

# **DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT**

*For*

**Proposed Jammanahalli Black Granite Quarry  
over an extent of 6.59.5 Ha  
Production Capacity-4,150m<sup>3</sup>**

*At*

**Survey No: 83 (Part)  
Village: Jammanahalli  
Taluk: Pappireddypatti  
District: Dharmapuri  
State: Tamil Nadu**

**By**



**M/s. Tamil Nadu Minerals Limited**

**(Project termed under Schedule 1(a) Mining of Minerals 'B1' category as per EIA  
Notification 2006 and its Amendments)**

**Proposal No: SIA/TN/MIN/525197/2025, Dtaed: 22.02.2025**

**ToR Identification No: T025B0108TN5769635N, Dated 19.05.2025**

**Baseline Period: February 2025 - April 2025**



**EIA Consultant & Laboratory**

**HUBERT ENVIRO CARE SYSTEMS (P) LTD, CHENNAI**

**NABET Certificate No & Validity: NABET/EIA/24-27/RA 0335, valid upto 31.03.2027**

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**August 2025**

**Revision Status**

|                               |            |                                                                |                       |                                                                                      |                                                                        |                                                                                      |               |                                                                                      |
|-------------------------------|------------|----------------------------------------------------------------|-----------------------|--------------------------------------------------------------------------------------|------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------|--------------------------------------------------------------------------------------|
| Name of the Client            |            |                                                                |                       | :                                                                                    | M/s. Tamil Nadu Minerals Limited                                       |                                                                                      |               |                                                                                      |
| Name of the Project           |            |                                                                |                       | :                                                                                    | Proposed Jammanahalli Black Granite Quarry over an extent of 6.59.5 Ha |                                                                                      |               |                                                                                      |
| Name of the Report            |            |                                                                |                       | :                                                                                    | Draft EIA Report                                                       |                                                                                      |               |                                                                                      |
| Project No: H/01/2023/CON/046 |            |                                                                |                       |                                                                                      | Document No: RP003                                                     |                                                                                      |               |                                                                                      |
|                               |            |                                                                |                       |                                                                                      |                                                                        |                                                                                      |               |                                                                                      |
| Revision details:             |            |                                                                |                       |                                                                                      |                                                                        |                                                                                      |               |                                                                                      |
| R2                            | 26.08.2025 | 3 <sup>rd</sup> submission-<br>Draft EIA for Public<br>Hearing | Mr. PVRs Surendra     |    | Mr. PVRs<br>Surendra                                                   |   | Dr.J.R.Moses  |   |
| R1                            | 29.07.2025 | 2 <sup>nd</sup> submission-<br>Draft EIA to QC<br>Team         | Mr. Vamsee<br>Krishna |   | Mr. PVRs<br>Surendra                                                   |   | Dr.J.R.Moses  |   |
| R0                            | 11.07.2025 | 1 <sup>st</sup> Submission                                     | Mr. Vamsee<br>Krishna |  | Mr. PVRs<br>Surendra                                                   |  | Dr.J.R. Moses |  |
| Rev<br>No.                    | Date       | Details                                                        | Name                  | Sign                                                                                 | Name                                                                   | Sign                                                                                 | Name          | Sign                                                                                 |
|                               |            |                                                                | Prepared by           |                                                                                      | Checked by                                                             |                                                                                      | Approved by   |                                                                                      |

## ACKNOWLEDGEMENT

The following personnel are gratefully acknowledged for their fullest support in collection, compilation of needful data regarding the project and kind cooperation in fulfilling the report on Environmental Impact Assessment (EIA) report of **“Proposed Jammanahalli Black Granite Quarry over an extent of 6.59.5 Ha”** at S.F.83 (Part) at Jammanahalli Village, Pappireddypatti Taluk, Dharmapuri District, and Tamil Nadu State.

### **M/s Tamil Nadu Minerals Limited,**

- Dr. E Ganesan - Manager (ML)

### **M/s Hubert Enviro Care System Private Limited**

- 1) Dr. J R Moses (CEO)
- 2) Dr. Raj Kumar Samuel (Director- Technical)
- 3) Mr. Vamsee Krishna Navooru (Head-Consultancy)
- 4) Mr. P.V.R.S. Surendra (EIA Coordinator)

**Declaration by the Project Proponent**

I, Dr. E Ganesan, Manager (ML) of M/s Tamil Nadu Minerals Limited, declaration/ undertaking that owing the contents (information and data) of the EIA report preparation has been undertaken in the compliance with Terms of Reference (ToR) for the “**Proposed Jammanahalli Black Granite Quarry over an extent of 6.59.5 Ha**” at S.F.83 (Part) of Jammanahalli Village, Pappireddypatti Taluk, Dharmapuri District, Tamil Nadu and the information and content provided in the report are factually correct.

For Tamil Nadu Minerals Ltd,



Authorised Signatory  
Manager (ML)  
TAMIN-Chennai



**Declaration by the Head of the Accredited Consultant Organization**

I, Dr.J.R. Moses, hereby, confirm that the below mentioned experts prepared the EIA/EMP report for “**Proposed Jammanahalli Black Granite Quarry over an extent of 6.59.5 Ha**” at S.F. 83 (Part) of Jammanahalli Village, Pappireddypatti Taluk, Dharmapuri District,Tamil Nadu State. I also confirm that I shall be fully accountable for any misleading information mentioned in this statement.



Signature:

**Date:** 26.08.2025

**Name:** Dr. J. R. Moses

**Designation:** Chief Executive Officer

**Name of the EIA Consultant Organization:** M/s. Hubert Enviro Care Systems (P) Ltd, Chennai

**NABET Certificate No & Validity:** NABET/EIA/24-27/RA 0335, valid up to 31.03.2027.

**Declaration of Experts contributing to the EIA**

I, hereby, certify that I was involved in the EIA report for the project titled “**Proposed Jammanahalli Black Granite Quarry over an extent of 6.59.5 Ha**” at S.F.83 (Part) of Jammanahalli Village, Pappireddypatti Taluk, Dharmapuri District, and Tamil Nadu State. I was a part of the EIA team in the following capacity that developed the above EIA with the support of the following functional area experts.

| EIA Coordinator        |                                                                                   |                                                                                     |
|------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Name:                  | Mr. Vamsee Krishna                                                                | Mr. PVR S Surendra                                                                  |
| Signature:             |  |  |
| Date:                  | 06.08.2025                                                                        | 26.08.2025                                                                          |
| Period of Involvement: | January 2025 to 06 <sup>th</sup> August 2025                                      | 06 <sup>th</sup> August 2025 to Till date                                           |

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**Functional Area Experts (FAEs):**

| S.No | Functional Areas | Name of the Expert  | Period of Involvement                                                                                                                                                                                                                                                                        | Signature                                                                             |
|------|------------------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 1.   | WP               | Dr. Rajkumar Samuel | <b>Period : January 2025 to Till date</b><br><b>Task:</b> Selection of surface and ground water quality monitoring locations, and interpretation of analysis results. Identification and quantification of impacts and proposed suitable control measures and Environmental Management Plan. |  |
| 2.   | SE               | Mr. V. Dhivakar     | <b>Period : January 2025 to Till date</b><br><b>Task:</b> Site visit, Collection of secondary data, discussion with stakeholders and Preparation of socio -economic status of the study area. Review of demographic                                                                          |  |

| S.No | Functional Areas | Name of the Expert         | Period of Involvement                                                                                                                                                                                                                                                                                                                                                           | Signature                                                                             |
|------|------------------|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|      |                  |                            | characteristics, and supervision of baseline data collection. Collection and analysis of perception study carried out for the proposed project.                                                                                                                                                                                                                                 |                                                                                       |
| 3.   | EB               | Dr. Rajkumar Samuel        | <b>Period: January 2025 to Till date</b><br><b>Task:</b> Primary ecological survey and assessment of flora and fauna with respect to the core and buffer zone in study area and development of EMP.Collection of data from secondary sources and comparing with field data, compilation of Ecology and bio diversity data and their impact assessment on the study area.        |    |
| 4.   | LU               | Mr. Venkateswarlu          | <b>Period : February 2025 to April 2025</b><br><b>Task :</b> Development of land use maps of study area using GIS / related tools, site visit for ground reality survey, finalization of land use maps and studying the ecologically sensitive details in the study area as per Topo map and Gazette notifications.                                                             |   |
| 5.   | AP               | Mr. PVR S Surendra         | <b>Period: January 2025 to Till date</b><br><b>Task:</b> Selection of air quality monitoring location, and interpretation of ambient air quality results. Estimation of fugitive emissions, identification and assessing of impacts due to air pollution and suggested suitable mitigation measures.                                                                            |  |
| 6.   | AQ               | Dr. J R Moses              | <b>Period: January 2025 to Till date</b><br><b>Task:</b> Collection and developing of micro-meteorological data from secondary sources, preparing site-specific wind rose pattern, prediction of dispersion of pollutants and incremental pollution levels with air quality modeling. Identification of impacts and proposed the suitable control measures, development of EMP. |  |
| 7.   | NV               | Mr. Vamsee Krishna Navooru | <b>Period: January 2025 to July 2025</b><br><b>Task:</b> Identification of noise monitoring locations and measured the ambient noise levels & vibrations generated due to                                                                                                                                                                                                       |  |

| S.No | Functional Areas | Name of the Expert         | Period of Involvement                                                                                                                                                                                                                                                                                        | Signature                                                                             |
|------|------------------|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
|      |                  |                            | various activities. Identifying the probable impacts due to noise & vibrations and suggested noise pollution control measures along with environmental management plan.                                                                                                                                      |                                                                                       |
| 8.   | GEO              | B. Mallikarjuna Rao        | <b>Period: February 2025 to April 2025</b><br><b>Task:</b> Studying the site topography, geology, geomorphological analysis, and existing available mineral resources. Studying of ground profile, assessing of environmental impacts due to proposed activity and proposed suitable mitigation measures.    |    |
| 9.   | HG               | Mr.PVRS Surendra           | <b>Period: January 2025 to Till date</b><br><b>Task:</b> Identification of ground water potential in the study area, analysis of surface hydrogeological data, its flow rate and direction. Preparation of report with respect to hydrogeological condition in and around the study area.                    |    |
| 10.  | SC               | Dr. B.C. Nagaraja          | <b>Period: February 2025 to April 2025</b><br><b>Task:</b> Identification of soil quality monitoring locations, assessing of soil nutrients/characteristics in the study area, assessing the impacts on soil and proposing the soil management practices during construction and operation phase of project. |  |
| 11.  | SHW              | Mr. Vamsee Krishna Navooru | <b>Period: January 2025 to July 2025</b><br><b>Task:</b> Quantification of Municipal solid waste and hazardous waste generation and suggesting management measures, methodologies for handling, treatment, disposal and storage of generated wastes.                                                         |  |
| 12.  | RH               | Dr. J R Moses              | <b>Period: January 2025 to Till date</b><br><b>Task:</b> Identification of hazardous materials, fire accidents within the quarry and validation of existing risk assessment & Disaster management plan along with mitigation measures.                                                                       |  |

### Team Members

| S. No | Name            | Role                        |
|-------|-----------------|-----------------------------|
| 1.    | PVRS Surendra   | TM for WP                   |
| 2.    | Dr Ramrajan S   | TM for EB                   |
| 3.    | Praveenkumaar R | TM for EC (Sector – 1)      |
| 4.    | Monadevi M      | TM for EC (Sector – 1) & AP |
| 5.    | Ajeeth Kumar    | TM for SC                   |
| 6.    | Hemanth         | TM for WP & AP              |
| 7.    | Vanitha S       | TM for SC & WP              |

*LU - Land Use*

*AP - Air Pollution monitoring, prevention and control*

*AQ - Meteorology, air quality modeling and prediction*

*WP - Water pollution monitoring, prevention and control*

*EB - Ecology and biodiversity*

*NV - Noise & Vibration*

*SE - Socio-economics*

*HG - Hydrology, ground water and water conservation*

*GEO - Geology*

*RH - Risk assessment and hazards management*

*SHW - Solid and hazardous waste management*

*SC - Soil Conservation*

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### List of Annexure

| Annexure No | Name of the Annexure              |
|-------------|-----------------------------------|
| 1           | Precise Area Communication Letter |
| 2           | Mining Plan Approval Letter       |
| 3           | Approved Mining Plan              |
| 4           | Sectional Plates                  |
| 5           | Terms of Reference                |
| 6           | Other Quarry Photographs          |
| 7           | Fencing Photographs               |
| 8           | 300m VAO Letter                   |
| 9           | DFO Letter                        |
| 10          | FMB Sketch                        |
| 11          | Village Map                       |
| 12          | A Register                        |
| 13          | Adangal Copy                      |
| 14          | RQP Certificate                   |

**LIST OF ABBREVIATIONS**

|         |                                                         |
|---------|---------------------------------------------------------|
| AAQ     | Ambient Air Quality                                     |
| AAQM    | Ambient Air Quality Monitoring                          |
| AMSL    | Above Mean Sea Level                                    |
| BGL     | Below Ground Level                                      |
| CPCB    | Central Pollution Control Board                         |
| CER     | Corporate Environmental Responsibility                  |
| EMC     | Environmental Management Cell                           |
| EMP     | Environmental Management Plan                           |
| GLC     | Ground Level Concentration                              |
| GO      | Government Order                                        |
| ISO     | International Organization for Standardization          |
| IUCN    | International Union for Conservation of Nature          |
| O.B     | Over Burden                                             |
| S.B     | Side Burden                                             |
| MoEF&CC | Ministry of Environment Forest & Climate Change         |
| NAAQS   | National Ambient Air Quality Standards                  |
| NABET   | National Accreditation Board for Education and Training |
| QCI     | Quality Council of India                                |
| SEIAA   | State Environmental Impact Assessment Authority         |
| SEAC    | State Level Expert Appraisal Committee                  |
| TNPCB   | Tamil Nadu Pollution Control Board                      |
| TWAD    | Tamil Nadu Water Supply and Drainage Board              |

## Executive Summary

### 1. Project Description

The Proposed Jammanahalli Black Granite Quarry is over an extent of 6.59.5 Ha at S.F.No.83 (P) of Jammanahalli Village, Pappireddipatty Taluk, Dharmapuri District, and Tamil Nadu State. It is a government poramboke land.

TAMIN has obtained a lease for 20 years vide precise area communication letter No.4539479/MME.1/2023-1, Dated: 13.09.2023. The precise area communication letter is enclosed as **Annexure-1**. Accordingly, the Mining Plan has been approved by the Commissioner, Department of Geology and Mining, Guindy, Chennai, vide letter Rc. No.72/MM4/2023 dated 23.11.2023 for the proposed production capacity of 4,150m<sup>3</sup> at 10% recovery of ROM 41,501m<sup>3</sup> during the five years of the mining plan period. The mining plan approval letter is enclosed as **Annexure-2** and approved mining plan is enclosed as **Annexure-3**.

The ToR application was submitted to TN-SEIAA vide online proposal No. SIA/TN/MIN/525197/2025, dated: 22.02.2025 as the area of the proposed project is more than 5.00.0Ha. The proposal was appraised during the 549<sup>th</sup> SEAC meeting held on 07.04.2025 and the 822<sup>nd</sup> SEIAA meeting held on 15.05.2025 and the ToR was issued along with a public hearing vide Identification No.T025B0108TN5769635N, dated: 19.05.2025 under B1 Category, Schedule 1(a) Mining of Minerals as per EIA Notification 2006 and its subsequent amendments. The copy of ToR is enclosed as **Annexure-5**.

Based on the issued ToR, the draft EIA report will be submitted to the Tamil Nadu Pollution Control Board for conducting Public Hearing. After the completion of the Public Hearing, the queries raised and their compliance will be incorporated into the final EIA report, which will be submitted to the Tamil Nadu SEAC/SEIAA for appraisal and for seeking Environmental Clearance for the proposed project.

**Table-1 Salient Features of the Project Site**

|                    |                                            |
|--------------------|--------------------------------------------|
| Survey No          | S.F.No.83 (Part)                           |
| Village            | Jammanahalli                               |
| Taluk and District | Pappireddipatty Taluk, Dharmapuri District |
| State              | Tamil Nadu                                 |
| Toposheets No.     | D44S8                                      |
| Latitude           | 12°00'33.8481"N to 12°00'45.4265"N         |

|                                                       |                                                                                                |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------|
| Longitude                                             | 78°25'11.6284"E to 78°25'25.2777"E                                                             |
| Extent Area                                           | 6.59.5 Ha                                                                                      |
| Lease Period                                          | 20 years                                                                                       |
| Estimated Geological Reserves (ROM)m <sup>3</sup>     | 4,09,500                                                                                       |
| Estimated Mineable Reserves (ROM) m <sup>3</sup>      | 2,13,213                                                                                       |
| Proposed Production (RoM) m <sup>3</sup>              | 41,501                                                                                         |
| Black Granite production @10% recovery m <sup>3</sup> | 4,150                                                                                          |
| Annual peak production in m <sup>3</sup>              | 1,000                                                                                          |
| Depth of Mining                                       | 12m from top of the hill (Height of the hillock is 32m)                                        |
| Method of Mining                                      | Open cast semi mechanized method                                                               |
| Nearest NH/SH Roads                                   | ➤ SH-6A (Tiruvannamalai-Harur), ~7.69 km, ENE<br>➤ NH-179A (Salem-Vaniyambadi), ~ 2.89 km, ESE |
| Nearest Town                                          | Harur, ~7km, NE                                                                                |
| Nearest Railway Station                               | Thonganur, ~10.17km, NW                                                                        |
| Nearest Airport                                       | Salem Airport, ~45.20km, WSW                                                                   |
| Project Cost                                          | 99.97 lakhs                                                                                    |
| Water Requirement                                     | 3.5KLD                                                                                         |
| Power Requirement                                     | 60kVA                                                                                          |
| Fuel Requirement                                      | 200 liters/day                                                                                 |
| Depth of Water Table                                  | 11.6m as per TWAD (TWAD- Dharmapuri - May 2024)                                                |

## 2. PROJECT DESCRIPTION

### 2.1 Method of Quarrying

The quarrying operation is being carried out by the open cast semi-mechanized method with the deployment of HEMM for development and production activities under Regulation 106. The quarrying work is being carried out under the direct supervision of our statutory mining personnel of TAMIN as approved by the Directorate General of Mines Safety (DGMS) under MMR, 1961.

## Reserves of Black Granite

The geological reserve of black granite was computed based on the geological plan & section as 4,09,500 m<sup>3</sup>. Mineable reserves have been computed as 2,13,213m<sup>3</sup> after leaving the reserves locked up in safety barriers and benches based on the conceptual plan and sections. The effective(Saleable) mineable reserves have been worked out as 21,321m<sup>3</sup> by recovering factor of 10%.

The total proposed production capacity is 4,150 m<sup>3</sup> at 10% recovery of ROM 41,501m<sup>3</sup>. The annual peak production per year would be 1,000m<sup>3</sup> at 10% recovery of ROM 9,999 m<sup>3</sup>.

**Table-2 Ultimate Pit Dimensional Details**

| S. No | Description | Ultimate Pit Dimensions (m) |       |       |
|-------|-------------|-----------------------------|-------|-------|
|       |             | Length                      | Width | Depth |
| 1     | Top         | 324.0                       | 68.0  | 33.0  |
| 2     | Bottom      | 193.0                       | 22.50 |       |

**Table-3 Available Reserves**

| S. No | Geological Reserves (m <sup>3</sup> ) | Mineable Reserves (m <sup>3</sup> ) | Proposed Production at 10% recovery (m <sup>3</sup> ) |
|-------|---------------------------------------|-------------------------------------|-------------------------------------------------------|
| 1.    | 4,09,500                              | 2,13,213                            | 4,150                                                 |

**Table-4 Mine Year Wise Production**

| S. No        | Year                 | ROM (m <sup>3</sup> ) | Recovery @ 10% (m <sup>3</sup> ) | Granite Waste @ 90 % (m <sup>3</sup> ) |
|--------------|----------------------|-----------------------|----------------------------------|----------------------------------------|
| 1            | 1 <sup>st</sup> Year | 6,003                 | 600                              | 5,403                                  |
| 2            | 2 <sup>nd</sup> Year | 7,503                 | 750                              | 6,753                                  |
| 3            | 3 <sup>rd</sup> Year | 8,500                 | 850                              | 7,650                                  |
| 4            | 4 <sup>th</sup> Year | 9,496                 | 950                              | 8,546                                  |
| 5            | 5 <sup>th</sup> Year | 9,999                 | 1,000                            | 8,999                                  |
| <b>Total</b> |                      | <b>41,501</b>         | <b>4,150</b>                     | <b>37,351</b>                          |

## 2.2 Waste Management

The waste generated during the mining operation, i.e., over burden, side burden, granite rejects, and the non-recoverable/unsized boulders and rubble, etc., is around 64,962 m<sup>3</sup> will be dumped in the suitable area of around 0.66.0 Ha which is already selected. The area of disposal of waste rock has been identified in southeast portion of the lease area. The unsold blocks are kept within the boundary of the country rock area. The dump will be maintained not exceeding 5m height and the slope angle will be at 45° from horizontal. The area and location of the waste

dump has been provided in Plate no. 8 of Sectional Plates and the same is enclosed as **Annexure-4.**

**Table-5 Proposed Waste Generation**

| S. No | Year                 | Over Burden (m <sup>3</sup> ) | Side Burden (m <sup>3</sup> ) | Granite Rejects @ 90% (m <sup>3</sup> ) |
|-------|----------------------|-------------------------------|-------------------------------|-----------------------------------------|
| 1     | 1 <sup>st</sup> Year | 6,320                         | 580                           | 5,403                                   |
| 2     | 2 <sup>nd</sup> Year | 4,452                         | 174                           | 6,753                                   |
| 3     | 3 <sup>rd</sup> Year | 4,539                         | 401                           | 7,650                                   |
| 4     | 4 <sup>th</sup> Year | 7,012                         | 2,339                         | 8,546                                   |
| 5     | 5 <sup>th</sup> Year | 1,314                         | 480                           | 8,999                                   |
|       | <b>Total</b>         | <b>23,637</b>                 | <b>3,974</b>                  | <b>37,351</b>                           |

### 2.3 Greenbelt Details

The total area for the proposed green belt is 0.06.5 Ha during first 5 years of the proposed quarrying activity. TAMIN is proposing to plant 825 trees which are proposed to plant within the 7.5m safety buffer zone mine lease area and in the proposed green belt area.

**Table-6 Proposed Greenbelt Details**

| Year    | No of trees proposed to be planted | Name of the species to be plant | Survival rate expected in % | No of trees expected to be grown |
|---------|------------------------------------|---------------------------------|-----------------------------|----------------------------------|
| 2025-26 | 825                                | Neem, pungam, vengai            | 80                          | 660                              |

### 2.4 Man power Requirement

Manpower details are given in below table.

**Table-7 Manpower Details**

| S.No     | Description                                                                 | No of persons |
|----------|-----------------------------------------------------------------------------|---------------|
| <b>A</b> | <b>Technical/Mining Personnel</b>                                           |               |
| 1        | Geologist/Agent (M.sc Qualified)                                            | 1             |
| 2        | Mine Manager ( Holder of Manager Certificate of Competency under MMR, 1961) | 1             |
| 3        | Mining Mate cum Blaster                                                     | 1             |
| 4        | Machinery operator                                                          | 6             |
| 5        | Diesel Mechanic                                                             | 1             |
| <b>B</b> | <b>Workers</b>                                                              |               |
| 1        | Skilled                                                                     | 1             |
| 2        | Semi- Skilled                                                               | 9             |
| 3        | Un-skilled                                                                  | 10            |
|          | <b>Total</b>                                                                | <b>30</b>     |

### 2.5 List of Equipment

The list of Equipment is given in below table.

**Table-8 List of Machineries**

| S. No | Machinery                      | Capacity               | Numbers |
|-------|--------------------------------|------------------------|---------|
| 1     | Excavator                      | 300 LC                 | 1       |
| 2     | Compressor                     | 400 cfm                | 2       |
| 3     | Dumpers                        | 25 Tonnes              | 2       |
| 4     | Diamond wire saw               | 30 m <sup>3</sup> /day | 1       |
| 5     | Jack Hammers (32mm dia.)       | 1.2 to 6m              | 6       |
| 6     | Diesel Generator               | 125 kVA                | 1       |
| 7     | Tractor Mounted Air Compressor | -                      | 1       |

## 2.6 Land Use Pattern

Land Use Pattern of the Mining Lease area is given in below **Table-9**.

**Table-9 Land Use Pattern of the Mining Lease area**

| S.No         | Description           | Present area ( Ha) | Proposed Mining Plan Period (Ha) | Area at the end of the life of mine (Ha) |
|--------------|-----------------------|--------------------|----------------------------------|------------------------------------------|
| 1.           | Mining Area           | --                 | 0.78.0                           | 2.20.5                                   |
| 2.           | Waste Dump            | --                 | 0.66.0                           | 1.74.0                                   |
| 3.           | Office Infrastructure | 0.01.0             | --                               | 0.01.0                                   |
| 4.           | Foot path             | 0.14.0             | --                               | 0.14.0                                   |
| 5.           | Afforestation         | --                 | 0.06.5                           | 0.27.5                                   |
| 6.           | Unutilized Area       | 6.44.5             | 4.94.0                           | 2.22.5                                   |
| <b>Total</b> |                       | <b>6.59.5</b>      | <b>6.44.5</b>                    | <b>6.59.5</b>                            |

## 3. IMPACTS AND MITIGATION MEASURES

### Impacts due to Mining Activity

Various environmental impacts which have been identified due to the mining operations are discussed in the following sections. The environmental parameters most commonly affected by mining activities are:

### 3.1. Land Environment

#### Impacts

Potential impacts envisaged due to mining operations on land environment are



- The topsoil and bushes observed in the hill slides over the dyke will be removed completely. Hence the top hill ridge will be excavated which will interrupt the aesthetic view of the locality.
- The proposed quarrying operation will alter the hill slope and natural drainage pattern.
- Due to the proposed mining activity, a pit will be created over the hill and left open with the approximate dimension as follows.

**Table-10 Ultimate Pit Dimension**

| S. No | Description | Average Ultimate Pit Dimensions (m) |       |       |
|-------|-------------|-------------------------------------|-------|-------|
|       |             | Length                              | Width | Depth |
| 1     | Top         | 324.0                               | 68.0  | 33.00 |
| 2     | Bottom      | 193.0                               | 22.50 |       |

- The Total waste (Granite waste + Over Burden + Side Burden) to be generated during the five years of mining plan period will be around 64,962m<sup>3</sup>. These wastes are proposed to be dumped on the South East side of lease area.
- Usage of chemicals like Rock Breaking Powder (Ca (OH)<sub>2</sub>) for secondary blasting, fuel and lubricants used for machineries will affect the soil quality and fertility.
- Generation of hazardous and non-hazardous wastages.
- Creation of infrastructure facilities like office building, rest shelter, first-aid centre, toilets and other service facilities.

### **Mitigation Measures**

- Good housekeeping and best practices of waste handling shall be adopted to eliminate/minimize the risks of soil contamination.
- The wastes generated will be stored in temporary storage facility and disposed through nearby municipal disposal bins. Waste oil generated from quarry machineries will be disposed through TNPCB authorized dealers.
- Dust suppression using water tankers.
- Greenbelt around infrastructure within the mine lease area and along the periphery of the mine lease area by using native plants.
- Proper fencing will be provided around the mine lease area.

## **3.2 Air Environment**

### **Impacts on Air Environment**

### Source

The major sources of air pollution due to mining operations are DG sets, Machineries and Vehicular transportation. The activities causing air pollution due to the mining operations will be excavation, drilling, blasting and transportation. The sources of air emission are given below in **Table-11**.

**Table-11 Sources of air pollution at quarry**

| S. No | Source of emission                   | Pollutant              |
|-------|--------------------------------------|------------------------|
| 1.    | Excavation of Granite                | PM                     |
| 2.    | Operation of diesel driven equipment | Gaseous Emission       |
| 3.    | Transportation of product            | PM,NO <sub>x</sub> ,CO |

### Impacts

- Due to mining activity, Air pollution will cause respiratory problems.
- Air pollution will affect nearby ecosystems, vegetation, livestock habitats and water sources.

### Mitigation measures

The mitigation measures due to the proposed mining activity for air environment are given below.

**Table-12 Dust control measures in quarry**

| S. No | Activities                 | Control Measures                                                                                                                                                                                                                                                                                                                                                |
|-------|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1     | Drilling                   | <ul style="list-style-type: none"> <li>➤ Adopting wet drilling method</li> <li>➤ Drilling machine should be provided with dust extractors</li> </ul>                                                                                                                                                                                                            |
| 2     | Blasting                   | <ul style="list-style-type: none"> <li>➤ Use of control blasting technique</li> <li>➤ Water spray before blasting</li> <li>➤ Usage of Rock breaking powder (Ca(OH)<sub>2</sub>)</li> <li>➤ Usage of Wire saw cutting method</li> </ul>                                                                                                                          |
| 3     | Loading                    | <ul style="list-style-type: none"> <li>➤ Water spray on granite material before loading</li> </ul>                                                                                                                                                                                                                                                              |
| 4     | Transportation of material | <ul style="list-style-type: none"> <li>➤ Covering of the trucks/dumpers to avoid spillage</li> <li>➤ Water spray on the haul roads before and after transportation</li> <li>➤ Maintenance of haul road</li> <li>➤ Speed of vehicles will be limited upto 25km/hr</li> <li>➤ Development of a green belt of suitable width on both sides of haul road</li> </ul> |

#### 3.2.1 Air Quality Modeling

Total maximum GLCs from emissions are as given below **Table-13**.

**Table-13 Total maximum GLCs from emissions**

| Pollutant       | Max. Base Line Conc. ( $\mu\text{g}/\text{m}^3$ ) | Estimated Incremental Conc. ( $\mu\text{g}/\text{m}^3$ ) | Total Conc. ( $\mu\text{g}/\text{m}^3$ ) | NAAQ standard |
|-----------------|---------------------------------------------------|----------------------------------------------------------|------------------------------------------|---------------|
| PM              | 57.72                                             | 2.05                                                     | 59.77                                    | 100           |
| SO <sub>2</sub> | 15.01                                             | 0.12                                                     | 15.13                                    | 80            |
| NO <sub>x</sub> | 25.87                                             | 0.96                                                     | 26.83                                    | 80            |

The maximum ground level concentration observed due to mining activities and traffic movement through Air Modeling for PM, SO<sub>2</sub> and NO<sub>x</sub> are 57.72 $\mu\text{g}/\text{m}^3$ , 15.01 $\mu\text{g}/\text{m}^3$  and 25.87  $\mu\text{g}/\text{m}^3$  respectively.

### 3.3 Transportation of Material

#### Impacts

The granite will be transported through existing road by tippers and approximately 2 times per week materials will be transported. The traffic load was observed on NH-179A Connecting Salem – Vaniyambadi. The vehicular movement for the proposed project is given in **Table-14**.

**Table-14 Traffic Volume after Implementation of the Project**

| For the Road         | Volume of Traffic | Volume (V) | Road Capacity (C) | V/C Ratio | LOS Category* | Traffic Classification |
|----------------------|-------------------|------------|-------------------|-----------|---------------|------------------------|
| Existing             | 9014              | 11970      | 35000             | 0.34      | "A"           | Free Flow Traffic      |
| After implementation | 9018              | 11985      | 35000             | 0.34      | "A"           | Free Flow Traffic      |

\*LOS (Level of Service) categories are A-Free Flow, B- Stable Traffic Flow, C- Restricted Flow, D- High Density Flow, E- Unstable flow, F- Forced or breakdown flow

Due to propose project there will be slight increment in the vehicle movement but the level of service (LOS) anticipated will be Free Flow Traffic.

