ground level for five years plan period. (Refer Plate No's. VI).</p> |   |  |

*T. Perambalam*

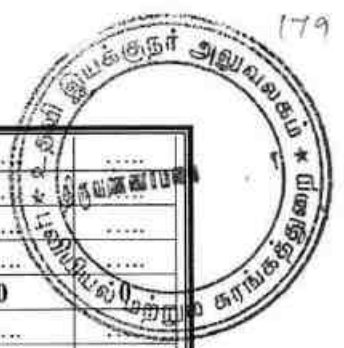


| Year         | Pit No.(s) | Topsoil/Overburden (m <sup>3</sup> ) | ROM (m <sup>3</sup> ) | Saleable rough stone (m <sup>3</sup> ) @ 100% | Rough stone rejects(m <sup>3</sup> ) | Sub grade/Weathered rock (m <sup>3</sup> ) | Saleable Gravel (m <sup>3</sup> ) | Rough stone to waste ratio |
|--------------|------------|--------------------------------------|-----------------------|---|--------------------------------------|--|-----------------------------------|----------------------------|
| I            | I          | ...                                  | 83930                 | 68008   | ...                                  | 5002                                       | 10920                             | ...                        |
| II           | I          | ...                                  | 94456                 | 81688   | ...                                  | 4208                                       | 8560                              | ...                        |
| III          | I          | ...                                  | 73304                 | 67056   | ...                                  | 2200                                       | 4048                              | ...                        |
| IV           | I          | ...                                  | 76040                 | 76040   | ...                                  | ...  | ...                               | ...                        |
| V            | I          | ...                                  | 93310                 | 93310   | ...                                  | ...  | ...                               | ...                        |
| <b>Total</b> | —          | ...                                  | <b>421040</b>         | <b>386102</b>                                 | ...                                  | <b>11410</b>                               | <b>23528</b>                      | ...                        |

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

| YEARWISE PRODUCTION RESERVES |         |              |               |              |              |                          |                               |                                  |                          |
|------------------------------|---------|--------------|---------------|--------------|--------------|--------------------------|-------------------------------|----------------------------------|--------------------------|
| Year                         | Section | Bench        | Length in (m) | Width in (m) | Depth in (m) | Volume In m <sup>3</sup> | Rough Stone in m <sup>3</sup> | Weathered Rock in m <sup>3</sup> | Gravel in m <sup>3</sup> |
| I-YEAR                       | XY-AB   | I            | 65            | 84           | 2            | 10920                    | .....                         | .....                            | 10920                    |
|                              |         | I            | 61            | 82           | 1            | 5002                     | .....                         | 5002                             | .....                    |
|                              |         | I            | 59            | 81           | 2            | 9558                     | 9558                          | .....                            | .....                    |
|                              |         | II           | 55            | 79           | 5            | 21725                    | 21725                         | .....                            | .....                    |
|                              |         | III          | 45            | 74           | 5            | 16650                    | 16650                         | .....                            | .....                    |
|                              |         | IV           | 35            | 69           | 5            | 12075                    | 12075                         | .....                            | .....                    |
|                              |         | V            | 25            | 64           | 5            | 8000                     | 8000                          | .....                            | .....                    |
| <b>TOTAL</b>                 |         |              |               |              |              | <b>83930</b>             | <b>68008</b>                  | <b>5002</b>                      | <b>10920</b>             |
| II-YEAR                      | XY-AB   | I            | 30            | 84           | 2            | 5040                     | .....                         | .....                            | 5040                     |
|                              |         | I            | 32            | 82           | 1            | 2624                     | .....                         | 2624                             | .....                    |
|                              |         | I            | 33            | 81           | 2            | 5346                     | 5346                          | .....                            | .....                    |
|                              |         | II           | 35            | 79           | 5            | 13825                    | 13825                         | .....                            | .....                    |
|                              |         | III          | 40            | 74           | 5            | 14800                    | 14800                         | .....                            | .....                    |
|                              |         | IV           | 45            | 69           | 5            | 15525                    | 15525                         | .....                            | .....                    |
|                              |         | V            | 50            | 64           | 5            | 16000                    | 16000                         | .....                            | .....                    |
|                              | XY-CD   | I            | 20            | 88           | 2            | 3520                     | .....                         | .....                            | 3520                     |
|                              |         | I            | 18            | 88           | 1            | 1584                     | .....                         | 1584                             | .....                    |
|                              |         | I            | 17            | 88           | 2            | 2992                     | 2992                          | .....                            | .....                    |
|                              |         | II           | 15            | 88           | 5            | 6600                     | 6600                          | .....                            | .....                    |
|                              |         | III          | 10            | 88           | 5            | 4400                     | 4400                          | .....                            | .....                    |
|                              |         | IV           | 5             | 88           | 5            | 2200                     | 2200                          | .....                            | .....                    |
|                              |         | <b>TOTAL</b> |               |              |              |                          |                               | <b>94456</b>                     | <b>81688</b>             |
| III-YEAR                     | XY-CD   | I            | 23            | 88           | 2            | 4048                     | .....                         | .....                            | 4048                     |
|                              |         | I            | 25            | 88           | 1            | 2200                     | .....                         | 2200                             | .....                    |
|                              |         | I            | 26            | 88           | 2            | 4576                     | 4576                          | .....                            | .....                    |
|                              |         | II           | 28            | 88           | 5            | 12320                    | 12320                         | .....                            | .....                    |
|                              |         | III          | 33            | 88           | 5            | 14520                    | 14520                         | .....                            | .....                    |
|                              |         | IV           | 38            | 88           | 5            | 16720                    | 16720                         | .....                            | .....                    |
|                              |         | IV           | 43            | 88           | 5            | 18920                    | 18920                         | .....                            | .....                    |
| <b>TOTAL</b>                 |         |              |               |              |              | <b>73304</b>             | <b>67056</b>                  | <b>2200</b>                      | <b>4048</b>              |

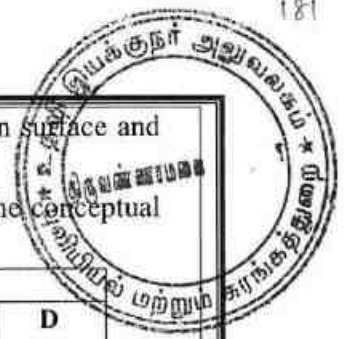
*T. Perumal*



|                    |           |      |    |    |   |               |               |              |              |
|--------------------|-----------|------|----|----|---|---------------|---------------|--------------|--------------|
| IV-<br>YEAR        | XY-<br>AB | VI   | 70 | 59 | 5 | 20650         | 20650         | .....        | .....        |
|                    |           | VII  | 65 | 54 | 5 | 17550         | 17550         | .....        | .....        |
|                    | XY-<br>CD | VI   | 43 | 88 | 5 | 18920         | 18920         | .....        | .....        |
|                    |           | VII  | 43 | 88 | 5 | 18920         | 18920         | .....        | .....        |
| <b>TOTAL</b>       |           |      |    |    |   | <b>76040</b>  | <b>76040</b>  | <b>0</b>     |              |
| V-<br>YEAR         | XY-<br>AB | VIII | 60 | 49 | 5 | 14700         | 14700         | .....        | .....        |
|                    |           | IX   | 55 | 44 | 5 | 12100         | 12100         | .....        | .....        |
|                    |           | X    | 50 | 39 | 5 | 9750          | 9750          | .....        | .....        |
|                    | XY-<br>CD | VIII | 43 | 88 | 5 | 18920         | 18920         | .....        | .....        |
|                    |           | IX   | 43 | 88 | 5 | 18920         | 18920         | .....        | .....        |
|                    |           | X    | 43 | 88 | 5 | 18920         | 18920         | .....        | .....        |
| <b>TOTAL</b>       |           |      |    |    |   | <b>93310</b>  | <b>93310</b>  | <b>0</b>     | <b>0</b>     |
| <b>GRAND TOTAL</b> |           |      |    |    |   | <b>421040</b> | <b>386102</b> | <b>11410</b> | <b>23528</b> |

|    |  |   |   |
|----|--|---|---|
| d) | Attach supporting composite plan and section showing pit layouts, dumps, stacks of sub-grade mineral, if any, etc.   | : | Composite plan not prepared in this proposed lease area   |
| e) | <p><i>Indicate proposed rate of production when the mine is fully developed and the expected life of the mine and the year from which effected:</i></p> <p>At this rate of production, the expected life of quarry is calculated as given below:</p> <p><b><u>Rough stone:</u></b></p> <p>Mineable reserves of rough stone (5 Years) = 386102m<sup>3</sup></p> <p>Annual Peak production = 93310m<sup>3</sup></p> <p><b><u>Gravel:</u></b></p> <p>Mineable reserves of gravel = 23528m<sup>3</sup></p> |   |   |
| f) | <p><i>Attach a note furnishing a conceptual mining plan for the entire lease period (for "B" category mines) and upto the life of the mine (for "A" category mines) based on the geological, mining and environments considerations:</i></p>   |   |   |
| i) | Time frame of completion of mineral exploration program in leasehold area: Give broad description identified potential areas to be covered in the given time frame:  | : | Considering the indefinite depth persistence of the rough stone deposit is proved beyond the workable limits about up to a depth of 50m below ground level (R.L.93m to 43m) from the petrogenetic character of the charnockite rock as well as from the actual mining practice in the area and with the current trend of rough stone production the quarry may sustain for 5 years. |

T. Panambalam



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

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

| SECTION XY-AB      |                        |                     |       |       |           |   |
|--------------------|------------------------|---------------------|-------|-------|-----------|---|
| Bench              | Period                 | Overburden/ Mineral | L (m) | W (m) | D (m)     |   |
| I                  | Five years Plan period | Gravel              | 95    | 84    | 2         |   |
| I                  |                        | Weathered Rock      | 93    | 82    | 1         |   |
| I                  |                        | Rough stone         |       | 92    | 81        | 2 |
| II                 |                        |                     |       | 90    | 79        | 5 |
| III                |                        |                     |       | 85    | 74        | 5 |
| IV                 |                        |                     |       | 80    | 69        | 5 |
| V                  |                        |                     |       | 75    | 64        | 5 |
| VI                 |                        |                     |       | 70    | 59        | 5 |
| VII                |                        |                     |       | 65    | 54        | 5 |
| VIII               |                        |                     |       | 60    | 49        | 5 |
| IX                 |                        |                     |       | 55    | 44        | 5 |
| X                  |                        |                     |       | 50    | 39        | 5 |
| <b>Total Depth</b> |                        |                     |       |       | <b>50</b> |   |

| SECTION XY-CD      |                        |                     |       |       |           |   |
|--------------------|------------------------|---------------------|-------|-------|-----------|---|
| Bench              | Period                 | Overburden/ Mineral | L (m) | W (m) | D (m)     |   |
| I                  | Five years Plan period | Gravel              | 43    | 88    | 2         |   |
| I                  |                        | Weathered Rock      | 43    | 88    | 1         |   |
| I                  |                        | Rough stone         |       | 43    | 88        | 2 |
| II                 |                        |                     |       | 43    | 88        | 5 |
| III                |                        |                     |       | 43    | 88        | 5 |
| IV                 |                        |                     |       | 43    | 88        | 5 |
| V                  |                        |                     |       | 43    | 88        | 5 |
| VI                 |                        |                     |       | 43    | 88        | 5 |
| VII                |                        |                     |       | 43    | 88        | 5 |
| VIII               |                        |                     |       | 43    | 88        | 5 |
| IX                 |                        |                     |       | 43    | 88        | 5 |
| X                  |                        |                     |       | 43    | 88        | 5 |
| <b>Total Depth</b> |                        |                     |       |       | <b>50</b> |   |

iii) Whether the site for disposal of waste rock or an un-saleable material have/ has been examined for adequacy of land and suitability of long term use in the event of continuation of mining activity: -

: The recovery of rough stone and gravel in this quarry is 100%. There is no waste rock will be proposed in this lease area.

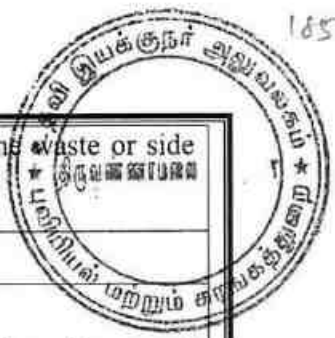


*T. Ramakrishnan*



|                     |  |  |
|---------------------|--|--|
| iv)                 | Whether back filling of pits after recovery of mineral up to techno -economically feasible depth envisaged. If so, describe the broad features of the proposal: -                | : As the depth of persistence of the deposit may likely to continue for further depth it is proposed not to backfilled the quarry pit  |
| v)                  | Whether post mining land use envisaged: -  | : At the end of mining activities over the quarry pit may be utilized for storage of rain water and may be converted in to dumping yards for solid waste by adopting suitable technologies.  |
| g) Open cast mining |  |  |
| i)                  | Describe briefly giving salient features of the mode of working (Mechanized, Semi-Mechanized, manual)  | : It is a fresh quarry lease. The mining operation is opencast, semi-mechanized methods are adopted and on single shift basis only. Under the regulation 106 of the Metalliferous Mines Regulations, 1961 in all opencast workings in hard rock, the benches and sides should be properly benched and sloped. The bench height should not exceed 6m and the bench width should not less than the bench height. The slope of the benches should not exceed 45° from horizontal. |
| ii)                 | Describe briefly the layout of mine workings, the layout of faces and sites for disposal of overburden/waste. A reference to the plans enclosed under 4(b) and 4(d) will suffice | The rough stone is proposed to quarry at 5m bench height & width conventional opencast semi mechanized quarrying operation using shot hole drilling with the help of tractor mounted compressor attached with jack hammers, smooth blasting and waste and are removal using Hydraulic excavator and loaded directly to the tippers and transported to the needy customer.<br>Bench height = 5mts.<br>Bench width = 5mts.   |
|                     | a. Details of Topsoil/Overburden   | No separate of topsoil will be removed.  |
|                     | b. Rough Stone waste and side burden waste:-   | The recovery of rough stone in this quarry is  |

*T. Ramakrishnan*



|                     |  | 100%. There is no rough stone waste or side burden will be removed.  |                 |              |              |      |     |                  |                 |              |              |      |             |    |       |           |    |        |    |            |   |     |     |    |        |    |      |     |                 |      |              |      |                     |   |                       |    |        |    |      |     |                 |      |              |      |        |   |    |    |        |    |
|---------------------|--|--|-----------------|--------------|--------------|------|-----|------------------|-----------------|--------------|--------------|------|-------------|----|-------|-----------|----|--------|----|------------|---|-----|-----|----|--------|----|------|-----|-----------------|------|--------------|------|---------------------|---|-----------------------|----|--------|----|------|-----|-----------------|------|--------------|------|--------|---|----|----|--------|----|
| H                   | Underground Mining   | Not applicable   |                 |              |              |      |     |                  |                 |              |              |      |             |    |       |           |    |        |    |            |   |     |     |    |        |    |      |     |                 |      |              |      |                     |   |                       |    |        |    |      |     |                 |      |              |      |        |   |    |    |        |    |
| i)                  | <p><b>Extent of mechanization:</b><br/>Describe briefly including the calculation for adequacy and type of machinery and equipment proposed to be used in different mining operations.</p> <p><b>(1) Drilling Machines:</b><br/>Drilling of shot holes will be carried out using tractor mounted compressor and jack hammer. Details of drilling equipment's are given below.</p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Type</th> <th>Nos</th> <th>Dia of hole (mm)</th> <th>Size / Capacity</th> <th>Make</th> <th>Motive power</th> <th>H.P.</th> </tr> </thead> <tbody> <tr> <td>Jack Hammer</td> <td>2</td> <td>32 mm</td> <td>Hand held</td> <td>--</td> <td>Diescl</td> <td>--</td> </tr> <tr> <td>Compressor</td> <td>1</td> <td>---</td> <td>Air</td> <td>--</td> <td>Diesel</td> <td>--</td> </tr> </tbody> </table> <p><b>(2) Loading Equipment:</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Type</th> <th>Nos</th> <th>Size / Capacity</th> <th>Make</th> <th>Motive power</th> <th>H.P.</th> </tr> </thead> <tbody> <tr> <td>Hydraulic Excavator</td> <td>2</td> <td>2.9-4.5m<sup>3</sup></td> <td>--</td> <td>Diesel</td> <td>--</td> </tr> </tbody> </table> <p><b>(3) Haulage and Transport Equipment</b><br/>(a) Haulage within the mining leasehold:</p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Type</th> <th>Nos</th> <th>Size / Capacity</th> <th>Make</th> <th>Motive power</th> <th>H.P.</th> </tr> </thead> <tbody> <tr> <td>Tipper</td> <td>9</td> <td>--</td> <td>--</td> <td>Diesel</td> <td>--</td> </tr> </tbody> </table> <p><b>Whether the dumpers are fitted with exhaust conditioner should be indicated:</b><br/>The dumpers not used in this quarry area, hence it's a small "B" category mine.</p> |  |                 |              |              | Type | Nos | Dia of hole (mm) | Size / Capacity | Make         | Motive power | H.P. | Jack Hammer | 2  | 32 mm | Hand held | -- | Diescl | -- | Compressor | 1 | --- | Air | -- | Diesel | -- | Type | Nos | Size / Capacity | Make | Motive power | H.P. | Hydraulic Excavator | 2 | 2.9-4.5m <sup>3</sup> | -- | Diesel | -- | Type | Nos | Size / Capacity | Make | Motive power | H.P. | Tipper | 9 | -- | -- | Diesel | -- |
| Type                | Nos  | Dia of hole (mm)   | Size / Capacity | Make         | Motive power | H.P. |     |                  |                 |              |              |      |             |    |       |           |    |        |    |            |   |     |     |    |        |    |      |     |                 |      |              |      |                     |   |                       |    |        |    |      |     |                 |      |              |      |        |   |    |    |        |    |
| Jack Hammer         | 2  | 32 mm  | Hand held       | --           | Diescl       | --   |     |                  |                 |              |              |      |             |    |       |           |    |        |    |            |   |     |     |    |        |    |      |     |                 |      |              |      |                     |   |                       |    |        |    |      |     |                 |      |              |      |        |   |    |    |        |    |
| Compressor          | 1  | ---  | Air             | --           | Diesel       | --   |     |                  |                 |              |              |      |             |    |       |           |    |        |    |            |   |     |     |    |        |    |      |     |                 |      |              |      |                     |   |                       |    |        |    |      |     |                 |      |              |      |        |   |    |    |        |    |
| Type                | Nos  | Size / Capacity  | Make            | Motive power | H.P.         |      |     |                  |                 |              |              |      |             |    |       |           |    |        |    |            |   |     |     |    |        |    |      |     |                 |      |              |      |                     |   |                       |    |        |    |      |     |                 |      |              |      |        |   |    |    |        |    |
| Hydraulic Excavator | 2  | 2.9-4.5m <sup>3</sup>  | --              | Diesel       | --           |      |     |                  |                 |              |              |      |             |    |       |           |    |        |    |            |   |     |     |    |        |    |      |     |                 |      |              |      |                     |   |                       |    |        |    |      |     |                 |      |              |      |        |   |    |    |        |    |
| Type                | Nos  | Size / Capacity  | Make            | Motive power | H.P.         |      |     |                  |                 |              |              |      |             |    |       |           |    |        |    |            |   |     |     |    |        |    |      |     |                 |      |              |      |                     |   |                       |    |        |    |      |     |                 |      |              |      |        |   |    |    |        |    |
| Tipper              | 9  | --   | --              | Diesel       | --           |      |     |                  |                 |              |              |      |             |    |       |           |    |        |    |            |   |     |     |    |        |    |      |     |                 |      |              |      |                     |   |                       |    |        |    |      |     |                 |      |              |      |        |   |    |    |        |    |
| b)                  | Transport from mine head to the destination  | Tipper will be used for transport rough stone from the mine head to needy customer.  |                 |              |              |      |     |                  |                 |              |              |      |             |    |       |           |    |        |    |            |   |     |     |    |        |    |      |     |                 |      |              |      |                     |   |                       |    |        |    |      |     |                 |      |              |      |        |   |    |    |        |    |
| c)                  | Describe briefly the transport system (please specify)   | Hydraulic excavator and tippers utilized for internal transport sizeable rough stone lumps and deliver to the customer's area.         |                 |              |              |      |     |                  |                 |              |              |      |             |    |       |           |    |        |    |            |   |     |     |    |        |    |      |     |                 |      |              |      |                     |   |                       |    |        |    |      |     |                 |      |              |      |        |   |    |    |        |    |
|                     | i) Ore transported by: own trucks / hired trucks   | Hired trucks for initially production purposes.  |                 |              |              |      |     |                  |                 |              |              |      |             |    |       |           |    |        |    |            |   |     |     |    |        |    |      |     |                 |      |              |      |                     |   |                       |    |        |    |      |     |                 |      |              |      |        |   |    |    |        |    |
|                     | ii) Main destination to which ore is transported (giving to and from distance)   | The excavated stone materials road metal will be supplied to the consumers like road laying, earth filling, building construction, etc |                 |              |              |      |     |                  |                 |              |              |      |             |    |       |           |    |        |    |            |   |     |     |    |        |    |      |     |                 |      |              |      |                     |   |                       |    |        |    |      |     |                 |      |              |      |        |   |    |    |        |    |
| a)                  | Details of hauling / transport equipment:  |  |                 |              |              |      |     |                  |                 |              |              |      |             |    |       |           |    |        |    |            |   |     |     |    |        |    |      |     |                 |      |              |      |                     |   |                       |    |        |    |      |     |                 |      |              |      |        |   |    |    |        |    |
|                     | <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Type</th> <th>Nos</th> <th>Size / Capacity</th> <th>Make</th> <th>Motive power</th> <th>H.P.</th> </tr> </thead> <tbody> <tr> <td>--</td> <td>--</td> <td>--</td> <td>--</td> <td>--</td> <td>--</td> </tr> </tbody> </table>   |  |                 |              |              | Type | Nos | Size / Capacity  | Make            | Motive power | H.P.         | --   | --          | -- | --    | --        | -- |        |    |            |   |     |     |    |        |    |      |     |                 |      |              |      |                     |   |                       |    |        |    |      |     |                 |      |              |      |        |   |    |    |        |    |
| Type                | Nos  | Size / Capacity  | Make            | Motive power | H.P.         |      |     |                  |                 |              |              |      |             |    |       |           |    |        |    |            |   |     |     |    |        |    |      |     |                 |      |              |      |                     |   |                       |    |        |    |      |     |                 |      |              |      |        |   |    |    |        |    |
| --                  | --   | --   | --              | --           | --           |      |     |                  |                 |              |              |      |             |    |       |           |    |        |    |            |   |     |     |    |        |    |      |     |                 |      |              |      |                     |   |                       |    |        |    |      |     |                 |      |              |      |        |   |    |    |        |    |

T. Perambalan



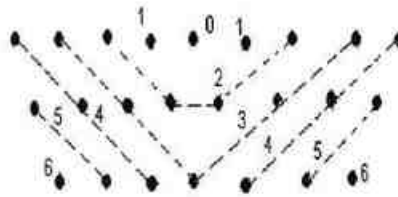
| 4)  | <b>(4). Miscellaneous:</b><br>Describe briefly any allied operations and machineries related to the mining of the deposit not covered earlier.  |   |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |   |     |                           |    |                           |   |                   |           |                              |      |                                    |      |                 |      |                    |        |                             |    |                   |       |
|---|---|---|--------------|--|------------------------------|----|-----------------|-----|------------------|------|---------------|-----|------------------------|------|----------|-----|----------------------|-----|------------------------|-----|-----------------------------|-------|------------------------------|-----|------------------------|------|-------------------------------------|------|---|-----|---------------------------|----|---------------------------|---|-------------------|-----------|------------------------------|------|------------------------------------|------|-----------------|------|--------------------|--------|-----------------------------|----|-------------------|-------|
| (A) Operations                                  |   | The mining operation is open-cast, semi-mechanized methods are adopted and on single shift basis only.  |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |   |     |                           |    |                           |   |                   |           |                              |      |                                    |      |                 |      |                    |        |                             |    |                   |       |
| (B) Machineries deployed                        |   | Machineries like Tractor mounted compressor attached with Jack hammers is proposed to drilling and blasting. Hydraulic Excavators and tipper combination are adapted.   |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |   |     |                           |    |                           |   |                   |           |                              |      |                                    |      |                 |      |                    |        |                             |    |                   |       |
| 5.  | <b>BLASTING:</b><br><i>a) Broad blasting parameters like charge per hole, blasting pattern, charge per delay, maximum number of holes blasted in a round, manner and sequence of firing, etc.</i><br><br>Blasting pattern:<br><br>The quarrying operation is proposed to carried by open cast mining in conjunction with conventional method using jack hammer drilling and blasting for shattering effect and loosen the rough stone.<br><br>Rough stone production for 5 years = <b>386102m<sup>3</sup></b> | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">BLAST DESIGN</th> </tr> </thead> <tbody> <tr><td>Blasthole Diameter (D) in mm</td><td style="text-align: center;">32</td></tr> <tr><td>Burden (B) in m</td><td style="text-align: center;">1.2</td></tr> <tr><td>Spacing (S) in m</td><td style="text-align: center;">1.38</td></tr> <tr><td>Subdrill in m</td><td style="text-align: center;">0.5</td></tr> <tr><td>Charge length (C) in m</td><td style="text-align: center;">0.70</td></tr> <tr><td>Stemming</td><td style="text-align: center;">0.5</td></tr> <tr><td>Hole Length (L) in m</td><td style="text-align: center;">1.2</td></tr> <tr><td>Bench Height (BH) in m</td><td style="text-align: center;">2.5</td></tr> <tr><td>Mass of explosive/hole in g</td><td style="text-align: center;">437.5</td></tr> <tr><td>Stemming material size in mm</td><td style="text-align: center;">3.2</td></tr> <tr><td>Burden stiffness ratio</td><td style="text-align: center;">2.08</td></tr> <tr><td>Blast volume/hole in m<sup>3</sup></td><td style="text-align: center;">4.14</td></tr> <tr><td>Production of rough stone/day in m<sup>3</sup></td><td style="text-align: center;">276</td></tr> <tr><td>Number of blast holes/day</td><td style="text-align: center;">60</td></tr> <tr><td>Number of blast round/day</td><td style="text-align: center;">2</td></tr> <tr><td>Blasthole pattern</td><td style="text-align: center;">Staggered</td></tr> <tr><td>Mass of explosive /day in kg</td><td style="text-align: center;">26.0</td></tr> <tr><td>Powder factor in kg/m<sup>3</sup></td><td style="text-align: center;">0.11</td></tr> <tr><td>Loading density</td><td style="text-align: center;">0.63</td></tr> <tr><td>Type of explosives</td><td style="text-align: center;">Slurry</td></tr> <tr><td>Diameter of packaging in mm</td><td style="text-align: center;">25</td></tr> <tr><td>Initiation system</td><td style="text-align: center;">NONEL</td></tr> </tbody> </table> <p>Note: If &gt;2kg of explosives per day use for blasting if proponent get the</p> | BLAST DESIGN |  | Blasthole Diameter (D) in mm | 32 | Burden (B) in m | 1.2 | Spacing (S) in m | 1.38 | Subdrill in m | 0.5 | Charge length (C) in m | 0.70 | Stemming | 0.5 | Hole Length (L) in m | 1.2 | Bench Height (BH) in m | 2.5 | Mass of explosive/hole in g | 437.5 | Stemming material size in mm | 3.2 | Burden stiffness ratio | 2.08 | Blast volume/hole in m <sup>3</sup> | 4.14 | Production of rough stone/day in m <sup>3</sup> | 276 | Number of blast holes/day | 60 | Number of blast round/day | 2 | Blasthole pattern | Staggered | Mass of explosive /day in kg | 26.0 | Powder factor in kg/m <sup>3</sup> | 0.11 | Loading density | 0.63 | Type of explosives | Slurry | Diameter of packaging in mm | 25 | Initiation system | NONEL |
| BLAST DESIGN                                    |   |   |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |   |     |                           |    |                           |   |                   |           |                              |      |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Blasthole Diameter (D) in mm                    | 32  |   |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |   |     |                           |    |                           |   |                   |           |                              |      |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Burden (B) in m                                 | 1.2   |   |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |   |     |                           |    |                           |   |                   |           |                              |      |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Spacing (S) in m                                | 1.38  |   |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |   |     |                           |    |                           |   |                   |           |                              |      |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Subdrill in m                                   | 0.5   |   |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |   |     |                           |    |                           |   |                   |           |                              |      |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Charge length (C) in m                          | 0.70  |   |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |   |     |                           |    |                           |   |                   |           |                              |      |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Stemming  | 0.5   |   |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |   |     |                           |    |                           |   |                   |           |                              |      |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Hole Length (L) in m                            | 1.2   |   |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |   |     |                           |    |                           |   |                   |           |                              |      |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Bench Height (BH) in m                          | 2.5   |   |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |   |     |                           |    |                           |   |                   |           |                              |      |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Mass of explosive/hole in g                     | 437.5   |   |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |   |     |                           |    |                           |   |                   |           |                              |      |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Stemming material size in mm                    | 3.2   |   |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |   |     |                           |    |                           |   |                   |           |                              |      |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Burden stiffness ratio                          | 2.08  |   |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |   |     |                           |    |                           |   |                   |           |                              |      |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Blast volume/hole in m <sup>3</sup>             | 4.14  |   |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |   |     |                           |    |                           |   |                   |           |                              |      |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Production of rough stone/day in m <sup>3</sup> | 276   |   |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |   |     |                           |    |                           |   |                   |           |                              |      |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Number of blast holes/day                       | 60  |   |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |   |     |                           |    |                           |   |                   |           |                              |      |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Number of blast round/day                       | 2   |   |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |   |     |                           |    |                           |   |                   |           |                              |      |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Blasthole pattern                               | Staggered   |   |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |   |     |                           |    |                           |   |                   |           |                              |      |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Mass of explosive /day in kg                    | 26.0  |   |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |   |     |                           |    |                           |   |                   |           |                              |      |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Powder factor in kg/m <sup>3</sup>              | 0.11  |   |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |   |     |                           |    |                           |   |                   |           |                              |      |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Loading density                                 | 0.63  |   |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |   |     |                           |    |                           |   |                   |           |                              |      |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Type of explosives                              | Slurry  |   |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |   |     |                           |    |                           |   |                   |           |                              |      |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Diameter of packaging in mm                     | 25  |   |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |   |     |                           |    |                           |   |                   |           |                              |      |                                    |      |                 |      |                    |        |                             |    |                   |       |
| Initiation system                               | NONEL   |   |              |  |                              |    |                 |     |                  |      |               |     |                        |      |          |     |                      |     |                        |     |                             |       |                              |     |                        |      |                                     |      |   |     |                           |    |                           |   |                   |           |                              |      |                                    |      |                 |      |                    |        |                             |    |                   |       |

*P. Parambaram*



permission from the DGMS

Face



Staggered method of mining

**b) Type of explosives used / to be used:**

Following explosives are recommended for efficient blasting with safe practice.

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

**c) Measures proposed to minimize ground vibration due to blasting:**

The control blasting measures is being adopted for minimizing ground vibration and fly rock.

Shallow depths jack hammer drilling and blasting is proposed to be carried out with minimum use of explosive mainly to give hearing effect in rough stone for easy excavation and to control fly rock.

**Delay detonators:**

Delay blasting permits to divide the shot to smaller charges, which are detonated in a predetermined millisecond sequence at specific time intervals. The major advantages of delay blasting are:

- ❖ Reduction of ground vibration
- ❖ Reduction in air blast
- ❖ Reduction in over break
- ❖ Improved fragmentation
- ❖ Better control of fly rock

Blasting program for the production per day

|                           |   |                          |
|---------------------------|---|--------------------------|
| No of holes               | : | 60 holes                 |
| Yield                     | : | 276m <sup>3</sup>        |
| Total explosive required  | : | 26.0kg-Slurry explosives |
| Charge per hole           | : | 0.5kg                    |
| Blasting at day time only | : | 12.0p.m-1.0p.m           |





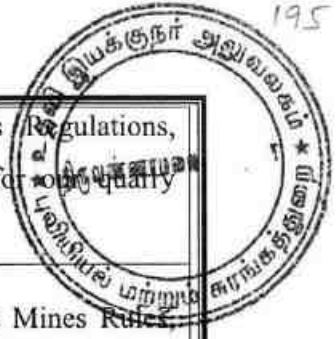
|                          |   |   |
|--------------------------|---|---|
| c)                       | Powder factor in ore and overburden / waste / development heading / stope   | : Powder factor is proposed as 0.4 kg per hole of explosives  |
| d)                       | Whether secondary blasting is needed, if so describe it briefly   | There is no secondary blasting involved.  |
| e)                       | Storage of explosives (like capacity and type of explosive magazine)  | <ol style="list-style-type: none"> <li>1. The applicant is advised to engage an authorized explosive agency to carry out blasting.</li> <li>2. First Aid Box will be keeping ready at all the time.</li> <li>3. Necessary precautionary announcement will be carried out before the blasting operation.</li> </ol>  |
| 6. <b>MINE DRAINAGE:</b> |   |   |
| a)                       | Likely depth of water table based on observations from nearby wells and water bodies  | : The ground water table is reported as of 75m in summer and 70m in rainy season from the general ground level observed in the adjacent bore well.  |
| b)                       | Workings expected to be _____ m. above / reach below water table by the year _____.   | : Proposed mining depth is 50m below ground level. Now, the present Mining lease shall be proposed above the water table and hence, quarrying may not affect the ground water.  |
| c)                       | Quantity and quality of water likely to be encountered, the pumping arrangements and places where the mine water is finally proposed to be discharged | : The ground water may not rise immediately in this type of mining. However, the rain water percolation and collection of water from the seepage shall be less than 300 L pm and it shall be pumped out periodically by a stand by diesel powered Centrifugal pump motivated with 7.5 H.P. Motor. The quality of water is potable and it is not contaminated with any hazardous things. |

T. Ponnambalam



|  |   |
|--|---|
| <b>7. STACKING OF MINERAL REJECTS AND DISPOSAL OF WASTE:</b> |   |
| a).  | Indicate briefly the nature and quantity of top soil, overburden / waste and mineral rejects likely to be generated during the years:<br><br>No other wastes are removed during years.  |
| b).  | Land chosen for disposal of waste with proposed justification : There is no waste are proposed.   |
| c).  | Attach a note indicating the manner of disposal and configuration, sequence of buildup of dumps along with the proposals for the stacking of sub-grade ore, to be indicated Year wise. : The recovery of rough stone in this quarry is 100%. If rough stone may be unsold will be keep within the lease boundary.         |
| <b>8. USE OF MINERAL:</b>                                    |   |
| a).  | Describe briefly the end-use of the mineral (sale to intermediary parties, captive consumption, export, industrial use) : The excavated stone materials will be supplied to the consumers like stone pillar, sized stone, etc. For instance, aggregates are mostly used for building, roads and footpaths., etc           |
| b).  | Indicate physical and chemical specifications stipulated by buyers : Basically, the materials produced at this quarry are rough stone (charnockite) and gravel the same are used for building materials and road metal. So, there is no chemical specifications are specified. Only physical specifications are involved. |
| c).  | Give details in case blending of different grades of ores is being practiced or is to be practiced at the mine to meet specifications stipulated by buyers. : Not blending process is involved, after blasting the rough stone and gravel will be directly loaded to the needy customer.                                  |
| <b>9. OTHERS</b>   |   |
|  | <b>Describe briefly the following</b>   |
| a) Site services   | : Infrastructure required for such mines like office, stores, canteen, first aid station, shelter latrine and bath rooms have been provided as  |

T. P. Ramakrishnan



per the Metalliferous Mines Regulations, 1961 as a welfare amenity for quarry laborers.

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

The following man power is proposed for quarrying stone material during the five years period the same manpower will be utilize for this mining plan period to achieve the proposed production and to comply the provisions of as per the MMR, 1961 norms.

|                |                |                   |                |
|----------------|----------------|-------------------|----------------|
| 1.             | Highly Skilled | Mines Manager     | 1No.           |
|                |                | Mine Engineer     | 1No.           |
|                |                | Mine Geologist    | 1No            |
|                |                | Blaster           | 1No            |
| 2.             | Unskilled      | Musdoor / Labours | 16No's         |
| <b>Total =</b> |                |                   | <b>20 No's</b> |

10 **MINERAL PROCESSING/BENEFICIATIONS:**

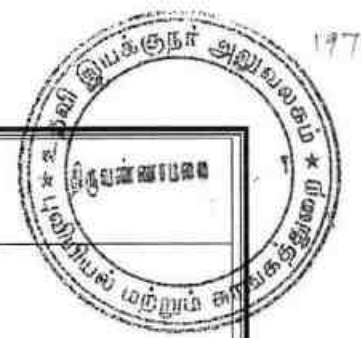
(a) If processing / beneficiations of the ore or minerals mined is planned to be conducted on site or adjacent to the extraction area, briefly describe the nature of the processing /beneficiation. This should indicate size and grade of feed material and concentrate (finished marketable product), recovery rate.

: Excavated rough stone minerals directly will be used by the applicant for required size ½, ¾ and 1½ inches Jelly which are mainly used in road and building construction purpose.  
The recovery of rough stone in this quarry is 100%.

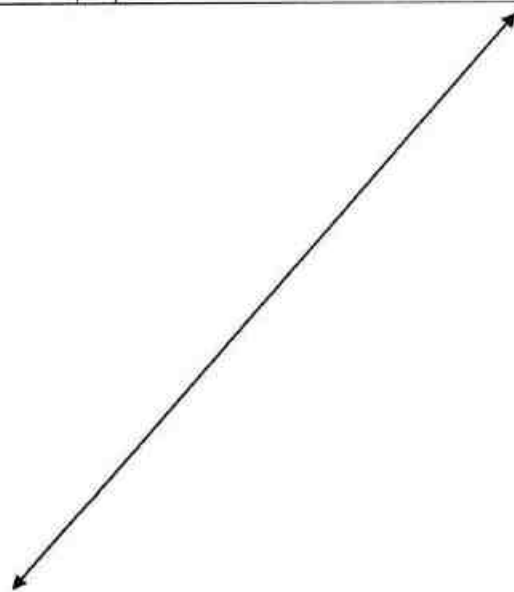
(b) Explain the disposal method for tailings or waste from the processing plant (quantity and quality of tailings proposed to be discharged, size and capacity of tailing pond, toxic effect of such tailings, if any, with process adopted to neutralize any such effect before their

: No water shall be used for quarrying or any other processing except drinking water to be drawn from public sources. Some stagnation of rain water in the pit shall be used for drilling and spraying haul roads. Therefore, need for tailing dam doesn't arise. But tailing control of rain water flow during rainy season has to be done by decanting the SPM in a pit before passing the water in to natural system.