#### Mitigation Measures

- Covering of the trucks/dumpers to avoid spillage
- Water spray on the haul roads before and after transportation
- Maintenance of haul road
- Speed control on vehicles
- Development of a green belt of suitable width on both sides of haul roads.

### **3.4 Water Environment**

#### **Impacts**

Impacts envisaged due to wastewater generation during mining operations are

- Wastewater generated from the mines can pollute surface water and groundwater, which can harm wildlife and human health.
- Runoff from mining wastewater can devastate surrounding vegetation.
- Explosive blasting in a mine can cause groundwater to seep to lower depths or connect aquifers, exposing them to contamination by toxic heavy metals.

#### **Mitigation Measures**

##### **Surface Water Pollution Control Measures**

- Construction of garland drains of suitable size around mine area and dumps to prevent rain water descent into active mine areas.
- Construction of baffle wall or trenches nearby water bodies to prevent runoff water from mines.
- The dumping will be provided with slopes and covered with grasses, shrubs, etc to prevent erosion.

##### **Ground Water Pollution Control Measures**

- The domestic sewage of 1.2 KLD will be disposed through septic tank followed by soak pit.
- Regular monitoring of water levels and quality in the existing open wells and bore well in the vicinity will be carried out.

### **3.5 Rain Water Harvesting**

#### **Impacts**

Impacts envisaged due to rainwater on mining operations are

- Heavy rainfall can cause high water levels at a mining site, which can damage equipment and threaten worker safety.
- Rainwater can carry pollutants from a mining site into nearby water bodies; these pollutants can include heavy metals, acids, and other substances that can contaminate the water.
- When it rains, the loosened topsoil can be washed away, carrying sediments that pollute water bodies.

#### **Mitigation Measures**

- Construct barriers at suitable intervals along the path of the drains to restrict the flow of water.
- Construction of baffle wall or trenches nearby water bodies to prevent runoff water from mines.
- Provide necessary overflow arrangement to maintain the natural drainage system.
- The rainwater will be diverted by garland drains to the sump area within the mine lease. The stored water will be used for agriculture activities and for dust suppression purpose.

### **3.6 Noise Environment**

#### **Impact**

The main sources of noise in the mine are as follows:

- Drilling
- Blasting
- Loading & unloading of minerals.
- Transportation vehicles

#### **Mitigation Measures**

Following mitigation measures should be taken to control noise pollution

- Workers will be provided with earmuffs, ear plugs etc.
- All vehicles and machinery will be properly lubricated and maintained regularly.
- Speed of the vehicles entering and leaving the quarrying lease will be limited to 25 kmph.
- Unnecessary use of horns by the drivers of the vehicles shall be avoided.
- Controlled blasting with proper spacing, burden and stemming will be maintained.
- Usage of NONEL Blasting (Non-Electric Detonator).
- Usage of Diamond Wire-saw cutting method.
- The blasting will be carried out during favorable atmospheric condition.

### **3.7. Vibration due to mining activity**

#### **Impacts**

Due to mining activities, the following impacts of vibration are envisaged as follows:

- Structural damage to infrastructure facilities within the mine lease area.
- Ground Subsidence
- Vibrations cause human health impacts such as fatigue, muscle strain, joint pain, sleep disturbances, cardiovascular problems etc.

#### **Mitigation Measures**

- No primary blasting will be used for granite quarry operations. Only secondary controlled blasting techniques will be used.
- Usage of NONEL Blasting.
- Proposed peripheral green belt will be developed in 7.5m safety zone around the quarry.
- All vehicles and machinery will be properly lubricated and maintained regularly.
- Periodical health checkup will be done for the workers.

### 3.8 Biological Environment

#### Impacts

Impacts on biodiversity are given below.

**Table-15 Impacts on Biodiversity**

| S. No | Activity                      | Examples of aspects                     | Examples of biodiversity impact                                                                          |
|-------|-------------------------------|-----------------------------------------|----------------------------------------------------------------------------------------------------------|
| 1     | Excavation                    | Land clearing                           | Loss of habitat, introduction of plant diseases, Siltation of water courses                              |
| 2     | Blasting, Digging and hauling | Dust, noise ,vibration, water pollution | Disruption of water courses ,impacts on aquatic ecosystems due to changes in hydrology and water quality |
| 3     | Waste dumping                 | Clearing, water and soil pollution      | Loss of habitat, soil and water contamination, sedimentation.                                            |
| 4     | Air emissions                 | Air pollution                           | Loss of habitat or species                                                                               |
| 5     | Waste disposal                | Oil and water pollution                 | Encouragement of pests, disease transfer, contamination of groundwater and soil                          |
| 6     | Access roads                  | Land clearing                           | Habitat loss or fragmentation, water logging upslope and drainage shadows                                |
| 7     | Water supply                  | Water abstraction or mine dewatering    | Loss or changes in habitat or species composition                                                        |

#### Mitigation Measures

- To reduce the adverse effects on flora/fauna due to deposition of dust generation from mining operations, water sprinkling and water spraying systems will be ensured in all dust prone areas to arrest dust generation.
- Development of greenbelt around the mine lease area.

### 3.9 Impacts on Occupational Health due to project operations

#### Impacts

The following occupational health issues are observed due to mining operations.

- Exposure to chemicals
- Airborne hazards
- Dust
- Noise and vibration
- High temperatures and humidity
- Manual handling

### Mitigation Measures

The mitigation measures of occupational health and safety is given below.

**Table-16 Mitigation for occupational health and safety**

| S.No | Activity                     | Mitigation measures                                                                                                                                                                                                                                     |
|------|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Excavation                   | ➤ Planned excavation, avoid haphazard mining                                                                                                                                                                                                            |
| 2    | Drilling and blasting        | ➤ In addition, the operators and other workers should be provided with masks, helmets, gloves and earplugs.                                                                                                                                             |
| 3    | Safety zone                  | ➤ Provisions for a buffer zone between the local habitation and the mine lease in the form of a green belt of suitable width.<br>➤ Restricted entry, use of sirens and cordoning of the lasting area are some of the good practices to avoid accidents. |
| 4    | Overburden stabilization     | ➤ Accidents are known to happen due to overburden collapse.<br>➤ Therefore, slope stabilization and dump stability are critical issues for safety and environment. Proper measures will be taken care.                                                  |
| 5    | Worker's health surveillance | ➤ Health survey programmes for workers and local community.<br>➤ Regular training and awareness of employees to be conducted to meet health and safety objectives.                                                                                      |

## 4. PROJECT COST & ESTIMATED TIME OF COMPLETION

### 4.1. Project Cost

The estimated project cost is given below **Table-17**.

**Table-17 Project cost**

| S. No                | Description of the Cost | Amount in Rs.           |
|----------------------|-------------------------|-------------------------|
| <b>A. Fixed Cost</b> |                         |                         |
| 1                    | Land Cost               | Nil. Because Govt. land |
| 2                    | Labour shed             | 50,000/-                |

|                                          |                                           |                                  |
|------------------------------------------|-------------------------------------------|----------------------------------|
| 3                                        | Sanitary facilities                       | 50,000/-                         |
| 4                                        | Fencing Cost                              | 1,25,000/-                       |
| <b>Total</b>                             |                                           | <b>2,25,000/-</b>                |
| <b>B. Operational Cost</b>               |                                           |                                  |
| 1                                        | Jack Hammers                              | 1,98,000/-                       |
| 2                                        | Compressor                                | 19,82,000/-                      |
| 3                                        | Diamond wire saw                          | 4,87,000/-                       |
| 4                                        | Diesel General                            | 4,00,000/-                       |
| 5                                        | Excavators                                | 6,00,000/-                       |
| 6                                        | Tippers                                   | 58,00,000/-                      |
| 7                                        | Drinking water facilities for the labours | 50,000/-                         |
| 8                                        | Safety kits                               | 50,000/-                         |
| <b>Total Operational Cost</b>            |                                           | <b>95,67,000/-</b>               |
| <b>C. EMP Cost</b>                       |                                           |                                  |
| 1                                        | Afforestation                             | 30,000/-                         |
| 2                                        | Water Sprinkling                          | 50,000/-                         |
| 3                                        | Water Quality test                        | 25,000/-                         |
| 4                                        | Air Quality test                          | 25,000/-                         |
| 5                                        | Noise/Vibration test                      | 25,000/-                         |
| 6                                        | CSR activities                            | 50,000/-                         |
| <b>Total EMP Cost</b>                    |                                           | <b>2,05,000/-</b>                |
| <b>Total Cost of the Project (A+B+C)</b> |                                           | <b>99,97,000/- (Say 1 Crore)</b> |

#### 4.2. Proposed schedule for approval and implementation

The time schedule for the completion of the proposed mining project is given in the below as,

**Table-18 Project schedule**

| Particulars                                             | Time Schedule |
|---------------------------------------------------------|---------------|
| Submission of Draft EIA/EMP to TNPCB for Public Hearing | August 2025   |
| Conduction of Public Hearing                            | October 2025  |
| Submitting final EIA/EMP                                | December 2025 |
| Presentation to SEAC and Obtaining EC                   | January 2026  |

The project will be implemented after obtaining EC from SEIAA and CTO from PCB.



#### 4.3 CER Activity

Based on O.M F.No. 22-65/2017-IA.III 2.0% of the Project cost need to be spent for CER activities i.e., Rs. 2.0 Lakhs need to be spent for the CER activity. However, TAMIN is proposing for Rs. 4.0 Lakhs which is 4.0% of Project cost under CER activities for the Jammanahalli Government Higher Secondary School.

### 5. MINING CLOSURE PLAN

#### 5.1 Progressive Mine Closure Plan

As a petro genetic character, the depth persistence of the black granite body in the mine lease area is beyond the workable limits. Based on the statutory provisions of mine safety rules and regulations the workable depth is proposed for 33m from top of the hill. However, in course of time there is a possibility of up gradation of technology for safe mining beyond 33m. Hence, it is proposed not to backfill the ultimate pit. The Pit boundaries shall be safely fenced with 7.5m buffer safety zone and rain water or seepage water stored in the pit will be used for agriculture purpose. Green belt development will be maintained in the 7.5m buffer safety zone. Garland drain will be constructed around the quarry area to prevent surface run off rain water entering to the pit. At the end of the life of mine, the mine closure plan will be prepared and submitted to the competent authority to obtain approval and the same will be implemented.

### 6. REHABILITATION AND RESETTLEMENT

There will be no Rehabilitation and Resettlement in this proposed project.

### 7. SITE ANALYSIS

Environmental sensitive such as water bodies, reserved forest, wildlife sanctuary, national park, human settlements and other ecological features are given below.

#### Environmentally/Ecologically Sensitive areas

The environmental sensitive areas covering an aerial distance of 15 km from the project boundary is given in below table.

**Table-19 Lists of Waterbodies**

| S.No | Water bodies            | Distance (~km) | Direction |
|------|-------------------------|----------------|-----------|
| 1.   | Turinjihalli Ar         | 0.57           | NW        |
| 2.   | Annamalaihalli Pond     | 1.26           | NE        |
| 3.   | Paraiyapatti Pudur Lake | 1.68           | SSE       |
| 4.   | Lake near Krishnapuram  | 2.30           | NNW       |
| 5.   | Tenkaraikottai Lake     | 2.53           | W         |

|     |                        |       |     |
|-----|------------------------|-------|-----|
| 6.  | Vaniyar River          | 2.74  | SE  |
| 7.  | Piniyar River          | 3.85  | ESE |
| 8.  | Nambiyappattii Lake    | 3.97  | ENE |
| 9.  | Karukkampatti River    | 4.04  | ESE |
| 10. | Panchalanagar Lake     | 4.53  | WSW |
| 11. | Alapuram Eri           | 5.73  | SW  |
| 12. | Todddampatti Lake      | 5.74  | ENE |
| 13. | Varatta Ar             | 8.61  | NE  |
| 14. | Sintalbadi Lake        | 10.04 | NW  |
| 15. | Vallimadurai Reservoir | 12.92 | ESE |

**Table-20 List of Reserved Forests**

| S.No | Reserved Forest    | Distance (~km) | Direction |
|------|--------------------|----------------|-----------|
| 1    | Kavaramalai RF     | 3.18           | W         |
| 2    | Harur RF           | 5.14           | NNE       |
| 3    | Pallippatti RF     | 6.21           | SE        |
| 4    | Thombakal Ext RF   | 6.64           | ESE       |
| 5    | Morappur RF        | 9.17           | NNE       |
| 6    | Thombakal RF       | 9.53           | SE        |
| 7    | Kavaramalai Ext RF | 11.55          | W         |
| 8    | Nochikuttai Ext RF | 12.62          | SSE       |
| 9    | Kuttar RF          | 12.78          | SSW       |
| 10   | Veppampatti RF     | 13.04          | E         |
| 11   | Veppampatti Ext RF | 13.42          | E         |
| 12   | Bothakkadu RF      | 13.61          | SW        |
| 13   | Poyyappatti RF     | 13.95          | ENE       |
| 14   | Nochikuttai RF     | 14.15          | SSE       |
| 15   | Karungal RF        | 14.59          | ESE       |
| 16   | Mavuttu RF         | 14.68          | SSW       |

**Table-21 Lists of nearby Habitations**

| S.No | Villages        | Distance (~km) | Direction | Population |
|------|-----------------|----------------|-----------|------------|
| 1    | Annamalaihalli  | 0.66           | NE        | 1,227      |
| 2    | Jammanahalli    | 0.95           | SSW       | 2,363      |
| 3    | Vadakarai       | 1.08           | NW        | 300        |
| 4    | Tennagaram      | 1.25           | WSW       | 100        |
| 5    | Gopinathampatti | 1.60           | ESE       | 2,500      |

\* Few settlements are located near to the quarry.

## 8. BASELINE STUDY

### 8.1 Study Period

The baseline environmental surveys were carried out during **(February 2025 – May 2025)** within the study area.

### 8.2 Ambient Air Quality

**Table-22 Summary of Ambient Air Quality Monitoring**

| S.No | Parameters ( $\mu\text{g}/\text{m}^3$ )        | Minimum | Maximum | NAAQ Standards |
|------|------------------------------------------------|---------|---------|----------------|
| 1.   | PM <sub>10</sub> ( $\mu\text{g}/\text{m}^3$ )  | 36.95   | 48.57   | 100            |
| 2.   | PM <sub>2.5</sub> ( $\mu\text{g}/\text{m}^3$ ) | 18.48   | 24.29   | 60             |
| 3.   | SO <sub>2</sub> ( $\mu\text{g}/\text{m}^3$ )   | 7.13    | 12.63   | 80             |
| 4.   | NO <sub>2</sub> ( $\mu\text{g}/\text{m}^3$ )   | 14.26   | 21.77   | 80             |

The ambient air quality has been monitored at 8 locations for 13 parameters as per NAAQS, 2009 within the study area.

### 8.3 Noise Environment

Ambient noise levels were monitored using precision noise level meter in and around the project site at 8 locations during study period.

- In Residential area day time noise levels varied from 50.1 dB (A) to 53.9dB (A) and night time noise levels varied from 40.5 dB(A) to 43.7 dB(A) across the sampling stations. The field observations during the study period indicate that the ambient noise levels in Residential area are within the limit prescribed by CPCB for Residential area (55 dB (A) Day time & 45 dB (A) Night time).

- In Industrial Area day time noise levels was recorded as 60.3 dB(A) and the night time noise levels was recorded as 51.9 dB(A) among the sampling stations. The field observations during the study period indicate that the ambient noise levels are within the prescribed limit by CPCB (75 dB(A) Day time & 70 dB(A) Night time).

#### 8.4 Water Quality

The prevailing status of water quality at 8 locations for surface water and 8 locations for ground water have been assessed during the study period. The standard methods prescribed in IS 2296:1992 were followed for sample collection, preservation and analysis in the laboratory for various physiochemical parameters.

##### 8.4.1 Surface water quality

**Table-23 Summary of Surface Water Quality Monitoring**

| S. No | Parameters           | Minimum | Maximum | Designated Best Use Water Quality Criteria |
|-------|----------------------|---------|---------|--------------------------------------------|
| 1.    | pH                   | 7.12    | 7.94    | A                                          |
| 2.    | TDS (mg/l)           | 673     | 1149    | -                                          |
| 3.    | COD (mg/l)           | 48      | 92      | -                                          |
| 4.    | BOD (mg/l)           | 4       | 8       | -                                          |
| 5.    | Total Hardness(mg/l) | 300     | 590     | -                                          |

##### 8.4.2 Ground Water Quality

**Table-24 Summary of Ground Water Quality Monitoring**

| S.NO | Parameters            | Minimum | Maximum | IS 10500: 2012 Standards |                   |
|------|-----------------------|---------|---------|--------------------------|-------------------|
|      |                       |         |         | Acceptable Limit         | Permissible Limit |
| 1.   | pH                    | 7.11    | 7.74    | 6.5 – 8.5                | NR                |
| 2.   | Chloride (mg/l)       | 529.52  | 900.7   | 250                      | 1000              |
| 3.   | Total Hardness (mg/l) | 460     | 790     | 200                      | 600               |
| 4.   | TDS (mg/l)            | 1160    | 1775    | 500                      | 2000              |

- It is observed that all the collected ground water samples meets the drinking water standards (IS 10500:2012) and can be used for drinking.

#### 8.5 Soil Quality

Soil sampling was carried out at eight locations in the study area. The summary of the soil quality is given below.

**Table-25 Summary of Soil Quality Monitoring**

| S.No | Parameters                      | Minimum | Maximum |
|------|---------------------------------|---------|---------|
| 1.   | pH                              | 6.83    | 7.86    |
| 2.   | Electrical conductivity (μS/cm) | 68.0    | 188.0   |

|    |                      |               |        |
|----|----------------------|---------------|--------|
| 3. | Nitrogen (%)         | 0.0010        | 0.0059 |
| 4. | Phosphorus (mg/kg)   | BLQ (LOQ 5.0) |        |
| 5. | Potassium (mEq/100g) | 11.85         | 23.58  |

## 9. WASTE HANDLING

### 9.1 Solid Waste Management

The municipal solid waste generation and management details are given in **Table-26**.

**Table-26 Municipal Solid Waste Generation & Management**

| S. No        | Type      | Quantity Kg/day | Disposal method                    |
|--------------|-----------|-----------------|------------------------------------|
| 1            | Organic   | 8.1             | Municipal bin including food waste |
| 2            | Inorganic | 5.4             | TNPCB authorized recyclers         |
| <b>Total</b> |           | <b>13.5</b>     |                                    |

As per CPHEEO guidelines: MSW per capita/day =0.45

### 9.2 Hazardous Waste Management

The type of hazardous waste and the quantity generated are detailed in **Table-27**.

**Table-27 Hazardous Waste Management**

| Waste Category No | Description | Quantity (L/Year) | Mode of Disposal                                                                      |
|-------------------|-------------|-------------------|---------------------------------------------------------------------------------------|
| 5.1               | Waste Oil   | 3.0               | Will be collected in leak proof containers and disposed to TNPCB authorized recyclers |

## 10. POST PROJECT MONITORING

### 10.1 Post Project Environmental Monitoring

The Project proponent set up regular monitoring stations to assess the quality of the environment.

**Table-28 Post Project Environmental Monitoring Program**

| S. No | Area of Monitoring  | Number of Sampling Stations                     | Frequency of Sampling         | Parameters to be Analyzed                                                                 |
|-------|---------------------|-------------------------------------------------|-------------------------------|-------------------------------------------------------------------------------------------|
| 1.    | Meteorology         | One                                             | Hourly and Daily basis        | Wind speed and direction, Temperature, Relative Humidity, Atmospheric pressure, Rainfall. |
| 2.    | Ambient Air Quality | 2 Stations (one in up wind and one in downwind) | Twice a week:24 hourly period | PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , and NO <sub>2</sub>              |

|    |                               |                                                   |                     |                                                                                  |
|----|-------------------------------|---------------------------------------------------|---------------------|----------------------------------------------------------------------------------|
| 3. | Noise                         | 2 (one within core area and one in buffer area)   | Once every season   | Ambient Equivalent continuous Sound Pressure Levels (Leq) at day and Night time. |
| 4  | Exhaust from DG set           | Stack of DG set                                   | Quarterly           | PM <sub>10</sub> , PM <sub>2.5</sub> , SO <sub>2</sub> , and NO <sub>2</sub>     |
| 5  | Soil                          | Two Locations within the Project Site             | Yearly Once         | Physico chemical properties, Nutrients, Heavy metals                             |
| 6  | Terrestrial Ecology           | Within 10km around the project                    | Once in three years | Symptoms of injuries on plants                                                   |
| 7  | Surface/ Ground water quality | One surface and ground water sample near the site | Yearly Once         | As per ISO 10500 Standard parameters and IS 2296:1992 Standards                  |

## 11. CONCLUSION

The **proposed Jammanahalli Black Granite Quarry**, extending over 6.59.5 hectares, is anticipated to play a vital role in fostering socio-economic development in the surrounding villages. The project is expected to provide direct employment opportunities for nearly 30 individuals, thereby improving local livelihood options and contributing to an enhanced standard of living for the community.

From an environmental standpoint, possible impacts such as dust emissions, noise generation, and siltation due to surface run-off have been carefully evaluated. The project will adopt comprehensive mitigation measures to ensure that all activities remain within prescribed regulatory standards, thereby minimizing potential adverse effects on the environment.

To ensure pollution control and workplace safety, the following environmental management practices will be implemented on a routine basis:

- Water sprinkling on haul roads and drilling sites to minimize dust emissions.
- Greenbelt development and plantation around the quarry lease boundary to serve as dust barriers and to augment local biodiversity.
- Adoption of diamond wire saw cutting techniques, which significantly reduce noise, vibration, and fugitive dust compared to conventional blasting practices.
- Mandatory provision and use of personal protective equipment (PPE) to safeguard workers' health and safety.

Furthermore, under its Corporate Environmental Responsibility (CER) commitments, the project proponent will extend support toward strengthening local infrastructure, education, healthcare, and sanitation facilities. These initiatives are expected to generate substantial social and economic benefits for the nearby communities, reinforcing the project's positive contribution to regional development.

## 1 INTRODUCTION

### 1.1 Purpose of the Report

The proposed jammanahalli black granite quarry is over an extent of 6.59.5Ha at S.F.No.83 (Part), Jammanahalli Village, Pappireddipatti Taluk, Dharmapuri District, and Tamil Nadu State. It is a government poramboke land.

As per the EIA Notification, 2006 and its subsequent amendment S.O. 1886(E) dated 20<sup>th</sup> April 2022, the proposed mining project, with an area of 6.595 Ha, falls under the B1 category. As per the Hon'ble National Green Tribunal's order dated 13<sup>th</sup> September 2018 in O.A. No. 186 of 2016, and the MoEF&CC Office Memorandum F.No. L-11011/175/2018-IA-II (M) dated 12.12.2018, the requirement of EIA/EMP and Public Hearing for B1 category projects has been clarified.

Based on this, the ToR was obtained vide Identification No. T025B0108TN5769635N, Dated: 19.05.2025. Accordingly, the EIA report has been prepared and the report will be submitted for Public Hearing. After the completion of the public hearing, the queries raised and their compliance will be incorporated into the final EIA report, which will be submitted to the Tamil Nadu SEAC /SEIAA for appraisal and for seeking Environmental Clearance for the proposed project.

### 1.2 Project Background

TAMIN has obtained lease for 20 years vide precise area communication letter No.4539479/MME.1/2023-1, Dated: 13.09.2023. Precise area communication letter is enclosed as **Annexure-1**. Accordingly, Mining Plan has been approved by the Commissioner, Department of Geology and Mining, Guindy, Chennai vide letter Rc. No.72/MM4/2023 dated 23.11.2023 for the proposed production capacity of 4,150m<sup>3</sup> at 10% recovery of ROM 41,501m<sup>3</sup> during the five years of mining plan period. The mining plan approval letter is enclosed as **Annexure-2** and approved mining plan is enclosed as **Annexure-3**.

The ToR application was submitted to TN-SEIAA vide online proposal No. SIA/TN/MIN/525197/2025, dated: 22.02.2025 as the area of the proposed project is more than 5.00.0Ha. The proposal was appraised during 549<sup>th</sup> SEAC meeting held on 07.04.2025 and 822<sup>nd</sup> SEIAA meeting held on 15.05.2025 and the ToR was issued along with public hearing vide Identification No.T025B0108TN5769635N, dated: 19.05.2025 under B1 Category, Schedule 1(a) Mining of Minerals as per EIA Notification 2006 and its subsequent amendments. The copy of ToR is enclosed as **Annexure-5**.

Based on the issued ToR, the draft EIA report will be submitted to Tamil Nadu Pollution Control Board for conducting Public Hearing. After the completion of the Public Hearing, the queries

raised and their compliance will be incorporated into the final EIA report, which will be submitted to the Tamil Nadu SEAC/SEIAA for appraisal and for seeking Environmental Clearance for the proposed project.

### **1.3 Identification of Project & Project Proponent**

#### **1.3.1 Identification of the Project**

The proposed jammanahalli black granite quarry is over an extent of 6.59.5 Ha located at S.F.83 (Part), Jammanahalli Village, Pappireddipatti Taluk, Dharmapuri District, Tamil Nadu State.

TAMIN is obtaining Environmental Clearance from SEIAA-Tamil Nadu. Since, the project falls under B1 Category, Schedule 1(a) Mining of Minerals as per MoEF&CC Notification and its amendment vide S. O. 1886 (E) dated; 20.04.2022.

#### **1.3.2 Identification of the Project Proponent**

Tamil Nadu Minerals Limited (TAMIN) (An Undertaking of Government of Tamil Nadu) has been established in the year 1978. It entered the international granite market in the year 1979 and has secured a steady market for dimensional blocks of black and other color materials in countries like Japan, Germany, Italy, Australia, UK, Switzerland, Holland, USA etc. TAMIN had started the Captive Graphite Mine in the year 1986.

TAMIN is only organization recognized by Bureau of Indian Standard for manufacture and supply of I.S. Sand all over the country. TAMIN has also been marketing granite cubes with sides measuring 6cm to 12cm. TAMIN has developed expertise in the mining of granite dimensional stones of different varieties including black granite (Dolerite), Kashmir white (Leptynite), Paradiso (Migmatite gneiss), Green onyx (Syenite - porphyry) Red wave (Pink Feldspathic gneiss) Colombo Juparana (Pegmatitic granite gneiss of migmatitic origin), Raw silk (Yellow Feldspathic Leptynite) and a number of other color granite varieties apart from other industrial minerals viz. quartz and feldspar, graphite, lime stone, silica sand, vermiculite, etc.

TAMIN has also set up industrial units for polishing processing the granite stones one each at Manali (Chennai), Madhepalli at Krishnagiri District and Melur at Madurai District. A Beneficiation plant for the beneficiation of graphite ore has been established close to Sivaganga Graphite mine. An exfoliation plant for the processing of vermiculite mineral at Sevathur village of Tirupathur district has also been established.



## 1.4 Brief Description of the Project

### 1.4.1 Nature and Size of the Project

The quarrying operation is being carried out by open cast semi-mechanized method with 6m bench height and 6m bench width along with deployment of HEMM for development and production activities under Regulation 106.

The Geological reserve of black granite was computed based on the geological plan & section as 4,09,500m<sup>3</sup>. Mineable Reserves have been computed as 2,13,213m<sup>3</sup> after leaving the reserves locked up in safety barrier and benches based on the conceptual plan and sections, the effective(Saleable) mineable reserves have been worked out as 21,321m<sup>3</sup> by applying the recovery factor 10%.

The total proposed production capacity is 4,150m<sup>3</sup> at 10% recovery of ROM 41,501m<sup>3</sup>. The annual peak production per year would be 1,000m<sup>3</sup> at 10% recovery of ROM 9,999m<sup>3</sup>. Total waste (Granite waste+Over Burden+Side Burden) to be generated during the five years of mining plan period will be around 64,962m<sup>3</sup>. These wastes are proposed to be dumped on the Southeast of the lease area.

**Table 1-1 Ultimate Pit Dimensional Details**

| S. No | Description | Average Ultimate Pit Dimensions(m) |       |       |
|-------|-------------|------------------------------------|-------|-------|
|       |             | Length                             | Width | Depth |
| 1     | Top         | 324.0                              | 68.0  | 33.0  |
| 2     | Bottom      | 193.0                              | 22.50 |       |

**Table 1-2 Reserves of Proposed Quarry**

| S. No | Geological Reserves (m <sup>3</sup> ) | Mineable Reserves (m <sup>3</sup> ) | Production Capacity at 10% Recovery (m <sup>3</sup> ) |
|-------|---------------------------------------|-------------------------------------|-------------------------------------------------------|
| 1     | 4,09,500                              | 2,13,213                            | 21,321                                                |

### 1.4.2 Location of the Project

The proposed project is over an extent of 6.59.5 Ha; the lease area is located at S.F.No.83 (Part) of Jammanahalli Village, Pappyreddypatty Taluk, Dharmapuri District, and Tamil Nadu State. Quarry lease area falls in the Survey of India Topo sheet no D44S8 and the area lies in the Eastern Longitude from 78°25'11.6284"E to 78°25'25.2777"E and Northern Latitude from 12°00'33.8481"N to 12°00'45.4265"N. The quarry lease area is hillock with height of about 32m surrounded by plain lands. The altitude of the area is 432m AMSL (Above Mean Sea Level). The site co-ordinates of the mine lease area are tabulated in **Table 1-3**.