T. Ramesh Babu



|     |   |   |
|-----|---|---|
|     | disposal and dealing of excess water from the tailing dam).   |   |
| (c) | A flow sheet or schematic diagram of the processing procedure should be attached.   | : Not applicable.   |
| (d) | Specify quantity and type of chemicals to be used in the processing plant.  | : Not applicable  |
| (e) | Specify quantity and type of chemicals to be stored on site / plant.  | : Not applicable  |
| (f) | Indicate quantity (cu.m. per day) of water required for mining and processing and sources of supply of water. Disposal of water and of recycling. | : Drinking is 0.2KLD, utilized water is 0.8KLD, Dust suppression is 1.0KLD and Green Belt is 1.0KLD. Minimum quantity of water 3.0KLD per day. It is proposed to make an authorized water vendors for drinking water, dust suppression. The workers utilized water will be used for green belt development. The sewage water to a tune of 0.9KLD generated from the mine office toilet and mine labour toilet will be diverted to the septic tank followed by soak pit. |



T. Perambalam

## PART - B

### 11.0 ENVIRONMENTAL MANAGEMENT PLAN:

a) Attach a note on the status of Baseline information with regard to the Following:

| 11.1    | Fresh lease land use pattern indicating the area already degraded due to quarrying /pitting, dumping, roads, processing plant, workshop, township etc in a tabular form. The present land use pattern is given as below.   |   |          |                      |    |                   |     |   |                |     |   |       |     |   |            |        |   |            |     |   |                          |     |  |                    |               |
|---------|--|---|----------|----------------------|----|-------------------|-----|---|----------------|-----|---|-------|-----|---|------------|--------|---|------------|-----|---|--------------------------|-----|--|--------------------|---------------|
|         | <table border="1"><thead><tr><th>Sl. No.</th><th>Land Use</th><th>Present area (Hect.)</th></tr></thead><tbody><tr><td>1.</td><td>Area under Mining</td><td>Nil</td></tr><tr><td>2</td><td>Infrastructure</td><td>Nil</td></tr><tr><td>3</td><td>Roads</td><td>Nil</td></tr><tr><td>4</td><td>Unutilized</td><td>1.34.5</td></tr><tr><td>5</td><td>Green belt</td><td>Nil</td></tr><tr><td>6</td><td>Settling Tank &amp; Drainage</td><td>Nil</td></tr><tr><td></td><td><b>Grand Total</b></td><td><b>1.34.5</b></td></tr></tbody></table> | Sl. No.   | Land Use | Present area (Hect.) | 1. | Area under Mining | Nil | 2 | Infrastructure | Nil | 3 | Roads | Nil | 4 | Unutilized | 1.34.5 | 5 | Green belt | Nil | 6 | Settling Tank & Drainage | Nil |  | <b>Grand Total</b> | <b>1.34.5</b> |
| Sl. No. | Land Use   | Present area (Hect.)  |          |                      |    |                   |     |   |                |     |   |       |     |   |            |        |   |            |     |   |                          |     |  |                    |               |
| 1.      | Area under Mining  | Nil   |          |                      |    |                   |     |   |                |     |   |       |     |   |            |        |   |            |     |   |                          |     |  |                    |               |
| 2       | Infrastructure   | Nil   |          |                      |    |                   |     |   |                |     |   |       |     |   |            |        |   |            |     |   |                          |     |  |                    |               |
| 3       | Roads  | Nil   |          |                      |    |                   |     |   |                |     |   |       |     |   |            |        |   |            |     |   |                          |     |  |                    |               |
| 4       | Unutilized   | 1.34.5  |          |                      |    |                   |     |   |                |     |   |       |     |   |            |        |   |            |     |   |                          |     |  |                    |               |
| 5       | Green belt   | Nil   |          |                      |    |                   |     |   |                |     |   |       |     |   |            |        |   |            |     |   |                          |     |  |                    |               |
| 6       | Settling Tank & Drainage   | Nil   |          |                      |    |                   |     |   |                |     |   |       |     |   |            |        |   |            |     |   |                          |     |  |                    |               |
|         | <b>Grand Total</b>   | <b>1.34.5</b>   |          |                      |    |                   |     |   |                |     |   |       |     |   |            |        |   |            |     |   |                          |     |  |                    |               |
| 11.2    | Water Regime   | : Water table in this area is noticed at a depth of 75m in summer and 70m in rainy season from the general ground level and presently the quarrying of rough stone is ultimate up to a depth of 50m below ground level. Hence, it will not affect the ground water depletion of this area. It is proposed to make an authorized water vendors for drinking water, dust suppression. The workers utilized water will be used for green belt development. |          |                      |    |                   |     |   |                |     |   |       |     |   |            |        |   |            |     |   |                          |     |  |                    |               |
| 11.3    | Flora and Fauna  | : There is no major flora observed in this area and except bushes, shrubs, no other valuable trees are noticed in the lease area. Further, neither flora of botanical interest nor fauna of zoological interest is noticed in this area.  |          |                      |    |                   |     |   |                |     |   |       |     |   |            |        |   |            |     |   |                          |     |  |                    |               |
| 11.4    | Quality of air, ambient noise level and water  | : Air or dust expected to be generated from drilling process, hauling roads, places of excavation etc., will be suppressed by periodical wetting of land by water spraying. Quarrying of rough stone will be carried out by drilling and blasting by using low power explosives, and hence, noise will be very minimum. However, periodical noise level monitoring will be carried out every six months around the quarry site.                         |          |                      |    |                   |     |   |                |     |   |       |     |   |            |        |   |            |     |   |                          |     |  |                    |               |



| 11.5 | <b>Climatic conditions:</b><br><p>This district has moderate climate. In Tiruvannamalai and Thanjavur taluks, the climate is cool in winter and hot during summer. The district receives rainfall during both north-east monsoon and southwest monsoon. In summer, from march to June, the wind is hot and uncomfortable. In the monsoon season, from July to November, the wind is mild and from December to February, the wind is cold. The hottest month in this district was April (36.3°C) and coldest month in this district was January (21.2°C).</p> <p>The general climate is tropical. The district receives rainfall from Northeast and Southwest monsoons. The total rainfall during 2016-17 districts is 635.8mm.</p> |  |                 |            |                 |            |   |           |       |       |      |   |          |      |       |      |   |                 |       |       |      |   |                |      |       |     |  |
|------|--|--|-----------------|------------|-----------------|------------|---|-----------|-------|-------|------|---|----------|------|-------|------|---|-----------------|-------|-------|------|---|----------------|------|-------|-----|--|
| 11.6 | <b>Human Settlement:</b><br><p>The nearest villages are found in the buffer zone with population as per 2011 census.</p> <table border="1"> <thead> <tr> <th>S.No</th> <th>Village</th> <th>Direction</th> <th>Distance in Kms</th> <th>Population</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Mennallur</td> <td>North</td> <td>0.4km</td> <td>1444</td> </tr> <tr> <td>2</td> <td>Suruttal</td> <td>East</td> <td>2.0km</td> <td>1266</td> </tr> <tr> <td>3</td> <td>Chinna Elacheri</td> <td>South</td> <td>1.5km</td> <td>2080</td> </tr> <tr> <td>4</td> <td>Bagavandapuram</td> <td>West</td> <td>2.3km</td> <td>777</td> </tr> </tbody> </table>  | S.No   | Village         | Direction  | Distance in Kms | Population | 1 | Mennallur | North | 0.4km | 1444 | 2 | Suruttal | East | 2.0km | 1266 | 3 | Chinna Elacheri | South | 1.5km | 2080 | 4 | Bagavandapuram | West | 2.3km | 777 |  |
| S.No | Village  | Direction  | Distance in Kms | Population |                 |            |   |           |       |       |      |   |          |      |       |      |   |                 |       |       |      |   |                |      |       |     |  |
| 1    | Mennallur  | North  | 0.4km           | 1444       |                 |            |   |           |       |       |      |   |          |      |       |      |   |                 |       |       |      |   |                |      |       |     |  |
| 2    | Suruttal   | East   | 2.0km           | 1266       |                 |            |   |           |       |       |      |   |          |      |       |      |   |                 |       |       |      |   |                |      |       |     |  |
| 3    | Chinna Elacheri  | South  | 1.5km           | 2080       |                 |            |   |           |       |       |      |   |          |      |       |      |   |                 |       |       |      |   |                |      |       |     |  |
| 4    | Bagavandapuram   | West   | 2.3km           | 777        |                 |            |   |           |       |       |      |   |          |      |       |      |   |                 |       |       |      |   |                |      |       |     |  |
| 11.7 | <b>Public buildings, places of worship and monuments</b>   | : No infrastructure like residential building, are found within radius of 300m. The places of special interest like archeological monuments, Sanctuaries, etc., are found around 10km radius.  |                 |            |                 |            |   |           |       |       |      |   |          |      |       |      |   |                 |       |       |      |   |                |      |       |     |  |
| 11.8 | <b>Attach plans showing the locations of sampling stations</b>   | : The proposed Ambient air quality, Water quality Ambient noise level and vibration are periodically tested for every season (6 months once) around 5km radius as per the guidance of MoEF and EIA Notification 2006 and also covering DGMS norms. |                 |            |                 |            |   |           |       |       |      |   |          |      |       |      |   |                 |       |       |      |   |                |      |       |     |  |
| 11.9 | <b>Does area (partly or fully) fall under notified area under Water (Prevention &amp; Control of Pollution), Act, 1974</b>   | : The proposed area not fall under notified area under Water (Prevention & Control of Pollution), Act, 1974  |                 |            |                 |            |   |           |       |       |      |   |          |      |       |      |   |                 |       |       |      |   |                |      |       |     |  |

T. P. Ramesh Babu

b) Attach an Environmental Impact Assessment Statement describing the impact of Mining and beneficiation on environment on the following over the next five years (and upto conceptual plan period for 'A' category mines)

| i)                 | <p><b>Land area indicating the area likely to be degraded due to quarrying, pitting, dumping, roads, workshop, processing plant, township etc:</b></p> <p>Due to quarrying and exploitation of the rough stone, there will impact in the form i.e. change in the ground profile, pits, and dumps. The details of the land use pattern, during the ensuing plan period and till lease period is shown in the tabular form:</p> | <table border="1"> <thead> <tr> <th>Sl. No.</th> <th>Land Use</th> <th>Area in use during the quarrying period (Hect.)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Area under Mining</td> <td>1.17.30</td> </tr> <tr> <td>2</td> <td>Infrastructure</td> <td>0.02.0</td> </tr> <tr> <td>3</td> <td>Roads</td> <td>0.05.0</td> </tr> <tr> <td>4</td> <td>Green Belt</td> <td>0.07.7</td> </tr> <tr> <td>5</td> <td>Un-Utilized Area</td> <td>Nil</td> </tr> <tr> <td>6</td> <td>Drainage &amp; Settling Tank</td> <td>0.02.5</td> </tr> <tr> <td colspan="2"><b>Grand Total</b></td> <td><b>1.34.5</b></td> </tr> </tbody> </table> | Sl. No. | Land Use | Area in use during the quarrying period (Hect.) | 1 | Area under Mining | 1.17.30 | 2 | Infrastructure | 0.02.0 | 3 | Roads | 0.05.0 | 4 | Green Belt | 0.07.7 | 5 | Un-Utilized Area | Nil | 6 | Drainage & Settling Tank | 0.02.5 | <b>Grand Total</b> |  | <b>1.34.5</b> |
|--------------------|---|--|---------|----------|---|---|-------------------|---------|---|----------------|--------|---|-------|--------|---|------------|--------|---|------------------|-----|---|--------------------------|--------|--------------------|--|---------------|
| Sl. No.            | Land Use  | Area in use during the quarrying period (Hect.)  |         |          |   |   |                   |         |   |                |        |   |       |        |   |            |        |   |                  |     |   |                          |        |                    |  |               |
| 1                  | Area under Mining   | 1.17.30  |         |          |   |   |                   |         |   |                |        |   |       |        |   |            |        |   |                  |     |   |                          |        |                    |  |               |
| 2                  | Infrastructure  | 0.02.0   |         |          |   |   |                   |         |   |                |        |   |       |        |   |            |        |   |                  |     |   |                          |        |                    |  |               |
| 3                  | Roads   | 0.05.0   |         |          |   |   |                   |         |   |                |        |   |       |        |   |            |        |   |                  |     |   |                          |        |                    |  |               |
| 4                  | Green Belt  | 0.07.7   |         |          |   |   |                   |         |   |                |        |   |       |        |   |            |        |   |                  |     |   |                          |        |                    |  |               |
| 5                  | Un-Utilized Area  | Nil  |         |          |   |   |                   |         |   |                |        |   |       |        |   |            |        |   |                  |     |   |                          |        |                    |  |               |
| 6                  | Drainage & Settling Tank  | 0.02.5   |         |          |   |   |                   |         |   |                |        |   |       |        |   |            |        |   |                  |     |   |                          |        |                    |  |               |
| <b>Grand Total</b> |   | <b>1.34.5</b>  |         |          |   |   |                   |         |   |                |        |   |       |        |   |            |        |   |                  |     |   |                          |        |                    |  |               |
| ii).               | Air Quality   | Air or dust expected to be generated from drilling process, hauling roads, places of excavation etc., will be suppressed by periodical wetting of land by water spraying.  |         |          |   |   |                   |         |   |                |        |   |       |        |   |            |        |   |                  |     |   |                          |        |                    |  |               |
| iii).              | Water quality   | A water sample from the open/bore wells was tested to NABL approved lab to assess hardness, Salinity, colour, Specific gravity, etc.   |         |          |   |   |                   |         |   |                |        |   |       |        |   |            |        |   |                  |     |   |                          |        |                    |  |               |
| iv).               | Noise levels  | Quarrying of rough stone will be carried out by drilling and blasting by using low power explosives, and hence, noise will be very minimum. However, periodical noise level monitoring will be carried out every six months around the quarry site.  |         |          |   |   |                   |         |   |                |        |   |       |        |   |            |        |   |                  |     |   |                          |        |                    |  |               |
| v).                | Vibration levels (due to blasting)  | No deep hole blasting envisaged. Small dia shot holes are used for breaking boulders. The maximum peak particles velocity shall be recoded using mini seismograph devises as per the guidance of MoEF and EIA Notification 2006 and also covering DGMS norms.  |         |          |   |   |                   |         |   |                |        |   |       |        |   |            |        |   |                  |     |   |                          |        |                    |  |               |
| vi).               | Water regime  | No major river or any odai track are found around 50m radius.  |         |          |   |   |                   |         |   |                |        |   |       |        |   |            |        |   |                  |     |   |                          |        |                    |  |               |



T. Ponnambalam



|        |                           |   |
|--------|---------------------------|---|
| vii).  | Socio-economics           | <ol style="list-style-type: none"> <li>To provide Employment opportunities of the nearby villagers.</li> <li>For the cultural development of the nearby villagers.</li> </ol> |
| viii). | Historical monuments etc. | There are no historical monuments, etc found around 300m radius.  |

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

|      |  |   |
|------|--|---|
| i).  | temporary storage and utilization of topsoil   | : No separate of topsoil will be removed.   |
| ii). | Yearwise proposal for reclamation of land affected by abandoned quarries and other mining activities during five years (and upto conceptual plan period for 'A' category mines) clarifying the extent of back filling and re-contouring and / or alternative use of unfilled / partially filled excavations / road sides / slopes and mine. In case abandoned quarries/ pits are proposed to be used as reservoir, their size, water holding capacity and proposal for utilization of such water be given. | : The present mining is proposed depth of 50m from below the ground level has been envisaged as workable depth for safe & economic mining during the lease period. The mined-out area will be fenced on top of working bench with S1 fencing. No immediate proposals for closure of pit as the rough stone persist still at deeper level. |

iii). *Programme of afforestation, Yearwise for the initial five years (and upto conceptual plan period for 'A' category mines) indicating the number of plants with name of species to be afforested under different areas in hectares.*

**Green Belt Development:**

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

| Year   | Place          | Area in Sq.m | No.of Plants | Rate of survival | Rate                | Amount in Rs |
|--------|----------------|--------------|--------------|------------------|---------------------|--------------|
| First  | Lease Boundary | 770          | 100          | 80%              | @100 Rs Per sapling | 10,000/-     |
| Second | Approach       | —            | 300          | 80%              |                     | 30,000/-     |

*T. Panambickan*





|              |   |    |   |     |  |         |
|--------------|---|----|---|-----|--|---------|
|              | road and<br>Nearby<br>Village Road  |    |   |     |  |         |
| Third        | Schools   | -- | 300   | 80% |  |         |
| <b>Total</b> |   |    |   |     |  | ₹ 800/- |
| iv).         | Stabilization and vegetation of dumps along with waste dump management Year wise for the five years (and upto conceptual plan period for 'A' category mines). | :  | No waste or rejects shall be proposed   |     |  |         |
| v).          | Measures to control erosion / sedimentation of water courses.   | :  | Not applicable. There is no major dumps are stabilize in this quarry area.  |     |  |         |
| vi).         | Treatment and disposal of water from mine.  | :  | It will not be harmful and it does not require any treatment before discharging into the natural courses.   |     |  |         |
| vii).        | Measures for minimizing adverse effects on water regime.  | :  | There is no water to be pumped out will be very pure and portable and therefore, it will not affect any water regime surrounding the quarry.  |     |  |         |
| viii).       | Protective measures for ground vibrations / air blast caused by blasting,   | :  | It is a small "B" category open cast, semi mechanized mining and no heavy machinery shall be used. The only smooth blasting is proposed, therefore no change for ground vibration or noise from the quarry. |     |  |         |
| ix).         | Measures for protecting historical monuments and for rehabilitation of human settlements likely to be disturbed due to mining activity.                       | :  | No historical monuments and for rehabilitation of human settlements doesn't to be disturbed during mining activity.   |     |  |         |
| x).          | Socioeconomic benefits arising out of mining.   | :  | The nearest villages are will get employment benefits.  |     |  |         |

*d). Monitoring schedules for different environmental components after the commencement of mining and other related activities. (for 'A' category mines only)*  
 Not applicable. It is B category quarry

*T. Perambalur*



**12.0 PROGRESSIVE QUARRY CLOSURE PLAN:**

|      |  |  |
|------|--|--|
| 12.1 | Steps proposed for phased restoration, reclamation of already mined out area.                              | : The Ultimate mining is proposed to an average depth of 50m below ground level. The mined-out area will be fenced on top of working bench with S1 fencing to arrest the entry of cattle's and public in to the quarry site.   |
| 12.2 | Measures to be under taken on mine closure as per Act & Rules  | : Measures will be taken as per the Acts and Rules. The quarried pit will be fenced by Barbed wire fencing. Green belt development at the rate of 100 trees will be proposed in the quarry area. No immediate proposals for closure of pit as the rough stone persist still at deeper level.   |
| 12.3 | Mitigation measures to be undertaken for safety and restoration/ reclamation of the already mined out area | : The quarry lease is a fresh mining lease, no mitigation measures observed.   |
| 12.4 | Mine closure activity  | : The present mining plan is proposed to depth of 50m below ground level has been envisaged as workable depth for safe & economic mining during the lease period. The mined-out area will be fenced on top of open cast working with S1 fencing. No immediate proposals for closure of pit as the rough stone persist still at deeper level. |
| 12.5 | Safety and security  | : Safety measures implement to the prevent access to surface opening excavations will be taken as Metalliferous mine regulations, 1961, it is a small open cast mining method adopted. Safety provisions like helmet, goggles, safety shoes, Dust mask, Ear muffs etc have to be provided as per the circulars and amendments made for Mine  |

T. Perumbalan

|      |   |   |
|------|---|---|
|      |   | labours under the guidance of DGMS being a mechanized operation.  |
| 12.6 | Disaster management and Risk Assessment                                 | : Open cast mining method is adopted in this quarry. If the benches are made with proposed height and with no risk will be there. Even then if any minor or major accident happens the quarry staffs having First aid facilities with first aid box with all necessary medicine and stretches etc., to give first aid treatment at the site and will arrange immediately the vehicle to reach nearest hospital, if any disaster happens the lessee is capable to meet such eventualities. At the time of any accident during mining activity, proposal of first aid facility at quarry and one vehicle always ready at quarry site. |
| 12.7 | Care and maintenance during temporary discontinuance                    | : A board of discontinuance will be changed on the main entrance of the working place. One watch man will be kept on the quarry area for security purposes also look after the survival of the plants.  |
| 12.8 | Economic repercussions of closure of quarry and man power entrenchments | : During the five years mining period the employment potential will be generated, general financial status and socio-economic conditions of approx. 20 labors will be improved.   |

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

|          |   |                          |
|----------|---|--------------------------|
| <b>A</b> | <b>Fixed Asset Cost:</b>                          |                          |
|          | 1. Land Cost                                      | : Rs. 20,00,000/-        |
|          | 2. Labour Shed                                    | : Rs. 1,00,000/-         |
|          | 3. Sanitary Facility                              | : Rs. 1,00,000/-         |
|          | 4. Fencing  | : Rs. 1,50,000/-         |
|          | 5. Other expenses (Security guard, dust bin, etc) | : Rs. 4,00,000/-         |
|          | <b>Total</b>                                      | <b>: Rs. 27,50,000/-</b> |

T. P. Ramakrishnan

|   |  |   |                                     |
|---|--|---|-------------------------------------|
| B | <b>B. Machinery cost</b>                                       | : | <b>Rs. 20,00,000/- (Hire Basis)</b> |
| C | <b>Total Expenditure of EMP cost (for five years)</b>          |   |                                     |
|   | 1. Drinking Water Facility                                     | : | Rs. 1,00,000/-                      |
|   | 2. Sanitary facility & Maintenance                             | : | Rs. 2,00,000/-                      |
|   | 3. Permanent water sprinkler                                   | : | Rs. 1,50,000/-                      |
|   | 4. Afforestation and its maintenance                           | : | Rs. 70,000                          |
|   | 5. Safety Kits   | : | Rs. 1,00,000/-                      |
|   | 6. Provision of tyre washing facility                          | : | Rs. 1,50,000/-                      |
|   | 7. Blasting materials with blast mat cost                      | : | Rs. 15,00,000/-                     |
|   | 8. Drainage & Settling Tank<br>(0.02.50Hect or 250 Sq.m x 400) |   | Rs. 1,00,000/-                      |
|   | 9. Environment monitoring                                      | : | Rs. 5,00,000/-                      |
|   | <b>Total</b>   | : | <b>Rs. 28,70,000/-</b>              |
| D | <b>Total Project Cost (A+B+C)</b>                              | : | <b>Rs. 76,20,000/-</b>              |

**13.0 FINANCIAL ASSURANCE:**

Not applicable, it is a small "B" rough stone and gravel quarry.

**14.0 CERTIFICATES:**

All required certificates are enclosed.

**15.0 PLAN AND SECTIONS, ETC:**

Plan and Sections are submitted along with mining plan.

**16.0 ANY OTHER DETAILS INTEND TO FURNISH BY THE APPLICANT**

- (i) Care and precautionary measures will be taken for the safety of workers as per Rules and Acts.
- (ii) The applicant will endeavor every attempt to quarry the rough stone economically without any wastage and to improve the environment and ecology.
- (iii) The Mining Plan is prepared by incorporating the conditions stipulated in the precise area communication issued by The Regional Joint Director (i/c), Assistant Director office, Department of Geology and Mining, Tiruvannamalai vide letter **Roc.No.270/Mines/2024 Dated 12.11.2024**.
- (iv) Total proposed production rough stone is **386102m<sup>3</sup>**, gravel is **23528m<sup>3</sup>**, Weathered rock is **11410m<sup>3</sup>** up to a depth of 50m below ground level for five years plan period.

*P. Ramakrishnan*



**17.0 CSR Expenditure:**

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

Place: Dharmapuri, TN

Date:

Signature of the Recognized Qualified Person

Dr.S.KARUPPANNAN,M.Sc,Ph.D.,  
RQP/MAS/263/2014/A  
GEO TECHNICAL MINING SOLUTIONS  
A NABET Accredited and ISO Certified Company  
1/213-B, Ground Floor, Natesan Complex,  
Collectorate Post Office, Oddapatti,  
Dharmapuri-636705, TamilNadu, India

This Mining Plan is Approved  
Subject to the conditions/Stipulation  
indicated in the Mining Plan Approval  
Letter No. 270/Mines/2024 , Dt: 25-11-2024  
office of the Assistant Director of  
Geology and Mining, Tiruvannamalai.

Joint Director (A/C)  
O/o. Assistant Director  
Geology and Mining,  
Tiruvannamalai.



ந.க.எண்.270/கனிமம்/2024

உதவி இயக்குநர்  
புவியியல் மற்றும் சுரங்கத்துறை  
திருவள்ளூர் மத்திய பல்கலைக்கழகம்  
நாள். 12.11.2024.

அறிவிக்கை

பொருள் கனிமங்களும் குவாரிகளும் - சிறுகனிமம் - திருவண்ணாமலை மாவட்டம் - வெம்பாக்கம் வட்டம், மேனல்லூர் கிராமம் புல எண்கள். 135/1 (0.10.0), 135/2 (0.10.5), 135/3A (0.22.5), 135/3B (0.02.0), 135/4 (0.23.5) மற்றும் 135/5 (0.66.0) ஆகியவற்றின் மொத்தப்பரப்பு 1.34.5 ஹெக்டேர் பரப்பில் சாதாரண கற்கள் மற்றும் கிராவல் மண் வெட்டியெடுக்க - குவாரி குத்தகை உரிமம் வழங்கக்கோரி திரு. T. பொன்னம்பலம் த/பெ.தங்கவேலு, என்பவர் விண்ணப்பம் செய்தது - பரிந்துரை அறிக்கை வரப்பெற்றது - சுரங்கத் திட்டம் (Mining plan) தயார் செய்து சமர்ப்பிக்க கோருவது - தொடர்பாக.

- பார்வை 1. திரு. T. பொன்னம்பலம் த/பெ.தங்கவேலு, எண் 12, பாலகிருஷ்ணன் தெரு, சீனிவாச நகர், சென்னை என்பவரின் விண்ணப்ப நாள். 16.08.2024
2. இவ்வலுவலக கடித ந.க.எண்.270/கனிமம்/2024 நாள். 16.08.2024
3. இவ்வலுவலக கடித ந.க.எண்.270/கனிமம்/2024 நாள். 19.08.2024.
4. செயற்பொறியாளர், (நீ.வ.து), கீழ்பாலாறு வடிநிலக்கோட்டம், காஞ்சிபுரம் அவர்களின் கடித எண். இவ.அ.2/கோ.22 (கனிமம் - மேனல்லூர்)/2024 நாள். 12.09.2024
5. வட்டாட்சியர், வெம்பாக்கம் அவர்களின் கடித எண். ந.க.ஆ.1/1704/2024 நாள். 11.09.2024.
6. வருவாய் கோட்ட அலுவலர் (மு.கூ.பொ), செய்யார் அவர்களின் கடித ந.க.ஆ.5/4224/2024 நாள். 30.10.2024.
7. உதவி புவியியலாளர், புவியியல் மற்றும் சுரங்கத்துறை திருவண்ணாமலை அவர்களின் புலத்தணிக்கை நாள். 06.11.2024.
8. தொடர்புடைய ஆவணங்கள்.

\*\*\*\*\*

திருவண்ணாமலை மாவட்டம், வெம்பாக்கம் வட்டம், மேனல்லூர் கிராமம், புல எண்கள். 135/1 (0.10.0), 135/2 (0.10.5), 135/3A (0.22.5), 135/3B (0.02.0), 135/4 (0.23.5) மற்றும் 135/5 (0.66.0) ஆகியவற்றின் மொத்தப்பரப்பு 1.34.5 ஹெக்டேர் பரப்பில் சாதாரண கற்கள் மற்றும் கிராவல் மண் வெட்டியெடுக்க 10 ஆண்டுகளுக்கு குவாரி குத்தகை உரிமம் வழங்கக்கோரி திரு. T. பொன்னம்பலம் த/பெ.தங்கவேலு, என்பவரின் பார்வை 1-ல் காணும் விண்ணப்பம் தொடர்பாக பார்வை 2-ல் காணும் இவ்வலுவலக

T. Ramabalan



கடிதம் மூலம் சார் ஆட்சியர், செய்யார் அவர்களின் அறிக்கை மற்றும் பார்வை மற்றும் காரணம் இவ்வலுவலக கடிதம் மூலம் செயற்பொறியாளர், நீவது, கீழ்பாலாறு வடிநிலக் கோட்டம், காஞ்சிபுரம் அவர்களின் அறிக்கை கோரப்பட்டது.

அதனைத்தொடர்ந்து, பார்வை 4-ல் காணும் செயற்பொறியாளர், நீவது, கீழ்பாலாறு வடிநிலக் கோட்டம், காஞ்சிபுரம் பார்வை 6-ல் காணும் வருவாய் கோட்ட அலுவலர்(மு.கூ.பொ), செய்யார் மற்றும் பார்வை 7-ல் காணும் திருவண்ணாமலை மாவட்ட புவியியல் மற்றும் சுரங்கத்துறை உதவி புவியியலாளர் ஆகியோரின் பரிந்துரை அறிக்கைகள் பரிசீலிக்கப்பட்டது.

மேற்காணும் பரிந்துரை அறிக்கைகளின்படி திருவண்ணாமலை மாவட்டம், வெம்பாக்கம் வட்டம், மேனல்லூர் கிராமம், புல எண்கள். 135/1 (0.10.0), 135/2 (0.10.5), 135/3A (0.22.5), 135/3B (0.02.0), 135/4 (0.23.5) மற்றும் 135/5 (0.66.0) ஆகியவற்றின் மொத்தப்பரப்பு 1.34.5 ஹெக்டேர் பரப்பளவில் 5 ஆண்டுகளுக்கு தமிழ்நாடு சிறுகனிம சலுகை விதிகள் 1959, விதி 19(1), 20 மற்றும் 22-ன்படி விண்ணப்பதாரர் திரு. T. பொன்னம்பலம் த/பெ.தங்கவேலு, என்பவருக்கு சாதாரண கற்கள் மற்றும் கிராவல் மண் வெட்டியெடுக்க குவாரி குத்தகை உரிமம் வழங்க பரிந்துரை செய்யப்பட்ட 1.34.5 ஹெக்டேர் பரப்பினை கற்குவாரி செய்ய உகந்த புலம் (Precise Area) என தீர்மானித்து கீழ்க்கண்ட நிபந்தனைகளுக்குட்பட்டு அறிவிப்பு செய்யப்படுகிறது.

#### நிபந்தனைகள்

1. விண்ணப்ப புலங்களுக்கு வடக்கே உள்ள புல எண்.122-ல் பூனைத்தாங்கல் ஏரிக்கு செல்லும் கால்வாய்க்கு பாதுகாப்பு இடைவெளியாக 10மீ (Set Back) விடப்பட வேண்டும் என செயற்பொறியாளர் (நீ.ஆ.து), கீழ்பாலாறு வடிநில கோட்டம், காஞ்சிபுரம் அவர்களின் தொழில்நுட்ப அறிக்கை கடித எண்.இவ.அ.2/கோ.22 (கனிமம் - மேனல்லூர்)/2024 நாள்.12.09.2024-ல் தெரிவிக்கப்பட்டுள்ள அனைத்து நிபந்தனைகளையும் தவறாது பின்பற்றப்பட வேண்டும்.
2. அருகில் உள்ள பட்டா நிலங்களுக்கு 7.5மீ மற்றும் அரக நிலங்களுக்கு 10மீ பாதுகாப்பு இடைவெளி விட வேண்டும்.
3. பொதுமக்களுக்கும் அருகிலுள்ள நிலங்களுக்கும் எவ்வித பாதிப்பும் ஏற்படுத்தக்கூடாது.
4. குவாரிப்பணி தொடங்குவதற்கு முன்பாக குவாரியை சுற்றி முள் கம்பிவேலி அமைத்து குவாரிப்பணி தொடங்க வேண்டும்.
5. முறைப்படிபும், விஞ்ஞானபூர்வமாகவும் குவாரிப்பணி செய்ய வேண்டும்.

T. Ponnambalam



- 6 சான்றிதழ் பெறப்பட்ட போர்மேன், வெடிப்பாளர் மற்றும் சுரங்க மேலாளர் மூலம் முறையே குவாரிப்பணி செய்யப்பட வேண்டும்.
- 7 குவாரிப்பணி தொடங்குவதற்கு முன் சுரங்க பாதுகாப்பு இயக்குநர், சென்னை அவர்களுக்கு தகவல் தெரிவிக்கப்பட வேண்டும்.
8. பாறைகளைத் தகர்க்க தமிழ்நாடு சிறுகனிம சலுகை விதிகள் 1959 விதி 36(1-A)(b)-ல் தெரிவிக்கப்பட்டுள்ள வழிமுறைகளை பின்பற்றி குவாரி பணி செய்ய வேண்டும்.

தமிழ்நாடு சிறுகனிம சலுகை விதிகள் 1959 விதிகள் 41 மற்றும் 42-ன்படி சாதாரண கற்கள் மற்றும் இதர சிறு கனிமங்களுக்கு குவாரி குத்தகை உரிமம் வழங்கும் முன்பு ஒப்புதல் பெறப்பட்ட சுரங்கத்திட்ட அறிக்கை மற்றும் மாநில சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணைய தடையின்மை சான்று பெறப்பட வேண்டும் என வரையறுக்கப்பட்டுள்ளது.

எனவே, திரு. T. பொன்னம்பலம் த/பெ. தங்கவேலு, என்பவர் ஒப்புதல் பெறப்பட்ட சுரங்கத்திட்ட அறிக்கை மற்றும் சுற்றுச்சூழல் தாக்க மதிப்பீட்டு ஆணைய தடையின்மை சான்றிணை பெற்று சமர்ப்பிக்கும் பட்சத்தில் திருவண்ணாமலை மாவட்டம், வெம்பாக்கம் வட்டம், மேனல்லூர் கிராமம், புல எண்கள். 135/1 (0.10.0), 135/2 (0.10.5), 135/3A (0.22.5), 135/3B (0.02.0), 135/4 (0.23.5) மற்றும் 135/5 (0.66.0) ஆகியவற்றின் மொத்தப்பரப்பு 1.34.5 ஹெக்டேர் பரப்பில் 5 ஆண்டுகளுக்கு தமிழ்நாடு சிறுகனிம சலுகை விதிகள் 1959 விதி எண் 19(1) மற்றும் 20-ன் கீழ் குத்தகை உரிமம் வழங்க உரிய நடவடிக்கை மேற்கொள்ளப்படும் என்ற விவரம் தெரிவிக்கப்படுகிறது.

மேலும், இவ்வறிப்பு கிடைக்கபெற்ற 90 நாட்களுக்குள் மேற்சொன்ன நிபந்தனைகளையும் குறிக்கும் வகையில் வரைவு சுரங்கத்திட்ட அறிக்கை தயார் செய்து இணை இயக்குநர் (கூ.பொ), புவியியல் மற்றும் சுரங்கத்துறை திருவண்ணாமலை அவர்களிடம் ஒப்புதல் பெற சமர்ப்பிக்குமாறு அறிவுறுத்தப்படுகிறது.

இணை இயக்குநர் (கூ.பொ),  
உதவி இயக்குநர் அலுவலகம்,  
புவியியல் மற்றும் சுரங்கத்துறை,  
திருவண்ணாமலை.

பெறுநர்:  
திரு. T. பொன்னம்பலம்,  
த/பெ. தங்கவேலு,  
எண். 12, பாலகிருஷ்ணன் தெரு,  
சீனிவாச நகர்,  
சென்னை.

T. Ponnambalam





District : Tiruvannamalai



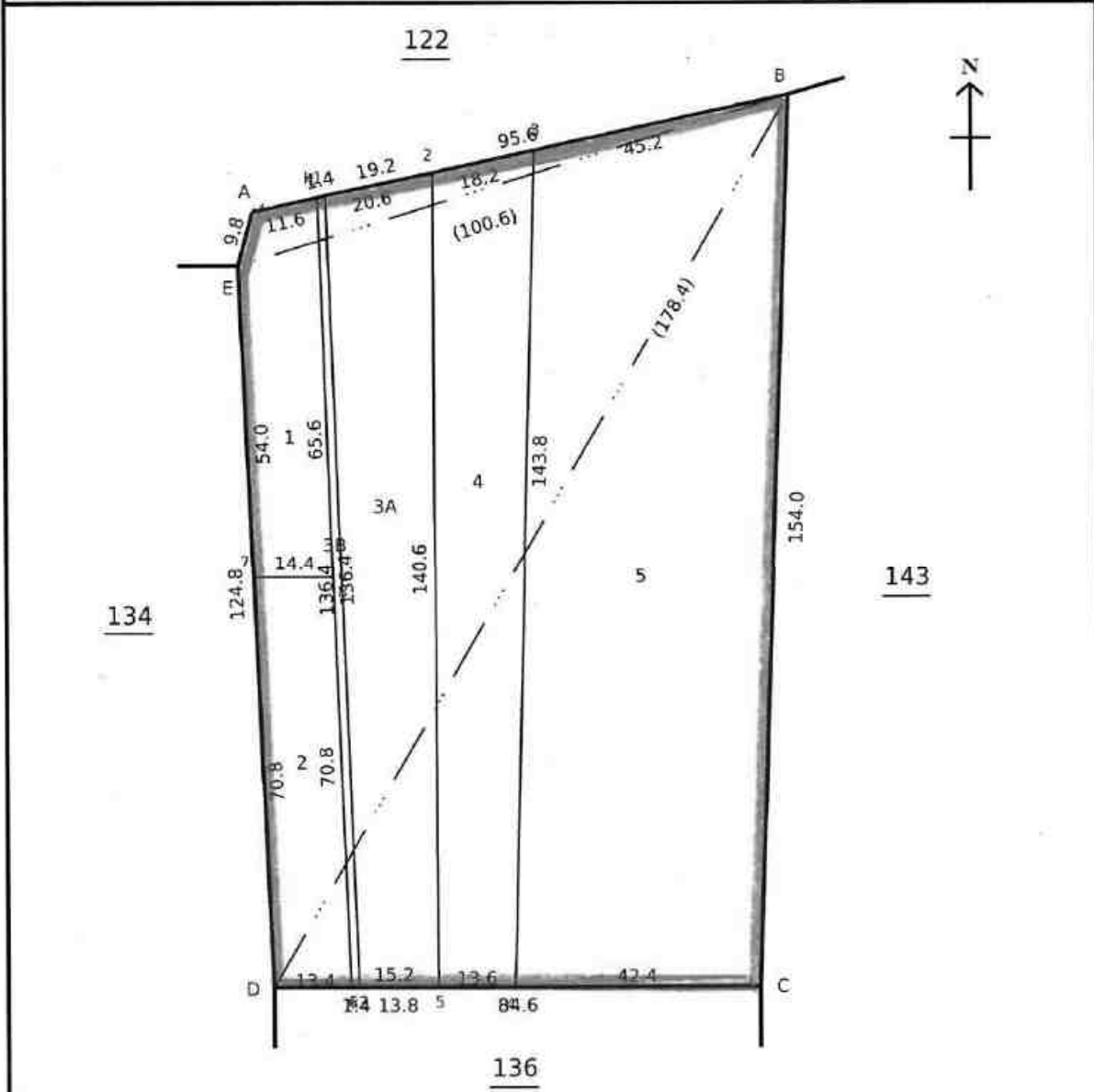
Survey No : 135

Taluk : Vembakkam

Area : Hect 01 Ares 29.80

Village : Mennallur [119]

Scale : 1 : 1000



LEASE APPLIED AREA



Data Digitally Signed By KIRSHNAMURTHI



Date of Issue: 11-08-2024 11:07:10

Survey and Settlement Department, Government of TamilNadu

270 fv.3

*T. P. Mambalan*

8/13/24, 12:44 PM

வட்டாட்சியர் அலுவலக இணைய சேவை - அ-பதிவேடு விவரங்களை பார்வையிட

அ-பதிவேடு விவரங்கள் - ஊரகம்

மாவட்டம் : திருவண்ணாமலை

வட்டம் : வெம்பாக்கம்

கிராமம் : மேனல்லூர்



|                              |            |                                |                  |
|------------------------------|------------|--------------------------------|------------------|
| 1. புல எண்                   | 135        | 9. மண் வயனமும்<br>ரகமும்       | 8 - 3            |
| 2. உட்பிரிவு எண்             | 1          | 10. மண் தரம்                   | 5                |
| 3. பழைய புல<br>உட்பிரிவு எண் | 135-1      | 11. தீர்வை (ரூ - ஹெ)           | 2.62             |
| 4. பகுதி                     | -          | 12. பரப்பு (ஹெக்டேர் -<br>ஏர்) | 0 - 10.00        |
| 5. அரசு / ரயத்துவாரி         | ரயத்துவாரி | 13. மொத்த தீர்வை (ரூ<br>- பை)  | 0.27             |
| 6. நிலத்தின் வகை             | புஞ்சை     | 14. பட்டா எண்                  | 832              |
| 7. பாசன ஆதாரம்               | -          | 15. குறிப்பு                   | ERAVAI VAGA 0.06 |
| 8. இரு போகமா                 | 0          | 16. பெயர்                      | 1.பொன்னம்பலம்    |

குறிப்பு:



மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து  
1. பெறப்பட்டவை. இவற்றை தாங்கள் <https://eservices.tn.gov.in> என்ற இணைய  
தளத்தில் 06/10/119/135/1/70923 என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி  
செய்துகொள்ளவும்.