**Table 1-3 Boundary Coordinates of the Project**

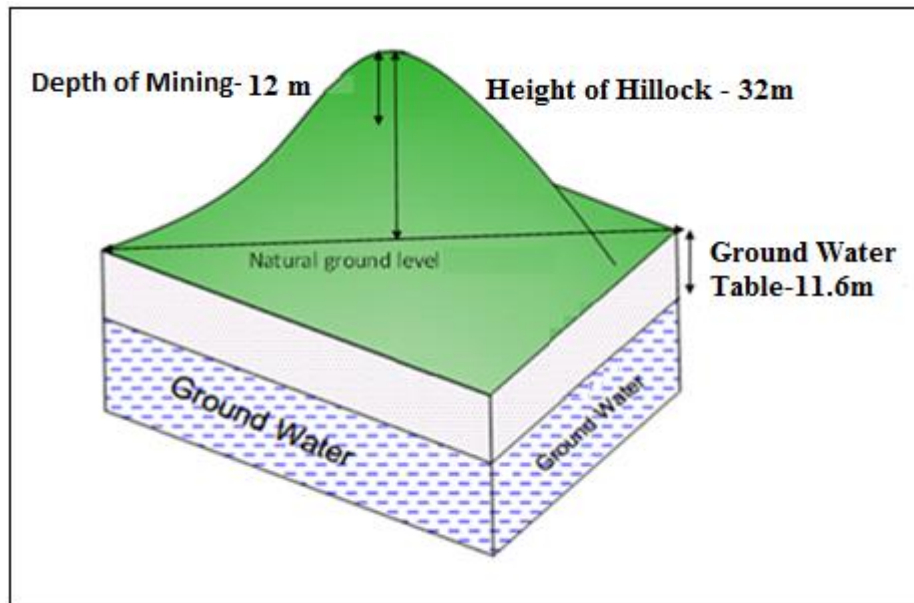
| S. No | Boundary mark point | Latitude (N)     | Longitude(E)     |
|-------|---------------------|------------------|------------------|
| 1     | BP1                 | 12° 00' 38.2442" | 78° 25' 25.2777" |
| 2     | BP2                 | 12° 00' 33.8481" | 78° 25' 23.0578" |
| 3     | BP3                 | 12° 00' 35.7907" | 78° 25' 21.0860" |
| 4     | BP4                 | 12° 00' 38.6116" | 78° 25' 15.9442" |
| 5     | BP5                 | 12° 00' 39.4785" | 78° 25' 13.4590" |
| 6     | BP6                 | 12° 00' 44.3812" | 78° 25' 11.6284" |
| 7     | BP7                 | 12° 00' 44.9224" | 78° 25' 12.3393" |
| 8     | BP8                 | 12° 00' 45.1505" | 78° 25' 12.2613" |
| 9     | BP9                 | 12° 00' 45.4265" | 78° 25' 13.2395" |
| 10    | BP10                | 12° 00' 44.3539" | 78° 25' 15.8430" |
| 11    | BP11                | 12° 00' 42.2847" | 78° 25' 20.8651" |



**Figure 1-1 Google Image of the Mine Lease Area with GPS Co-ordinates**

### 1.4.3 Site elevation and ground water depth

The Altitude of the proposed project site is 432m above MSL. Height of the hillock is 32m. The available ground water depth is 11.6m (As per TWAD) (TWAD- Dharmapuri - May 2024). The Pappireddypatti Taluk falls under over exploited category as per CGWB.



**Figure 1-2 Schematic Diagram of Site Elevation and Ground Water Regime**

### **1.5 EIA Study**

As a part of compliance to the regulatory requirement i.e., to obtain Environmental Clearance from SEIAA-TN, TAMIN has appointed Environmental Consultant accredited by National Accreditation Board for Education and Training (NABET)-Quality Council of India (QCI), New Delhi. The project proponent assigned the work of undertaking field studies and preparation of EIA/EMP report under B1category as obtained Terms of Reference from SEIAA-TN to M/s Hubert Enviro Care Systems (P) Ltd. (HECS) Chennai. HECS is accredited by NABET, vide possession of Certificate No. NABET/EIA/24-27/RA 0335, Valid up to 31.03.2027.

### **1.6 EIA Cost**

EIA study was undertaken by HECS for an amount of Rs.2,67,500/- .The base line monitoring was done by M/s. HECS lab, Chennai, an NABL and MoEF& CC Accredited Laboratory. NABL Certificate No: TC-12310 Dated: 25.09.2023 Valid Till 24.09.2025.

### **1.7 Importance of the Project to the Country and Region**

Granite quarries play a significant role in India's economy and infrastructure development. Here are some key aspects highlighting the importance of granite quarries to India:

#### **Economic Importance:**

1. **Employment:** Granite quarries provide direct and indirect employment to thousands of people, contributing to the livelihoods of many families.

2. Revenue generation: Granite exports earn significant foreign exchange for India, boosting the country's economy.

3. GDP contribution: The mining and quarrying sector, including granite, contributes substantially to India's Gross Domestic Product (GDP).

#### **Global Significance:**

1. Export hub: India is a significant exporter of granite, catering to global demand, particularly from countries like China, the United States, and the Middle East.

2. Quality and diversity: Indian granite is renowned for its quality, color, and pattern variety, making it a preferred choice globally.

Overall, granite quarries contribute substantially to India's economic growth, infrastructure development, and social welfare, while also catering to global demand for this valuable natural resource.

### **1.8 Scope of the Study**

The scope of the work mentioned includes an assessment study of proposed black granite quarry project and their impact on the region. This study puts forward the most effective ways to protect the environment from increasing pollution caused by the mining activities and recommendations for environmental-friendly development initiatives in the region.

An Environmental Impact Assessment (EIA) is an assessment of the possible impact, whether positive or negative that, the mining activities may have on the environment, together consisting of the natural, social and economic aspects, i.e., aiming at "Sustainable Development" due to the project activities.

This EIA report presents the existing baseline scenario and the assessment and evaluation of the environmental impacts that may arise during mining. This report also highlights the Environmental Monitoring Program during the operation phase of the project and the post mined management program. The generic structure of the EIA document will be as per the EIA Notification of the MoEF&CC dated 14<sup>th</sup> September 2006 and subsequent amendments. The basic structure of the report will be as under.

### **Chapter 1: Introduction**

Introductory information is presented in this Chapter. The introduction chapter provides background to the project, project proponent and describes the objective of this document. The purpose and organization of the report is also presented in this chapter.

## **Chapter 2: Project Description**

This chapter includes project description and infrastructure facilities delineating all the quarry operations and environmental aspect of the quarry activities.

## **Chapter 3: Description of the Environment**

This chapter provides baseline environmental status of Environmental Components (Primary data) delineating meteorological details of the project site and surrounding area.

## **Chapter 4: Anticipated Environmental Impacts & Mitigation Measures**

This chapter presents the analysis of impacts on the environmental and social aspects of the project as a result of establishment of plan and thereby suggesting the mitigation measures.

## **Chapter 5: Analysis of Alternatives (Technology and Sites)**

This chapter includes the justification for the selection of the project site from Environmental point of view as well as from economic point of view.

## **Chapter 6: Environmental Monitoring Programme**

This chapter will include the technical aspects of monitoring, the effectiveness of mitigation measures which will include the measurement methodologies, frequency, location, data analysis, reporting schedules etc,

## **Chapter 7: Additional Studies**

This chapter will detail about the public consultation sought regarding the project. It will also identify the risks of the project in relation to the general public and the surrounding environment during quarry operation phase and thereby presents Disaster Management Plan, Social impact assessment and R&R action plans.

## **Chapter 8: Project Benefits**

This chapter deals with improvement in physical and social infrastructures, employment potential and other tangible benefits.

## **Chapter 9: Environmental Cost Benefit analysis**

Not recommended during scoping

## **Chapter 10: Environmental Management Plan**



This is the key chapter of the report and presents the mitigation plan, covers the institutional and monitoring requirements to implement environmental mitigation measures and to assess their adequacy during project implementation.

### **Chapter 11: Summary and Conclusion**

This chapter summarizes the information given in Chapters in this EIA/EMP report and the conclusion based on the environmental study, impact identification, mitigation measures and the environmental management plan.

### **Chapter 12: Disclosure of the Consultant**

Names of consultants engaged in the preparation of the EIA/EMP report along with their brief resume and nature of consultancy rendered are included in this chapter

#### **1.8.1 Objectives of the Study**

- To ensure environmental considerations are explicitly addressed and incorporated into the development decision-making process.
- To anticipate and avoid, minimize or offset the adverse significant biophysical, social and other relevant effects of the above project proposal.
- To protect the productivity and capacity of natural systems and the ecological processes which maintain their respective functions.
- To promote development that is sustainable and optimizes resource use as well as management opportunities.
- To fully recognize the scope and requirements of the ToR and comply with the same.

The major objective of this study is to prepare a detailed Environmental Impact Assessment study within the study area i.e 10 km radius from the project

#### **1.8.2 EIA Process**

An Environmental Impact Assessment (EIA) is an assessment of the possible impact, whether positive or negative, that a proposed project may have on the environment, together consisting of the natural, social and economic aspects, i.e., aiming at “Sustainable Development” due to the project activities.

The EIA process followed for this EIA report is composed of the following stages:

1. Study of project information.
2. Screening & Scoping.
3. Environmental pre-feasibility study & application for approval of ToR.
4. Collection of detailed project management plan/report.

5. Baseline data collection.
6. Impact identification, Prediction & Evaluation.
7. Mitigation measures & delineation of EMP.
8. Risk assessment and safety & disaster management plan.
9. Review & finalization of EIA Report based on the ToR requirements.
10. Submission of EIA report for implementation of mitigation measures & EMP as well as necessary clearances from relevant Authority.

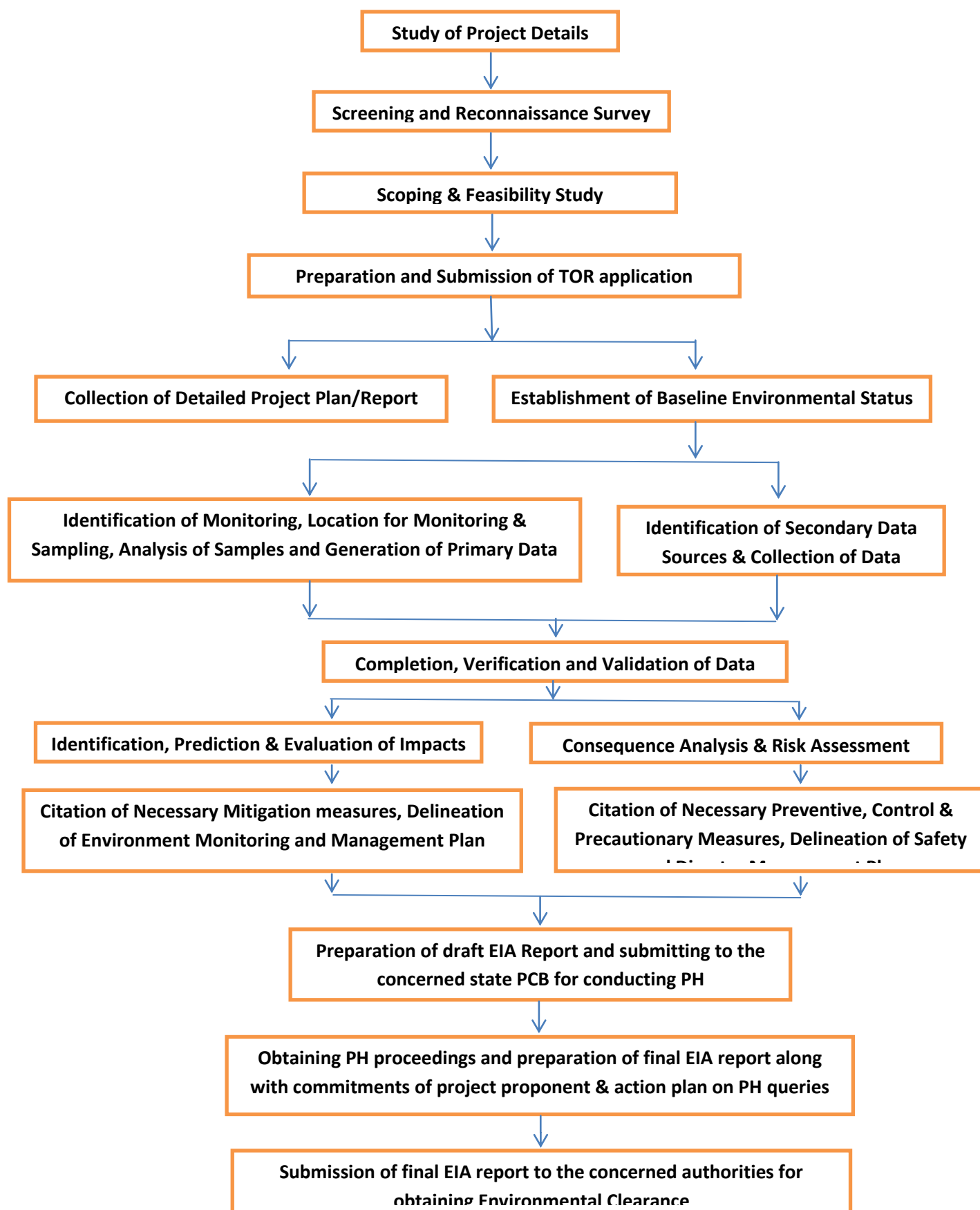


Figure 1-3 Feasibility & Environmental Assessment Process



### 1.8.3 Legal Complicability

The following environmental acts/regulations besides the local zoning and land use laws of the States will govern the establishment and functioning of mining industry.

| S.No | Acts/Rules                                                                                                   |
|------|--------------------------------------------------------------------------------------------------------------|
| 1    | The Environment Protection Act of 1986 amended in 2018                                                       |
| 2    | Environmental Impact Assessment Notification 14 <sup>th</sup> Sep2006 and subsequent amendments time to time |
| 3    | The Water (Prevention and Control of Pollution) Act, 1974 as amended in 1988                                 |
| 4    | The Water (Prevention and Control of Pollution) Cess Act, 1977, as amended in 2003                           |
| 5    | The Air (Prevention and Control of Pollution) Act, 1981 as amended in 1987, 2014 and 2018.                   |
| 6    | The Noise Pollution and Regulation Act: 2000 amended in 2010                                                 |
| 7    | The Wildlife (Protection) Act, 1972 as amended in 1991, 1993, 2002, 2006 and 2013                            |
| 8    | The Forest (Conservation) Act, 1980 as amended in 1988 and 1998                                              |
| 9    | The Public Liability Insurance Act, 1991, 1992 and 2015                                                      |
| 10   | The Mines and Minerals (Regulation and Development) Act, 1957 as amended in 2016                             |
| 11   | Circulars issued by the Director-General Mines Safety (DGMS)                                                 |
| 12   | Contract Labor Regulation and Abolition Act 1970 amended in 2017                                             |
| 13   | The Motor Vehicles Act – 1989 as amended in 2022                                                             |
| 14   | PESO – Explosives and handling of Hazardous Material: 1934 amended in 2021.                                  |

#### 1.8.4 Terms of Reference Compliance

##### SEAC Conditions – Site Specific

| S.No | Terms of Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Compliance                                                                                                                                                               |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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>There is only one existing quarry of same proponent located within 500m radius of the proposed project site. Hence, Cluster Management Committee is not required.</p> |

| 2               | The Boundary pillars to be erected as per the mine rules and the evidence should be submitted along with the EIA report.                                                                                                                                                                                                                                                                                                    | The Boundary pillars will be erected as per the mine rules and the evidence will be submitted along with the final EIA report.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |      |             |       |              |  |  |   |      |   |                |  |  |   |      |   |   |       |   |                 |  |  |   |        |   |   |      |   |   |       |    |                 |  |  |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------------|-------|--------------|--|--|---|------|---|----------------|--|--|---|------|---|---|-------|---|-----------------|--|--|---|--------|---|---|------|---|---|-------|----|-----------------|--|--|
| 3               | Since waterbodies are situated nearby, the PP shall carry out the hydrological study including the details of waterflow pattern to determine the impacts of the mining operation in the waterbodies.                                                                                                                                                                                                                        | The impact of water environment is discussed in <b>Chapter 4, Section-4.7</b> .<br>The mitigation measures of water environment is discussed in <b>Chapter 4, Section 4.25</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |             |       |              |  |  |   |      |   |                |  |  |   |      |   |   |       |   |                 |  |  |   |        |   |   |      |   |   |       |    |                 |  |  |
| 4               | The details of enumeration of structures including schools, colleges, primary health centres should be submitted along with the EIA report.                                                                                                                                                                                                                                                                                 | The details of schools, colleges, primary health centres are given in <b>Chapter 3, Section 3.3, and Table 3-1</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |             |       |              |  |  |   |      |   |                |  |  |   |      |   |   |       |   |                 |  |  |   |        |   |   |      |   |   |       |    |                 |  |  |
| 5               | 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. | <p>The structures within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m and (iv) 300 m &amp; upto 1km is given below.</p> <table border="1"> <thead> <tr> <th>S.No</th><th>Description</th><th>Count</th></tr> </thead> <tbody> <tr> <td colspan="3"><b>0-50m</b></td></tr> <tr> <td>1</td><td>Shed</td><td>1</td></tr> <tr> <td colspan="3"><b>50-100m</b></td></tr> <tr> <td>2</td><td>Shed</td><td>2</td></tr> <tr> <td>1</td><td>House</td><td>4</td></tr> <tr> <td colspan="3"><b>100-200m</b></td></tr> <tr> <td>1</td><td>Temple</td><td>1</td></tr> <tr> <td>2</td><td>Shed</td><td>8</td></tr> <tr> <td>3</td><td>House</td><td>12</td></tr> <tr> <td colspan="3"><b>200-300m</b></td></tr> </tbody> </table> | S.No | Description | Count | <b>0-50m</b> |  |  | 1 | Shed | 1 | <b>50-100m</b> |  |  | 2 | Shed | 2 | 1 | House | 4 | <b>100-200m</b> |  |  | 1 | Temple | 1 | 2 | Shed | 8 | 3 | House | 12 | <b>200-300m</b> |  |  |
| S.No            | Description                                                                                                                                                                                                                                                                                                                                                                                                                 | Count                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |      |             |       |              |  |  |   |      |   |                |  |  |   |      |   |   |       |   |                 |  |  |   |        |   |   |      |   |   |       |    |                 |  |  |
| <b>0-50m</b>    |                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |             |       |              |  |  |   |      |   |                |  |  |   |      |   |   |       |   |                 |  |  |   |        |   |   |      |   |   |       |    |                 |  |  |
| 1               | Shed                                                                                                                                                                                                                                                                                                                                                                                                                        | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |             |       |              |  |  |   |      |   |                |  |  |   |      |   |   |       |   |                 |  |  |   |        |   |   |      |   |   |       |    |                 |  |  |
| <b>50-100m</b>  |                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |             |       |              |  |  |   |      |   |                |  |  |   |      |   |   |       |   |                 |  |  |   |        |   |   |      |   |   |       |    |                 |  |  |
| 2               | Shed                                                                                                                                                                                                                                                                                                                                                                                                                        | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |             |       |              |  |  |   |      |   |                |  |  |   |      |   |   |       |   |                 |  |  |   |        |   |   |      |   |   |       |    |                 |  |  |
| 1               | House                                                                                                                                                                                                                                                                                                                                                                                                                       | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |             |       |              |  |  |   |      |   |                |  |  |   |      |   |   |       |   |                 |  |  |   |        |   |   |      |   |   |       |    |                 |  |  |
| <b>100-200m</b> |                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |             |       |              |  |  |   |      |   |                |  |  |   |      |   |   |       |   |                 |  |  |   |        |   |   |      |   |   |       |    |                 |  |  |
| 1               | Temple                                                                                                                                                                                                                                                                                                                                                                                                                      | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |             |       |              |  |  |   |      |   |                |  |  |   |      |   |   |       |   |                 |  |  |   |        |   |   |      |   |   |       |    |                 |  |  |
| 2               | Shed                                                                                                                                                                                                                                                                                                                                                                                                                        | 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |             |       |              |  |  |   |      |   |                |  |  |   |      |   |   |       |   |                 |  |  |   |        |   |   |      |   |   |       |    |                 |  |  |
| 3               | House                                                                                                                                                                                                                                                                                                                                                                                                                       | 12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |      |             |       |              |  |  |   |      |   |                |  |  |   |      |   |   |       |   |                 |  |  |   |        |   |   |      |   |   |       |    |                 |  |  |
| <b>200-300m</b> |                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |             |       |              |  |  |   |      |   |                |  |  |   |      |   |   |       |   |                 |  |  |   |        |   |   |      |   |   |       |    |                 |  |  |

|   |                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                   |                 |        |    |  |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--------|----|--|
|   |                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                   | 1               | Shed   | 3  |  |
|   |                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                   | 2               | House  | 12 |  |
|   |                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                   | <b>300-500m</b> |        |    |  |
|   |                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                   | 1               | Temple | 2  |  |
|   |                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                   | 2               | Shed   | 9  |  |
|   |                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                   | 3               | House  | 19 |  |
|   |                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                   | <b>500m-1km</b> |        |    |  |
|   |                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                   | 1               | Temple | 2  |  |
|   |                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                   | 2               | Shed   | 27 |  |
|   |                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                   | 3               | House  | 68 |  |
| 6 | 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. | Site photographs and the fencing photographs are enclosed as <b>Annexure -7</b> .                                                                                                 |                 |        |    |  |
| 7 | The Proponent shall carry out Bio diversity study as a part of EIA study and the same shall be included in the Report.                                                                                                                                                                                           | The detailed biodiversity study has been carried out and the details of list of flora and fauna species in the study area have been discussed in <b>Chapter 3, Section 3.10</b> . |                 |        |    |  |
| 8 | The PP shall prepare the EMP for the entire life of mine and also furnish the sworn affidavit stating to abide the EMP                                                                                                                                                                                           | EMP details are discussed in <b>Chapter-10, Section 10.10</b> .                                                                                                                   |                 |        |    |  |

|    |                                                                                                                                                                                                                                      |                                                                                                             |
|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
|    | for the entire life of mine.                                                                                                                                                                                                         |                                                                                                             |
| 9  | 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.        | The cumulative environmental impacts of the existing & proposed quarries are discussed in <b>Chapter 4.</b> |
| 10 | 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. | Conceptual design of proposed quarry is discussed in <b>Chapter 2, Section 2.8.3.</b>                       |
| 11 | The PP shall install the CCTV camera for the continuous surveillance of mining activity & furnish the photographic/video graphic evidence along with the EIA report.                                                                 | The CCTV camera photographic/video graphic evidence will be submitted along with the final EIA report.      |

#### 1.8.4.1 SEAC Standard Conditions

| S.No | Terms of Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Compliance                                                        |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1    | <p>In the case of existing/operating mines, a letter obtained from the concerned AD (Mines) shall be submitted and it shall include the following:</p> <p>(i) Original pit dimension</p> <p>(ii) Quantity achieved Vs EC Approved Quantity</p> <p>(iii) Balance Quantity as per Mineable Reserve calculated.</p> <p>(iv) Mined out Depth as on date Vs EC Permitted depth</p> <p>(v) Details of illegal/illicit mining</p> <p>(vi) Violation in the quarry during the past working.</p> <p>(vii) Quantity of material mined out outside the mine lease area</p> <p>(viii) Condition of Safety zone/benches</p> <p>(ix) Revised/Modified Mining Plan showing the benches of not exceeding 6 m height and ultimate depth of not exceeding 50m.</p> | <p>Not applicable, as the proposed project is a fresh quarry.</p> |

| 2               | Details of habitations around the proposed mining area and latest VAO certificate regarding the location of habitations within 300m radi from the periphery of the site.                                                                                                                                                                                                                                                                                                                                | The 300m radius VAO certificate enclosed as <b>Annexure-8</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |             |       |              |  |  |   |      |   |                |  |  |   |      |   |   |       |   |                 |  |  |   |        |   |   |      |   |   |       |    |                 |  |  |   |      |   |   |       |    |                 |  |  |   |        |   |   |      |   |   |       |    |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------------|-------|--------------|--|--|---|------|---|----------------|--|--|---|------|---|---|-------|---|-----------------|--|--|---|--------|---|---|------|---|---|-------|----|-----------------|--|--|---|------|---|---|-------|----|-----------------|--|--|---|--------|---|---|------|---|---|-------|----|
| 3               | The proponent is requested to carry out a survey and enumerate on the structures located within the radius of ( i ) 50 m. (ii) 100m, (iii) 200 m and (iv) 300m (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>The structures within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m and (iv) 300 m &amp; upto 500m are given in below</p> <table border="1"> <thead> <tr> <th>S.No</th><th>Description</th><th>Count</th></tr> </thead> <tbody> <tr> <td colspan="3"><b>0-50m</b></td></tr> <tr> <td>1</td><td>Shed</td><td>1</td></tr> <tr> <td colspan="3"><b>50-100m</b></td></tr> <tr> <td>2</td><td>Shed</td><td>2</td></tr> <tr> <td>1</td><td>House</td><td>4</td></tr> <tr> <td colspan="3"><b>100-200m</b></td></tr> <tr> <td>1</td><td>Temple</td><td>1</td></tr> <tr> <td>2</td><td>Shed</td><td>8</td></tr> <tr> <td>3</td><td>House</td><td>12</td></tr> <tr> <td colspan="3"><b>200-300m</b></td></tr> <tr> <td>1</td><td>Shed</td><td>3</td></tr> <tr> <td>2</td><td>House</td><td>12</td></tr> <tr> <td colspan="3"><b>300-500m</b></td></tr> <tr> <td>1</td><td>Temple</td><td>2</td></tr> <tr> <td>2</td><td>Shed</td><td>9</td></tr> <tr> <td>3</td><td>House</td><td>19</td></tr> </tbody> </table> | S.No | Description | Count | <b>0-50m</b> |  |  | 1 | Shed | 1 | <b>50-100m</b> |  |  | 2 | Shed | 2 | 1 | House | 4 | <b>100-200m</b> |  |  | 1 | Temple | 1 | 2 | Shed | 8 | 3 | House | 12 | <b>200-300m</b> |  |  | 1 | Shed | 3 | 2 | House | 12 | <b>300-500m</b> |  |  | 1 | Temple | 2 | 2 | Shed | 9 | 3 | House | 19 |
| S.No            | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Count                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |      |             |       |              |  |  |   |      |   |                |  |  |   |      |   |   |       |   |                 |  |  |   |        |   |   |      |   |   |       |    |                 |  |  |   |      |   |   |       |    |                 |  |  |   |        |   |   |      |   |   |       |    |
| <b>0-50m</b>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |             |       |              |  |  |   |      |   |                |  |  |   |      |   |   |       |   |                 |  |  |   |        |   |   |      |   |   |       |    |                 |  |  |   |      |   |   |       |    |                 |  |  |   |        |   |   |      |   |   |       |    |
| 1               | Shed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |             |       |              |  |  |   |      |   |                |  |  |   |      |   |   |       |   |                 |  |  |   |        |   |   |      |   |   |       |    |                 |  |  |   |      |   |   |       |    |                 |  |  |   |        |   |   |      |   |   |       |    |
| <b>50-100m</b>  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |             |       |              |  |  |   |      |   |                |  |  |   |      |   |   |       |   |                 |  |  |   |        |   |   |      |   |   |       |    |                 |  |  |   |      |   |   |       |    |                 |  |  |   |        |   |   |      |   |   |       |    |
| 2               | Shed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |             |       |              |  |  |   |      |   |                |  |  |   |      |   |   |       |   |                 |  |  |   |        |   |   |      |   |   |       |    |                 |  |  |   |      |   |   |       |    |                 |  |  |   |        |   |   |      |   |   |       |    |
| 1               | House                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |             |       |              |  |  |   |      |   |                |  |  |   |      |   |   |       |   |                 |  |  |   |        |   |   |      |   |   |       |    |                 |  |  |   |      |   |   |       |    |                 |  |  |   |        |   |   |      |   |   |       |    |
| <b>100-200m</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |             |       |              |  |  |   |      |   |                |  |  |   |      |   |   |       |   |                 |  |  |   |        |   |   |      |   |   |       |    |                 |  |  |   |      |   |   |       |    |                 |  |  |   |        |   |   |      |   |   |       |    |
| 1               | Temple                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |             |       |              |  |  |   |      |   |                |  |  |   |      |   |   |       |   |                 |  |  |   |        |   |   |      |   |   |       |    |                 |  |  |   |      |   |   |       |    |                 |  |  |   |        |   |   |      |   |   |       |    |
| 2               | Shed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |             |       |              |  |  |   |      |   |                |  |  |   |      |   |   |       |   |                 |  |  |   |        |   |   |      |   |   |       |    |                 |  |  |   |      |   |   |       |    |                 |  |  |   |        |   |   |      |   |   |       |    |
| 3               | House                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |             |       |              |  |  |   |      |   |                |  |  |   |      |   |   |       |   |                 |  |  |   |        |   |   |      |   |   |       |    |                 |  |  |   |      |   |   |       |    |                 |  |  |   |        |   |   |      |   |   |       |    |
| <b>200-300m</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |             |       |              |  |  |   |      |   |                |  |  |   |      |   |   |       |   |                 |  |  |   |        |   |   |      |   |   |       |    |                 |  |  |   |      |   |   |       |    |                 |  |  |   |        |   |   |      |   |   |       |    |
| 1               | Shed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |             |       |              |  |  |   |      |   |                |  |  |   |      |   |   |       |   |                 |  |  |   |        |   |   |      |   |   |       |    |                 |  |  |   |      |   |   |       |    |                 |  |  |   |        |   |   |      |   |   |       |    |
| 2               | House                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |             |       |              |  |  |   |      |   |                |  |  |   |      |   |   |       |   |                 |  |  |   |        |   |   |      |   |   |       |    |                 |  |  |   |      |   |   |       |    |                 |  |  |   |        |   |   |      |   |   |       |    |
| <b>300-500m</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |      |             |       |              |  |  |   |      |   |                |  |  |   |      |   |   |       |   |                 |  |  |   |        |   |   |      |   |   |       |    |                 |  |  |   |      |   |   |       |    |                 |  |  |   |        |   |   |      |   |   |       |    |
| 1               | Temple                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |             |       |              |  |  |   |      |   |                |  |  |   |      |   |   |       |   |                 |  |  |   |        |   |   |      |   |   |       |    |                 |  |  |   |      |   |   |       |    |                 |  |  |   |        |   |   |      |   |   |       |    |
| 2               | Shed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |             |       |              |  |  |   |      |   |                |  |  |   |      |   |   |       |   |                 |  |  |   |        |   |   |      |   |   |       |    |                 |  |  |   |      |   |   |       |    |                 |  |  |   |        |   |   |      |   |   |       |    |
| 3               | House                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 19                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |      |             |       |              |  |  |   |      |   |                |  |  |   |      |   |   |       |   |                 |  |  |   |        |   |   |      |   |   |       |    |                 |  |  |   |      |   |   |       |    |                 |  |  |   |        |   |   |      |   |   |       |    |

|   |                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                 |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4 | The PP shall submit a detailed hydrogeological report indicating the impact of proposed quarrying operations on the waterbodies like lake, water tanks, etc are located within 1km of the proposed quarry.                                                                                                 | <p>The hydrogeology report is being prepared by Government of Tamil Nadu Water Resources Department.</p> <p>However, the proposed mining activity is for a depth of 12m from the top of the hill. Ground water table is available at 11.6mBGL (<i>Ref – TWAD</i>). Therefore, mining activities will not intersect with ground water table.</p> |
| 5 | The proponent shall carry out Bio diversity study through reputed Institution and the same shall be included in EIA report.                                                                                                                                                                                | The detailed biodiversity study has been carried out and the details of list of flora and fauna species in the study area have been discussed in <b>Chapter 3, Section 3.10</b> .                                                                                                                                                               |
| 6 | The DFO letter stating that the proximity distance of Reserve forests, protected area, Sanctuaries, Tiger reserve etc., up to a radius of 25km from the proposed site.                                                                                                                                     | <p>DFO letter is enclosed as <b>Annexure -9</b>.</p> <p>However, the details of Reserved Forest, Wildlife Sanctuaries within the study area are given in <b>Chapter-3, Section 3.3 &amp; Table 3-1</b>.</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 | Not applicable, as the proposed quarry is a fresh quarry.                                                                                                                                                                                                                                                                                       |



|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                    |
|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   | and existing quarry wall, by involving any one of the reputed Research and Academic Institutions - CSIR-Central Institute of Mining & Fuel Research / Dhanbad, NIRM/Bangalore, Division of Geotechnical Engineering-IIT-Madras, NIT-Dept of Mining Engg, Surathkal, and Anna University Chennai-CEG Campus. The PP shall submit a copy of the aforesaid report indicating the stability status of the quarry wall and possible mitigation measures during the time of appraisal for obtaining the EC. |                                                                                                                                                                                                                                                                                                                                                                    |
| 8 | However, in case of 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 30m below ground level.                                                                                                                                                                                                                                               | As there is no proposal to mine beyond 12m depth from the top of the hill lock and the height of the hill lock is 32m AMSL. Since the proposed mining activity is from the top of the hill lock and the mine benches will be form as per the mining plan in accordance with Regulation 106 of the MMR, 1961, the question of slope stability study does not arise. |
| 9 | The proponent shall furnish affidavit stating that the blasting operation in the                                                                                                                                                                                                                                                                                                                                                                                                                      | Tamin will carried out the blasting operation in accordance with MMR 1961.                                                                                                                                                                                                                                                                                         |

|    |                                                                                                                                                                                                                                                                                            |                                                                                                                    |
|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
|    | proposed quarry is carried out by the statutory component person as per the MMR 1961 such as blaster, mining mate, mine foremen, II/I class mines manager appointed by the proponent.                                                                                                      |                                                                                                                    |
| 10 | The PP shall present a conceptual design for carrying out only controlled blasting operation involving line drilling and muffle blasting in the proposed quarry such that the blast induced ground vibrations are controlled as well as no fly rock travel beyond 30m from the blast site. | The conceptual design of blasting operation is given in <b>Chapter 2, Section 2.8.3.</b>                           |
| 11 | The EIA Coordinators shall obtain and furnish the details of quarry/quarries operated by the proponent in the past, in either the same location or elsewhere in the State with video and photographic evidences.                                                                           | The quarry photographs operated by the proponent in the past in other locations are enclosed as <b>Annexure-6.</b> |
| 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                                                                                                                            | Not applicable, as the proposed project is a fresh quarry.                                                         |