8/13/24, 12:46 PM

வட்டாட்சியர் அலுவலக இணைய சேவை - அ-பதிவேடு விவரங்களை பார்வையிடு

## அ-பதிவேடு விவரங்கள் - ஊரகம்



மாவட்டம் : திருவண்ணாமலை

வட்டம் : வெம்பாக்கம்

கிராமம் : மேனல்வூர்

|                              |            |                                |                  |
|------------------------------|------------|--------------------------------|------------------|
| 1. புல எண்                   | 135        | 9. மண் வயனமும்<br>ரகமும்       | 8 - 3            |
| 2. உட்பிரிவு எண்             | 2          | 10. மண் தரம்                   | 5                |
| 3. பழைய புல<br>உட்பிரிவு எண் | 135-2      | 11. தீர்வை (ரூ - ஹெ)           | 2.62             |
| 4. பகுதி                     | -          | 12. பரப்பு (ஹெக்டேர் -<br>ஏர்) | 0 - 10.50        |
| 5. அரசு / ரயத்துவாரி         | ரயத்துவாரி | 13. மொத்த தீர்வை (ரூ<br>- பை)  | 0.28             |
| 6. நிலத்தின் வகை             | பஞ்சை      | 14. பட்டா எண்                  | 832              |
| 7. பாசன ஆதாரம்               | -          | 15. குறிப்பு                   | ERAVAI VAGA 0.06 |
| 8. இரு போகமா                 | 0          | 16. பெயர்                      | 1.பொன்னம்பலம்    |

## குறிப்பு:



மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து  
1. பெறப்பட்டவை. இவற்றை தாங்கள் <https://eservices.tn.gov.in> என்ற இணைய  
தளத்தில் 06/10/119/135/2/70923 என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி  
செய்துகொள்ளவும்.

T. Ramesh Babu

8/13/24, 12:47 PM

வட்டாட்சியர் அலுவலக இணைய சேவை - அ-பதிவேடு விவரங்களை பார்வையிடு

## அ-பதிவேடு விவரங்கள் - ஊரகம்



மாவட்டம் : திருவண்ணாமலை

வட்டம் : வெம்பாக்கம்

கிராமம் : மேனல்லூர்

|                              |            |                                |               |
|------------------------------|------------|--------------------------------|---------------|
| 1. புல எண்                   | 135        | 9. மண் வயனமும்<br>ரசுமும்      | 8 - 3         |
| 2. உட்பிரிவு எண்             | 3A         | 10. மண் தரம்                   | 5             |
| 3. பழைய புல<br>உட்பிரிவு எண் | 135-3      | 11. தீர்வை (ரூ - ஹெ)<br>ஏர்)   | 2.62          |
| 4. பகுதி                     | P          | 12. பரப்பு (ஹெக்டேர் -<br>ஏர்) | 0 - 22.50     |
| 5. அரசு / ரயத்துவாரி         | ரயத்துவாரி | 13. மொத்த தீர்வை (ரூ<br>- பை)  | 0.60          |
| 6. நிலத்தின் வகை             | புஞ்சை     | 14. பட்டா எண்                  | 821           |
| 7. பாசன ஆதாரம்               | -          | 15. குறிப்பு                   | -             |
| 8. இரு போகமா                 | 0          | 16. பெயர்                      | 1.பொன்னம்பலம் |

## குறிப்பு:



மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் யின் பதிவேட்டிலிருந்து

1. பெறப்பட்டவை. இவற்றை தாங்கள் <https://eservices.tn.gov.in> என்ற இணைய தளத்தில் 06/10/119/135/3A/70911 என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.

T. Ramesh Babu

8/13/24, 12:48 PM

வட்டாட்சியர் அலுவலக இணைய சேவை - அ-பதிவேடு விவரங்களை பார்வையிட  
அ-பதிவேடு விவரங்கள் - ஊரகம்

மாவட்டம் : திருவண்ணாமலை

வட்டம் : வெம்பாக்கம்

கிராமம் : மேனல்லூர்



|                              |            |                                |               |
|------------------------------|------------|--------------------------------|---------------|
| 1. புல எண்                   | 135        | 9. மண் வயனமும்<br>ரகமும்       | 8 - 3         |
| 2. உட்பிரிவு எண்             | 38         | 10. மண் தரம்                   | 5             |
| 3. பழைய புல<br>உட்பிரிவு எண் | 135-3      | 11. தீர்வை (ரூ - ஹெ)           | 2.62          |
| 4. பகுதி                     | P          | 12. பரப்பு (ஹெக்டேர் -<br>ஏர்) | 0 - 2.00      |
| 5. அரசு / ரயத்துவாரி         | ரயத்துவாரி | 13. மொத்த தீர்வை (ரூ<br>- பை)  | 0.10          |
| 6. நிலத்தின் வகை             | பஞ்சை      | 14. பட்டா எண்                  | 832           |
| 7. பாசன ஆதாரம்               | -          | 15. குறிப்பு                   | -             |
| 8. இரு போகமா                 | 0          | 16. பெயர்                      | 1.பொன்னம்பலம் |

குறிப்பு:



மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து  
1. பெறப்பட்டவை. இவற்றை தாங்கள் <https://eservices.tn.gov.in> என்ற இணைய  
தளத்தில் 06/10/119/135/38/70923 என்ற குறிப்பு எண்ணை உள்ளீடு செய்து  
உறுதி செய்துகொள்ளவும்.

T. Ramesh

8/13/24, 12:49 PM

வட்டாட்சியர் அலுவலக இணைய சேவை - அ-பதிவேடு விவரங்களை பார்வையிடு

## அ-பதிவேடு விவரங்கள் - ஊரகம்



மாவட்டம் : திருவண்ணாமலை

வட்டம் : வெம்பாக்கம்

கிராமம் : மேனல்வூர்

|                              |            |                                |               |
|------------------------------|------------|--------------------------------|---------------|
| 1. புல எண்                   | 135        | 9. மண் வயனமும்<br>ரகமும்       | 8 - 3         |
| 2. உட்பிரிவு எண்             | 4          | 10. மண் தரம்                   | 5             |
| 3. பழைய புல<br>உட்பிரிவு எண் | 135-4      | 11. தீர்வை (ரூ - ஹெ)           | 2.62          |
| 4. பகுதி                     | -          | 12. பரப்பு (ஹெக்டேர் -<br>ஏர்) | 0 - 23.50     |
| 5. அரசு / ரயத்துவாரி         | ரயத்துவாரி | 13. மொத்த தீர்வை (ரூ<br>- பை)  | 0.61          |
| 6. நிலத்தின் வகை             | பஞ்சை      | 14. பட்டா எண்                  | 832           |
| 7. பாசன ஆதாரம்               | -          | 15. குறிப்பு                   | -             |
| 8. இரு போகமா                 | 0          | 16. பெயர்                      | 1.பொன்னம்பலம் |

## குறிப்பு:



மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து  
1. பெறப்பட்டவை. இவற்றை தாங்கள் <https://eservices.tn.gov.in> என்ற இணைய  
தளத்தில் 06/10/119/135/4/70923 என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி  
செய்துகொள்ளவும்.

T. Panambalam  
1/1

8/13/24, 12:53 PM

வட்டாட்சியர் அலுவலக இணைய சேவை - அபதிவேடு விவரங்களை பார்செய்தல்  
அ-பதிவேடு விவரங்கள் - ஊரகம்



மாவட்டம் : திருவண்ணாமலை

வட்டம் : வெம்பாக்கம்

கிராமம் : மேனல்லூர்

|                              |            |                                |               |
|------------------------------|------------|--------------------------------|---------------|
| 1. புல எண்                   | 135        | 9. மண் வயனமும்<br>ரகமும்       | 8 - 3         |
| 2. உட்பிரிவு எண்             | 5          | 10. மண் தரம்                   | 5             |
| 3. பழைய புல<br>உட்பிரிவு எண் | 135-5      | 11. தீர்வை (ரூ - ஹெ)           | 2.62          |
| 4. பகுதி                     | -          | 12. பரப்பு (ஹெக்டேர் -<br>ஏர்) | 0 - 66.00     |
| 5. அரசு / ரயத்துவாரி         | ரயத்துவாரி | 13. மொத்த தீர்வை (ரூ<br>- பை)  | 1.73          |
| 6. நிலத்தின் வகை             | புஞ்சை     | 14. பட்டா எண்                  | 744           |
| 7. பாசன ஆதாரம்               | -          | 15. குறிப்பு                   | -             |
| 8. இரு போகமா                 | 0          | 16. பெயர்                      | 1.பொன்னம்பலம் |

குறிப்பு:



மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து

1. பெறப்பட்டவை. இவற்றை தாங்கள் <https://eservices.tn.gov.in> என்ற இணைய தளத்தில் 06/10/119/135/5/70945 என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.

T. Ramesh Kumar

8/13/24, 1:01 PM

வட்டாட்சியர் அலுவலக இணைய சேவை - நில உரிமை விபரங்கள்



தமிழ்நாடு அரசு

வருவாய்த் துறை

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

மாவட்டம் : திருவண்ணாமலை

வட்டம் : வெம்பாக்கம்

வருவாய் கிராமம் : மேனல்லூர்

பட்டா எண் : 832

உரிமையாளர்கள் பெயர்

1. தங்கவேல் மகன் பொன்னம்பலம்

| புல எண் | உட்பிரிவு | புன்செய்   |         | நன்செய்    |         | மற்றவை     |         | குறிப்புகள்   |
|---------|-----------|------------|---------|------------|---------|------------|---------|---|
|         |           | பரப்பு     | தீர்வை  | பரப்பு     | தீர்வை  | பரப்பு     | தீர்வை  |   |
|         |           | ஹெக் - ஏர் | ரூ - பை | ஹெக் - ஏர் | ரூ - பை | ஹெக் - ஏர் | ரூ - பை |   |
| 135     | 1         | 0 - 10.00  | 0.27    | --         | --      | --         | --      | 2024/0103/06/420136-<br>-- --ERAVAI VAGA 0.06-<br>---- 03-07-2024 |
| 135     | 2         | 0 - 10.50  | 0.28    | --         | --      | --         | --      | 2024/0103/06/420136-<br>-- --ERAVAI VAGA 0.06-<br>---- 03-07-2024 |
| 135     | 3B        | 0 - 2.00   | 0.10    | --         | --      | --         | --      | 2024/0103/06/420136-<br>-2023/06/10/000039SD<br>----- 03-07-2024  |
| 135     | 4         | 0 - 23.50  | 0.61    | --         | --      | --         | --      | 2024/0103/06/428185-<br>-- ----- 11-08-2024                       |
|         |           | 0 - 46.00  | 1.26    |            |         |            |         |   |

குறிப்பு :



- மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் <https://eservices.tn.gov.in> என்ற இணைய தளத்தில் 06/10/119/00832/140923 என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.
- இத் தகவல்கள் 13-08-2024 அன்று 01:02:24 PM நேரத்தில் அச்சடிக்கப்பட்டது.
- கைப்பேசி கேமராவின் 2D barcode படிப்பான் மூலம் படித்து 3G/GPRS வழி இணையதளத்தில் சரிபார்க்கவும்



8/13/24, 1:00 PM

வட்டாட்சியர் அலுவலக இணைய சேவை - நில உரிமை விபரங்கள்



தமிழ்நாடு அரசு

வருவாய்த் துறை

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

மாவட்டம் : திருவண்ணாமலை

வட்டம் : வெம்பாக்கம்

வருவாய் கிராமம் : மேனல்லூர்

பட்டா எண் : 821

உரிமையாளர்கள் பெயர்

1. தங்கவேல் மகன் பொன்னம்பலம்

| புல எண் | உட்பிரிவு | புன்செய்   |         | நன்செய்    |         | மற்றவை     |         | குறிப்புகள்   |
|---------|-----------|------------|---------|------------|---------|------------|---------|---|
|         |           | பரப்பு     | தீர்வை  | பரப்பு     | தீர்வை  | பரப்பு     | தீர்வை  |   |
|         |           | ஹெக் - ஏர் | ரூ - பை | ஹெக் - ஏர் | ரூ - பை | ஹெக் - ஏர் | ரூ - பை |   |
| 135     | 3A        | 0 - 22.50  | 0.60    | --         | --      | --         | --      | 2024/0103/06/399464-<br>2023/06/10/000039SD<br>----- 14-03-2024 |
|         |           | 0 - 22.50  | 0.60    |            |         |            |         |   |

குறிப்பு :



- மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை நாங்கள் <https://eservices.tn.gov.in> என்ற இணைய தளத்தில் 06/10/119/00821/140911 என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.
- இத் தகவல்கள் 13-08-2024 அன்று 01:01:22 PM நேரத்தில் அச்சடிக்கப்பட்டது.
- கைப்பேசி கேமராவின் 2D barcode படிப்பான் மூலம் படித்து 3G/GPRS வழி இணையதளத்தில் சரிபார்க்கவும்

T. Ramakrishnan

8/11/24, 11:21 AM

வட்டாட்சியர் அலுவலக இணைய சேவை - நில உரிமை விபரங்கள்



தமிழ்நாடு அரசு  
வருவாய்த் துறை

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

மாவட்டம் : திருவண்ணாமலை

வட்டம் : வெம்பாக்கம்

வருவாய் கிராமம் : மேனல்லூர்

பட்டா எண் : 744

உரிமையாளர்கள் பெயர்

1. தங்கவேலு

மகன்

பொன்னம்பலம்

| புல எண் | உட்பிரிவு | புன்செய்   |         | நன்செய்    |         | மற்றவை     |         | குறிப்புரைகள்   |
|---------|-----------|------------|---------|------------|---------|------------|---------|---|
|         |           | பரப்பு     | தீர்வை  | பரப்பு     | தீர்வை  | பரப்பு     | தீர்வை  |   |
|         |           | ஹெக் - ஏர் | ரூ - பை | ஹெக் - ஏர் | ரூ - பை | ஹெக் - ஏர் | ரூ - பை |   |
| 134     | 10        | 0 - 26.50  | 0.70    | --         | --      | --         | --      | 2020/0103/06/204778-<br>--- ----- 30-12-2020          |
| 134     | 11        | 0 - 26.50  | 0.69    | --         | --      | --         | --      | 2020/0103/06/204778-<br>--- ----- 30-12-2020          |
| 134     | 12        | 0 - 5.00   | 0.13    | --         | --      | --         | --      | 2020/0103/06/204778-<br>--- ----- 30-12-2020          |
| 134     | 13        | 0 - 8.00   | 0.21    | --         | --      | --         | --      | 2020/0103/06/204778-<br>--- ----- 30-12-2020          |
| 134     | 14        | 0 - 7.50   | 0.19    | --         | --      | --         | --      | 2020/0103/06/204778-<br>--- ----- 30-12-2020          |
| 134     | 15B       | 0 - 31.50  | 0.90    | --         | --      | --         | --      | 2020/0103/06/204778-<br>-89/1422 ----- 30-<br>12-2020 |
| 134     | 8         | 0 - 16.00  | 0.41    | --         | --      | --         | --      | 2020/0103/06/204778-<br>--- ----- 30-12-2020          |
| 134     | 9         | 0 - 9.50   | 0.25    | --         | --      | --         | --      | 2020/0103/06/204778-<br>--- ----- 30-12-2020          |
| 135     | 5         | 0 - 66.00  | 1.73    | --         | --      | --         | --      | 2021/0103/06/214004-<br>--- ----- 11-03-2021          |
|         |           | 1 - 96.50  | 5.21    |            |         |            |         |   |

குறிப்பு :



- மேற்கண்ட தகவல் / சான்றிதழ் நகல் விவரங்கள் மின் பதிவேட்டிலிருந்து பெறப்பட்டவை. இவற்றை தாங்கள் <https://eservices.tn.gov.in> என்ற இணைய தளத்தில் 06/10/119/00744/130945 என்ற குறிப்பு எண்ணை உள்ளீடு செய்து உறுதி செய்துகொள்ளவும்.
- இத் தகவல்கள் 11-08-2024 அன்று 11:22:24 AM நேரத்தில் அச்சடிக்கப்பட்டது.
- கைப்பேசி கேமராவின் 2D barcode படிப்பான் மூலம் படித்து 3G/GPRS வழி இணையதளத்தில் சரிபார்க்கவும்

T. Ramakrishnan



**PHOTOCOPY OF THE APPLIED LEASE AREA**

Site photos in respect of Rough stone and gravel quarry lease in S.F.No's: 135/2, 135/3A, 135/3B, 135/4 & 135/5 Patta Land - over an extent of 1.34.5hectares – Mennallur Village village – Vembakkam Taluk – Tiruvannamalai District, Tamil Nadu State in belongs to **T.Ponnambalam**.



T. Ponnambalam.



**இந்திய அரசாங்கம்**  
**Government of India**

பொன்னம்பலம் தங்கவேல்  
**Ponnambalam Thangavel**

பிறந்த நாள்: DOB: 15/04/1957  
ஆண்பால் / Male

**6136 9410 4452**

**ஆதார் - சாதாரண மனிதனின் அதிகாரம்**

**இந்திய தனிப்பட்ட அடையாள ஆணைய அமைப்பு**  
**Unique Identification Authority of India**

**ஆதார்**

முகவரி: 12 தங்கவேல், எண் 12  
பாலகிருஷ்ணன் தெரு, சீனிவாச நகர்  
பீர்க்கன்காரணை, பீர்க்கன்காரணை  
சீனிவாசநகர், காஞ்சிபுரம், தமிழ் நாடு  
600063

Address: S/O: Thangavel,  
NO 12, BALAKRISHNAN  
STREET, SRINIVASA  
NAGAR,  
PEERKANKARANAI,  
PEERKANKARANAI,  
Srinivasanagar,  
Kancheepuram, Tamil Nadu,  
600063

**6136 9410 4452**

1947  
1800 300 1947

help@uidai.gov.in

www  
www.uidai.gov.in

T. Ponnambalam




நிரந்தர கணக்கை எண் /PERMANENT ACCOUNT NUMBER  
**AHMPP3442J**

பெயர் /NAME  
**PONNAMBALAM**

பிள்ளை பெயர் / FATHER'S NAME  
**THANGAVEL**

பிறந்த தேதி /DATE OF BIRTH  
**11-04-1957**

கையொப்பம் /SIGNATURE  


வருமானவரி ஆணையர் (கணினிப்பொறி இயக்கம்)  
 Commissioner of Income-Tax (Computer Operations)

இந்த அட்டை, காணாமற்போனாலோ, கண்டுபிடிக்கப்பட்டாலோ இவ்வட்டையை விடுவோமிடம் கீழ்க்கண்ட அதிகாரிகளுக்கு தகவல் அனுப்பமாறு அல்லது திருப்பி அனுப்பமாறு கோரப்படுகிறது.

வருமானவரி ஆணையர் (கணினிப்பொறி இயக்கம்),  
 108, மகாத்மா காந்தி சாலை,  
 நுங்கம்பாக்கம்,  
 சென்னை-600 034.

**In case this card is lost/found, kindly inform/return to the issuing authority :**  
**Commissioner of Income-tax (Computer Operations),**  
**108, Mahatma Gandhi Road ,**  
**Nungambakkam,**  
**Chennai - 600 034.**

T. Ponnambalam.

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



*Rupasingh*

अर्हता प्राप्त व्यक्ति के रूप में मान्यता प्रमाण पत्र  
(खनिज रियायत नियमावली, 1960 के नियम 22सी के तहत)  
**CERTIFICATE OF RECOGNITION AS QUALIFIED PERSON**  
(Under Rule 22C of Mineral Concession Rules, 1960)

श्री एस. करुपण्ण, मॉगनीकाडू, मुत्तमपट्टी पोस्ट, बोम्मीडी वर्यो, ओमलूर तालुक, सेलम डीस्टीक्ट, तमिलनाडू - 635 301, जिनका फोटो और हस्ताक्षर ऊपर दिया हुआ है, तथा जिनहोंने अपनी अर्हता और अनुभव का संतोष जनक साक्ष्य दिया है, को खनन योजना तैयार करने हेतु खनिज रियायत नियमावली 1960 के नियम 22सी के तहत अर्हता प्राप्त व्यक्ति के रूप में मान्यता प्रदान की जाती है।

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

उनकीपंजीयन संख्या है  
His registration number is

RQP /MAS/263/2014/A

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

उनके द्वारा प्रस्तुत खनन योजना में गलत जानकारी / दस्तावेज पाए जाने की स्थिति में यह प्रमाण पत्र वापस लिया जाएगा / निरस्त किया जाएगा।

This certificate will liable to be withdrawn / cancelled in the event of furnishing the wrong information / documents in the Mining Plan submitted by him.

स्थान/ Place : Chennai  
दिनांक/ Date : 16.12.2014.

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

*R. Ramanathan*

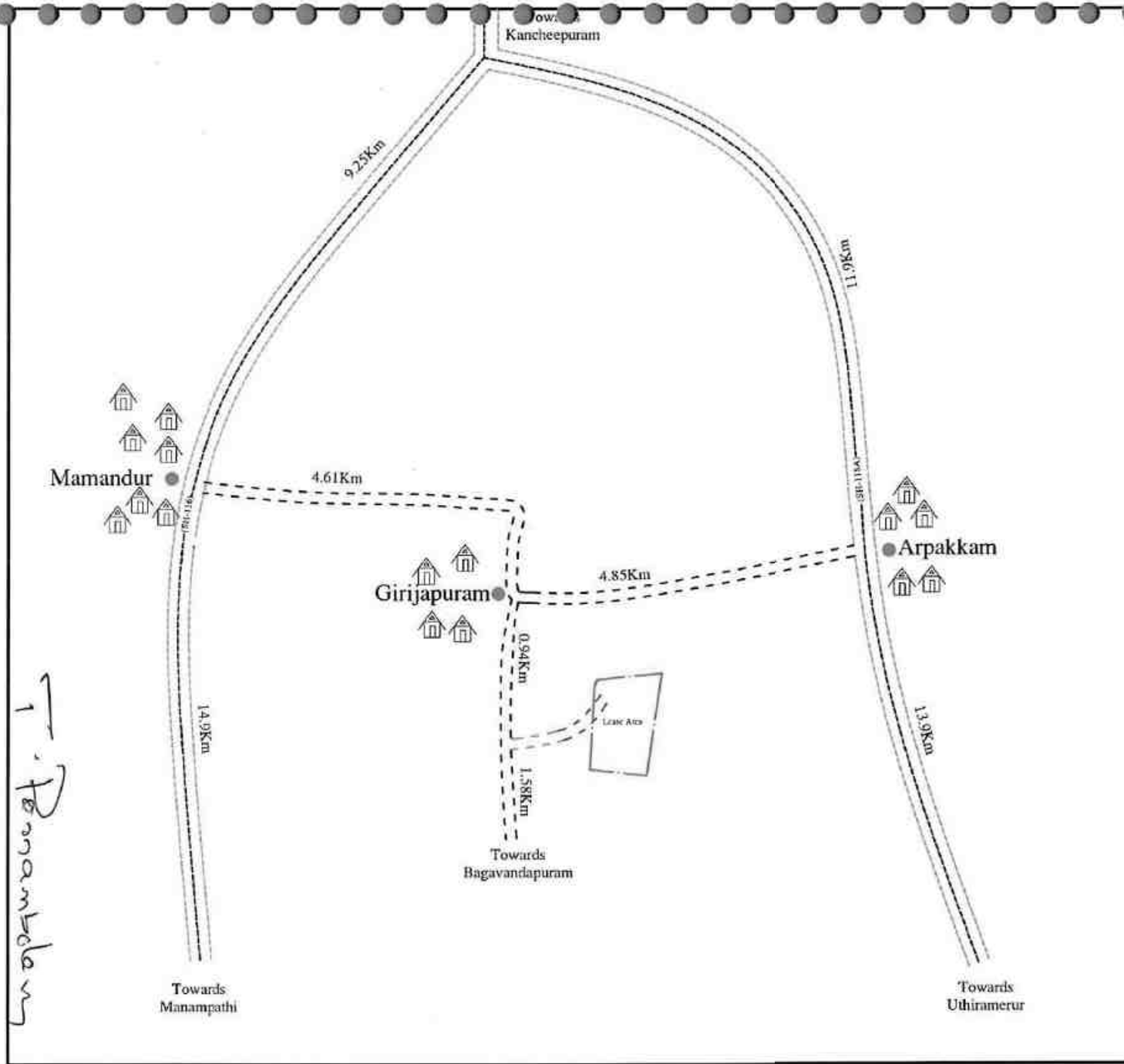


PLATE No. **135/1, 135/2, 135/3A, 135/3B, 135/4 & 135/5**

**APPLICANT:**  
**Mr. T. PONNAMBALAM,**  
 S/o. THANGAVELU,  
 No. 12, BALAKRISHNAN STREET,  
 SRINIVASA NAGAR,  
 CHENNAI - 600 063.

**LEASE AREA:**  
 S.F.No : 135/1, 135/2, 135/3A, 135/3B,  
 135/4 & 135/5  
**EXTENT** : 1.34.50 Hect  
**VILLAGE** : MENNALLUR  
**TALUK** : VEMBAKKAM  
**DISTRICT** : TIRUVANNAMALAI

**INDEX**

|                      |  |
|----------------------|--|
| MINE LEASE AREA      |  |
| APPROACH ROAD        |  |
| CART ROAD            |  |
| VILLAGE ROAD         |  |
| SH - 116 & 118A ROAD |  |
| HABITATION           |  |

**KEY MAP**  
 Not to Scale

Prepared By:

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

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

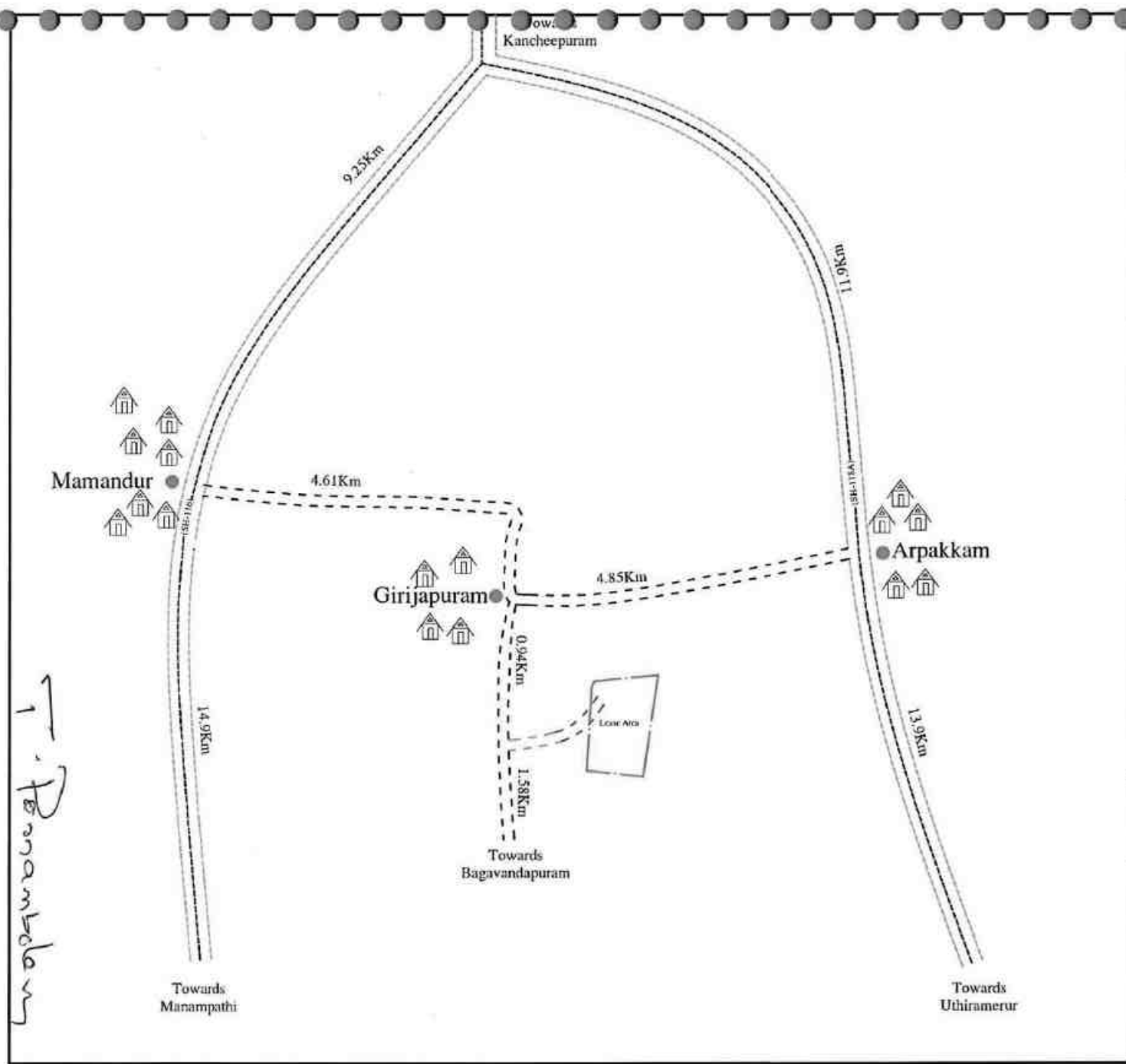

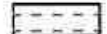






PLATE NO: **135/1, 135/2, 135/3A, 135/3B, 135/4 & 135/5**

**APPLICANT:**  
**Mr. T. PONNAMBALAM,**  
 S/o. THANGAVELU,  
 No.12, BALAKRISHNAN STREET,  
 SRINIVASA NAGAR,  
 CHENNAI - 600 063.


**LEASE AREA:**  
 S.F.No : 135/1, 135/2, 135/3A, 135/3B,  
 135/4 & 135/5  
 EXTENT : 1.34.50 Hect  
 VILLAGE : MENNALLUR  
 TALUK : VEMBAKKAM  
 DISTRICT : TIRUVANNAMALAI

**INDEX**

|                      |   |
|----------------------|---|
| MINE LEASE AREA      |    |
| APPROACH ROAD        |    |
| CART ROAD            |    |
| VILLAGE ROAD         |    |
| SH - 116 & 118A ROAD |   |
| HABITATION           |  |

**KEY MAP**  
 Not to Scale

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

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



12°44'28.80"N



79°42'32.15"E



PLATE No-IA

**APPLICANT:**  
 Mr.T.PONNAMBALAM,  
 S/o.THANGAVELU,  
 No.12, BALAKRISHNAN STREET,  
 SRINIVASA NAGAR,  
 CHENNAI - 600 063.

**LEASE AREA:**  
 S.F.No : 135/1, 135/2, 135/3A, 135/3B,  
 135/4 & 135/5  
**EXTENT** : 1.34.50Hect  
**VILLAGE** : MENNALLUR  
**TALUK** : VEMBAKKAM  
**DISTRICT** : TIRUVANNAMALAI

INDEX

MINE LEASE AREA : ●

TOPO SHEET NO : 57-P/10

LATITUDE : 12°44'23.84"N to 12°44'28.80"N

LONGITUDE : 79°42'32.15"E to 79°42'35.65"E

LOCATION PLAN  
NOT TO SCALE

Prepared By:

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

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



Towards  
Girijapuram 12°44'28.80"N



79°42'32.15"E

Towards  
Bagavandapuram

242



PLATE No-IC

**APPLICANT:**

**Mr.T.PONNAMBALAM,**  
S/o.THANGAVELU,  
No.12, BALAKRISHNAN STREET,  
SRINIVASA NAGAR,  
CHENNAI - 600 063.

**LEASE AREA:**

S.F.No : 135/1, 135/2, 135/3A, 135/3B,  
135/4 & 135/5  
EXTENT : 1.34.50Hect  
VILLAGE : MENNALLUR  
TALUK : VEMBAKKAM  
DISTRICT : TIRUVANNAMALAI

**INDEX**

|   |  |
|---|--|
| MINE LEASE AREA                           |  |
| APPROACH ROAD                             |  |
| CART ROAD                                 |  |
| VILLAGE ROAD                              |  |
| 100m RADIUS                               |  |
| 200m RADIUS                               |  |
| 300m RADIUS                               |  |
| 400m RADIUS                               |  |
| 500m RADIUS                               |  |
| EXISTING PIT                              |  |
| Mr.T.PONNAMBALAM EXISTING QUARRY BOUNDARY |  |

TOPO SHEET NO : 57-P/10

LATITUDE : 12°44'23.84"N to 12°44'28.80"N

LONGITUDE : 79°42'32.15"E to 79°42'35.65"E

**SATELLITE IMAGERY MAP**  
SCALE- 1:5000

Prepared By:

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

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

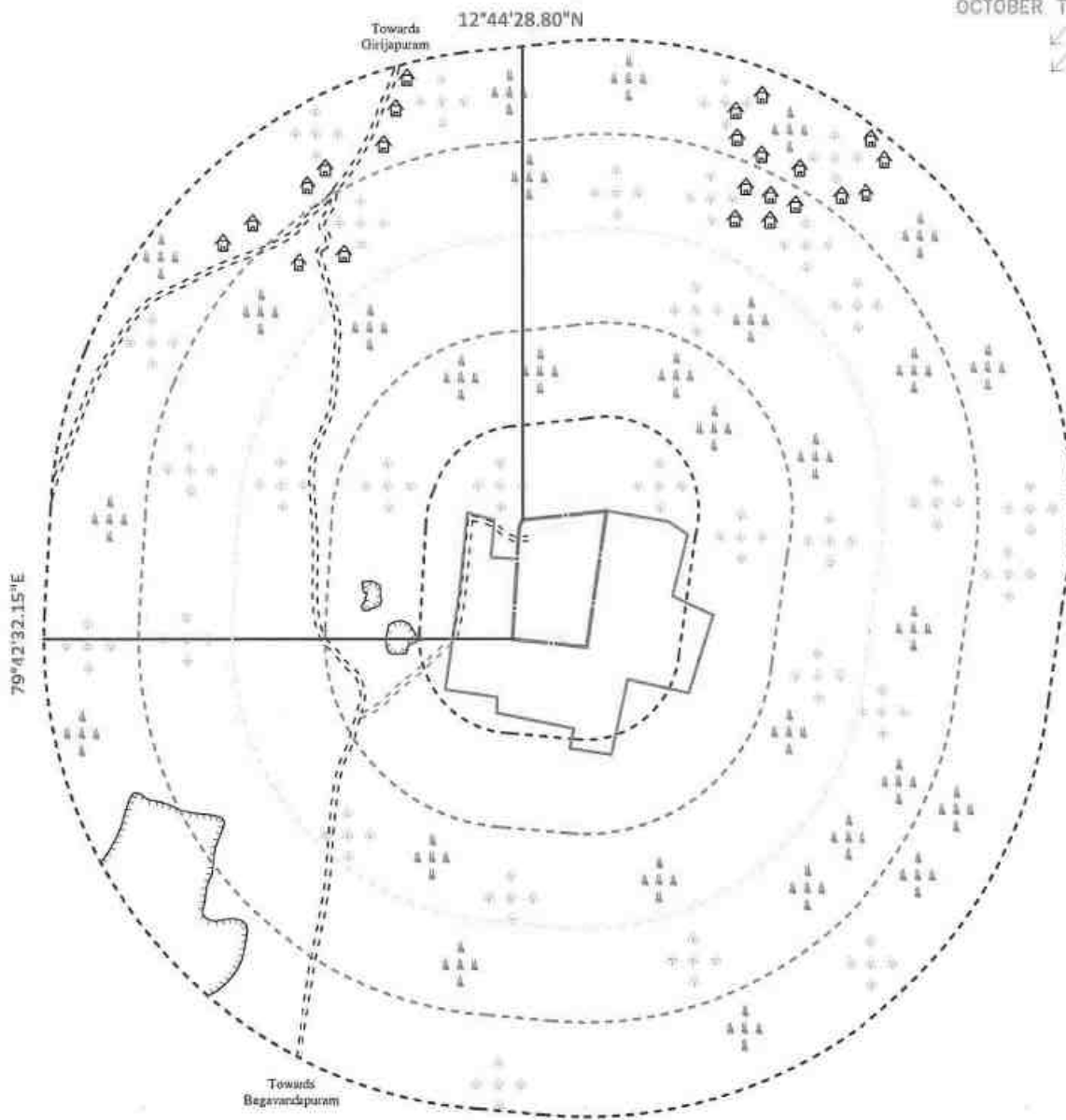


PLATE No-ID

**APPLICANT:**

**Mr. T. PONNAMBALAM,**  
S/o. THANGAVELU,  
No.12, BALAKRISHNAN STREET,  
SRINIVASA NAGAR,  
CHENNAI - 600 963.

**LEASE AREA:**

S.F.No : 135/1, 135/2, 135/3A, 135/3B,  
135/4 & 135/5  
EXTENT : 1.34.50Hect  
VILLAGE : MENNALLUR  
TALUK : VEMBAKKAM  
DISTRICT : TIRUVANNAMALAI

**INDEX**

|   |  |
|---|--|
| MINE LEASE AREA                             |  |
| APPROACH ROAD                               |  |
| CART ROAD                                   |  |
| VILLAGE ROAD                                |  |
| 100m RADIUS                                 |  |
| 200m RADIUS                                 |  |
| 300m RADIUS                                 |  |
| 400m RADIUS                                 |  |
| 500m RADIUS                                 |  |
| EXISTING PIT                                |  |
| SHRUBS & TREES                              |  |
| WIND DIRECTION                              |  |
| HABITATION                                  |  |
| Mr. T. PONNAMBALAM EXISTING QUARRY BOUNDARY |  |

TOPO SHEET NO : 57-P/10  
LATITUDE : 12°44'23.84"N to 12°44'28.80"N  
LONGITUDE : 79°42'32.15"E to 79°42'35.65"E

**ENVIRONMENTAL PLAN**

SCALE - 1:5000

Prepared By:

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

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

OCTOBER TO DECEMBER



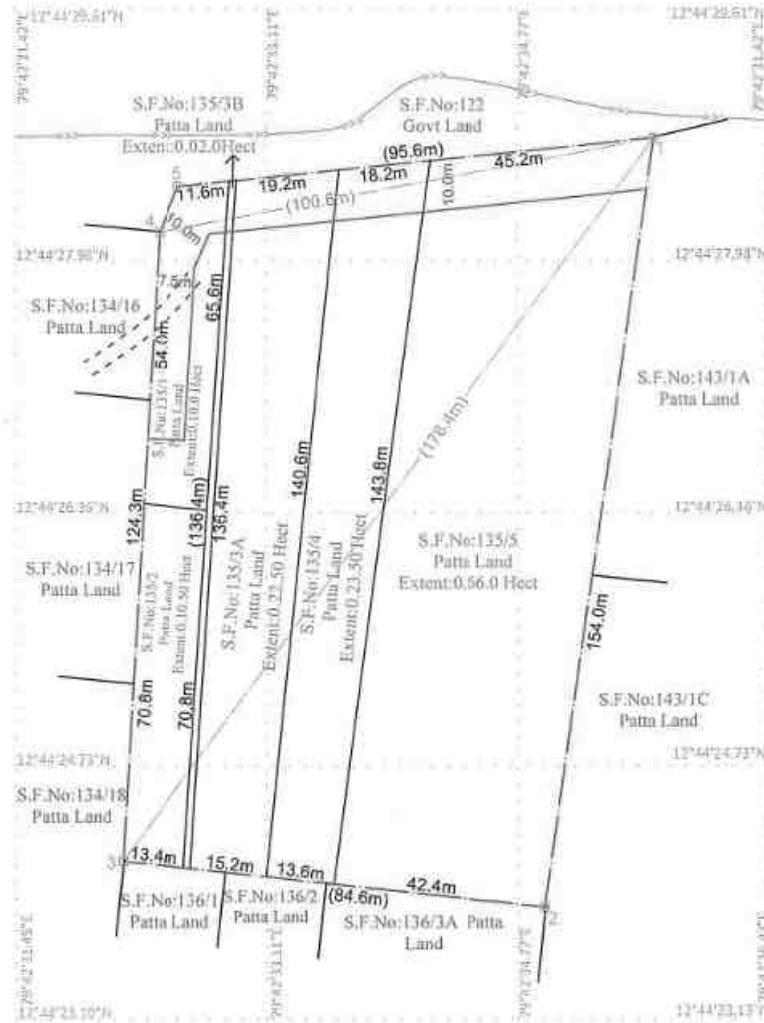
Towards  
Girijapuram

79°42'32.15"E

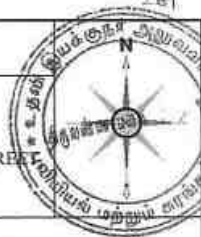
Towards  
Begavandapuram



JULY TO SEPTEMBER



**PLATE NO- II**



**APPLICANT:**  
**Mr. T.PONNAMBALAM,**  
 S/o.THANGAVELU,  
 No.12, BALAKRISHNAN STREET,  
 SRINIVASA NAGAR,  
 CHENNAI - 600 063.