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                      |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | details from AD/DD mines.                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                      |
| 13 | What was the period of operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines?                                                                                                                                                                                                                                                                                                                                                   | Not applicable, as the proposed project is a fresh quarry.                                                                                                                                                                                                                                                                                                                           |
| 14 | <p>Quantity of minerals mined out.</p> <p>a) Highest production achieved in any one year</p> <p>b) Detail of approved depth of mining</p> <p>c) Actual depth of mining achieved earlier</p> <p>d) Name of the person already minded out in that lease area</p> <p>e) If EC and CTO already obtained, the copy of the same shall be submitted</p> <p>f) Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches</p> | Not applicable, as the proposed project is a fresh quarry.                                                                                                                                                                                                                                                                                                                           |
| 15 | All corner coordinates of the mine lease area superimposed on a high resolution Imagery/Topo sheet, topographic sheet, geomorphology, lithology and geology of                                                                                                                                                                                                                                                                                                        | <ul style="list-style-type: none"> <li>The boundary coordinates of the site is given in <b>Table 1-3</b> and Google image of the site with GPS coordinates is given in <b>Figure 1-1</b>.</li> <li>Topo map of the study area is given in <b>Figure 3-1</b>.</li> <li>Geomorphology of the study area is discussed in <b>Chapter-3, Section 3.4.8.1</b> and <b>Figure</b></li> </ul> |

|    |                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                     |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | 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><b>3-8.</b></p> <ul style="list-style-type: none"> <li>• Geology of the dharmapuri district is given in <b>Chapter-3, Section 3.4.6.</b></li> <li>• Land use and Land cover of the study area is discussed in <b>Chapter-3, Section 3.4.9.1</b> and <b>Figure 3-9.</b></li> <li>• Ecological Features of the study area is given in <b>Table 3-1</b> and <b>Figure 3-2 &amp; 3-3.</b></li> </ul> |
| 16 | The PP shall carry out Drone video survey covering the cluster, green belt, fencing, etc.,                                                                                                                                                          | Drone video will be submitted during the final EC presentation.<br>However, the site photographs & fencing photographs are enclosed as <b>Annexure-7.</b>                                                                                                                                                                                                                                           |
| 17 | The proponent shall furnish photographs of adequate fencing, green belt along the periphery including replantation of existing trees & safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan | Site photographs and the fencing photographs are enclosed as <b>Annexure-7.</b>                                                                                                                                                                                                                                                                                                                     |

| 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><b>Total Reserves</b></p> <table><tr><th>S. No</th><th>Updated Geological Reserves</th><th>Updated Mineable Reserves</th><th>Proposed Production at 10% recovery (m³)</th></tr><tr><td>1</td><td>4,09,500</td><td>2,13,213</td><td>4,150</td></tr></table> <p><b>Yearwise Production</b></p> <table><tr><th>S.No</th><th>Year</th><th>ROM (m³)</th><th>Recovery@10% (m³)</th><th>Granite Waste @ 90 % (m³)</th></tr><tr><td>1</td><td>1<sup>st</sup>Year</td><td>6,003</td><td>600</td><td>5,403</td></tr><tr><td>2</td><td>2<sup>nd</sup>Year</td><td>7,503</td><td>750</td><td>6,753</td></tr><tr><td>3</td><td>3<sup>rd</sup>Year</td><td>8,500</td><td>850</td><td>7,650</td></tr><tr><td>4</td><td>4<sup>th</sup>Year</td><td>9,496</td><td>950</td><td>8,546</td></tr><tr><td>5</td><td>5<sup>th</sup>Year</td><td>9,999</td><td>1000</td><td>8,999</td></tr><tr><td colspan="2">Total</td><td>41,501</td><td>4,150</td><td>37,351</td></tr></table> <ul style="list-style-type: none"><li>Methodology of the proposed mining activity is given in <b>Chapter-2, Section 2.8.</b></li><li>Impacts and Mitigation measures due to proposed mining activity is given in <b>Chapter-4.</b></li></ul> | S. No                                    | Updated Geological Reserves | Updated Mineable Reserves | Proposed Production at 10% recovery (m³) | 1 | 4,09,500 | 2,13,213 | 4,150 | S.No | Year | ROM (m³) | Recovery@10% (m³) | Granite Waste @ 90 % (m³) | 1 | 1 <sup>st</sup> Year | 6,003 | 600 | 5,403 | 2 | 2 <sup>nd</sup> Year | 7,503 | 750 | 6,753 | 3 | 3 <sup>rd</sup> Year | 8,500 | 850 | 7,650 | 4 | 4 <sup>th</sup> Year | 9,496 | 950 | 8,546 | 5 | 5 <sup>th</sup> Year | 9,999 | 1000 | 8,999 | Total |  | 41,501 | 4,150 | 37,351 |
|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|-----------------------------|---------------------------|------------------------------------------|---|----------|----------|-------|------|------|----------|-------------------|---------------------------|---|----------------------|-------|-----|-------|---|----------------------|-------|-----|-------|---|----------------------|-------|-----|-------|---|----------------------|-------|-----|-------|---|----------------------|-------|------|-------|-------|--|--------|-------|--------|
| S. No | Updated Geological Reserves                                                                                                                                                                                                                                                                               | Updated Mineable Reserves                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Proposed Production at 10% recovery (m³) |                             |                           |                                          |   |          |          |       |      |      |          |                   |                           |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |      |       |       |  |        |       |        |
| 1     | 4,09,500                                                                                                                                                                                                                                                                                                  | 2,13,213                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 4,150                                    |                             |                           |                                          |   |          |          |       |      |      |          |                   |                           |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |      |       |       |  |        |       |        |
| S.No  | Year                                                                                                                                                                                                                                                                                                      | ROM (m³)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Recovery@10% (m³)                        | Granite Waste @ 90 % (m³)   |                           |                                          |   |          |          |       |      |      |          |                   |                           |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |      |       |       |  |        |       |        |
| 1     | 1 <sup>st</sup> Year                                                                                                                                                                                                                                                                                      | 6,003                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 600                                      | 5,403                       |                           |                                          |   |          |          |       |      |      |          |                   |                           |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |      |       |       |  |        |       |        |
| 2     | 2 <sup>nd</sup> Year                                                                                                                                                                                                                                                                                      | 7,503                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 750                                      | 6,753                       |                           |                                          |   |          |          |       |      |      |          |                   |                           |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |      |       |       |  |        |       |        |
| 3     | 3 <sup>rd</sup> Year                                                                                                                                                                                                                                                                                      | 8,500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 850                                      | 7,650                       |                           |                                          |   |          |          |       |      |      |          |                   |                           |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |      |       |       |  |        |       |        |
| 4     | 4 <sup>th</sup> Year                                                                                                                                                                                                                                                                                      | 9,496                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 950                                      | 8,546                       |                           |                                          |   |          |          |       |      |      |          |                   |                           |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |      |       |       |  |        |       |        |
| 5     | 5 <sup>th</sup> Year                                                                                                                                                                                                                                                                                      | 9,999                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1000                                     | 8,999                       |                           |                                          |   |          |          |       |      |      |          |                   |                           |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |      |       |       |  |        |       |        |
| Total |                                                                                                                                                                                                                                                                                                           | 41,501                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 4,150                                    | 37,351                      |                           |                                          |   |          |          |       |      |      |          |                   |                           |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |      |       |       |  |        |       |        |
| 19    | <p>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</p>                                                                                                      | <p>The organization chart hierarchy is discussed in <b>Chapter-10, Figure 10-1.</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                          |                             |                           |                                          |   |          |          |       |      |      |          |                   |                           |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |      |       |       |  |        |       |        |

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                 |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | Mines Act 1952 and the MMR, 1961 for carrying out the quarrying operations scientifically and systematically in order to ensure safety and to protect the environment.                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                 |
| 20 | The Project Proponent shall conduct the hydro-geological study considering the contour map of the water table detailing the number of groundwater pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds, etc. within 1 km (radius) along with the collected water level data for both monsoon and non- monsoon seasons from the PWD / TWAD so as to assess the impacts on the wells due to mining activity. Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. | <p>The hydrogeology report is being prepared by Government of Tamil Nadu Water Resources Department.</p> <p>However, the proposed mining activity is for a depth of 12m from the top of the hill. Ground water table is available at 11.6mBGL (<i>Ref – TWAD</i>). Therefore, mining activities will not intersect with ground water table.</p> |
| 21 | The proponent shall furnish the baseline data for the environmental and                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | The baseline data for the environmental and ecological parameters with regard to surface water / groundwater quality, air quality, noise monitoring, soil quality & flora / fauna including traffic /                                                                                                                                           |

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | ecological parameters with regard to surface water/ground water quality, air quality, soil quality & flora/fauna including traffic/vehicular movement study.                                                                                                                                                                                                                                                                               | vehicular movement study were conducted from <b>February 2025 - April 2025</b> period are discussed in <b>Chapter-3</b> .<br><br>Ambient Air Quality details are provided in <b>Chapter-3, Section 3.6</b> .<br>Noise monitoring locations are mentioned in <b>Chapter-3, Section 3.7</b> .<br>Surface Water Quality Assessment is given in <b>Chapter-3, Section 3.8.1</b> .<br>Ground Water Quality Assessment is given in <b>Chapter-3, Section 3.8.3</b> .<br>Soil quality assessment is given in <b>Chapter-3, Section 3.9</b> .<br>Biological Environment is given in <b>Chapter-3, Section 3.10</b> .<br>The traffic / vehicular movement study are discussed in <b>Chapter 4 and Section 4.6</b> . |
| 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 quantity and the surrounding habitations in the mind. | Detailed impact study has been carried out and the Impacts and mitigation measures in terms of soil health, biodiversity, air pollution, and water pollution were given in <b>Chapter -4</b> .<br><br>Environmental Management Plan & its Control Measures are provided in <b>Chapter -10</b> .                                                                                                                                                                                                                                                                                                                                                                                                            |
| 23 | Rain water harvesting management with                                                                                                                                                                                                                                                                                                                                                                                                      | Rain water harvesting management details are provided in <b>Chapter-4, Section 4.7.1 and 4.25.3</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

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|    | recharging details along with water balance (both monsoon & non-monsoon) be submitted.                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                  |
| 24 | Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other 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>Land use of the study area is given in <b>Chapter 3 and Section 3.4.9.1, Figure 3-9 &amp; Table3-4.</b></p> <p>Land use plan of mine lease area is given in <b>Chapter 2, Section 2.5 &amp; Table 2-2.</b> Impacts and mitigation measures are given in <b>Chapter 4.</b></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&R issues, if any should be provided.                                                                                                                                                                                                                               | <p>The waste generation and the disposal were discussed in <b>Chapter-2, Section 2.8.9.</b></p> <p>Since the proposed project activity is a government poramboke land, Replace and Rehabilitation issues are not arise.</p>                                                      |
| 26 | Proximity to Areas declared as 'Critically Polluted (or) the Project areas which attracts the court restrictions for mining                                                                                                                                                                                                                                                                                                              | There is no critical polluted area within the study area.                                                                                                                                                                                                                        |



|    |                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                       |
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|    | operations, should also be indicated and where so required. Clearance certifications from the prescribed Authorities, such as the TNPCB (or) Dept. of Geology and Mining should be secured and furnished to the effect that the proposed mining activities could be considered. |                                                                                                                                                                                       |
| 27 | Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.                                                                                          | Water Mitigation Measures are given in <b>Chapter-4, Section 4.25</b> .<br>Rain water harvesting management details are provided in <b>Chapter 4, Section 4.7.1 and 4.25.3</b> .      |
| 28 | Impact on local transport infrastructure due to the Project should be indicated.                                                                                                                                                                                                | Impact on local transport infrastructure due to the mining activity is discussed in <b>Chapter 4, Section 4.6</b> .                                                                   |
| 29 | A tree survey study shall be carried out (nos., name of the species, age, diameter etc.,) both within the mining lease applied area & 300m buffer zone and its management during mining activity.                                                                               | The detailed bio diversity study has been carried out and the details of list of flora and faunal species in the study area have been discussed in <b>Chapter – 3, Section 3.10</b> . |
| 30 | A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-                                                                                                                                                                 | Mine closure plan is given in <b>Chapter 2, Section 2.12</b> .                                                                                                                        |

|           | specific.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                        |                              |  |  |      |                               |                                 |                        |                              |           |     |                                    |     |     |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|------------------------------|--|--|------|-------------------------------|---------------------------------|------------------------|------------------------------|-----------|-----|------------------------------------|-----|-----|
| 31        | As a part of the study of flora and fauna around the vicinity of the proposed site, the EIA coordinator shall strive to educate the local students on the importance of preserving local flora and fauna by involving them in the study, wherever possible.                                                                                                                                                                                                                                                              | The Importance of preserving local flora and fauna will be educated to the local students by the EIA coordinator.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                        |                              |  |  |      |                               |                                 |                        |                              |           |     |                                    |     |     |
| 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>The proposed greenbelt development activity will cover an area of 0.06.5 Ha during the first five years of quarrying activity. Under this initiative, TAMIN plans to plant approximately 825 trees, which will be distributed within the 7.5 m safety buffer zone of the mine lease area as well as in the designated greenbelt zone.</p> <p>For plantation, native species with dense to moderate canopy cover will be prioritized to ensure ecological adaptability and effective environmental protection. A mixed plantation strategy will be adopted, incorporating small, medium, and tall tree species in combination with shrubs in an alternating pattern. This approach is expected to enhance biodiversity, provide effective dust and noise attenuation, and contribute to the aesthetic and ecological value of the quarry surroundings.</p> <table><tr><th>Year</th><th>No of trees proposed to plant</th><th>Name of the species to be plant</th><th>Survival rate expected</th><th>No of trees expected to grow</th></tr><tr><td>2025-2026</td><td>825</td><td>Neem, Pungan, Vilvam, Aathi, Panai</td><td>80%</td><td>660</td></tr></table> |                        |                              |  |  | Year | No of trees proposed to plant | Name of the species to be plant | Survival rate expected | No of trees expected to grow | 2025-2026 | 825 | Neem, Pungan, Vilvam, Aathi, Panai | 80% | 660 |
| Year      | No of trees proposed to plant                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Name of the species to be plant                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Survival rate expected | No of trees expected to grow |  |  |      |                               |                                 |                        |                              |           |     |                                    |     |     |
| 2025-2026 | 825                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Neem, Pungan, Vilvam, Aathi, Panai                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 80%                    | 660                          |  |  |      |                               |                                 |                        |                              |           |     |                                    |     |     |

|    |                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                        |
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|    |                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                        |
| 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>As per committee recommendations, taller / one year old saplings raised in eco-friendly bags, will be planted in proper escapement as per the advice of local forest authorities / botanist / horticulturist with regard to sites specific choices.</p> <p>The proponent earmarked the green belt area of around 0.06.5Ha and it was provided in <b>Annexure-4, Plate no.5.</b></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.                                                                                                                                                                                                                                                | A detailed Disaster management plan is discussed in <b>Chapter 7, Section 7.3.</b>                                                                                                                                                                                                                                                                                                     |
| 35 | A Risk Assessment and management Plan shall be prepared and included in the EIA/EMP Report for the complete life of the proposed quarry (or) till the end of the lease period.                                                                                                                                                                                                                                     | A detailed Risk assessment and management plan is discussed in <b>Chapter 7, Section 7.2.</b>                                                                                                                                                                                                                                                                                          |

|    |                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                          |
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| 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. | Occupational Health impacts & mitigation measures are provided in <b>Chapter 4, Section 4.15 and 4.28.</b><br><br>The detailed EMP is given in <b>Chapter 10, Section 10.10.</b>                         |
| 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.                                                                                                                                                          | Public Health impacts & mitigation measures are provided in <b>Chapter 4, Section 4.16 and 4.28.</b><br><br>The detailed EMP is given in <b>Chapter 10, Section 10.10.</b>                               |
| 38 | The Socio-economic studies should be carried out within a 5km buffer zone from the mining activity. Measures of socio-economic significance and influence to the local community                                                                                                                                                                                                           | The socio-economic study was carried out within a 10 km buffer zone from the mining activity.<br><br>The detailed measure of socio-economic significance is discussed in <b>Chapter 3, Section 3.11.</b> |

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|    | proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 39 | Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.                                          | There is no litigation pending against the proposed 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. | <b>Benefits of the Proposed Project</b> <ul style="list-style-type: none"> <li>• This proposed quarry will benefit to the local people by providing direct employment for 30 persons &amp; indirect employment for 20 persons.</li> <li>• The direct beneficiaries will be those who get employed in the mines as skilled and unskilled workers.</li> <li>• Improvement in Per Capita Income.</li> <li>• The socio - economic conditions of the village will enhance due to this proposed project.</li> <li>• Necessary pollution control measures like water sprinkling, plantation, personal protective equipment and diamond wire saw cutting etc., will form regular practice in the project.</li> <li>• Thus, the project is environmentally compatible, financially viable and would be in the interest of construction industry thereby indirectly benefiting the masses.</li> </ul> |
| 41 | If any quarrying operations were carried out in the proposed quarrying site for                                                                                                           | Not applicable, as the proposed project is a fresh quarry.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

|    |                                                                                                                                                                                                                                                                                |                                                                                                               |
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|    | which now the EC is sought, the Project Proponent shall furnish the detailed compliance to EC with the site photographs which shall duly be certified by MoEF&CC, Regional Office, Chennai (or) the concerned DEE/TNPCB.                                                       |                                                                                                               |
| 42 | The PP shall prepare the EMP for the entire life of mine and also furnish the sworn affidavit stating to abide the EMP for the entire life of mine.                                                                                                                            | The detailed EMP is provided in <b>Chapter 10, Section 10.10</b> .                                            |
| 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. | All the information provided by the project proponent is factual and no false information has been submitted. |

#### 1.8.4.2 Standard Terms of Reference for Mining Minerals

| S.No  | Terms of Reference                                                                                                                                                                                                                                                                                                                    | Compliance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                     |                          |          |                     |                          |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |       |       |       |  |        |       |        |
|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------------------|----------|---------------------|--------------------------|---|----------------------|-------|-----|-------|---|----------------------|-------|-----|-------|---|----------------------|-------|-----|-------|---|----------------------|-------|-----|-------|---|----------------------|-------|-------|-------|-------|--|--------|-------|--------|
| 1     | Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came into force, w.r.t the highest production achieved prior to 1994. | <p>It is a fresh lease quarry. The proponent has obtained lease for 20 years vide letter No. 4539479/MME.1/2023-1, dated: 13.09.2023 is enclosed as <b>Annexure -1</b>. The proposed yearwise production details are given below.</p> <table><tr><th>S. No</th><th>Year</th><th>ROM (m³)</th><th>Recovery @ 10% (m³)</th><th>Granite waste @ 90% (m³)</th></tr><tr><td>1</td><td>1<sup>st</sup>Year</td><td>6,003</td><td>600</td><td>5,403</td></tr><tr><td>2</td><td>2<sup>nd</sup>Year</td><td>7,503</td><td>750</td><td>6,753</td></tr><tr><td>3</td><td>3<sup>rd</sup>Year</td><td>8,500</td><td>850</td><td>7,650</td></tr><tr><td>4</td><td>4<sup>th</sup>Year</td><td>9,496</td><td>950</td><td>8,546</td></tr><tr><td>5</td><td>5<sup>th</sup>Year</td><td>9,999</td><td>1,000</td><td>8,999</td></tr><tr><td colspan="2">Total</td><td>41,501</td><td>4,150</td><td>37,351</td></tr></table> | S. No               | Year                     | ROM (m³) | Recovery @ 10% (m³) | Granite waste @ 90% (m³) | 1 | 1 <sup>st</sup> Year | 6,003 | 600 | 5,403 | 2 | 2 <sup>nd</sup> Year | 7,503 | 750 | 6,753 | 3 | 3 <sup>rd</sup> Year | 8,500 | 850 | 7,650 | 4 | 4 <sup>th</sup> Year | 9,496 | 950 | 8,546 | 5 | 5 <sup>th</sup> Year | 9,999 | 1,000 | 8,999 | Total |  | 41,501 | 4,150 | 37,351 |
| S. No | Year                                                                                                                                                                                                                                                                                                                                  | ROM (m³)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Recovery @ 10% (m³) | Granite waste @ 90% (m³) |          |                     |                          |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |       |       |       |  |        |       |        |
| 1     | 1 <sup>st</sup> Year                                                                                                                                                                                                                                                                                                                  | 6,003                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 600                 | 5,403                    |          |                     |                          |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |       |       |       |  |        |       |        |
| 2     | 2 <sup>nd</sup> Year                                                                                                                                                                                                                                                                                                                  | 7,503                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 750                 | 6,753                    |          |                     |                          |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |       |       |       |  |        |       |        |
| 3     | 3 <sup>rd</sup> Year                                                                                                                                                                                                                                                                                                                  | 8,500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 850                 | 7,650                    |          |                     |                          |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |       |       |       |  |        |       |        |
| 4     | 4 <sup>th</sup> Year                                                                                                                                                                                                                                                                                                                  | 9,496                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 950                 | 8,546                    |          |                     |                          |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |       |       |       |  |        |       |        |
| 5     | 5 <sup>th</sup> Year                                                                                                                                                                                                                                                                                                                  | 9,999                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1,000               | 8,999                    |          |                     |                          |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |       |       |       |  |        |       |        |
| Total |                                                                                                                                                                                                                                                                                                                                       | 41,501                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 4,150               | 37,351                   |          |                     |                          |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |       |       |       |  |        |       |        |
| 2     | A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.                                                                                                                                                                                                                  | A copy of the document issued by the Industries, Natural Resources (MME.1) Department, Government of Tamil Nadu, vide Letter No. 4539479/MME.1/2023-1 dated 13.09.2023, confirming that TAMIN is the rightful lessee of the mine, is enclosed as <b>Annexure -1</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                     |                          |          |                     |                          |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |       |       |       |  |        |       |        |
| 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                                                                                             | All documents including approved Mining plan, EIA and Public Hearing is compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc., is in the name of TAMIN.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                     |                          |          |                     |                          |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |     |       |   |                      |       |       |       |       |  |        |       |        |

|   |                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   | the name of the lessee.                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 4 | All corner co-ordinates of the mine lease area, superimposed in a High Resolution Imagery/ topo sheet, topographic sheet, geomorphology and geology of the area should be provided. Such a Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone). | <ul style="list-style-type: none"> <li>• The boundary coordinates of the site is given in <b>Table1-3</b> and Google image of the site with GPS coordinates is given in <b>Figure 1-1</b>.</li> <li>• Topo map of the study area is given in <b>Figure 3-1</b>.</li> <li>• Geomorphology of the study area is discussed in <b>Chapter-3, Section 3.4.8.1</b> and <b>Figure 3-8</b>.</li> <li>• Geology of the dharmapuri district is given in <b>Chapter-3, Section 3.4.6</b>.</li> <li>• Land use and Land cover of the study area is discussed in <b>Chapter-3, Section 3.4.9.1</b> and <b>Figure 3-9</b>.</li> <li>• Ecological Features of the study area is given in <b>Table 3-1</b> and <b>Figure 3-2&amp;3-3</b>.</li> </ul> |
| 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.                                            | <ul style="list-style-type: none"> <li>• Topo map of the study area was prepared in 1:50,000 scale and given as <b>Chapter-3, Figure 3-1</b>.</li> <li>• Geomorphology Map of study area is given in <b>Figure 3-8</b>.</li> <li>• Geology of the dharmapuri district is provided in <b>Chapter-3, Section 3.4.6. &amp; Figure 3-6</b>.</li> <li>• Water bodies, streams and rivers and soil characteristics have been explained in <b>Chapter-3</b>.</li> </ul>                                                                                                                                                                                                                                                                     |
| 6 | Details about the land proposed for mining activities should be given with information as to whether mining confirms to the land use policy of the State; land diversion for mining should                                                                                                                                       | TAMIN has obtained lease for 20 years vide Natural Resources (MME.1) Department, Lr. No. 4539479/MME.1/2023-1, dated 13.09.2023. Precise area communication letter is enclosed as <b>Annexure-1</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |



|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                        |
|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   | 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? I 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/vibration of the environmental or forest norms/conditions? The hierarchical systems or administrative order of the Company to deal with the environmental issues and for ensuring compliances 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 stakeholders at large, may also be detailed in the EIA Report. | TAMIN has a well laid down Environment Policy approved by its Board of Directors. Environmental Policy of TAMIN is given in <b>Chapter -10, Figure10-1</b> .           |
| 8 | Issues relating to Mine safety, including subsidence study in case of underground                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ➤ It is open cast semi mechanized mining and no underground mining will be done. Therefore, no subsidence study is required. Workable depth of mining will be 12m from |

|       | mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should be provided.                                                                                                                                                                                                                                                                             | <p>top of the hill.</p> <p>➤ A detail regarding slope of the pit, drilling and blasting is mentioned in <b>Chapter-2</b> and <b>Section 2.8.</b></p> <p>➤ Safeguard measures are provided in <b>Chapter-10, Section 10.9.</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                  |                                          |  |      |             |                    |                                  |                                          |    |             |    |        |        |    |            |    |        |        |    |                       |        |    |        |    |           |        |    |        |    |               |    |        |        |    |                 |        |        |        |       |  |        |        |        |
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| 9     | The study area will comprise of 10km 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.                                                                                                                                                                                                                                    | <ul style="list-style-type: none"><li>• The study area of 10km zone around the periphery of the mines lease area is considered.</li><li>• Life of mine is 22 years.</li><li>• The production capacity, mineable capacity, waste generation and other such details have been calculated for the lease period of five years as per the approved mining plan and also discussed in EIA in the <b>Chapter-2, Section 2.5, Table 2-3 ,Table 2-4</b> and <b>Table 2-5.</b></li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                  |                                          |  |      |             |                    |                                  |                                          |    |             |    |        |        |    |            |    |        |        |    |                       |        |    |        |    |           |        |    |        |    |               |    |        |        |    |                 |        |        |        |       |  |        |        |        |
| 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. | <p><b>Land use pattern of the study area:</b></p> <p>Land use/land cover of study area is given in <b>Chapter-3</b> and <b>Section 3.4.9.1, Table 3-4, Figure 3-9.</b></p> <p><b>Land use details of the quarry area:</b></p> <p>A Land use detail of the quarry area is provided in <b>Chapter -2, Section 2.5, and Table 2-2.</b></p> <table><tr><th>S.No</th><th>Description</th><th>Present area ( Ha)</th><th>Proposed Mining Plan Period (Ha)</th><th>Area at the end of the life of mine (Ha)</th></tr><tr><td>1.</td><td>Mining Area</td><td>--</td><td>0.78.0</td><td>2.20.5</td></tr><tr><td>2.</td><td>Waste Dump</td><td>--</td><td>0.66.0</td><td>1.74.0</td></tr><tr><td>3.</td><td>Office Infrastructure</td><td>0.01.0</td><td>--</td><td>0.01.0</td></tr><tr><td>4.</td><td>Foot path</td><td>0.14.0</td><td>--</td><td>0.14.0</td></tr><tr><td>5.</td><td>Afforestation</td><td>--</td><td>0.06.5</td><td>0.27.5</td></tr><tr><td>6.</td><td>Unutilized Area</td><td>6.44.5</td><td>4.94.0</td><td>2.22.5</td></tr><tr><td colspan="2">Total</td><td>6.59.5</td><td>6.44.5</td><td>6.59.5</td></tr></table> |                                  |                                          |  | S.No | Description | Present area ( Ha) | Proposed Mining Plan Period (Ha) | Area at the end of the life of mine (Ha) | 1. | Mining Area | -- | 0.78.0 | 2.20.5 | 2. | Waste Dump | -- | 0.66.0 | 1.74.0 | 3. | Office Infrastructure | 0.01.0 | -- | 0.01.0 | 4. | Foot path | 0.14.0 | -- | 0.14.0 | 5. | Afforestation | -- | 0.06.5 | 0.27.5 | 6. | Unutilized Area | 6.44.5 | 4.94.0 | 2.22.5 | Total |  | 6.59.5 | 6.44.5 | 6.59.5 |
| S.No  | Description                                                                                                                                                                                                                                                                                                                                                                                                                              | Present area ( Ha)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Proposed Mining Plan Period (Ha) | Area at the end of the life of mine (Ha) |  |      |             |                    |                                  |                                          |    |             |    |        |        |    |            |    |        |        |    |                       |        |    |        |    |           |        |    |        |    |               |    |        |        |    |                 |        |        |        |       |  |        |        |        |
| 1.    | Mining Area                                                                                                                                                                                                                                                                                                                                                                                                                              | --                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0.78.0                           | 2.20.5                                   |  |      |             |                    |                                  |                                          |    |             |    |        |        |    |            |    |        |        |    |                       |        |    |        |    |           |        |    |        |    |               |    |        |        |    |                 |        |        |        |       |  |        |        |        |
| 2.    | Waste Dump                                                                                                                                                                                                                                                                                                                                                                                                                               | --                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0.66.0                           | 1.74.0                                   |  |      |             |                    |                                  |                                          |    |             |    |        |        |    |            |    |        |        |    |                       |        |    |        |    |           |        |    |        |    |               |    |        |        |    |                 |        |        |        |       |  |        |        |        |
| 3.    | Office Infrastructure                                                                                                                                                                                                                                                                                                                                                                                                                    | 0.01.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | --                               | 0.01.0                                   |  |      |             |                    |                                  |                                          |    |             |    |        |        |    |            |    |        |        |    |                       |        |    |        |    |           |        |    |        |    |               |    |        |        |    |                 |        |        |        |       |  |        |        |        |
| 4.    | Foot path                                                                                                                                                                                                                                                                                                                                                                                                                                | 0.14.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | --                               | 0.14.0                                   |  |      |             |                    |                                  |                                          |    |             |    |        |        |    |            |    |        |        |    |                       |        |    |        |    |           |        |    |        |    |               |    |        |        |    |                 |        |        |        |       |  |        |        |        |
| 5.    | Afforestation                                                                                                                                                                                                                                                                                                                                                                                                                            | --                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0.06.5                           | 0.27.5                                   |  |      |             |                    |                                  |                                          |    |             |    |        |        |    |            |    |        |        |    |                       |        |    |        |    |           |        |    |        |    |               |    |        |        |    |                 |        |        |        |       |  |        |        |        |
| 6.    | Unutilized Area                                                                                                                                                                                                                                                                                                                                                                                                                          | 6.44.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 4.94.0                           | 2.22.5                                   |  |      |             |                    |                                  |                                          |    |             |    |        |        |    |            |    |        |        |    |                       |        |    |        |    |           |        |    |        |    |               |    |        |        |    |                 |        |        |        |       |  |        |        |        |
| Total |                                                                                                                                                                                                                                                                                                                                                                                                                                          | 6.59.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 6.44.5                           | 6.59.5                                   |  |      |             |                    |                                  |                                          |    |             |    |        |        |    |            |    |        |        |    |                       |        |    |        |    |           |        |    |        |    |               |    |        |        |    |                 |        |        |        |       |  |        |        |        |

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| 11 | Details of the land for any Over Burden dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R & R issues, if any, should be given.                                                                                                                                                                                                                                                                                                                                                                                                                                                 | The waste generation details are given in <b>Chapter-2, Table 2-5</b> & Disposal of waste is given in <b>Chapter-2, Section 2.8.9</b> .<br>There is no R&R issues.                                                                                                                                                                                                                                         |
| 12 | A Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees. | No forestland is involved in the proposed project site. The proposed quarry site is a government poramboke land & Additional Chief Secretary, Industries, Natural Resources (MME.1) Department, Secretariat, Chennai has been issued the Precise area communication letter by vide Letter Lr.No.4539479/MME.1/2023-1, dated: 13.09.2023 to grant lease for 20 years and is enclosed as <b>Annexure-1</b> . |
| 13 | State of forestry clearance for the broken up area and virgin forestland involved in                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | As the lease area is government poramboke land and there is no forestland involved.                                                                                                                                                                                                                                                                                                                        |

|    |                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                             |
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|    | 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.                                                                                                                                                  | The area is not covered under Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006. Hence, it is not applicable. |
| 15 | The vegetation in the RF/ PF areas in the study area, with necessary details, should be given.                                                                                                                                                                                                                                        | The details of the RF/ PF areas in the study area are given in <b>Chapter-3, Section 3.3, Table 3-1 and Figure 3-3.</b>                                     |
| 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 are no protected wildlife sanctuaries within the study area. Hence, there will be no impact envisaged.                                                |
| 17 | Locations of National parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors,                                                                                                                                                                                                                                                     | There are no National parks, Sanctuaries, Biosphere Reserves, Ramsar site, Tiger/Elephant                                                                   |

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                   |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <p>Ramsar site Tiger/ Elephant Reserves/(existing as well proposed), if any, within 10km 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>Reserves within the study area.</p> <p>The details of environmental sensitive areas covering within 15km from project boundary are given in <b>Chapter-3, Section 3.3</b> and <b>Table 3-1</b>.</p>                            |
| 18 | <p>A detailed biological study of the study area [core zone and buffer zone (10km 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 filed survey, clearly indicating the schedule of the fauna present. In case of any Schedule-I fauna found in the</p>                | <p>The details of Flora and fauna study are discussed in <b>Chapter-3, Section 3.10</b>. Also, the conservation plan for the schedule-1 species with budgetary allocations was discussed in <b>Table 3-21 and Table 3-22</b>.</p> |

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|    | 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 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 restriction 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. | There is no critical polluted area within the study area. |
| 20 | Similarly, for coastal Projects, A CRZ map duly authenticated by one of the authorized agencies demarcating LTL.                                                                                                                                                                                                                                                                                                                       | Not applicable.                                           |

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|    | 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)                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                   |
| 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 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 | The lease area is classified as Government Poramboke land. There is no Project Affected People (PAP) by the proposed mining activities. Hence, there is no need of R&R Plan. There is no human settlement in the allotted mine lease area. Socio economic study has been done and incorporated in <b>Chapter-3, Section 3.11.</b> |

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|    | 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 | <p>One season (non-monsoon) [i.e March–May (Summer Season); October–December (Post Monsoon Season); December–February (Winter Seasons)] 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 data-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 500m of the mine lease in the pre-</p> | <p>The primary baseline data monitored covered three (3) months i.e., from <b>February 2025 – April 2025</b> and secondary data was collected from Government and Semi-Government organizations.</p> <ul style="list-style-type: none"> <li>• Ambient Air Quality details are provided in <b>Chapter -3, Section 3.6.</b></li> <li>• Noise Monitoring details are mentioned in <b>Chapter-3, Section 3.7.</b></li> <li>• Surface Water Quality Assessment is given in <b>Chapter-3, Section 3.8.1.</b></li> <li>• Ground Water Quality Assessment is given in <b>Chapter-3, Section 3.8.3.</b></li> <li>• Soil quality assessment is given in <b>Chapter-3, Section 3.9.</b></li> <li>• Biological Environment is given in <b>Chapter-3, Section 3.10.</b></li> </ul> |



|                 | dominant downwind direction.<br>The mineralogical composition of PM10, particularly for free silica, should be given.                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                     |               |  |  |           |                              |                                     |                     |               |    |       |      |       |     |                 |       |      |       |    |                 |       |      |       |    |
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| 23              | 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 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. | <b>Total maximum GLCs from emissions:</b> <table><tr><th>Pollutant</th><th>Max. Base Line Conc. (µg/m³)</th><th>Estimated Incremental Conc. (µg/m³)</th><th>Total Conc. (µg/m³)</th><th>NAAQ standard</th></tr><tr><td>PM</td><td>57.72</td><td>2.05</td><td>59.77</td><td>100</td></tr><tr><td>SO<sub>2</sub></td><td>15.01</td><td>0.12</td><td>15.13</td><td>80</td></tr><tr><td>NO<sub>x</sub></td><td>25.87</td><td>0.96</td><td>26.83</td><td>80</td></tr></table> <p>The details are provided in <b>Chapter- 4, Section 4.3.2</b> and <b>Table 4-11</b>.<br/>Air Quality modelling results are given in <b>Chapter-4, Section 4.3.1, Table 4-8 to 4-10</b> and <b>Figure 4-2 to Figure 4-4</b>.<br/>Wind rose diagram considered for dispersion modeling is shown in <b>Chapter-4, Section 4.3.1 Figure 4-1</b>.<br/><b>Traffic Volume after Implementation of the Project:</b><br/>The details are provided in <b>Chapter-4, Section 4.6, and Table 4-14 &amp; Table 4-15</b>.</p> |                     |               |  |  | Pollutant | Max. Base Line Conc. (µg/m³) | Estimated Incremental Conc. (µg/m³) | Total Conc. (µg/m³) | NAAQ standard | PM | 57.72 | 2.05 | 59.77 | 100 | SO <sub>2</sub> | 15.01 | 0.12 | 15.13 | 80 | NO <sub>x</sub> | 25.87 | 0.96 | 26.83 | 80 |
| Pollutant       | Max. Base Line Conc. (µg/m³)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Estimated Incremental Conc. (µg/m³)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Total Conc. (µg/m³) | NAAQ standard |  |  |           |                              |                                     |                     |               |    |       |      |       |     |                 |       |      |       |    |                 |       |      |       |    |
| PM              | 57.72                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 2.05                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 59.77               | 100           |  |  |           |                              |                                     |                     |               |    |       |      |       |     |                 |       |      |       |    |                 |       |      |       |    |
| SO <sub>2</sub> | 15.01                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0.12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 15.13               | 80            |  |  |           |                              |                                     |                     |               |    |       |      |       |     |                 |       |      |       |    |                 |       |      |       |    |
| NO <sub>x</sub> | 25.87                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0.96                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 26.83               | 80            |  |  |           |                              |                                     |                     |               |    |       |      |       |     |                 |       |      |       |    |                 |       |      |       |    |
| 24              | The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water                                                                                                                                                                                                                                                                                                                                                                                                                  | The water requirement for the project is addressed in <b>Chapter-2</b> and <b>Section 2.9.1. Table 2-7</b> .<br>The total water requirement is sourced from private tank suppliers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                     |               |  |  |           |                              |                                     |                     |               |    |       |      |       |     |                 |       |      |       |    |                 |       |      |       |    |

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|    | 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.                                                                                                                                          | No ground water withdrawal to meet the water requirement is proposed. The total water requirement will be sourced from private tank suppliers.                                                                                                                                                                                             |
| 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.                                                                                 | Water conservation measures are given in <b>Chapter-4, Section 4.25.</b><br><br>Rainwater harvesting management details are provided in <b>Chapter 4, Section 4.7.1 and 4.25.3.</b>                                                                                                                                                        |
| 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.                                                                                                    | Impacts due to the proposed project on water environment and their mitigation measures are discussed in <b>Chapter-4, Section 4.7 and 4.25.</b>                                                                                                                                                                                            |
| 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 | The hydrogeology report is being prepared by Government of Tamil Nadu Water Resources Department.<br><br>However, the proposed mining activity is for a depth of 12m from the top of the hill. Ground water table is available at 11.6mBGL ( <i>Ref – TWAD</i> ). Therefore, mining activities will not intersect with ground water table. |

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|    | 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 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.                                                                                                                           | There is no any stream passing within the proposed mine lease area.                                                                                                                                                                                                                                                                                                                              |
| 30 | Information on site elevation, working depth, groundwater table etc. Should be provided both in ASML and bgl. A schematic diagram may also be provided for the same.                                                                                                                                                   | <p>Site Elevation: 432 AMSL</p> <p>Height of the Hill: 32m</p> <p>Groundwater level is 11.6m depth (<i>Ref- TWAD</i>)</p> <p>Proposed Depth of Mining is 12m from the top of the hillock is given in the Mining Plan as enclosed as <b>Annexure-3</b>.</p> <p>Schematic Diagram of Site Elevation and Ground Water Regime is given in <b>Chapter 1, Section 1.4.3</b> and <b>Figure 1-1</b>.</p> |
| 31 | A time bound Progressive Greenbelt Development Plan shall be prepared in a                                                                                                                                                                                                                                             | The total area for the proposed green belt is 0.06.5 Ha during first 5 years of the proposed quarrying activity. TAMIN is proposing to plant 825 trees are proposed to plant within the 7.5m                                                                                                                                                                                                     |

|         | <p>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 greenbelt 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>safety buffer zone mine lease area and also in the proposed green belt area.</p> <p><b>Proposed Greenbelt Details:</b></p> <table><tr><th>Year</th><th>No of trees proposed to be planted</th><th>Name of the species to be plant</th><th>Survival rate expected in %</th><th>No of trees expected to be grown</th></tr><tr><td>2025-26</td><td>825</td><td>Neem, pungam, vengai</td><td>80</td><td>660</td></tr></table> | Year                        | No of trees proposed to be planted | Name of the species to be plant | Survival rate expected in % | No of trees expected to be grown | 2025-26 | 825 | Neem, pungam, vengai | 80 | 660 |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|------------------------------------|---------------------------------|-----------------------------|----------------------------------|---------|-----|----------------------|----|-----|
| Year    | No of trees proposed to be planted                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Name of the species to be plant                                                                                                                                                                                                                                                                                                                                                                                              | Survival rate expected in % | No of trees expected to be grown   |                                 |                             |                                  |         |     |                      |    |     |
| 2025-26 | 825                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Neem, pungam, vengai                                                                                                                                                                                                                                                                                                                                                                                                         | 80                          | 660                                |                                 |                             |                                  |         |     |                      |    |     |
| 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,</p>                                                                                                                                                                                                                                                                                                                                                                                                                                  | <p>Impacts and mitigation measures on transportation is given in <b>Chapter-4, Section 4.6 and 4.24.</b></p>                                                                                                                                                                                                                                                                                                                 |                             |                                    |                                 |                             |                                  |         |     |                      |    |     |

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|    | 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.                                                                                                                                                                                                                | Sanitation facilities, Shelters for Workers, Office Room and other facilities will be provided for the mines workers. The details are provided in sectional plates and the same is enclosed as <b>Annexure-4</b> .<br><br>Land use details of the quarry area are given in <b>Chapter-2, Section 2.5, Table 2-2</b> . |
| 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.                                                                                                                                                              | There will be no reclamation and restoration.<br><br>It is proposed not to fill back the ultimate pit, in as much as good quantity of reserve is available below the workable depth.                                                                                                                                  |
| 35 | Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement                                                                                                                                                                                  | Occupational Health impacts & preventive measures details are given in <b>Chapter-4, Section 4.15</b> and <b>4.28</b> .<br><br>The EMP details are given separately as <b>Chapter-10</b> along with EMP Cost details are provided in                                                                                  |

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|    | 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.           | <b>Section 10.10.</b>                                                                                                                                                                                                                                                          |
| 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.                | Due to implementation of proposed environmental Management plan mentioned in this report no significant public health implications are anticipated. Budgetary allocations on remedial measures have been included in EMP Budget in Chapter 10 “Environmental Management Plan”. |
| 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. | CER activity discussed in <b>Chapter 8, Section 8.4.</b><br><br>Project Benefits are discussed in <b>Chapter 8.</b>                                                                                                                                                            |
| 38 | Detailed Environmental Management Plan (EMP) to mitigate the                                                                                                                                                                                     | The detailed EMP was discussed in <b>Chapter-10</b> along with EMP Cost details are provided in                                                                                                                                                                                |

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|    | 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.                            | <b>Section 10.10.</b>                                                                                                                                                                                                                                                    |
| 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. | Since the report is being prepared for submission for the Public Hearing, the points raised during the public hearing, along with the commitments made by the project proponent, will be incorporated into Chapter 7 – 'Additional Studies' of the Final EIA/EMP Report. |
| 40 | Details of litigation pending against the project, if any, with direction/order passed by any Court of Law against the Project should be given.                                                                                                         | There is no litigation against the project.                                                                                                                                                                                                                              |
| 41 | The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.                                                                                                                | The project Cost is <b>99,97,000/-</b> as addressed in <b>Chapter-2 and Section 2.7.</b><br>The cost spent for EMP is discussed in <b>Chapter -10, Section 10.10.</b>                                                                                                    |
| 42 | A Disaster Management Plan shall be prepared and include in the EIA/EMP                                                                                                                                                                                 | Detailed Disaster management plan are provided in <b>Chapter -7 and Section 7.3.</b>                                                                                                                                                                                     |

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|    | 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. | The benefit of the proposed project indicating environmental, social, economic, employment potential was discussed in <b>Chapter- 8</b> . |

#### 1.8.4.3 SEIAA Standard Conditions

| S.No                                | Terms of Reference                                                                                                                                                                     | Compliance                                                                                                                                                |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Cluster Management Committee</b> |                                                                                                                                                                                        |                                                                                                                                                           |
| 1                                   | Cluster Management Committee, which must include all the proponents in the cluster as members including the existing as well as proposed quarry:                                       | There is only one existing quarry of same proponent located within 500m radius of the proposed site. Hence, Cluster Management Committee is not required. |
| 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... | Cluster management committee is not required. However, TAMIN is a government organization will effectively implement the EMP as committed.                |
| 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                                                  | Since there is no cluster mines other than same proponent quarry, the cluster management committee is not applicable.                                     |



|   |                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                    |
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|   | 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.                                                                                             | There is only one existing quarry of same proponent located within 500m radius of the proposed site.                                                               |
| 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 inner especially during natural calamities like intense rain and the mitigation measures Considering the inundation of the cluster and evacuation plan. | The cluster management committee formation is not required. However, Risk management of the proposed mining project is discussed in <b>Chapter 7, Section 7.2.</b> |
| 6 | The Cluster Management Committee shall forms 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.                                    | The cluster management committee formation is not required. However, Environmental management plan details are discussed in <b>Chapter-10.</b>                     |

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| 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.            | There is only one existing quarry of same proponent located within 500m radius of the proposed site.                                                                                                                                                                                                                                                                                                              |
| 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.                               | There is only one existing quarry of same proponent located within 500m radius of the proposed site. Hence, Cluster Management Committee is not required. However, the health of the workers/staff involved in the mining as well as the health of the public discussed in <b>Chapter -10</b> .                                                                                                                   |
| <b>Impact study of mining</b>              |                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Agriculture &amp; Agro Biodiversity</b> |                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 9                                          | Impact on surrounding agricultural fields around the proposed mining Area                                                                                                   | The detailed impact and mitigation measures due to proposed mining activity on surrounding agricultural fields are discussed in <b>Chapter-4, Section 4.11</b> and <b>Section 4.29</b> .                                                                                                                                                                                                                          |
| 10                                         | Impact on soil flora & vegetation around the project site                                                                                                                   | Impact and mitigation measures of soil given in <b>Chapter-4, Section 4.2</b> and <b>Section 4.17.1</b> .<br>Impact and mitigation measures of flora & fauna are given in <b>Chapter-4, Section 4.10</b> and <b>Section 4.27</b> .<br>Impact and mitigation measures due to proposed mining activity on surrounding agricultural fields are discussed in <b>Chapter-4, Section 4.11</b> and <b>Section 4.29</b> . |
| 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 | In the proposed lease boundary, only Fabaceae and Malvaceae Shrubs are present. Hence, no trees will be cut for the project activity. In addition, Greenbelt development around the project lease boundary will be done by planting around 825 trees of Vilvam, Neem, and Pungam as a part of control measures.                                                                                                   |

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|                | 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. | The details of Flora and fauna study are discussed in <b>Chapter-3, Section 3.10</b> . In addition, the conservation plan for the schedule 1 species with budgetary allocations was given in <b>Table 3-22</b> .                                                        |
| 13             | Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.                                                                                                            | The proponent to manage the surrounding environment and restore the ecosystem will follow all the essential environmental protective measures.                                                                                                                          |
| 14             | The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock.                                                                                             | The detailed impacts and mitigation measures are discussed in <b>Chapter 4, Section 4.11 and 4.29</b> .                                                                                                                                                                 |
| <b>Forests</b> |                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                         |
| 15             | The project proponent shall detailed study on impact of mining on Reserve forests free ranging wildlife.                                                                                                                                          | Nearest reserved forest is Kavaramalai RF which at a distance of 3.18 km (W), so there is no any impact for free ranging of wildlife and remaining reserve forest details are given in <b>Chapter 3, Table 3-1</b> .                                                    |
| 16             | The Environmental Impact Assessment should study impact on forest, vegetation, endemic vulnerable and endangered indigenous flora                                                                                                                 | The impacts on Biological environment and mitigation measures are discussed in <b>Chapter-4, Section 4.10 and Section 4.27</b> . The details of Flora and fauna study are discussed in <b>Chapter 3, Section 3.10</b> . Also, the conservation plans for the schedule 1 |

|                          |                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
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|                          | and fauna.                                                                                                                                                                                                                                                                                                                                                                                               | species with budgetary allocations were discussed in <b>Table 3-21 and 3-22.</b>                                                                                                                                                                                                                                                                                                                                                                                         |
| 17                       | The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and action suggested for protection.                                                                                                                                                                                                                                                 | <p>The impacts and mitigation measures of Biological environment is discussed in <b>Chapter-4, Section 4.10 and Section 4.27..</b></p> <p><b>Action suggested for protection:</b></p> <p>The total area for the proposed green belt is 0.06.5 Ha during first 5 years of the proposed quarrying activity. TAMIN is proposing to plant 825 trees, which are proposed to plant within the 7.5m safety buffer zone mine lease area and in the proposed green belt area.</p> |
| 18                       | The Environment Impact Assessment study impact on protected areas. Reserve Forests, National Parks. Corridors and life pathways, near project site.                                                                                                                                                                                                                                                      | <p>There are no National parks, Biosphere Reserves, Wildlife Corridors; Tiger/ Elephant Reserves were located within 10km of the mine lease area.</p> <p>Nearest reserved forest is Kavaramalai RF which at a distance of 3.18 km (W), so there will be no any impact and remaining reserved forest details are given in <b>Chapter 3, Table 3-1.</b></p>                                                                                                                |
| <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, tank 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. | <p>The hydrogeology report is being prepared by Government of Tamil Nadu Water Resources Department.</p> <p>However, the proposed mining activity is for a depth of 12m from the top of the hill. Ground water table is available at 11.6m BGL (<i>Ref – TWAD</i>). Therefore, mining activities will not intersect with ground water table.</p>                                                                                                                         |

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|    | Necessary data and documentation in this regard may be provided, covering the entire mine lease period.                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                       |
| 20 | Erosion Control measures.                                                                                                                                                                                                                                            | Erosion control measures given in <b>Chapter 4, Section 4.20.</b><br>Green belt development is one the important control measure of erosion, which is discussed in <b>Chapter 4, Section 4.27.1.</b>                                                                                                                                                                                                  |
| 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 area.                                                                                    | The impacts due to proposed mining activity on nearby Villages, Water-bodies Rivers, & any ecological fragile area are discussed in <b>Chapter -4.</b>                                                                                                                                                                                                                                                |
| 22 | The project proponent shall study impact on fish habitats and the food WEB food chain in the water body and Reservoir.                                                                                                                                               | The water body around the project site is seasonal and involves common aquatic fish and flora. Therefore, it is not expected to have any significant effects on aquatic species or their habitats.                                                                                                                                                                                                    |
| 23 | The project proponent shall study and furnish the details on potential fragmentation impact of natural environment, by the activities.                                                                                                                               | The potential fragmentation impact of natural environment due to proposed mining activity is discussed in <b>Chapter-4, Section 4.31.</b>                                                                                                                                                                                                                                                             |
| 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 water body surrounding the project site is seasonal, and only common aquatic fish and flora are present. Therefore, the project is not expected to impact the ecological character of aquatic plants and animals in the water bodies. Additionally, there are no nearby caves or heritage sites in the vicinity of the proposed site, so no impacts are anticipated from the proposed activities. |
| 25 | The Terms of Reference should specifically                                                                                                                                                                                                                           | The detailed base line study has been conducted and the soil quality monitoring locations                                                                                                                                                                                                                                                                                                             |

|                       |                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                |
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|                       | study impact on soil health, soil erosion, the soil physical, chemical components and microbial components.                                                                                                                                                                                           | & results are discussed in <b>Chapter 3, Section 3.9.</b><br><br>Impacts and mitigation measures are given in <b>Chapter 4, Section 4.2</b> and <b>Section 4.19.</b>                                                                                                                                                                                           |
| 26                    | The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites.                                                                                                                                                                                   | The detailed impact and mitigation measures on water environment are discussed in <b>Chapter- 4, Section 4.7 &amp; Section 4.25.</b>                                                                                                                                                                                                                           |
| 27                    | The EIA shall include the impact of mining activity on the following:<br><br>a) Hydrothermal/Geothermal effect due to destruction in the Environment.<br><br>b) Bio-geochemical processes and its foot prints including Environmental stress.<br><br>c) Sediment geochemistry in the surface streams. | The impact of Hydrothermal/Geothermal Environment is discussed in <b>Chapter 4, Section 4.12</b> and <b>Section 4.13.</b> and the control measures are given in <b>Section 4.30.</b><br><br>Impact on Sediment Geochemistry in the Surface streams are discussed in <b>Chapter 4, Section 4.14.</b> and the control measures are given in <b>Section 4.18.</b> |
| <b>Energy</b>         |                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                |
| 28                    | The measures taken to control Noise, Air, Water, Dust Control and steps adopted so efficiently utilize the Energy shall be furnished.                                                                                                                                                                 | Environmental Impacts and Mitigation Measures are provided in <b>Chapter-4.</b>                                                                                                                                                                                                                                                                                |
| <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                                                                                                                               | Operating a granite quarry can have several impacts on increasing carbon emissions and contributing to temperature rise, primarily through direct and indirect mechanisms.<br><br>The proposed Granite Quarry has the potential to generate various GHG emissions,                                                                                             |

|                          |                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                          | sinks and temperature reduction including control or other emission and climate mitigation activities                                                                                                               | including carbon dioxide (CO <sub>2</sub> ), methane (CH <sub>4</sub> ), nitrous oxide (N <sub>2</sub> O), fluorinated gases, water vapour, and ozone. These emissions can arise from different phases of quarrying operations, such as excavation, transportation, energy consumption, and land-use changes. A detailed study has been conducted to analyse and mitigating these emissions for minimizing environmental impact and promoting sustainable quarrying practices the same has been discussed in <b>Chapter- 4, Section 4.5 and 4.23.</b> |
| 33                       | 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 operation of the proposed quarry can have various impacts on climate change, temperature rise, pollution, and carbon stocks, both above and below the soil. A detailed study has been conducted the results are discussed in <b>Chapter -4, Section 4.4 &amp; 4.5</b> and the mitigation measures are given in <b>Section 4.22</b> and <b>Section 4.23.</b>                                                                                                                                                                                       |
| <b>Mine Closure Plan</b> |                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 34                       | Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued.                                                                                                    | Mine Closure Plan is provided in <b>Chapter -2, Section 2.12.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>EMP</b>               |                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 35                       | 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. | The Environment Management Plan with budget allocation is discussed in <b>Chapter-10.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 36                       | The Environmental Impact Assessment should                                                                                                                                                                          | The EMP details are given in <b>Chapter-10</b> , and budget for EMP is given in <b>Section 10.10.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

|                                 |                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                 |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
|                                 | hold detailed study on EMP with budget for Green belt development and mine closure plan including disaster management plan.                                                                                                                                                                                                                                                              |                                                                                 |
| <b>Risk Assessment</b>          |                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                 |
| 37                              | To furnish risk assessment and management plan including anticipated vulnerabilities during operational and post operational phases of Mining                                                                                                                                                                                                                                            | Risk Identification & Management are provided in <b>Chapter-7, Section 7.2.</b> |
| <b>Disaster Management Plan</b> |                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                 |
| 38                              | To furnish disaster management plan and disaster mitigation measures in regard to all aspects to avoid reduce vulnerability to hazards & to cope with disaster/untoward accidents in & around the proposed mine lease areas due to the proposed method of mining activity & its related activities covering the entire mine lease period as per precise area communication order issued. | Disaster Management Plan is provided in <b>Chapter -7, Section 7.3.</b>         |
| <b>Others</b>                   |                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                 |
| 39                              | The project proponent shall furnish VAO certificate with reference to 300m radius regard to approved habitations, schools. Archaeological sites. Structures, railway lines,                                                                                                                                                                                                              | The VAO certificate is enclosed as <b>Annexure-8.</b>                           |



|    |                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | roads, water bodies such as streams, oda, vaari, canal, channel, river, lake pond, tank etc.                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 40 | As per the MoEF& CC office memorandum F.No.22-65/2017-IA III dated: 30.09.2020 and 20.10.2020 the proponent shall address the concerns raised during the public consultation and all the activities proposed shall be part of the Environment Management Plan                                                      | The draft EIA report for the proposed quarry will be submitted for the Public Hearing. After receiving the minutes from the TNPCB, the concerns raised during the Public Hearing will be incorporated into the final EIA report along with the corresponding compliance measures. The budget for the Environmental Management Plan (EMP) will be allocated based on the concerns raised during the Public Hearing, if applicable. |
| 41 | The project proponent shall study and furnish the possible pollution due to plastic and microplastic on the environment. The ecological risks and impacts of plastic & microplastics on aquatic environment and fresh water systems due to activities, contemplated during mining may be investigated and reported | No plastics are involved in the proposed project.                                                                                                                                                                                                                                                                                                                                                                                 |

## **2 PROJECT DESCRIPTION**

### **2.1 Description of the Project**

The quarry operation is proposed to carry out by opencast semi mechanized method by formation of benches. Benches are proposed with a height of 6m & 6m width with vertical slopes. The topography of the applied area is a hilly terrain of about 32m surrounding by plain lands. The altitude of the area is 432 AMSL. The total proposed production capacity is 4,150m<sup>3</sup> at 10% recovery of ROM 41,501m<sup>3</sup>. The annual peak production will be 1,000m<sup>3</sup> at 10% recovery of ROM 9,999m<sup>3</sup>.

### **2.2 Type of Project**

The project falls under B1 Category, Schedule 1(a) Mining of Minerals as per MoEF&CC notification 2006 and its subsequent amendments. The quarrying operation is being carried out by open cast semi-mechanized method with 6m bench height and 6m bench width along with deployment of HEMM for development and production activities under Regulation 106.

### **2.3 Need of the Project**

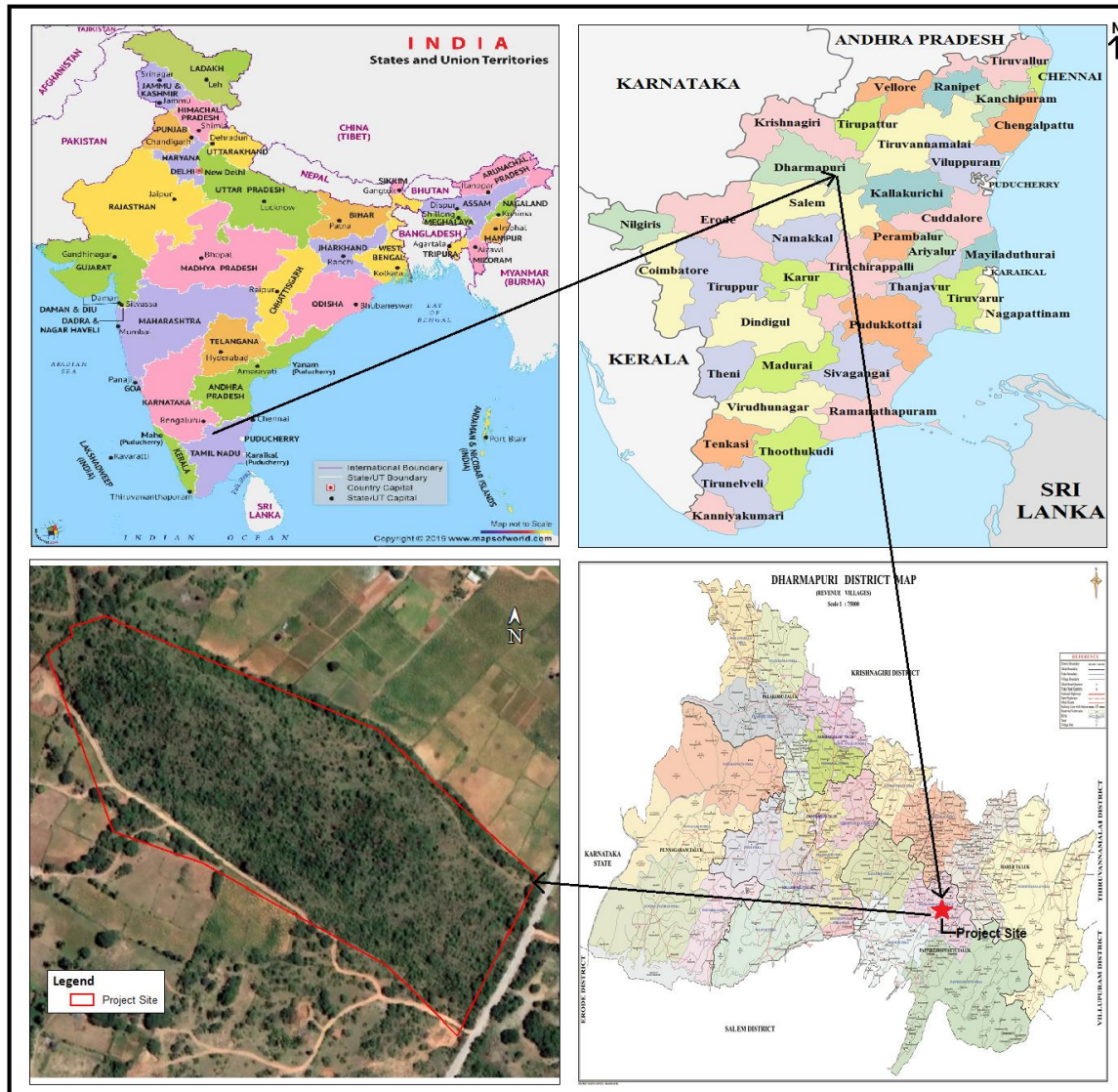
The granite dimensional stone material by virtue of its pleasing color and texture and its best ability to take polishing and appealing look in polished product has attracted the consumers in the building construction and interior decoration industries. The domestic market capabilities have also been explored in recent periods. Bulk quantity of the blocks is produced and exported as raw blocks and some quantity is being processed at TAMIN's granite processing units and exported as value added finished products.