**LEASE AREA:**  
 S.F.No : 135/1, 135/2, 135/3A, 135/3B,  
 135/4 & 135/5  
**EXTENT** : 1.34.50 Hect  
**VILLAGE** : MENNALLUR  
**TALUK** : VEMBAKKAM  
**DISTRICT** : TIRUVANNAMALAI

**INDEX**

- MINE LEASE AREA
- SAFETY DISTANCE
- APPROACH ROAD
- BOUNDARY PILLAR STONES
- ODAI

| Sl.No        | S.F.No | EXTENT              |
|--------------|--------|---------------------|
| 1            | 135/1  | 0.10.00 Hect        |
| 2            | 135/2  | 0.10.50 Hect        |
| 3            | 135/3A | 0.22.50 Hect        |
| 4            | 135/3B | 0.02.00 Hect        |
| 5            | 135/4  | 0.23.50 Hect        |
| 6            | 135/5  | 0.66.0 Hect         |
| <b>TOTAL</b> |        | <b>1.34.50 Hect</b> |

| Sl.No | LATITUDE      | LONGITUDE     |
|-------|---------------|---------------|
| 1     | 12°44'28.80"N | 79°42'35.65"E |
| 2     | 12°44'23.84"N | 79°42'34.94"E |
| 3     | 12°44'24.12"N | 79°42'32.15"E |
| 4     | 12°44'28.18"N | 79°42'32.38"E |
| 5     | 12°44'28.47"N | 79°42'32.50"E |

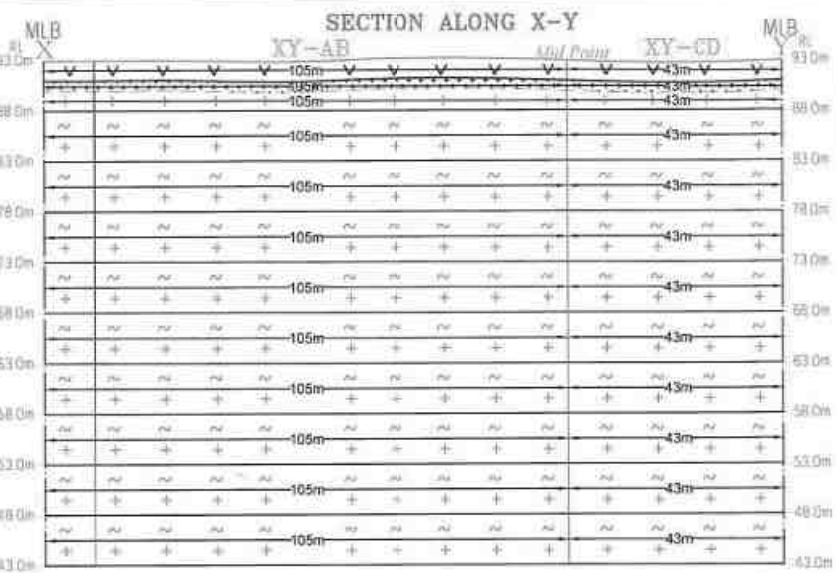
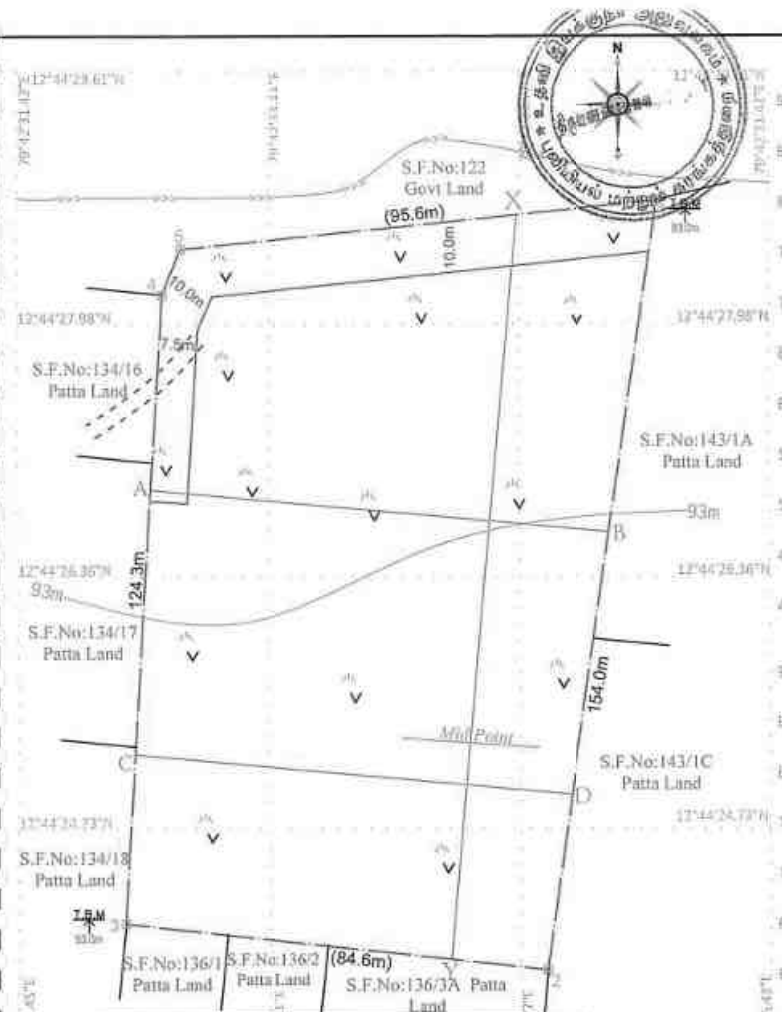
**MINE LEASE PLAN**

PLANSCALE 1 : 1000

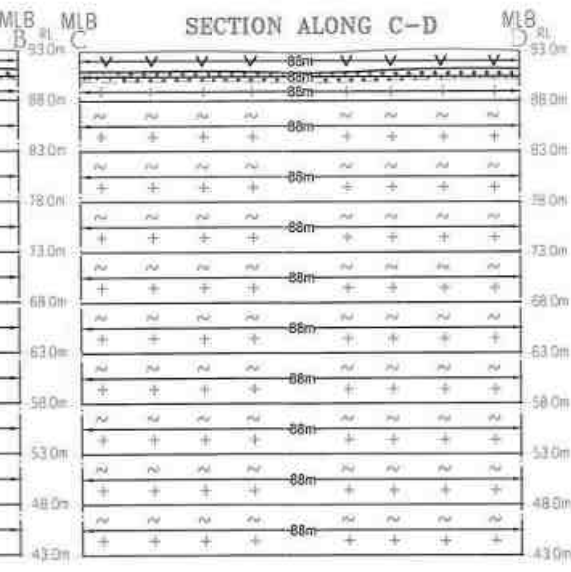
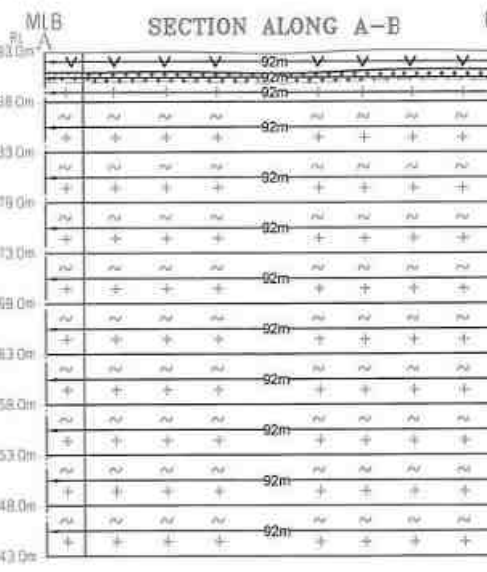
Prepared By:

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

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



| INDEX                  |  |
|------------------------|--|
| MINE LEASE AREA        |  |
| SAFETY DISTANCE        |  |
| APPROACH ROAD          |  |
| BOUNDARY PILLAR STONES |  |
| ODAI                   |  |
| ROUGH STONE            |  |
| GRAVEL                 |  |
| SHRUBS                 |  |
| CONTOUR LINES          |  |
| TEMPORARY BENCH MARK   |  |
| WEATHERED ROCK         |  |



| GEOLOGICAL RESOURCES |       |               |              |              |                          |                               |                                  |
|----------------------|-------|---------------|--------------|--------------|--------------------------|-------------------------------|----------------------------------|
| Section              | Bench | Length in (m) | Width in (m) | Depth in (m) | Volume in m <sup>3</sup> | Rough Stone in m <sup>3</sup> | Weathered Rock in m <sup>3</sup> |
| XY-AB                | I     | 105           | 92           | 2            | 19320                    |                               |                                  |
|                      | I     | 105           | 92           | 1            | 9660                     |                               | 9660                             |
|                      | I     | 105           | 92           | 2            | 19320                    | 19320                         |                                  |
|                      | II    | 105           | 92           | 5            | 48300                    | 48300                         |                                  |
|                      | III   | 105           | 92           | 5            | 48300                    | 48300                         |                                  |
|                      | IV    | 105           | 92           | 5            | 48300                    | 48300                         |                                  |
|                      | V     | 105           | 92           | 5            | 48300                    | 48300                         |                                  |
|                      | VI    | 105           | 92           | 5            | 48300                    | 48300                         |                                  |
|                      | VII   | 105           | 92           | 5            | 48300                    | 48300                         |                                  |
|                      | VIII  | 105           | 92           | 5            | 48300                    | 48300                         |                                  |
| IX                   | 105   | 92            | 5            | 48300        | 48500                    |                               |                                  |
| X                    | 105   | 83            | 5            | 43650        | 43650                    |                               |                                  |
| TOTAL                |       |               | 50           |              | 477780                   | 448770                        | 9660                             |
| XY-CD                | I     | 43            | 88           | 2            | 7568                     |                               | 7568                             |
|                      | I     | 43            | 88           | 1            | 3784                     |                               | 3784                             |
|                      | I     | 43            | 88           | 2            | 7568                     | 7568                          |                                  |
|                      | II    | 43            | 88           | 5            | 18920                    | 18920                         |                                  |
|                      | III   | 43            | 88           | 5            | 18920                    | 18920                         |                                  |
|                      | IV    | 43            | 88           | 5            | 18920                    | 18920                         |                                  |
|                      | V     | 43            | 88           | 5            | 18920                    | 18920                         |                                  |
|                      | VI    | 43            | 88           | 5            | 18920                    | 18920                         |                                  |
|                      | VII   | 43            | 88           | 3            | 11352                    | 11352                         |                                  |
|                      | VIII  | 43            | 88           | 3            | 11352                    | 11352                         |                                  |
| IX                   | 43    | 88            | 5            | 18920        | 18920                    |                               |                                  |
| X                    | 43    | 88            | 5            | 18920        | 18920                    |                               |                                  |
| TOTAL                |       |               | 50           |              | 189200                   | 172848                        | 3784                             |

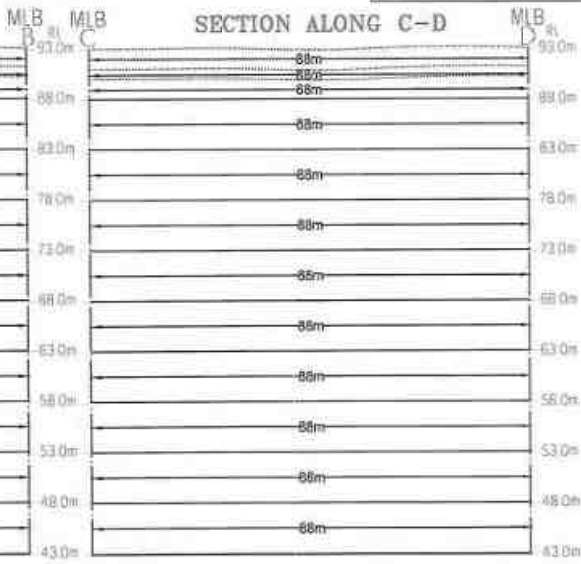
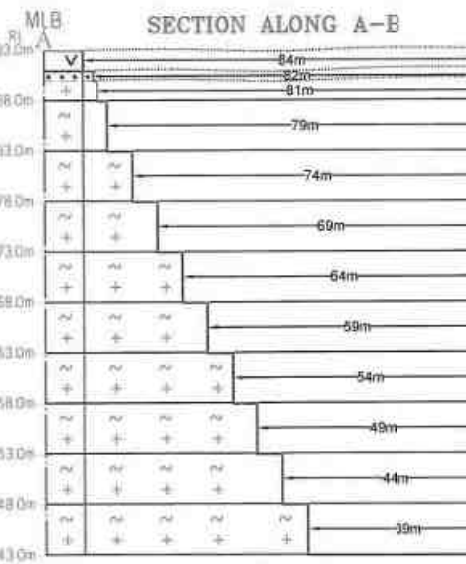
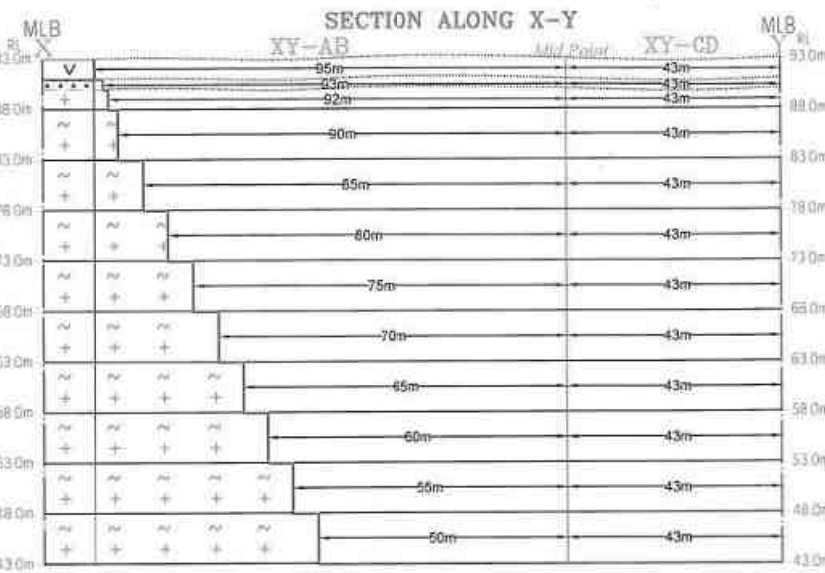
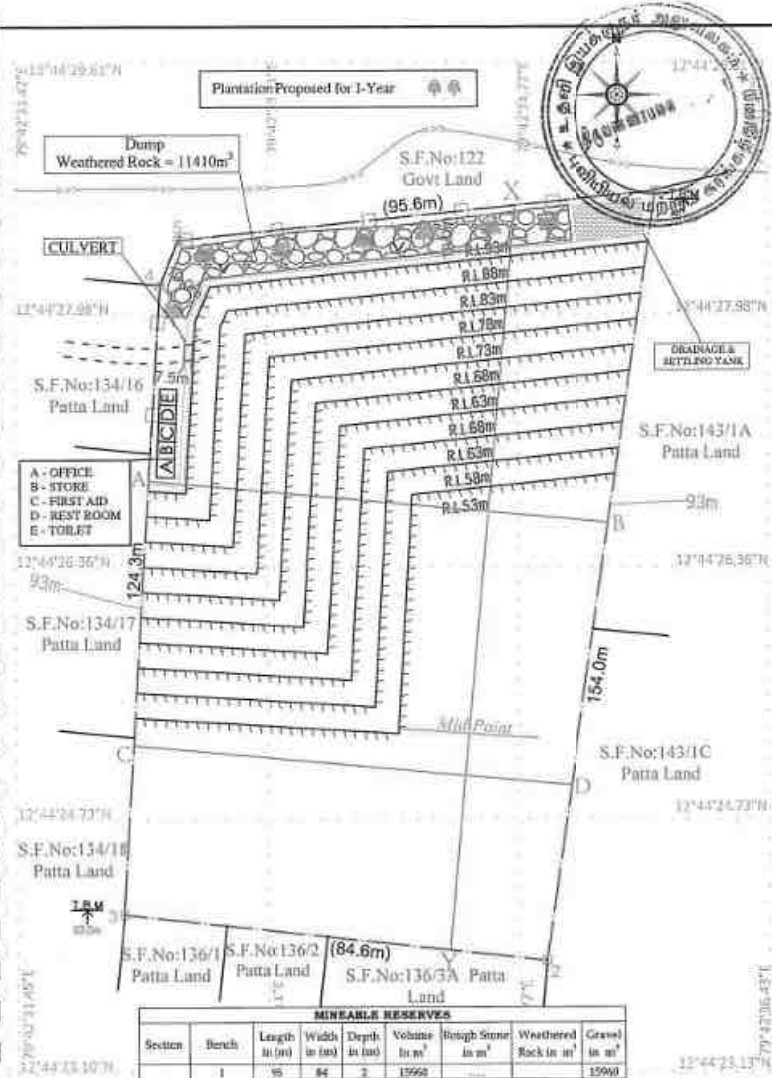
SURFACE, GEOLOGICAL PLAN & SECTION  
 PLAN- SCALE 1: 1000  
 SECTION- SCALE- HOR 1: 1000 & VER 1: 500

PLATE NO- III

APPLICANT:  
**Mr.T.PONNAMBALAM,**  
 S/o.THANGAVELU,  
 No.12, BALAKRISHNAN STREET,  
 SRINIVASAGAR,  
 CHENNAI - 600 063.