The earning source in the targeted area is limited, most of the people in and around the area depend upon the seasonal agriculture and much of the people migrate to nearby towns where good industries and factories are growing up. This project will provide direct employment for about 30 persons. This material is well known in the international supermarket of Granite, which will fetch a good foreign exchange to the nation.

### **2.4 Location of the Project**

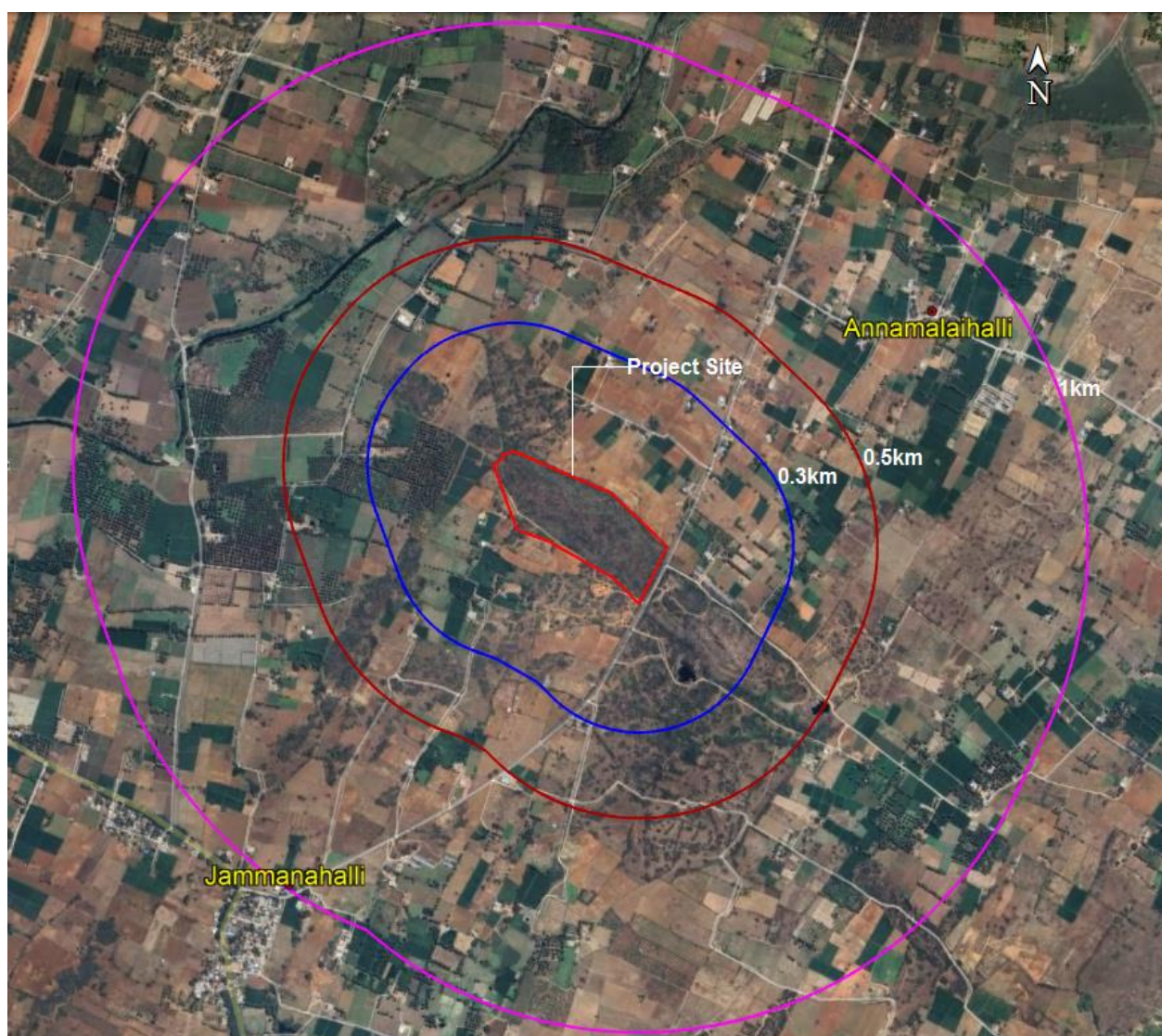
The quarry is located at SF.No.83 (Part), Jammanahalli Village, Pappireddypatti Taluk, Dharmapuri District, Tamil Nadu State. Quarry lease area falls in the survey of India Topo sheet D44S8 and the area lies in the Eastern Longitude from 78°25'11.6284"E to 78°25'25.2777"E and Northern latitude from 12°00'33.8481"N to 12°00'45.4265"N. The quarry lease area is hillock with height of about 32m surrounded by plain lands. The altitude of the area is 432m AMSL (Above Mean Sea Level).

Location map of the lease area is given in **Figure 2-1**. 1km Radius Google image of the lease area is shown in **Figure 2-2**. 5km Radius Google image of the lease area is shown in **Figure 2-3**. 10km Radius Google image of the lease area is shown in **Figure 2-4**.



**Figure 2-1 Location Map of the Leased Area**





**Figure 2-2 1km Radius Google Image of the Lease Area**



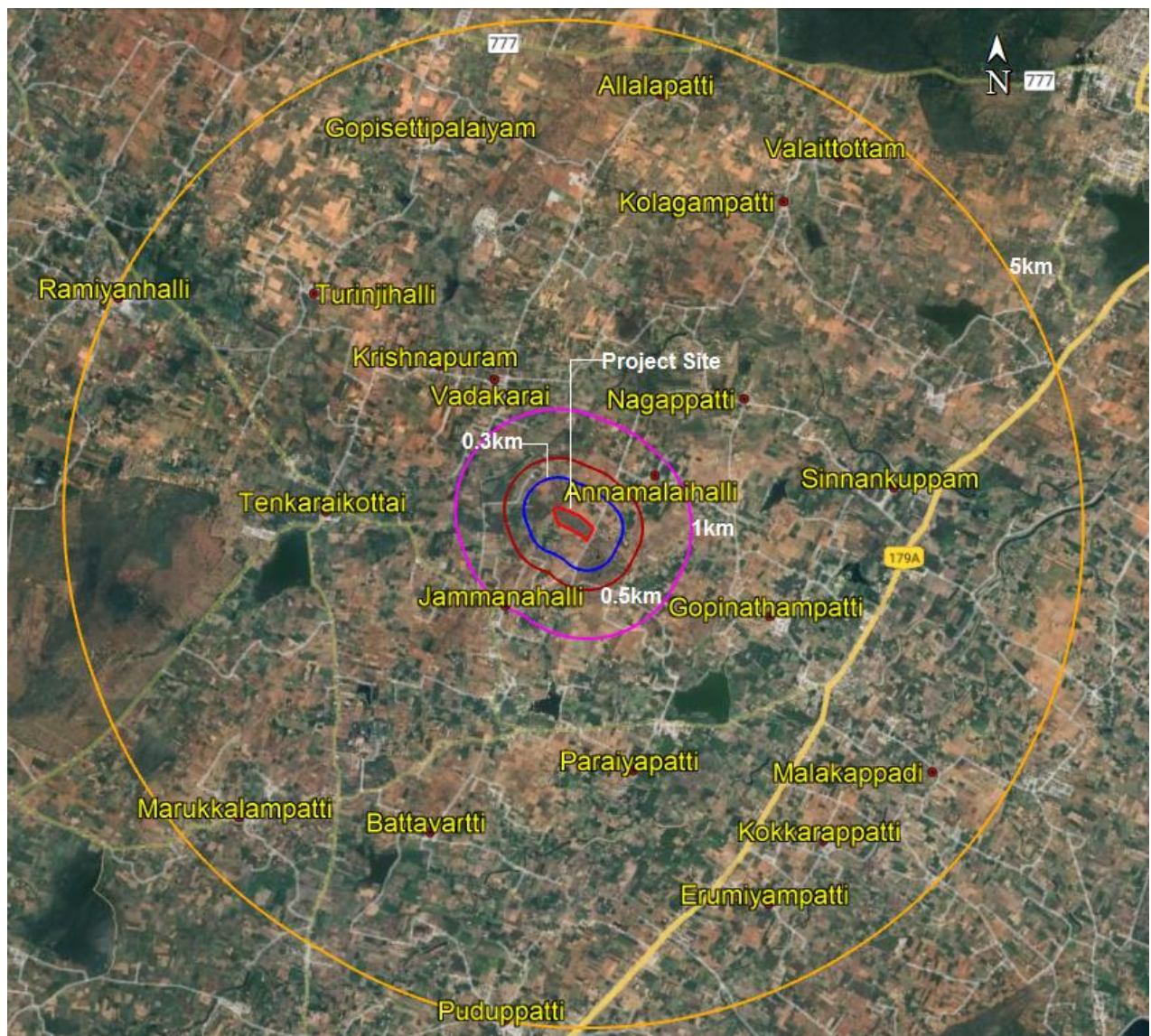
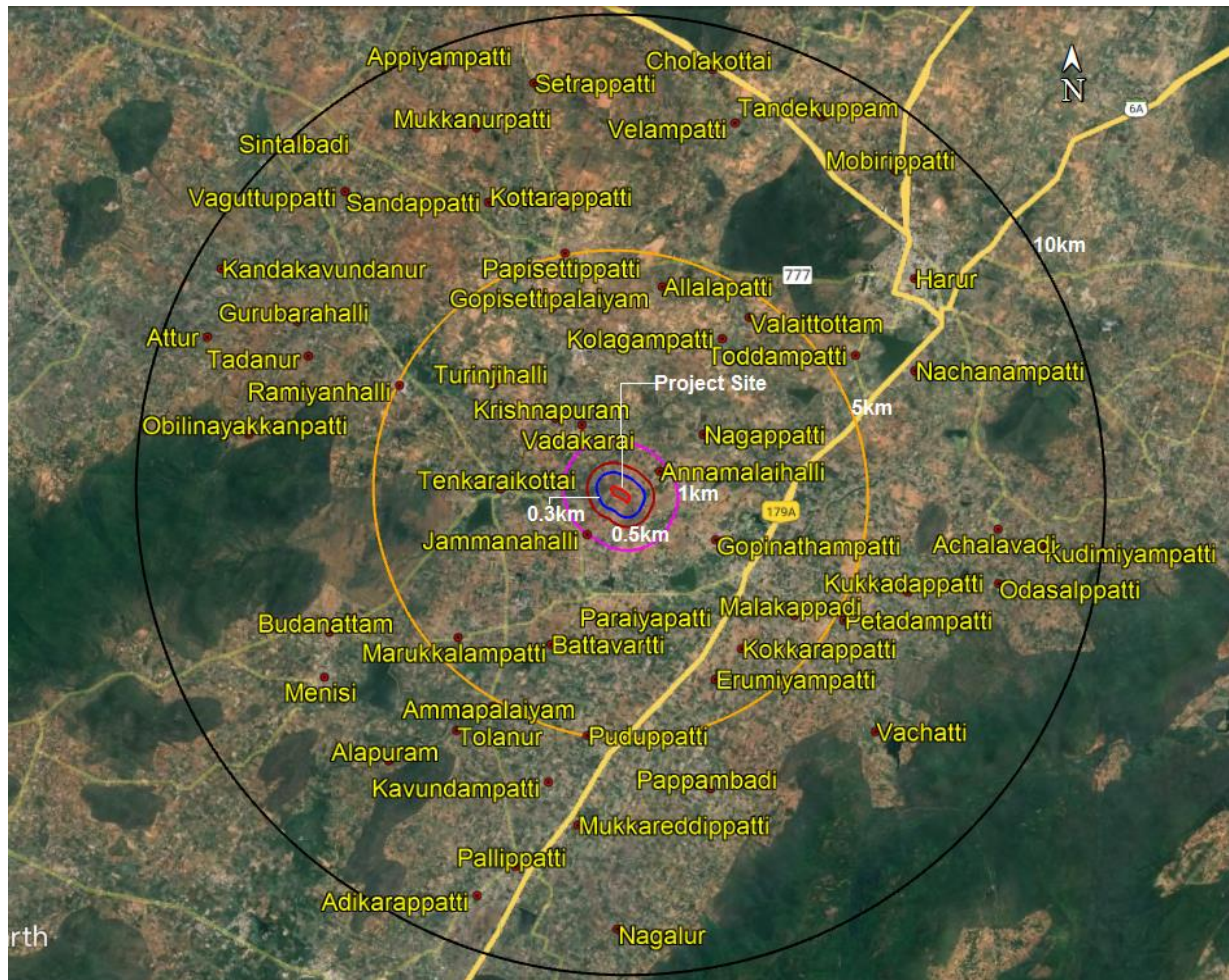


Figure 2-3 5km Radius Google Image of the Lease Area





**Figure 2-4 10km Radius Google Image of the Lease Area**



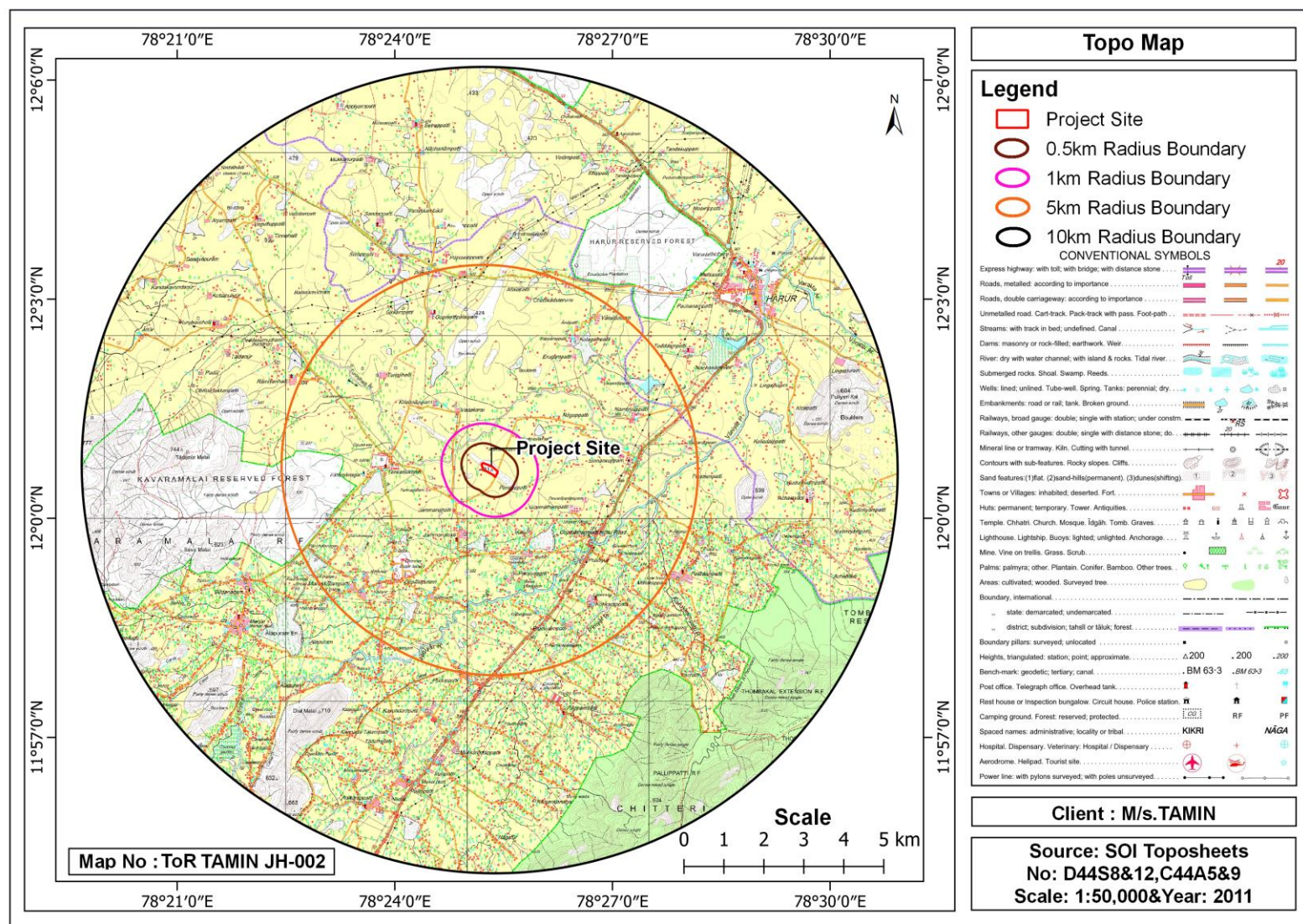


Figure 2-5 Topo Map of the Study Area

**Table 2-1 Project Summary**

| S. No | Particulars                                        | Details                                                                                                                            |
|-------|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| 1.    | Project Location                                   | S.F.No.83(Part), Jammanahalli Village, Pappireddypatti Taluk, Dharmapuri District, Tamil Nadu State.                               |
| 2.    | Land classification                                | Government Poramboke Land                                                                                                          |
| 3.    | Extent of lease area (Ha.)                         | 6.59.5                                                                                                                             |
| 4.    | Precise area communication                         | Precise area communication letter was granted vide Industries (MME.1) Department, Rc. No. 4539479/MME.1/2023-1, dated: 13.09.2023. |
| 5.    | Lease Period                                       | 20 years                                                                                                                           |
| 6.    | Estimated Geological Reserves (ROM) m <sup>3</sup> | 4,09,500                                                                                                                           |
| 7.    | Estimated Mineable Reserves (ROM) m <sup>3</sup>   | 2,13,213                                                                                                                           |
| 8.    | Proposed production Capacity (m <sup>3</sup> )     | 4,150                                                                                                                              |
| 9.    | Depth of Mining                                    | 12m from the top of hill                                                                                                           |
| 10.   | Method of Mining                                   | Open cast semi mechanized method                                                                                                   |
| 11.   | Water Requirement (KLD)                            | 3.5                                                                                                                                |
| 12.   | Source of Water                                    | Private tankers                                                                                                                    |
| 13.   | Power requirement (kVA)                            | 60                                                                                                                                 |
| 14.   | Power Backup (DG set)Kva                           | 1* 125                                                                                                                             |
| 15.   | Fuel requirements (Lts/Day)                        | 200                                                                                                                                |
| 16.   | Direct Manpower (Nos)                              | 30                                                                                                                                 |
| 17.   | Municipal Solid Waste Generation (kg/day)          | 13.5                                                                                                                               |
| 18.   | Project Cost in Lakhs                              | 99.97                                                                                                                              |

## 2.5 Size or Magnitude of operation

The quarrying operation is being carried out by open cast semi-mechanized method with 6m bench height and 6m bench width along with deployment of HEMM for development and production activities under Regulation 106.



The Geological reserves of black granite have been computed based on the Geological Plan & Sections up to the economically workable average depth of 33m from the top of the hillock works out to 4,09,500m<sup>3</sup>. Mineable reserves have been computed as 2,13,213m<sup>3</sup> after leaving the reserves locked up in safety barrier and benches based on the Conceptual Plan and sections, the effective (Saleable) mineable reserves have been worked out as 21,321m<sup>3</sup> by applying the recovery factor 10%. The total proposed production capacity 4,150m<sup>3</sup> is at 10% recovery of ROM 41,501m<sup>3</sup>. The annual peak production will be 1,000m<sup>3</sup> at 10% recovery of ROM 9,999m<sup>3</sup>.

Total waste (Granite waste + Side Burden+Over Burden) to be generated during the five years of Mining Plan period will be around 64,962m<sup>3</sup>. These wastes are proposed to be dumped on the South East side of lease area. The Land use details of the lease area were summarized in **Table 2-2**.

**Table 2-2 Land Use Details of the Lease Area**

| S.No         | Description           | Present area ( Ha) | Proposed Mining Plan Period (Ha) | Area at the end of the life of mine (Ha) |
|--------------|-----------------------|--------------------|----------------------------------|------------------------------------------|
| 1.           | Mining Area           | --                 | 0.78.0                           | 2.20.5                                   |
| 2.           | Waste Dump            | --                 | 0.66.0                           | 1.74.0                                   |
| 3.           | Office Infrastructure | 0.01.0             | --                               | 0.01.0                                   |
| 4.           | Foot Path             | 0.14.0             | --                               | 0.14.0                                   |
| 5.           | Afforestation         | --                 | 0.06.5                           | 0.27.5                                   |
| 6.           | Unutilized Area       | 6.44.5             | 4.94.0                           | 2.22.5                                   |
| <b>Total</b> |                       | <b>6.59.5</b>      | <b>6.44.5</b>                    | <b>6.59.5</b>                            |

Granite Quarry Reserves is given in **Table 2-3**.The yearwise production details are given in the **Table 2-4**. Total waste generation is given in **Table 2-5**. Surface Plan of the Quarry is given in **Figure 2-6**. Geological plan and cross section of the quarry is shown in **Figure 2-7**. The yearwise production and development details are given in the **Figure 2-8**. Land use and afforestation of the quarry is shown as **Figure 2-9**. Conceptual Plan of the quarry area is shown as **Figure 2-10**.

**Table 2-3 Granite Quarry Reserves**

| S. No | Geological Reserves (m <sup>3</sup> ) | Mineable Reserves (m <sup>3</sup> ) | Proposed Production at 10% recovery (m <sup>3</sup> ) |
|-------|---------------------------------------|-------------------------------------|-------------------------------------------------------|
| 1.    | 4,09,500                              | 2,13,213                            | 4,150                                                 |

**Table 2-4 Yearwise Production Details**

| S. No        | Year                 | ROM (m <sup>3</sup> ) | Recovery @ 10% (m <sup>3</sup> ) | Granite Waste @ 90 % (m <sup>3</sup> ) |
|--------------|----------------------|-----------------------|----------------------------------|----------------------------------------|
| 1            | 1 <sup>st</sup> Year | 6,003                 | 600                              | 5,403                                  |
| 2            | 2 <sup>nd</sup> Year | 7,503                 | 750                              | 6,753                                  |
| 3            | 3 <sup>rd</sup> Year | 8,500                 | 850                              | 7,650                                  |
| 4            | 4 <sup>th</sup> Year | 9,496                 | 950                              | 8,546                                  |
| 5            | 5 <sup>th</sup> Year | 9,999                 | 1000                             | 8,999                                  |
| <b>Total</b> |                      | <b>41,501</b>         | <b>4,150</b>                     | <b>37,351</b>                          |

**Table 2-5 Waste Generation Details**

| S. No        | Year                 | Over Burden (m <sup>3</sup> ) | Side Burden (m <sup>3</sup> ) | Granite Rejects @ 90% (m <sup>3</sup> ) |
|--------------|----------------------|-------------------------------|-------------------------------|-----------------------------------------|
| 1            | 1 <sup>st</sup> Year | 6,320                         | 580                           | 5,403                                   |
| 2            | 2 <sup>nd</sup> Year | 4,452                         | 174                           | 6,753                                   |
| 3            | 3 <sup>rd</sup> Year | 4,539                         | 401                           | 7,650                                   |
| 4            | 4 <sup>th</sup> Year | 7,012                         | 2,339                         | 8,546                                   |
| 5            | 5 <sup>th</sup> Year | 1,314                         | 480                           | 8,999                                   |
| <b>Total</b> |                      | <b>23,637</b>                 | <b>3,974</b>                  | <b>37,351</b>                           |

**Estimated Life of the Quarry:**

- Mineable Reserves @10% recovery : 21,321m<sup>3</sup>
- Annual Peak Production @10% recovery : 1,000m<sup>3</sup>
- Estimated Life of the Quarry = ~22 years

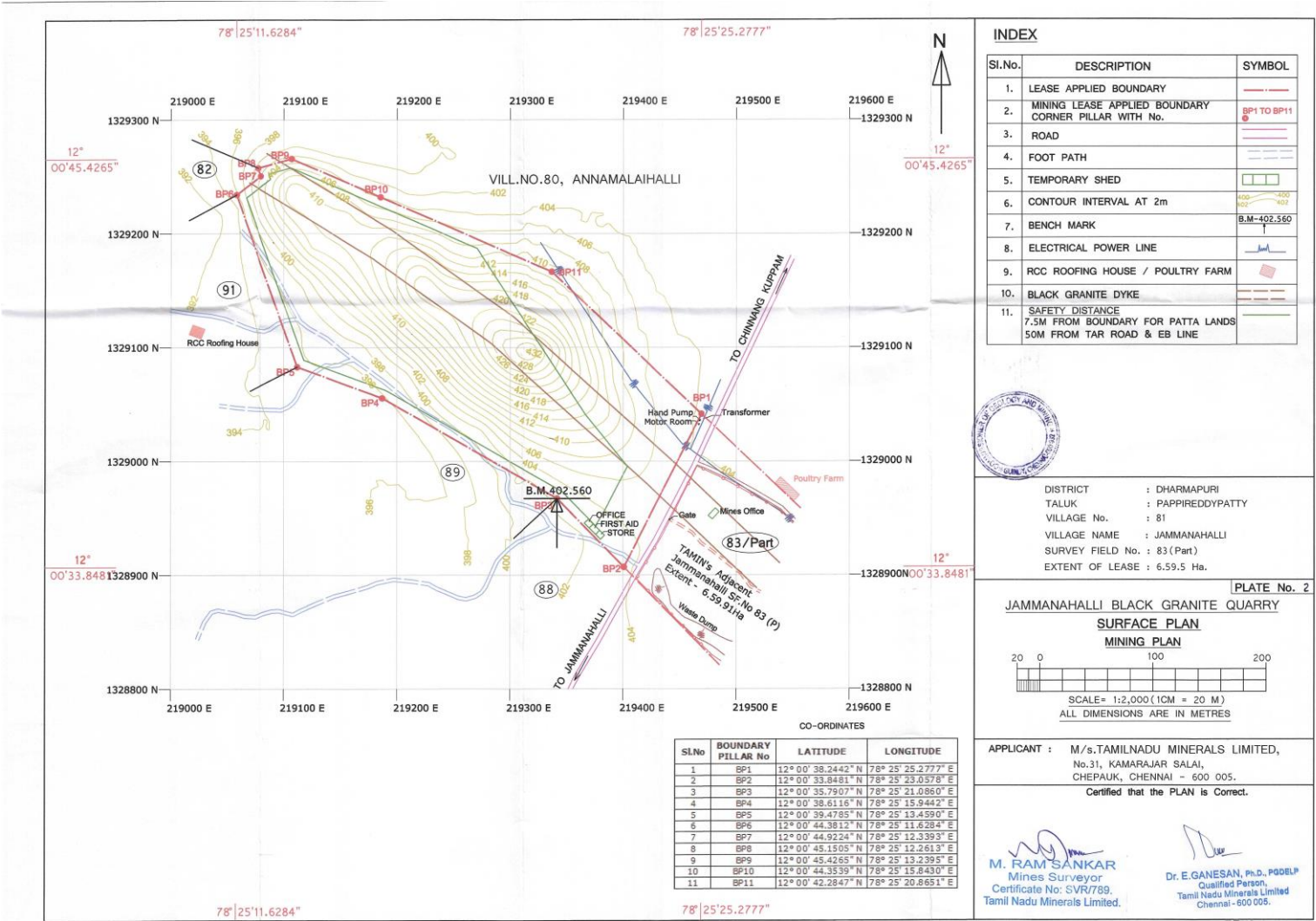


Figure 2-6 Surface Plan of the Quarry

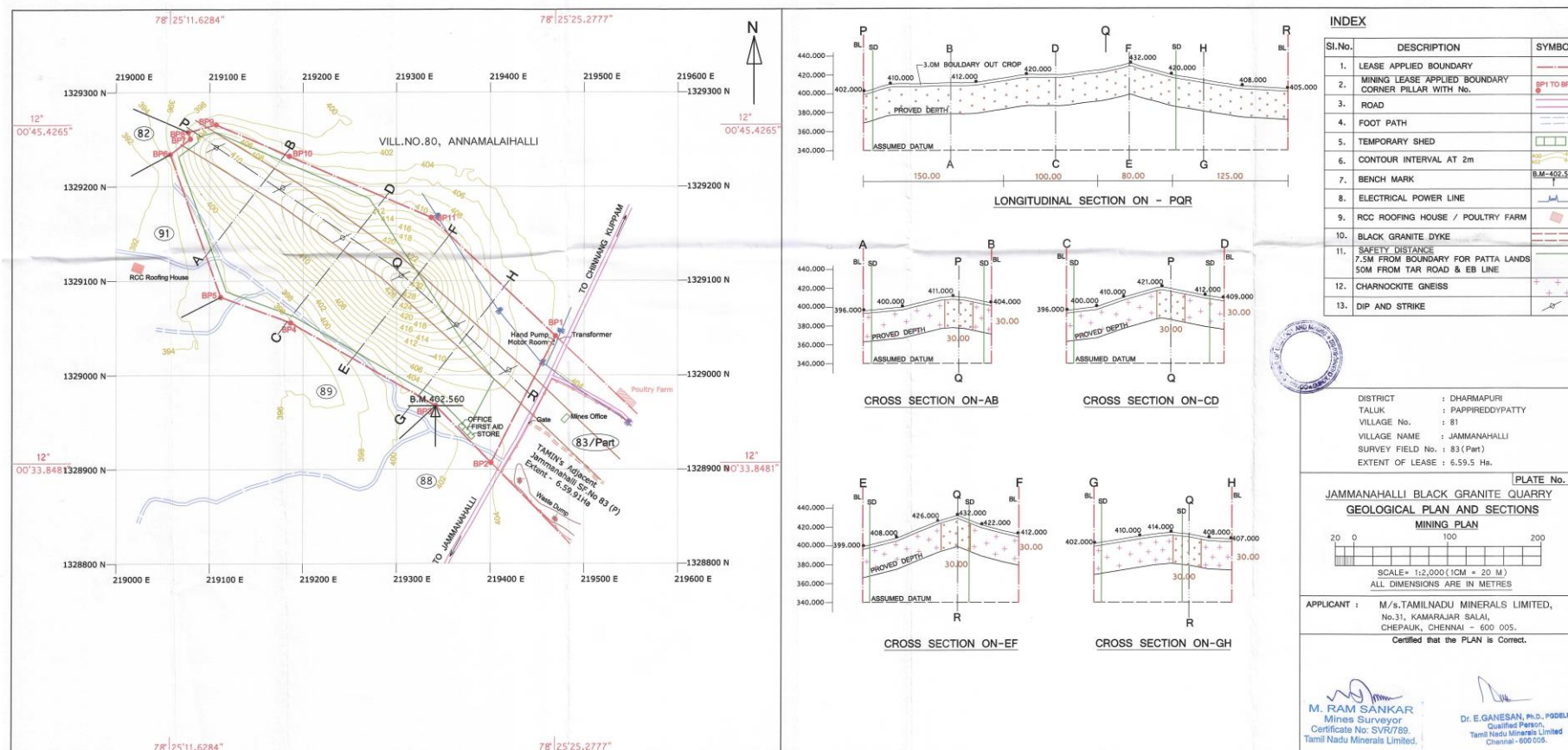


Figure 2-7 Geological Plan & Section of the Quarry



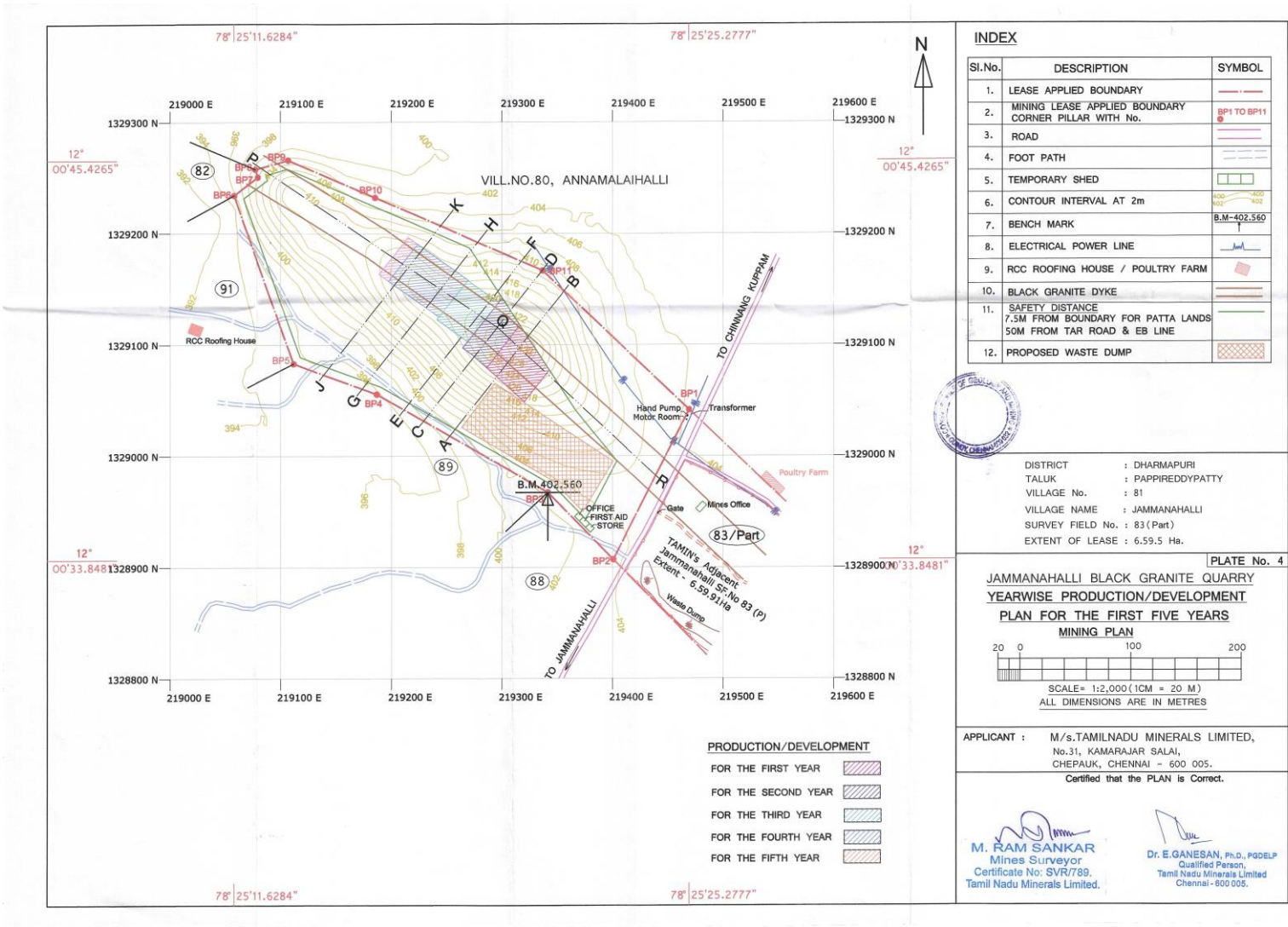


Figure 2-8 Yearwise Production/Development Plan for 5 years

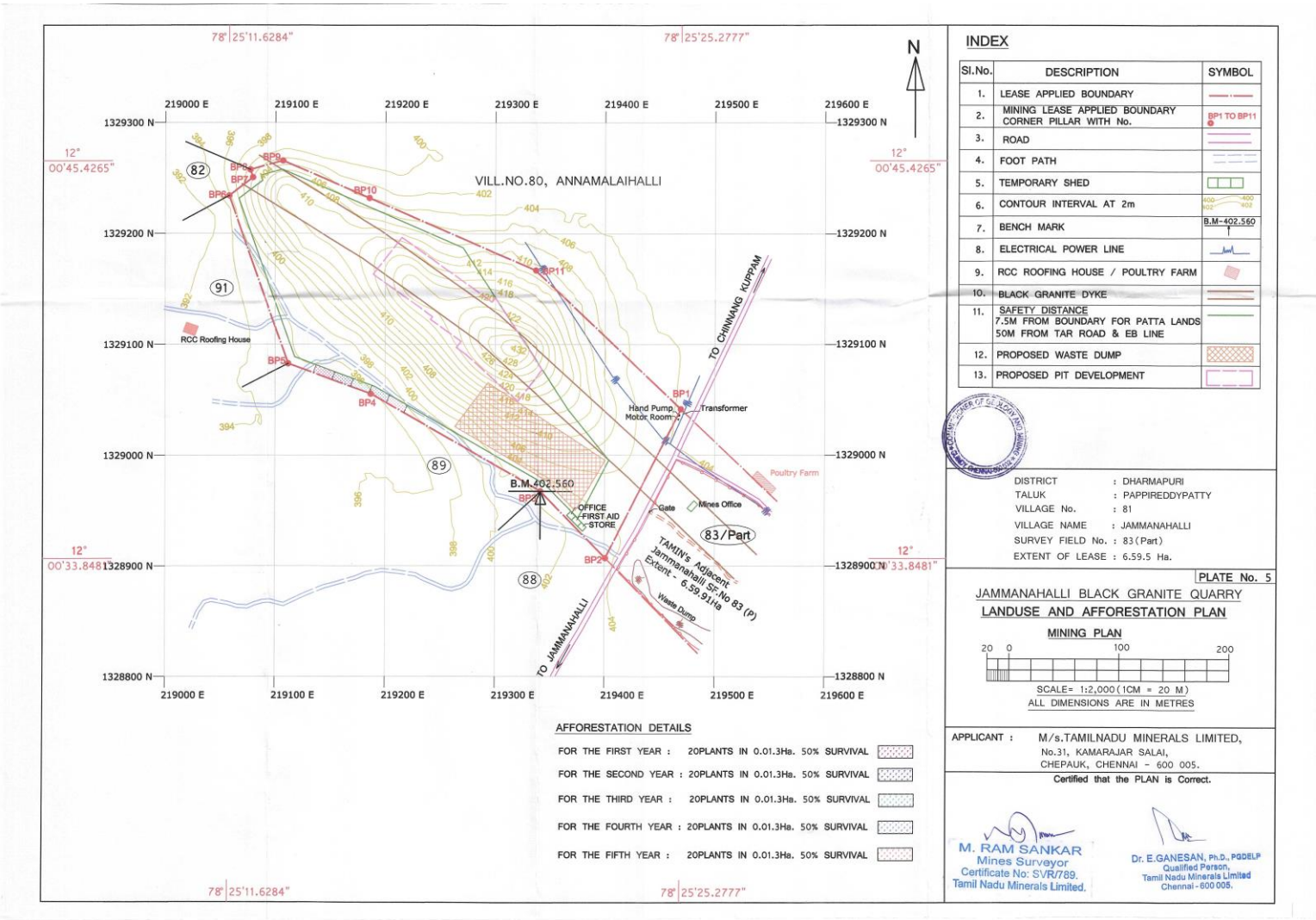


Figure 2-9 Land Use and Afforestation Plan of the Quarry

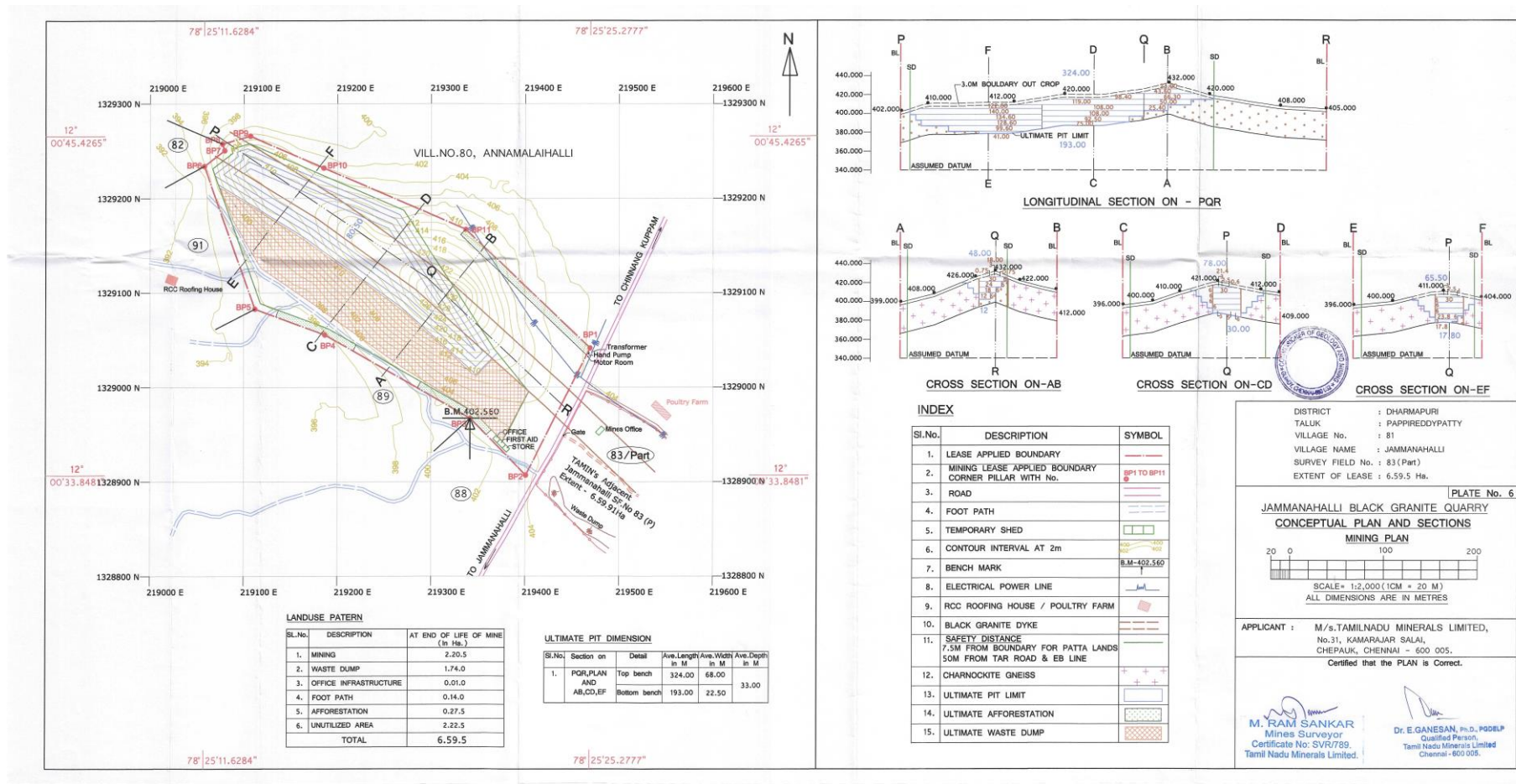


Figure 2-10 Conceptual Plan & Section of the Quarry



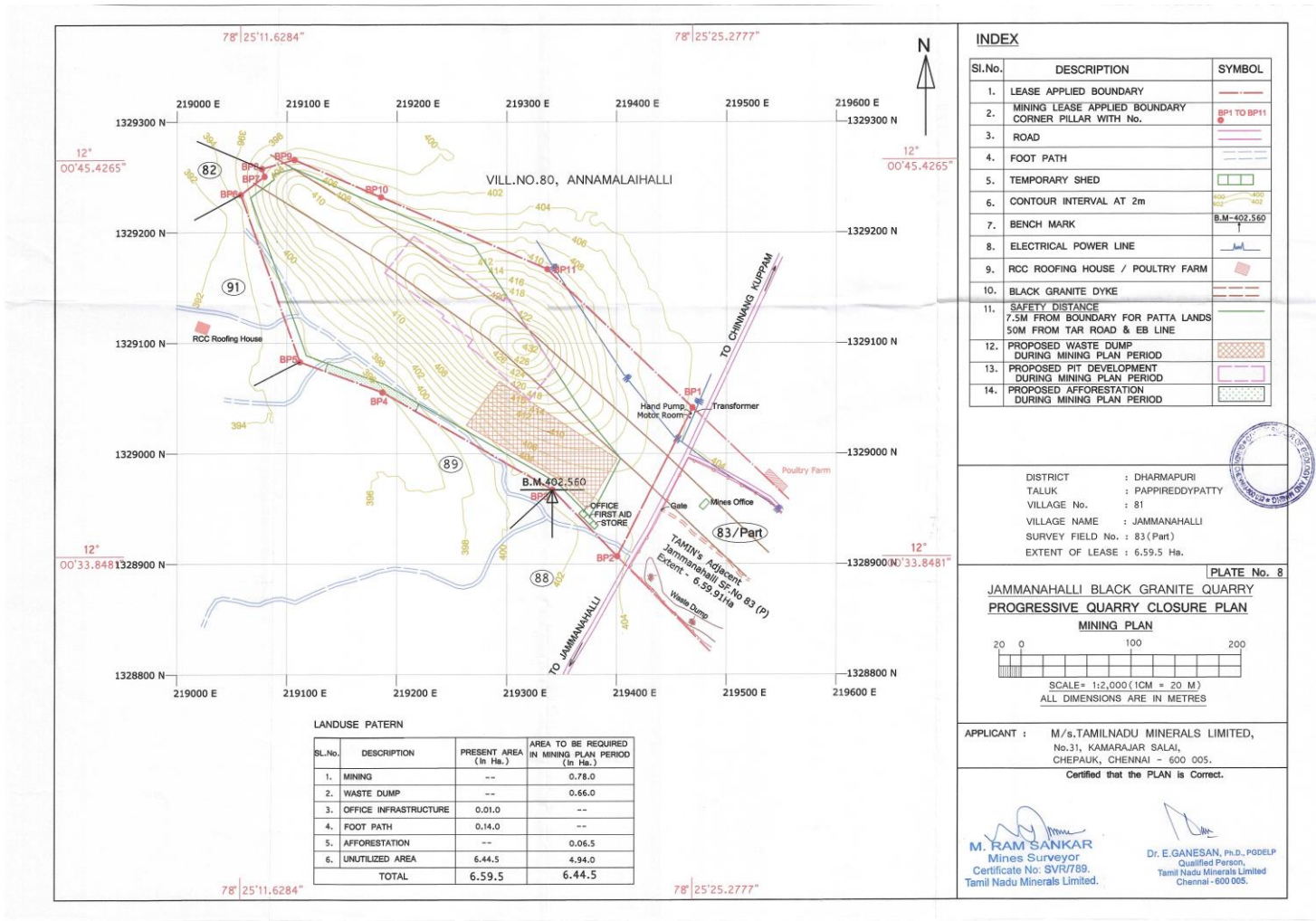


Figure 2-11 Progressive Closure Plan of the Quarry



## 2.6 Proposed Schedule for Approval and Implementation

The time schedule for the completion of the proposed mining project is given in the below as,

| Particulars                                             | Time Schedule |
|---------------------------------------------------------|---------------|
| Submission of Draft EIA/EMP to TNPCB for Public Hearing | August 2025   |
| Conduction of Public Hearing                            | October 2025  |
| Submitting final EIA/EMP                                | December 2025 |
| Presentation to SEAC and Obtaining EC                   | January 2026  |

The project will be implemented after Obtaining EC from SEIAA and CTO from PCB.

## 2.7 Project Cost

The project cost is summarized in Table 2-6.

**Table 2-6 Project Cost**

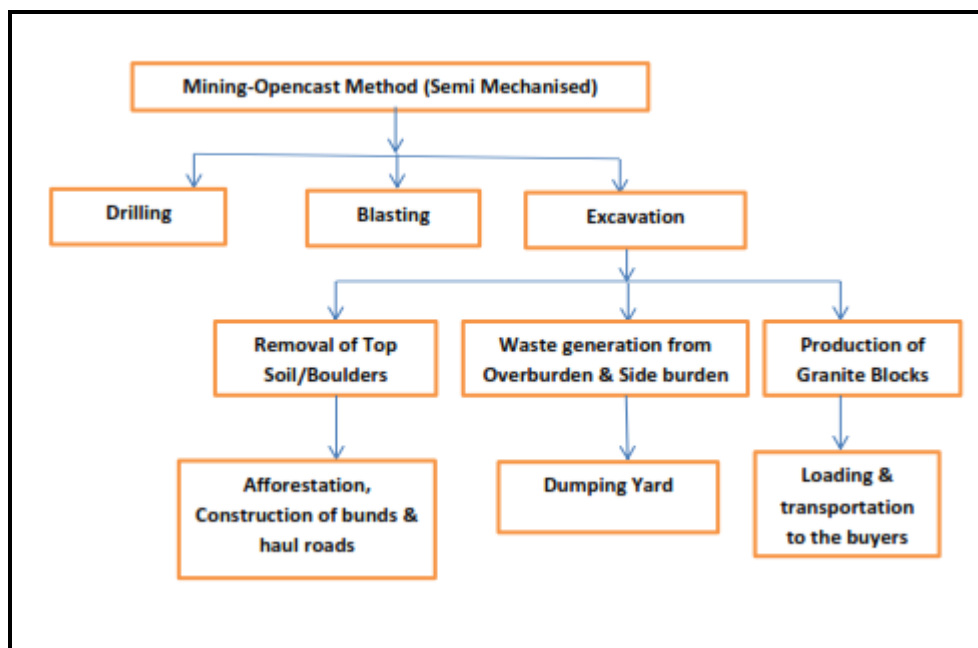
| S. No                         | Description of the Cost                   | Amount in Rs.           |
|-------------------------------|-------------------------------------------|-------------------------|
| <b>A. Fixed Cost</b>          |                                           |                         |
| 1                             | Land Cost                                 | Nil. Because Govt. land |
| 2                             | Labour shed                               | 50,000/-                |
| 3                             | Sanitary facilities                       | 50,000/-                |
| 4                             | Fencing Cost                              | 1,25,000/-              |
| <b>Total</b>                  |                                           | <b>2,25,000/-</b>       |
| <b>B. Operational Cost</b>    |                                           |                         |
| 1                             | Jack Hammers                              | 1,98,000/-              |
| 2                             | Compressor                                | 19,82,000/-             |
| 3                             | Diamond wire saw                          | 4,87,000/-              |
| 4                             | Diesel General                            | 4,00,000/-              |
| 5                             | Excavators                                | 6,00,000/-              |
| 6                             | Tippers                                   | 58,00,000/-             |
| 7                             | Drinking water facilities for the labours | 50,000/-                |
| 8                             | Safety kits                               | 50,000/-                |
| <b>Total Operational Cost</b> |                                           | <b>95,67,000/-</b>      |
| <b>C. EMP Cost</b>            |                                           |                         |
| 1                             | Afforestation                             | 30,000/-                |
| 2                             | Water Sprinkling                          | 50,000/-                |

|                                          |                      |                                  |
|------------------------------------------|----------------------|----------------------------------|
| 3                                        | Water Quality test   | 25,000/-                         |
| 4                                        | Air Quality test     | 25,000/-                         |
| 5                                        | Noise/Vibration test | 25,000/-                         |
| 6                                        | CSR activities       | 50,000/-                         |
| <b>Total EMP Cost</b>                    |                      | <b>2,05,000/-</b>                |
| <b>Total Cost of the Project (A+B+C)</b> |                      | <b>99,97,000/- (Say 1 Crore)</b> |

## 2.8 Technology & Process Description

### 2.8.1 Technology

Primary step of mining of minerals is the removal of the deposits from the ground. Once the minerals / ore are removed, additional preparation process is required to isolate the valuable minerals from their waste gangue minerals. There are two basic method of mining of minerals opencast and underground mining. The choice of method depends on the geologic, hydrological, geo-technical, geographic, economic, technological, environmental, safety, Socio - political and financial considerations. Schematic Diagram of Mining Process is given in **Figure 2-14**.



**Figure 2-12 Schematic Diagram of Mining Process**

### 2.8.2 Method of mining-Open Cast Mining

In accordance with Regulation 106 (2)(a) of the Metalliferous Mines Regulations 1961, in all open cast workings where the ore body forms hard rock, the working faces and sides should be adequately benched and sloped. A bench height not exceeding 6m and a bench width not less

than the height have to be maintained. The slope angle of such benches and sides should not exceed 60° from the horizontal. However, observance of these statutory provisions in granite dimensional stone mining is seldom possible due to the field difficulties and technical reasons as below:

- Recovery of the granite mineral is to be as undamaged rectangular dimensional blocks. In the attempt to level the benches and sides with the above statutory parameters haphazard blasting may be involved. In which case the commercial granite body may get spoiled due to the generation of blasting cracks.
- In the exercise of forming the benches with a 60° slope within the granite deposit, the portion confined within the 60° as well as its complementary part in the extricated block will become as mineral waste while shaping into rectangular blocks.
- The granite industry needs blocks as huge as few cubic meters volume with measurements up to 3m x 2m x 2m. Production of such huge blocks with a moving bench of 6m height is not possible. Production of such huge blocks in turn increases the recovery and reduces the mineral waste during dressing. Blocks of smaller size of certain varieties of granite are not marketable nowadays.
- Formation of too many benches with more height and the width equal to the height may lead to mineral lock up.
- Hence, in order to avoid granite waste and to facilitate economical and convenient mining operations, it is proposed to obtain relaxation to the provisions of Regulation 106 (2) (a) up to a bench parameter of 6m height and 3m width with vertical faces. Such a provision for relaxation of the Regulation has been provided within the regulation 106 (2) (a). Further, it is to be noteworthy that opencast granite mining operations with the above proposed bench parameters may not be detrimental to Mines Safety, since the entire terrain is made up of hard rock, compact sheets and possesses high stability on slopes even at higher vertical angles.

It is proposed not to backfill the pit in as much as good quantities of reserves are underlying the pits. The stockyard for the granite blocks produced and the dressing yard where the manual dressing and shaping of the blocks are carried out are located near the working pit in order to minimize the lead from the pit to the dressing yard and stock yard. A mine office, store room, first-aid room and workers rest shelter are provided within the lease area.

### 2.8.3 Process Description

- 1) Splitting of rock mass of considerable volume from the parent sheet rock carefully avoiding any kind of damage in the form of cracks adopting the following methods.
  - a) Diamond wire cutting along the horizontal as well as two vertical sides parallel to strike and dip direction and the third vertical face will be a free face is liberated by conventional serial blasting.
  - b) Separation of the horizontal (bottom) and the vertical (length side) planes by serial blasting simultaneously along the above two planes by using 32mm dia. blast holes charged with mild explosive like gun powder or detonating. The process continued aiming at the liberation of huge volume of the granite body from the parent sheet rock is called 'Primary Cutting'.

The 'Secondary Splitting' into required size involves long hole drilling upto the bottom of the separated block along the required planes for which mostly rock breaking powder or expansion mortar is used for splitting. It is chemically called as 'Calcium Hydroxide'  $\text{Ca(OH)}_2$ .

- 3) Removing the defective portions and dressing into the useful dimensional blocks are done manually using feather and wedges and chiselling respective by the labourers who are skilled in this work.

The defect free rectangular shaped dimensional stones as consumers are produced by the method described as above, which is constantly supervised by experienced Mining Geologist and Mining Engineer.

The waste materials generated during mining activity includes the rock fragments of different angularity formed during the removal of naturally defective and uneconomical portions of the deposits and the working waste formed during dressing of the extricated blocks. During the five years of Mining Plan period such waste materials are proposed to be dumped on the south east portion of the lease hold area.

### 2.8.4 Drilling & Blasting

The blasting parameters in the mining of granite dimensional stones are entirely different from that of industrial minerals, since the basic purpose for the use of explosives in both the cases are entirely different. In the rough stone minerals, maximum fragmentation and crushing of the ore is essential, whereas in the granite mining, the granite stones are to be extricated intact, without any damage on both the extricated part and the parent rock body.

The portion to be extricated from the parent rock body is free in all planes by adopting different methods. Only mild explosives such as detonating cord, ordinary detonators etc will be used for the production of granite blocks. The blast holes of 32mm diameter are drilled up to the bottom of the horizontal plane all along the required planes without deviations.

Conventional 32 mm dia blast holes are drilled perfectly parallel to each other at 20 to 25cm intervals without any hole deviations, all along the required plane of splitting. The holes are drilled up to a depth of few centimeters above the required horizontal plane. Sub grade drilling is not necessary, since the splitting will be affected up to a further distance of few centimeters from the drill hole on blasting. Sub grade drilling may affect the underlying granite deposit.

Explosives such as gelatin, delay detonators etc. may also be used occasionally at places further away from the granite deposit for certain development works such as forming approach roads to the working faces below ground level for forming flat surfaces to be used as dumping yard etc.

The explosives required for this mine is obtained from the authorized licensed dealer for which necessary permission will be obtained from the concerned authority. Now, as a latest method of NONEL blasting is used. The blasting will be under the direct supervision of the statutory persons of TAMIN.

The secondary splitting into required size involves along hole drilling up to the bottom of the separated block along the required planes for which mostly rock breaking powder is used for splitting. It is chemically called as Calcium Hydroxide  $\text{Ca}(\text{OH})_2$ .

Now-a-days the splitting the rock from the parent rock is done by using diamond wire sawing, which largely reduces the use of explosives in granite mining. Many adverse effects of blasting are avoided and hence the recovery will be substantially increased by diamond wire cutting. Hence it is proposed to deploy one diamond wire saw machine in this mine.

#### **2.8.5 Loading & Transportation**

The mode of transport of the granite blocks produced and marketed is by road of various consumer destinations and granite processing units located at different parts of the country. The blocks approved for export market are shipped through Chennai / Tuticorin Harbours to various countries.

#### **2.8.6 Exploration**

A number of valuable data for economical mining of the granite stone in this area have been known.

1. Occurrence of the Black granite stone is economically viable quality and quantity has been established by geological mapping and visual examination by mining geologist experiences in granite mining which have been proved by actual mining practice.
2. The depth persistence of the granite stone is proved beyond the workable limits of depth of 12m from the surface level and the top surface of the granite body works.
3. The recovery of the saleable granite stones has been established as 5% from the visual exploration and from the data available by actual mining practices during the past mining in this area.

#### **2.8.7 Storage of Explosives**

The applicant will engage an authorized explosive agency to carry out the small amount of blasting as such no storage of explosives is envisaged for this proposal. The blasting will be supervised by DGMS authorized Mines Foreman /Mines Manager.

#### **2.8.8 Mine Drainage**

The lease applied area is hillock 32m height with slope. Through the area receives scanty rainfall, the ground water level is at 11.6m depth. The Production faces are operated at shallow depths. During the rainy seasons, the surface run of water and the ground water are collected in sump and dewatered to nearby agricultural field with the help of 10HP motors.

#### **2.8.9 Disposal of Waste**

The waste generated during the mining operation i.e., over burden, side burden, granite rejects and the non-recoverable/un sized boulders and rubbles etc is around 64,962m<sup>3</sup>, will be dumped in the suitable area of around 0.065Ha which is already selected. The area of disposal waste rock has been identified in southeast portion of the lease area. The unsold blocks are kept within the boundary on the country rock area. The dump will be maintained not exceeding 5m height and the slope angle will be at 45° from horizontal.

#### **2.8.10 Top Soil Management**

Topsoil will be properly stacked at earmarked dump site with adequate measures. It will be used for growing plants along the fringes of the site roads and reclamation of external dump and backfilled area. The topsoil stockpiles will be low height and will be grassed to retain fertility. Besides these topsoil stacks there will be temporary stacks near the excavation area and area to be reclaimed which will be made use of concurrent lying without bringing the topsoil to the soil stack near the OB dump.

### 2.8.11 Stabilization of Dump

As the waste generation in the mine includes hard rock fragments of considerable size and irregular shape with varying angularity, the waste dump will be stable on its own even at higher slopes of the sides. However, suitable variety of soil will be identified and brought from outside and used for increasing the stability of the sides of the waste dumps and also for planting trees over the dumps in a phased manner.

## 2.9 Other Requirements

### 2.9.1 Water Requirement

The total water requirement is 3.5 KLD. The total water requirement will be met through private tankers. The granite quarry will not produce toxic effluent in the form of solid, liquid or gas. No wastewater will be generated during quarry operation except domestic sewage. Domestic sewage will be disposed to septic tank followed by soak pit. Septic tank will be cleaned periodically.

**Table 2-7 Water requirement breakup**

| S. No        | Description                 | Water Requirement(KLD) |
|--------------|-----------------------------|------------------------|
| 1            | Drinking & Domestic purpose | 1.5                    |
| 2            | Wire Saw Cutting            | 0.5                    |
| 3            | Dust suppression            | 1.0                    |
| 4            | Green Belt                  | 0.5                    |
| <b>Total</b> |                             | <b>3.5</b>             |

### 2.9.2 Sewage Generation

The domestic sewage of 1.2 KLD will be disposed through septic tank followed by soak pit.

### 2.9.3 Power & Fuel Requirement

The Power and Fuel requirement details are given in **Table 2-8**.

**Table 2-8 Power Requirements**

| S. No | Description                 | Power Required |
|-------|-----------------------------|----------------|
| 1     | Power requirement (kVA)     | 60             |
| 2     | Power Backup (DG set)       | 1*125kVA       |
| 3     | Fuel requirements (Lts/Day) | 200            |

### 2.9.4 List of Equipments

The list of Equipments is given in **Table 2-9**.



**Table 2-9 Lists of Machineries**

| S. No | Machinery type                 | Numbers | Capacity              | Motive power     |
|-------|--------------------------------|---------|-----------------------|------------------|
| 1     | Jack Hammar (32mm dia.)        | 6       | 1.2 to 6m             | Compressed air   |
| 2     | Compressor                     | 2       | 400 psi               | Diesel Drive     |
| 3     | Tractor Mounted air Compressor | 1       | -                     | Diesel Drive     |
| 4     | Diamond wire saw               | 1       | 30m <sup>3</sup> /day | Diesel Generator |
| 5     | Diesel Generator               | 1       | 125 kVA               | Diesel           |
| 6     | Excavator                      | 1       | 300Lc                 | Diesel           |
| 7     | Dumper                         | 2       | 25Tonnes              | Diesel           |

### 2.9.5 Man power Requirement

Manpower details are given in **Table 2-10**.