LEASE AREA:  
 S.F.No : 135/1, 135/2, 135/3A, 135/3B,  
 135/4 & 135/5  
 EXTENT : 1.34.50Hect.  
 VILLAGE : MENNALLUR  
 TALUK : VEMBAKKAM  
 DISTRICT : TIRUVANNAMALAI

Prepared By:  
 I DO HEREBY CERTIFY THAT THE PLATE HAS  
 BEEN CHECKED BY ME AND IS CORRECT  
 TO THE BEST OF MY KNOWLEDGE  
  
 Dr.S.KARUPPANNAN,M.Sc.,Ph.D.  
 RECOGNIZED QUALIFIED PERSON  
 RQP/MAS/263/2014/A



INDEX

|                        |          |
|------------------------|----------|
| MINE LEASE AREA        | [Symbol] |
| SAFETY DISTANCE        | [Symbol] |
| APPROACH ROAD          | [Symbol] |
| BOUNDARY PILLAR STONES | [Symbol] |
| ODAI                   | [Symbol] |
| ROUGH STONE            | [Symbol] |
| GRAVEL                 | [Symbol] |
| WEATHERED ROCK         | [Symbol] |
| SHRUBS                 | [Symbol] |
| CONTOUR LINES          | [Symbol] |
| TEMPORARY BENCH MARK   | [Symbol] |
| ULTIMATE BENCH         | [Symbol] |
| FENCING                | [Symbol] |
| DUMP                   | [Symbol] |

CONCEPTUAL PLAN & SECTION

PLAN- SCALE 1: 1000

SECTION- SCALE - HOR 1: 1000 & VER 1: 500

PLATE NO- IV

APPLICANT: Mr. T. PONNAMBALAM, S/o. THANGAVELU, No. 12, SAKAKRISHNAN STREET, SRINIVASANAGAR, CHENNAI - 600 063.

LEASE AREA: S.F.No : 135/1, 135/2, 135/3A, 135/3B, 135/4 & 135/5

EXTENT : 1.34.50 Hect

VILLAGE : MENNALLUR

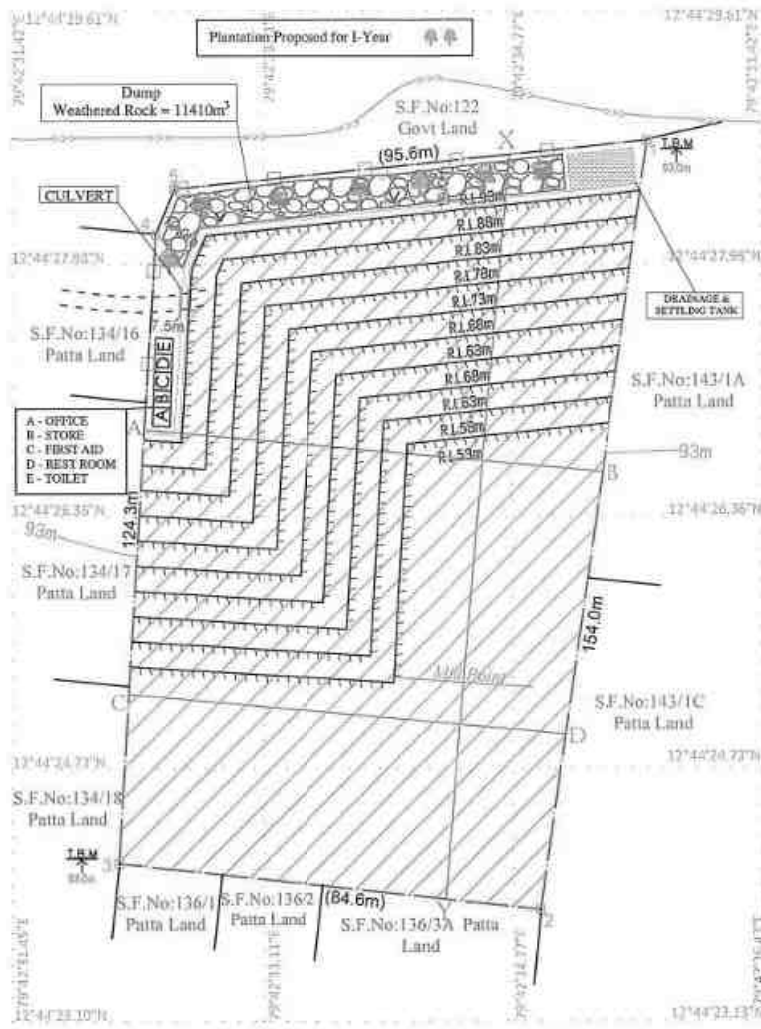
TALUK : VEMBAKKAM

DISTRICT : TIRUVANNAMALAI

Prepared By:

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

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



| INDEX                  |          |
|------------------------|----------|
| MINE LEASE AREA        | [Symbol] |
| SAFETY DISTANCE        | [Symbol] |
| APPROACH ROAD          | [Symbol] |
| BOUNDARY PILLAR STONES | [Symbol] |
| ODAI                   | [Symbol] |
| ROUGH STONE            | [Symbol] |
| GRAVEL                 | [Symbol] |
| WEATHERED ROCK         | [Symbol] |
| SHRUBS                 | [Symbol] |
| CONTOUR LINES          | [Symbol] |
| TEMPORARY BENCH MARK   | [Symbol] |
| ULTIMATE BENCH         | [Symbol] |
| FENCING                | [Symbol] |
| DUMP                   | [Symbol] |

MINE LAYOUT LAND USE PATTERN

| DESCRIPTION              | PRESENT AREA (Hect) | AREA IN USE DURING THE QUARRYING PERIOD(Hect) | COLOR CODE |
|--------------------------|---------------------|---|------------|
| AREA UNDER QUARRYING     | NIL                 | 1.17.30                                       | [Symbol]   |
| INFRASTRUCTURE           | NIL                 | 0.02.0  | [Symbol]   |
| ROADS                    | NIL                 | 0.05.0  | [Symbol]   |
| UN-UTILIZED AREA         | 1.34.50             | NIL   | [Symbol]   |
| GREEN BELT               | NIL                 | 0.07.70                                       | [Symbol]   |
| DRAINAGE & SETTLING TANK | NIL                 | 0.02.50                                       | [Symbol]   |
| <b>GRAND TOTAL</b>       | <b>1.34.50</b>      | <b>1.34.50</b>                                |            |

**MINE LAYOUT PLAN & LAND USE PATTERN**

SCALE 1 : 1000

**PLATE NO- V**

**APPLICANT:**  
 Mr. T. PONNAMBALAM,  
 S/o. THANGAVELU,  
 No. 12, KRISHNAN STREET,  
 SRINIVASAN NAGAR,  
 CHENNAI - 600 063.

**LEASE AREA:**  
 S.F.No : 135/1, 135/2, 135/3A, 135/3B,  
 135/4 & 135/5  
 EXTENT : 1.34.50 Hect  
 VILLAGE : MENNALLUR  
 TALUK : VEMBAKKAM  
 DISTRICT : TIRUVANNAMALAI

Prepared By:

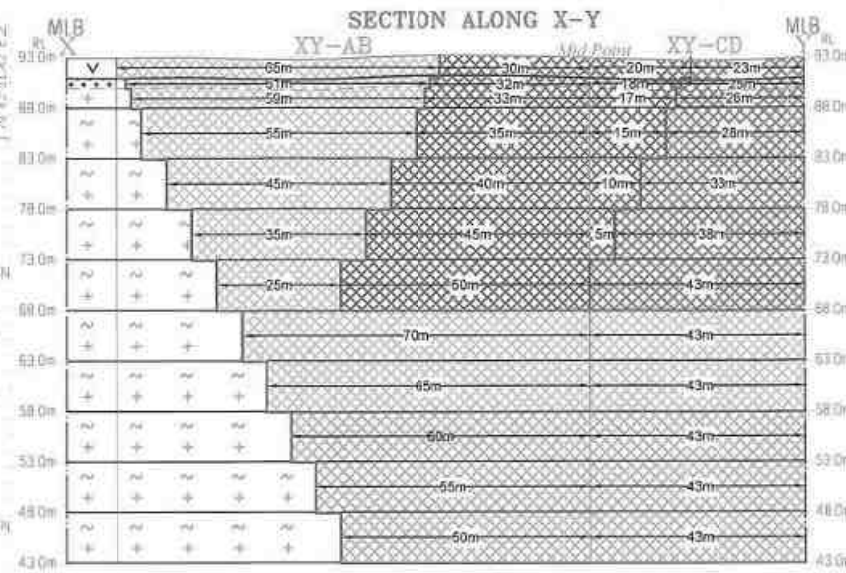
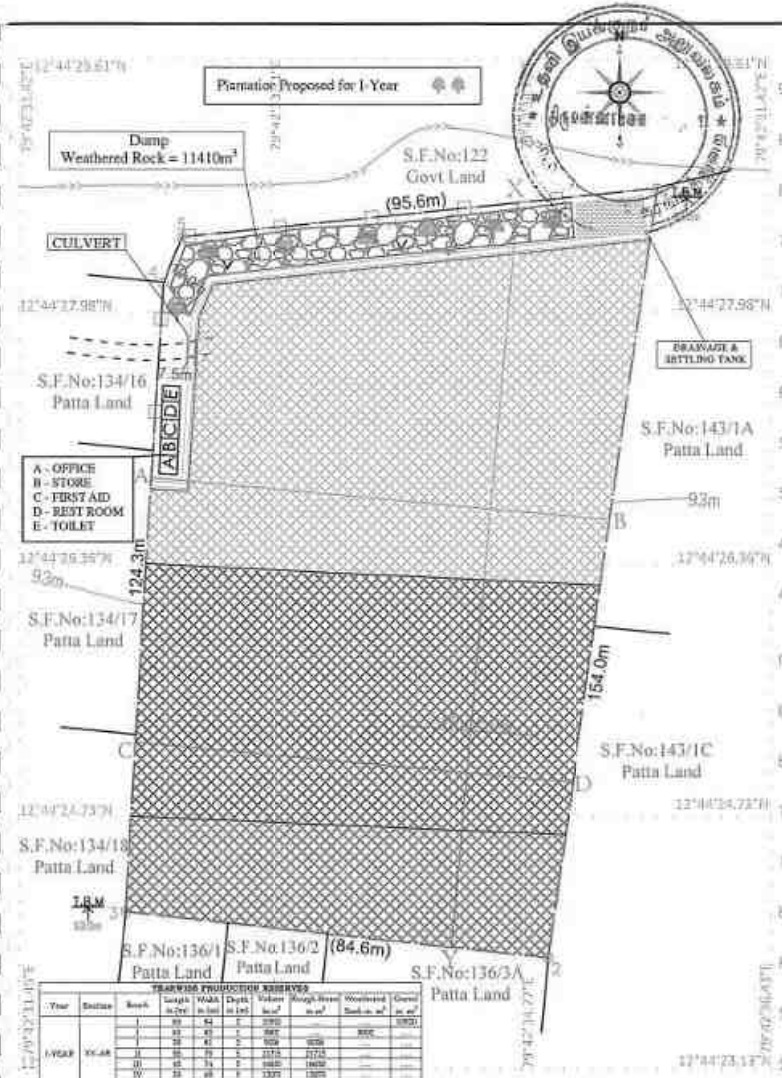
I DO HEREBY CERTIFY THAT THE PLATE HAS BEEN CHECKED BY ME AND IS CORRECT TO THE BEST OF MY KNOWLEDGE

*[Signature]*

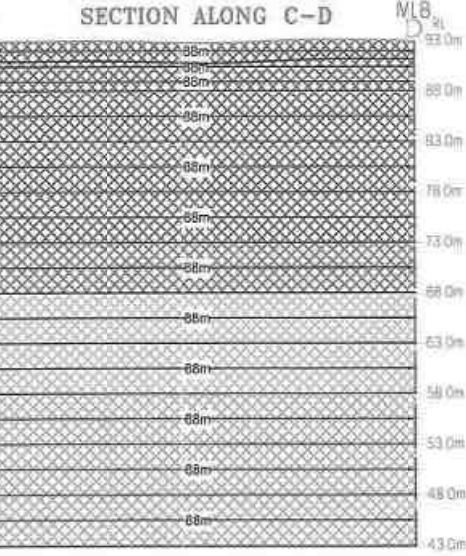
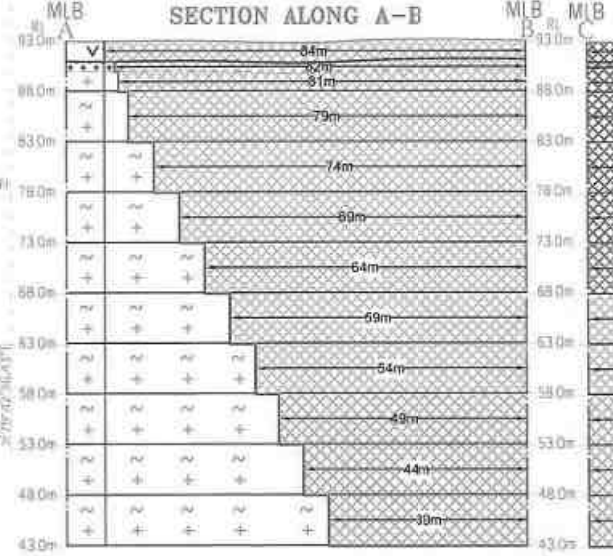
Dr. S. KARUPHANNAN, M.Sc., Ph.D.  
 RECOGNIZED QUALIFIED PERSON  
 RQP/MAS/263/2014/A

T.P. ...





| INDEX                  |  |
|------------------------|--|
| MINE LEASE AREA        |  |
| SAFETY DISTANCE        |  |
| APPROACH ROAD          |  |
| BOUNDARY PILLAR STONES |  |
| ODAI                   |  |
| ROUGH STONE            |  |
| GRAVEL                 |  |
| WEATHERED ROCK         |  |
| SHRUBS                 |  |
| CONTOUR LINES          |  |
| TEMPORARY BENCH MARK   |  |
| PROPOSED BENCH         |  |
| FENCING                |  |
| DUMP                   |  |



| YEARWISE PRODUCTION SUMMARY |         |       |               |              |               |                 |                         |                 |       |
|-----------------------------|---------|-------|---------------|--------------|---------------|-----------------|-------------------------|-----------------|-------|
| Year                        | Section | Block | Length in Ctr | Width in Ctr | Area in Sq. m | Volume in cu. m | Weathered Rock in cu. m | Gravel in cu. m | Other |
| I-VGAR                      | XX-AR   | I     | 30            | 42           | 1260          | 12600           | 12600                   | 12600           | 12600 |
|                             |         | II    | 30            | 42           | 1260          | 12600           | 12600                   | 12600           | 12600 |
|                             |         | III   | 30            | 42           | 1260          | 12600           | 12600                   | 12600           | 12600 |
|                             |         | IV    | 30            | 42           | 1260          | 12600           | 12600                   | 12600           | 12600 |
|                             |         | V     | 30            | 42           | 1260          | 12600           | 12600                   | 12600           | 12600 |
| TOTAL                       |         |       |               |              |               |                 |                         |                 |       |
| II-VGAR                     | XX-AR   | I     | 30            | 42           | 1260          | 12600           | 12600                   | 12600           | 12600 |
|                             |         | II    | 30            | 42           | 1260          | 12600           | 12600                   | 12600           | 12600 |
|                             |         | III   | 30            | 42           | 1260          | 12600           | 12600                   | 12600           | 12600 |
|                             |         | IV    | 30            | 42           | 1260          | 12600           | 12600                   | 12600           | 12600 |
|                             |         | V     | 30            | 42           | 1260          | 12600           | 12600                   | 12600           | 12600 |
| TOTAL                       |         |       |               |              |               |                 |                         |                 |       |
| III-VGAR                    | XX-AR   | I     | 30            | 42           | 1260          | 12600           | 12600                   | 12600           | 12600 |
|                             |         | II    | 30            | 42           | 1260          | 12600           | 12600                   | 12600           | 12600 |
|                             |         | III   | 30            | 42           | 1260          | 12600           | 12600                   | 12600           | 12600 |
|                             |         | IV    | 30            | 42           | 1260          | 12600           | 12600                   | 12600           | 12600 |
|                             |         | V     | 30            | 42           | 1260          | 12600           | 12600                   | 12600           | 12600 |
| TOTAL                       |         |       |               |              |               |                 |                         |                 |       |
| IV-VGAR                     | XX-AR   | I     | 30            | 42           | 1260          | 12600           | 12600                   | 12600           | 12600 |
|                             |         | II    | 30            | 42           | 1260          | 12600           | 12600                   | 12600           | 12600 |
|                             |         | III   | 30            | 42           | 1260          | 12600           | 12600                   | 12600           | 12600 |
|                             |         | IV    | 30            | 42           | 1260          | 12600           | 12600                   | 12600           | 12600 |
|                             |         | V     | 30            | 42           | 1260          | 12600           | 12600                   | 12600           | 12600 |
| TOTAL                       |         |       |               |              |               |                 |                         |                 |       |
| V-VGAR                      | XX-AR   | I     | 30            | 42           | 1260          | 12600           | 12600                   | 12600           | 12600 |
|                             |         | II    | 30            | 42           | 1260          | 12600           | 12600                   | 12600           | 12600 |
|                             |         | III   | 30            | 42           | 1260          | 12600           | 12600                   | 12600           | 12600 |
|                             |         | IV    | 30            | 42           | 1260          | 12600           | 12600                   | 12600           | 12600 |
|                             |         | V     | 30            | 42           | 1260          | 12600           | 12600                   | 12600           | 12600 |
| TOTAL                       |         |       |               |              |               |                 |                         |                 |       |

- T. Ponnambalam
- I - Year Proposed area to be Quarried
  - II - Year Proposed area to be Quarried
  - III - Year Proposed area to be Quarried
  - IV - Year Proposed area to be Quarried
  - V - Year Proposed area to be Quarried

YEARWISE DEVELOPMENT  
PRODUCTION PLAN & SECTION  
PLAN- SCALE 1: 1000  
SECTION- SCALE- HOR 1: 1000 & VER 1: 500

PLATE NO- VI

APPLICANT:  
**Mr. T. PONNAMBALAM,**  
S/o. THANGAVELU,  
No. 12, SAKA KRISHNAN STREET,  
SRINIVASAGAR,  
CHENNAI - 600 063.

LEASE AREA:  
S.F.No : 135/1, 135/2, 135/3A, 135/3B,  
135/4 & 135/5  
EXTENT : 1.34.50 Hect  
VILLAGE : MENNALLUR  
TALUK : VEMBAKKAM  
DISTRICT : TIRUVANNAMALAI

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

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

திருவண்ணாமலை மாவட்டம்  
வெம்பாக்கம் வட்டம் 79-மேநல்லூர் கிராமம் -  
மூலக் கட்டிடம் 135/1 010.0, 135/2 010.5  
135/3A 022.5, 135/3B 002.0, 135/4 023.5,  
135/5 066.0. மேலும் மேற்படி புலத்தைச் சார்ந்த  
சிறு 300 மீட்டர் சிற்றளவில் குடியிருப்புகளின்  
புராதன சின்னங்களான, மயானங்களான கிண்ட  
ரின் விசாரணையில் தெரிய வருகிறது, பின்வதை  
தொகுத்துக் கொடுக்கப்படுகிறது

ச  
சுமணி  
29/12/20  
கிராம நிருவாக அலுவலர்  
79. மேநல்லூர் குருப்.  
வெம்பாக்கம் வட்டம்.  
திருவண்ணாமலை மாவட்டம்.

T. Ponnambalam



## National Accreditation Board for Education and Training

# Certificate of Accreditation

### Geo Technical Mining Solutions, Dharmapuri

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

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

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


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

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

Issue Date  
Feb 19, 2024

Valid up to  
Dec 31, 2026



  
Mr. Ajay Kumar Jha  
Sr. Director, NABET

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

  
Prof (Dr) Varinder S Kanwar  
(CEO NABET)