**Table 2-10 Manpower Details**

| S.No                     | Details                                                                   | Numbers   |
|--------------------------|---------------------------------------------------------------------------|-----------|
| <b>A</b>                 | <b>Technical/Mining Personnel</b>                                         |           |
| 1                        | Geologist/Agent (M.sc Qualified)                                          | 1         |
| 2                        | Mine Manager (Holder of Manager Certificate of Competency under MMR, 1961 | 1         |
| 3                        | Mining Mate cum Blaster                                                   | 1         |
| 4                        | Machinery operator                                                        | 6         |
| 5                        | Diesel Mechanic                                                           | 1         |
| <b>B</b>                 | <b>Workers</b>                                                            |           |
| 1                        | Skilled                                                                   | 1         |
| 2                        | Semi- Skilled                                                             | 9         |
| 3                        | Un-skilled                                                                | 10        |
| <b>Total</b>             |                                                                           | <b>30</b> |
| <b>Indirect Manpower</b> |                                                                           | <b>20</b> |

### 2.10 Infrastructure Facilities

Store room, office room and first-aid room facilities will be provided.

## 2.11 Description of Mitigation Measures Incorporated into the Project to Meet the Environmental Standards

From an environmental perspective, this phase is of paramount significance due to its potential to invoke long-term impacts. The adverse effects that are likely to occur during operational phase of the project are: Air Pollution (gaseous emissions), Sewage generation, Noise generation, Solid waste generation etc.

### 2.11.1 Solid Waste Management

The municipal solid waste generation and management details are given in **Table 2-11**.

**Table 2-11 Municipal Solid Waste Generation & Management**

| S.No         | Type      | Quantity Kg/day | Disposal Method                    |
|--------------|-----------|-----------------|------------------------------------|
| 1            | Organic   | 8.1             | Municipal bin including food waste |
| 2            | Inorganic | 5.4             | TNPSB authorized recyclers         |
| <b>Total</b> |           | <b>13.5</b>     |                                    |

As per CPHEEO guidelines: MSW per capita/day =0.45

### 2.11.2 Hazardous Waste Management

The type of hazardous waste and the quantity generated are detailed in **Table 2-12**.

**Table 2-12 Hazardous Waste Management**

| Waste Category No | Description | Quantity (L/Year) | Mode of Disposal                                                                      |
|-------------------|-------------|-------------------|---------------------------------------------------------------------------------------|
| 5.1               | Waste Oil   | 3.0               | Will be collected in leak proof containers and disposed to TNPSB authorized agencies. |

## 2.12 Progressive Mine Closure Plan

As a petrogenetic character, the depth persistence of the black granite body in the area is beyond the workable limits. However, it is very difficult to operate granite dimensional stone mine economically below an average depth of 33m by observing the statutory provisions of mine safety rules and regulations. Hence, in the proposed mining plan, only 33m average depth has been envisaged as 'Workable depth' for safe and economic mining.

However, it is proposed not to back fill the ultimate pit, in as much as good quantity of reserves is available below the workable depth of 33m and there is possibility of technology of up gradation in granite mining for greater depths in course of time for safe mining at economic cost

beyond 33m depth. The pit boundaries shall be securely fenced to prevent entry by the public and cattle, and the area maybe used for agricultural purposes once the pit is filled with underground seepage water or rainwater.

### **2.13 Assessment of New and Untested Technology for the Risk of Technological Failure**

The technology used for mining is made by TAMIN in house there would not be any changes in the Mining. The mining technology is tried & tested method, and therefore there is no risk of technological failure. In addition to this, the TAMIN is being processed to take care of any technological failures.

### 3 DESCRIPTION OF ENVIRONMENT

The environment of region is characterized by diverse natural and anthropogenic features, including landforms, water resources, vegetation and human settlements. It exhibits a mix of ecological habitats, ranging from agricultural lands to natural ecosystems, supporting a variety of flora and fauna. Climatic conditions, soil characteristics, and water availability play a significant role in shaping the environmental dynamics of the area. Understanding these baseline environmental conditions is crucial for assessing potential project impacts and planning sustainable development measures. This chapter depicts the establishment of baseline for various environmental components, as identified in and around the proposed project. This chapter depicts the establishment of baseline for valued environmental components, as identified in and around the proposed project of “**Proposed jammanahalli black granite quarry**” over an extent of 6.59.5 Ha in S.F. No. 83 (Part) Jammanahalli Village, Pappireddypatti Taluk, Dharmapuri District, Tamil Nadu by M/s. Tamil Nadu Minerals Limited. The primary baseline data has been generated by M/s. Hubert Enviro Care Systems (P) Ltd, Chennai, a MoEF&CC approved and National Accreditation Board for Testing and Calibration Laboratories (NABL) accredited environmental testing laboratory for the following terrestrial environmental components. NABL Certificate No: TC-12310 Dated: 25.09.2023 Valid Till 24.09.2025.

#### 3.1 Study Area

About 10 km radius from the proposed project site has been designated as the Project Impact/Influence Area (PIA) for assessing the baseline environmental conditions and potential impacts associated with the project. The core study area is the project area and its immediate surroundings to the tune of 1km radius from the boundary. The PIA covers parts of parts of Jammanahalli Village in Pappireddypatti Taluk, Dharmapuri District, and Tamil Nadu State. This PIA was subjected to monitor for 3 months duration starting from the month from **February 2025 to April 2025**. The data collected during the monitoring period are considered as primary baseline data. The key points of the PIA are given below:

|                            |   |                                                    |
|----------------------------|---|----------------------------------------------------|
| <b>PIA Area</b>            | : | 10km radius from the periphery of the project site |
| <b>Village</b>             | : | Jammanahalli                                       |
| <b>Taluk</b>               | : | Pappireddypatti                                    |
| <b>District</b>            | : | Dharmapuri                                         |
| <b>State</b>               | : | Tamil Nadu                                         |
| <b>Monitoring Duration</b> | : | February 2025 to April 2025                        |

**3.2 Description of the Study Area**

As outlined in Chapter 1, M/s. Tamil Nadu Minerals Limited. Proposed jammanahalli black granite quarry over an extent of 6.59.5 Ha in S.F. No. 83 (Part) Jammanahalli Village, Pappireddypatti Taluk, Dharmapuri District, and Tamil Nadu. The topographic map of the study area is provided in Figure 3.1. The present study involves a comprehensive analysis of land use, topography, geology, water resources, biodiversity and demographic patterns. Methodologies adopted for the assessment include field surveys, remote sensing, GIS mapping and data collection from secondary sources such as government reports (CGWB, DCHB etc)and published data from portals. These methods ensure a systematic and detailed evaluation of the project area, laying the groundwork for identifying environmental sensitivities and proposing appropriate mitigation measures. An overview of the study area, with reference to its physical characteristics, is presented in the following sections to provide a clear understanding before detailing the prevailing environmental conditions.

|                                                               |   |                           |
|---------------------------------------------------------------|---|---------------------------|
| <b>Meteorology</b>                                            | : | <b>Refer Section 3.5</b>  |
| <b>Ambient Air Quality</b>                                    | : | <b>Refer Section 3.6</b>  |
| <b>Ambient Noise Levels</b>                                   | : | <b>Refer Section 3.7</b>  |
| <b>Water Quality- Surface Water &amp; Groundwater Quality</b> | : | <b>Refer Section 3.8</b>  |
| <b>Soil Quality</b>                                           | : | <b>Refer Section 3.9</b>  |
| <b>Ecology</b>                                                | : | <b>Refer Section 3.10</b> |
| <b>Socio Economic Status</b>                                  | : | <b>Refer Section 3.11</b> |



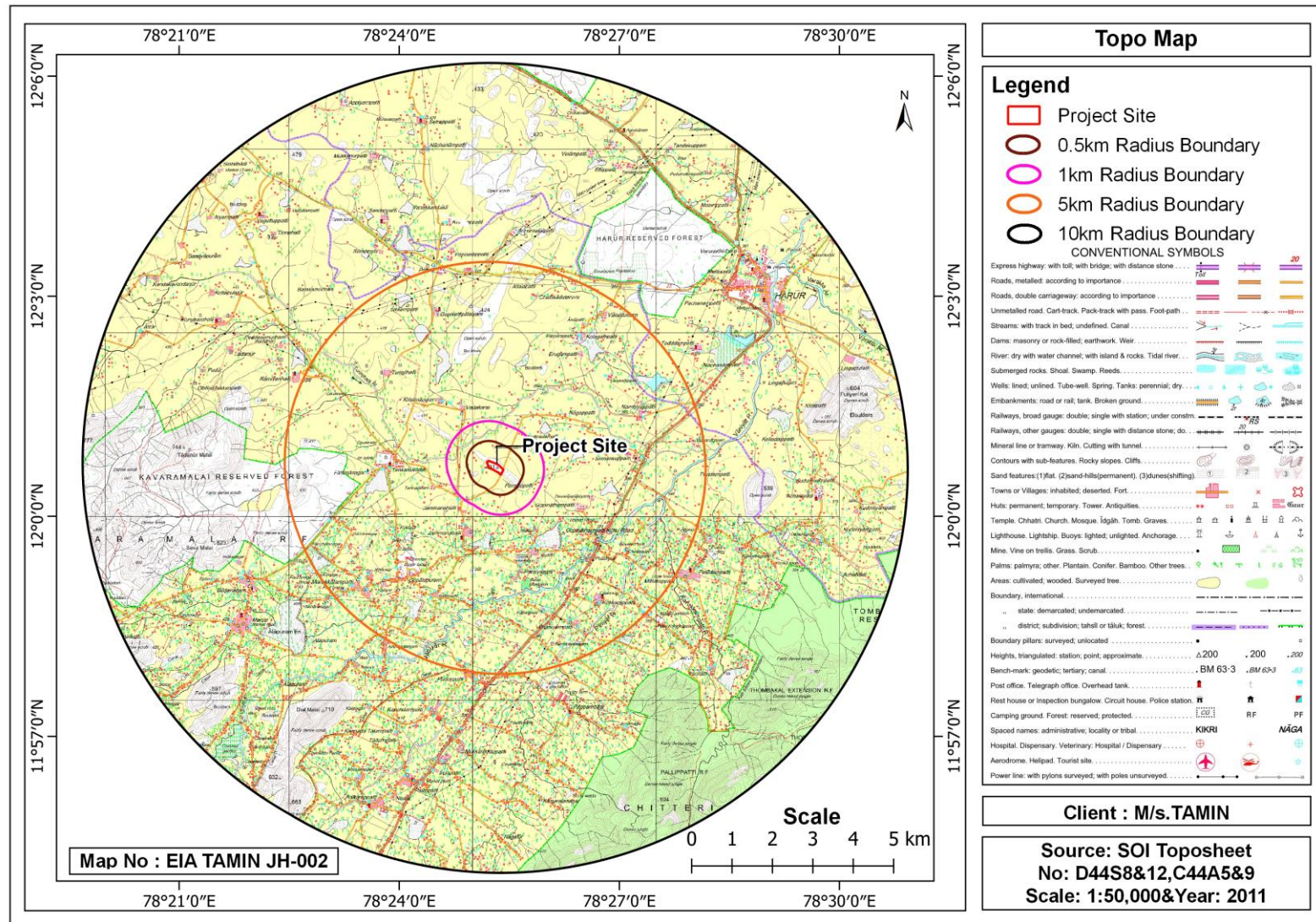


Figure 3-1 Topo Map of the Study Area

### 3.3 Environmentally/Ecologically Sensitive areas

The National Environment Policy (2006) defined the Eco-Sensitive Areas “as areas/zones with identified environmental resources having incomparable values which require special attention for their conservation” because of its landscape, wildlife, biodiversity, historical and natural values. This section details with the environmentally sensitive areas present within the project site and surrounding environs. It included national parks, state forest, essential habitats etc. The environmental sensitive areas covering an aerial distance of 15 km from the project boundary is given in **Table 3-1**, **Figure 3-2** and **Figure 3-3**. Due to the complexity of the environmental features, which are difficult to represent clearly on a single map, the sensitive areas are shown in two separate maps (**Figure 3-2** and **Figure 3-3**).

**Note:** This split is purely for representation purposes and does not indicate any classification or division of the study area.

**Table 3-1 Environmentally Sensitive Areas within 15km from Project Boundary**

| S.No | Areas                   | Distance & Direction from project boundary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |           |  |  |      |              |                |           |   |                         |      |    |   |                    |      |    |   |                         |      |     |   |                        |      |     |   |                     |      |   |   |               |      |    |
|------|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|--|--|------|--------------|----------------|-----------|---|-------------------------|------|----|---|--------------------|------|----|---|-------------------------|------|-----|---|------------------------|------|-----|---|---------------------|------|---|---|---------------|------|----|
| 1    | Monuments               | Nill                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |           |  |  |      |              |                |           |   |                         |      |    |   |                    |      |    |   |                         |      |     |   |                        |      |     |   |                     |      |   |   |               |      |    |
| 2    | Heritages               | <table><tr><th>S.No</th><th>Heritages</th><th>Distance (~km)</th><th>Direction</th></tr><tr><td>1</td><td>Thenkarai Fort (Ruined)</td><td>2.46</td><td>W</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                 |           |  |  | S.No | Heritages    | Distance (~km) | Direction | 1 | Thenkarai Fort (Ruined) | 2.46 | W  |   |                    |      |    |   |                         |      |     |   |                        |      |     |   |                     |      |   |   |               |      |    |
| S.No | Heritages               | Distance (~km)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Direction |  |  |      |              |                |           |   |                         |      |    |   |                    |      |    |   |                         |      |     |   |                        |      |     |   |                     |      |   |   |               |      |    |
| 1    | Thenkarai Fort (Ruined) | 2.46                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | W         |  |  |      |              |                |           |   |                         |      |    |   |                    |      |    |   |                         |      |     |   |                        |      |     |   |                     |      |   |   |               |      |    |
| 2    | Water bodies.           | <table><tr><th>S.No</th><th>Water bodies</th><th>Distance (~km)</th><th>Direction</th></tr><tr><td>1</td><td>Turinjihalli Ar</td><td>0.57</td><td>NW</td></tr><tr><td>2</td><td>Annamalahalli Pond</td><td>1.26</td><td>NE</td></tr><tr><td>3</td><td>Paraiyapatti Pudur Lake</td><td>1.68</td><td>SSE</td></tr><tr><td>4</td><td>Lake near Krishnapuram</td><td>2.30</td><td>NNW</td></tr><tr><td>5</td><td>Tenkaraikottai Lake</td><td>2.53</td><td>W</td></tr><tr><td>6</td><td>Vaniyar River</td><td>2.74</td><td>SE</td></tr></table> |           |  |  | S.No | Water bodies | Distance (~km) | Direction | 1 | Turinjihalli Ar         | 0.57 | NW | 2 | Annamalahalli Pond | 1.26 | NE | 3 | Paraiyapatti Pudur Lake | 1.68 | SSE | 4 | Lake near Krishnapuram | 2.30 | NNW | 5 | Tenkaraikottai Lake | 2.53 | W | 6 | Vaniyar River | 2.74 | SE |
| S.No | Water bodies            | Distance (~km)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Direction |  |  |      |              |                |           |   |                         |      |    |   |                    |      |    |   |                         |      |     |   |                        |      |     |   |                     |      |   |   |               |      |    |
| 1    | Turinjihalli Ar         | 0.57                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | NW        |  |  |      |              |                |           |   |                         |      |    |   |                    |      |    |   |                         |      |     |   |                        |      |     |   |                     |      |   |   |               |      |    |
| 2    | Annamalahalli Pond      | 1.26                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | NE        |  |  |      |              |                |           |   |                         |      |    |   |                    |      |    |   |                         |      |     |   |                        |      |     |   |                     |      |   |   |               |      |    |
| 3    | Paraiyapatti Pudur Lake | 1.68                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | SSE       |  |  |      |              |                |           |   |                         |      |    |   |                    |      |    |   |                         |      |     |   |                        |      |     |   |                     |      |   |   |               |      |    |
| 4    | Lake near Krishnapuram  | 2.30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | NNW       |  |  |      |              |                |           |   |                         |      |    |   |                    |      |    |   |                         |      |     |   |                        |      |     |   |                     |      |   |   |               |      |    |
| 5    | Tenkaraikottai Lake     | 2.53                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | W         |  |  |      |              |                |           |   |                         |      |    |   |                    |      |    |   |                         |      |     |   |                        |      |     |   |                     |      |   |   |               |      |    |
| 6    | Vaniyar River           | 2.74                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | SE        |  |  |      |              |                |           |   |                         |      |    |   |                    |      |    |   |                         |      |     |   |                        |      |     |   |                     |      |   |   |               |      |    |



|    |                 |             |                        |                       |                  |  |
|----|-----------------|-------------|------------------------|-----------------------|------------------|--|
|    |                 | 7           | Piniyar River          | 3.85                  | ESE              |  |
|    |                 | 8           | Nambiyappattii Lake    | 3.97                  | ENE              |  |
|    |                 | 9           | Karukkampatti River    | 4.04                  | ESE              |  |
|    |                 | 10          | Panchalanagar Lake     | 4.53                  | WSW              |  |
|    |                 | 11          | Alapuram Eri           | 5.73                  | SW               |  |
|    |                 | 12          | Todddampatti Lake      | 5.74                  | ENE              |  |
|    |                 | 13          | Varatta Ar             | 8.61                  | NE               |  |
|    |                 | 14          | Sintalbadi Lake        | 10.04                 | NW               |  |
|    |                 | 15          | Vallimadurai Reservoir | 12.92                 | ESE              |  |
| 3. | Reserved Forest | <b>S.No</b> | <b>Reserved Forest</b> | <b>Distance (~km)</b> | <b>Direction</b> |  |
|    |                 | 1           | Kavaramalai RF         | 3.18                  | W                |  |
|    |                 | 2           | Harur RF               | 5.14                  | NNE              |  |
|    |                 | 3           | Pallippatti RF         | 6.21                  | SE               |  |
|    |                 | 4           | Thombakal Ext RF       | 6.64                  | ESE              |  |
|    |                 | 5           | Morappur RF            | 9.17                  | NNE              |  |
|    |                 | 6           | Thombakal RF           | 9.53                  | SE               |  |
|    |                 | 7           | Kavaramalai Ext RF     | 11.55                 | W                |  |
|    |                 | 8           | Nochikuttai Ext RF     | 12.62                 | SSE              |  |
|    |                 | 9           | Kuttar RF              | 12.78                 | SSW              |  |
|    |                 | 10          | Veppampatti RF         | 13.04                 | E                |  |
|    |                 | 11          | Veppampatti Ext RF     | 13.42                 | E                |  |
|    |                 | 12          | Bothakkadu RF          | 13.61                 | SW               |  |
|    |                 | 13          | Poyyappatti RF         | 13.95                 | ENE              |  |
|    |                 | 14          | Nochikuttai RF         | 14.15                 | SSE              |  |
|    |                 | 15          | Karungal RF            | 14.59                 | ESE              |  |
|    |                 | 16          | Mavuttu RF             | 14.68                 | SSW              |  |

|    |         |             |                                                   |                       |                  |
|----|---------|-------------|---------------------------------------------------|-----------------------|------------------|
| 4. | Manmade | <b>S.No</b> | <b>Hospitals</b>                                  | <b>Distance (~km)</b> | <b>Direction</b> |
|    |         | 1           | Chinnakuppam Government Primary Health Centre     | 3.40                  | E                |
|    |         | 2           | Erukkampatti Government Primary Sub Health Centre | 3.43                  | NE               |
|    |         | 3           | Ramiyanahalli Government Primary Health Centre    | 4.73                  | WNW              |
|    |         | <b>S.No</b> | <b>Government Buildings</b>                       | <b>Distance (~km)</b> | <b>Direction</b> |
|    |         | 1           | Parayapatti Village Administrative Office         | 1.98                  | SSE              |
|    |         | 2           | Gopinathampatti Panchayat office                  | 2.19                  | ESE              |
|    |         | 3           | Harur Taluk Office                                | 8                     | NE               |
|    |         | <b>S.No</b> | <b>Colleges</b>                                   | <b>Distance (~km)</b> | <b>Direction</b> |
|    |         | 1           | Indian College of Education for Women             | 3.11                  | E                |
|    |         | 2           | ERK Group of Institutions                         | 3.97                  | SSE              |
|    |         | 3           | AMS Annai Education instituions                   | 4.37                  | ENE              |
|    |         | <b>S.No</b> | <b>Religious Places</b>                           | <b>Distance (~km)</b> | <b>Direction</b> |
|    |         | 1           | Thambikalaiyan Temple                             | 0.16                  | N                |
|    |         | 2           | Arulmigu Theepanji Amman Temple                   | 0.45                  | W                |
|    |         | 3           | Singarathoppu Shri Muniyappan Temple              | 0.8                   | WNW              |
|    |         | 4           | Annamalaihalli Shri Mariyamman Temple             | 0.86                  | NE               |

|  |  |             |                                                      |                       |                  |
|--|--|-------------|------------------------------------------------------|-----------------------|------------------|
|  |  | 5           | Kattu Mariyamman Temple                              | 0.95                  | SSW              |
|  |  | 6           | Sri Ramar Temple                                     | 1.48                  | E                |
|  |  | 7           | Vadagarai vartharaja perumal Temple                  | 1.98                  | NNW              |
|  |  | 8           | Shri Kalyana Ramar Temple                            | 2.43                  | W                |
|  |  | 9           | Our Lady of Mount Carmel Church                      | 2.94                  | W                |
|  |  | 10          | Om Shakthi Temple Malagapadi                         | 4.17                  | ESE              |
|  |  | 11          | Sri Lakshmi Narashima and Lord Sri Ranganatha Temple | 5.07                  | NNW              |
|  |  | 12          | Pachaiyamman Temple                                  | 5.45                  | SSW              |
|  |  | 13          | Angalaamman Temple                                   | 7.2                   | NE               |
|  |  | 14          | Kaaniyamman Temple                                   | 7.34                  | S                |
|  |  | 15          | Harur Masjid                                         | 7.83                  | NE               |
|  |  | 16          | Karia Perumal Temple                                 | 7.85                  | ENE              |
|  |  | 17          | Pattalamman Temple                                   | 10.57                 | NW               |
|  |  | 18          | Singaravelan Thoppu Muniswaran Temple                | 11.41                 | NNW              |
|  |  |             |                                                      |                       |                  |
|  |  | <b>S.No</b> | <b>Industries</b>                                    | <b>Distance (~km)</b> | <b>Direction</b> |
|  |  | 1           | Subramanya Siva Co-op Sugar Factory                  | 2.62                  | SW               |
|  |  | 2           | Ponguru blue metals                                  | 2.83                  | NNW              |
|  |  | 3           | Amman Granites                                       | 8.4                   | ENE              |
|  |  | 4           | Varalakshmi Starch Industries Pvt Ltd                | 13.34                 | SSW              |
|  |  |             |                                                      |                       |                  |
|  |  | <b>S.No</b> | <b>Schools</b>                                       | <b>Distance (~km)</b> | <b>Direction</b> |
|  |  | 1           | Vadagarai Government Middel School                   | 1.13                  | NW               |
|  |  | 2           | Jammanahalli Government Higher Secondary School      | 1.56                  | SSW              |

|       |                                                | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Nagapatti Government Panchayat Union Primary School       | 2          | NE  |       |             |                |           |            |                             |                |      |    |                              |      |              |      |                             |       |     |           |                    |    |     |   |                                   |       |     |     |                        |                 |      |     |       |
|-------|------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|------------|-----|-------|-------------|----------------|-----------|------------|-----------------------------|----------------|------|----|------------------------------|------|--------------|------|-----------------------------|-------|-----|-----------|--------------------|----|-----|---|-----------------------------------|-------|-----|-----|------------------------|-----------------|------|-----|-------|
|       |                                                | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Gopinathampatti Government Panchayat Union Primary School | 2.15       | ESE |       |             |                |           |            |                             |                |      |    |                              |      |              |      |                             |       |     |           |                    |    |     |   |                                   |       |     |     |                        |                 |      |     |       |
|       |                                                | 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Chinnankuppam Government High School                      | 3.77       | ENE |       |             |                |           |            |                             |                |      |    |                              |      |              |      |                             |       |     |           |                    |    |     |   |                                   |       |     |     |                        |                 |      |     |       |
| 5     | State/National boundaries/Wildlife Sanctuaries | Nil                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                           |            |     |       |             |                |           |            |                             |                |      |    |                              |      |              |      |                             |       |     |           |                    |    |     |   |                                   |       |     |     |                        |                 |      |     |       |
| 6     | Nearest Highway/Railway/Town and city          | <table> <tr> <th>S. No</th> <th>Description</th> <th>Distance (~km)</th> <th>Direction</th> </tr> <tr> <td>1</td> <td>Nearest Road - Nagapatti Rd</td> <td>0.01</td> <td>E</td> </tr> <tr> <td>2</td> <td>SH-6A (Tiruvannamalai-Harur)</td> <td>7.69</td> <td>ENE</td> </tr> <tr> <td>3</td> <td>NH-179A (Salem-Vaniyambadi)</td> <td>2.89</td> <td>ESE</td> </tr> <tr> <td>4</td> <td>Nearest Town-Harur</td> <td>7</td> <td>NE</td> </tr> <tr> <td>5</td> <td>Nearest Railway Station-Thonganur</td> <td>10.17</td> <td>NW</td> </tr> <tr> <td>6</td> <td>DC Office - Dharmapuri</td> <td>31.35</td> <td>WNW</td> </tr> </table> |                                                           |            |     | S. No | Description | Distance (~km) | Direction | 1          | Nearest Road - Nagapatti Rd | 0.01           | E    | 2  | SH-6A (Tiruvannamalai-Harur) | 7.69 | ENE          | 3    | NH-179A (Salem-Vaniyambadi) | 2.89  | ESE | 4         | Nearest Town-Harur | 7  | NE  | 5 | Nearest Railway Station-Thonganur | 10.17 | NW  | 6   | DC Office - Dharmapuri | 31.35           | WNW  |     |       |
| S. No | Description                                    | Distance (~km)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Direction                                                 |            |     |       |             |                |           |            |                             |                |      |    |                              |      |              |      |                             |       |     |           |                    |    |     |   |                                   |       |     |     |                        |                 |      |     |       |
| 1     | Nearest Road - Nagapatti Rd                    | 0.01                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | E                                                         |            |     |       |             |                |           |            |                             |                |      |    |                              |      |              |      |                             |       |     |           |                    |    |     |   |                                   |       |     |     |                        |                 |      |     |       |
| 2     | SH-6A (Tiruvannamalai-Harur)                   | 7.69                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ENE                                                       |            |     |       |             |                |           |            |                             |                |      |    |                              |      |              |      |                             |       |     |           |                    |    |     |   |                                   |       |     |     |                        |                 |      |     |       |
| 3     | NH-179A (Salem-Vaniyambadi)                    | 2.89                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ESE                                                       |            |     |       |             |                |           |            |                             |                |      |    |                              |      |              |      |                             |       |     |           |                    |    |     |   |                                   |       |     |     |                        |                 |      |     |       |
| 4     | Nearest Town-Harur                             | 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | NE                                                        |            |     |       |             |                |           |            |                             |                |      |    |                              |      |              |      |                             |       |     |           |                    |    |     |   |                                   |       |     |     |                        |                 |      |     |       |
| 5     | Nearest Railway Station-Thonganur              | 10.17                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | NW                                                        |            |     |       |             |                |           |            |                             |                |      |    |                              |      |              |      |                             |       |     |           |                    |    |     |   |                                   |       |     |     |                        |                 |      |     |       |
| 6     | DC Office - Dharmapuri                         | 31.35                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | WNW                                                       |            |     |       |             |                |           |            |                             |                |      |    |                              |      |              |      |                             |       |     |           |                    |    |     |   |                                   |       |     |     |                        |                 |      |     |       |
| 7     | Nearest Airport                                | ➤ Salem Airport (Domestic) at a distance of ~ 45.20km towards WSW                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                           |            |     |       |             |                |           |            |                             |                |      |    |                              |      |              |      |                             |       |     |           |                    |    |     |   |                                   |       |     |     |                        |                 |      |     |       |
| 8     | Near by villages and Population                | <table> <tr> <th>S.No</th> <th>Villages</th> <th>Distance (~km)</th> <th>Direction</th> <th>Population</th> </tr> <tr> <td>1</td> <td>Annamalaihalli</td> <td>0.66</td> <td>NE</td> <td>1,227</td> </tr> <tr> <td>2</td> <td>Jammanahalli</td> <td>0.95</td> <td>SSW</td> <td>2,363</td> </tr> <tr> <td>3</td> <td>Vadakarai</td> <td>1.08</td> <td>NW</td> <td>300</td> </tr> <tr> <td>4</td> <td>Tennagaram</td> <td>1.25</td> <td>WSW</td> <td>100</td> </tr> <tr> <td>5</td> <td>Gopinathampatti</td> <td>1.60</td> <td>ESE</td> <td>2,500</td> </tr> </table> <p>* Few settlements are located near to the quarry.</p>        |                                                           |            |     | S.No  | Villages    | Distance (~km) | Direction | Population | 1                           | Annamalaihalli | 0.66 | NE | 1,227                        | 2    | Jammanahalli | 0.95 | SSW                         | 2,363 | 3   | Vadakarai | 1.08               | NW | 300 | 4 | Tennagaram                        | 1.25  | WSW | 100 | 5                      | Gopinathampatti | 1.60 | ESE | 2,500 |
| S.No  | Villages                                       | Distance (~km)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Direction                                                 | Population |     |       |             |                |           |            |                             |                |      |    |                              |      |              |      |                             |       |     |           |                    |    |     |   |                                   |       |     |     |                        |                 |      |     |       |
| 1     | Annamalaihalli                                 | 0.66                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | NE                                                        | 1,227      |     |       |             |                |           |            |                             |                |      |    |                              |      |              |      |                             |       |     |           |                    |    |     |   |                                   |       |     |     |                        |                 |      |     |       |
| 2     | Jammanahalli                                   | 0.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | SSW                                                       | 2,363      |     |       |             |                |           |            |                             |                |      |    |                              |      |              |      |                             |       |     |           |                    |    |     |   |                                   |       |     |     |                        |                 |      |     |       |
| 3     | Vadakarai                                      | 1.08                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | NW                                                        | 300        |     |       |             |                |           |            |                             |                |      |    |                              |      |              |      |                             |       |     |           |                    |    |     |   |                                   |       |     |     |                        |                 |      |     |       |
| 4     | Tennagaram                                     | 1.25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | WSW                                                       | 100        |     |       |             |                |           |            |                             |                |      |    |                              |      |              |      |                             |       |     |           |                    |    |     |   |                                   |       |     |     |                        |                 |      |     |       |
| 5     | Gopinathampatti                                | 1.60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ESE                                                       | 2,500      |     |       |             |                |           |            |                             |                |      |    |                              |      |              |      |                             |       |     |           |                    |    |     |   |                                   |       |     |     |                        |                 |      |     |       |
| 9     | Defence installations                          | Nill                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                           |            |     |       |             |                |           |            |                             |                |      |    |                              |      |              |      |                             |       |     |           |                    |    |     |   |                                   |       |     |     |                        |                 |      |     |       |

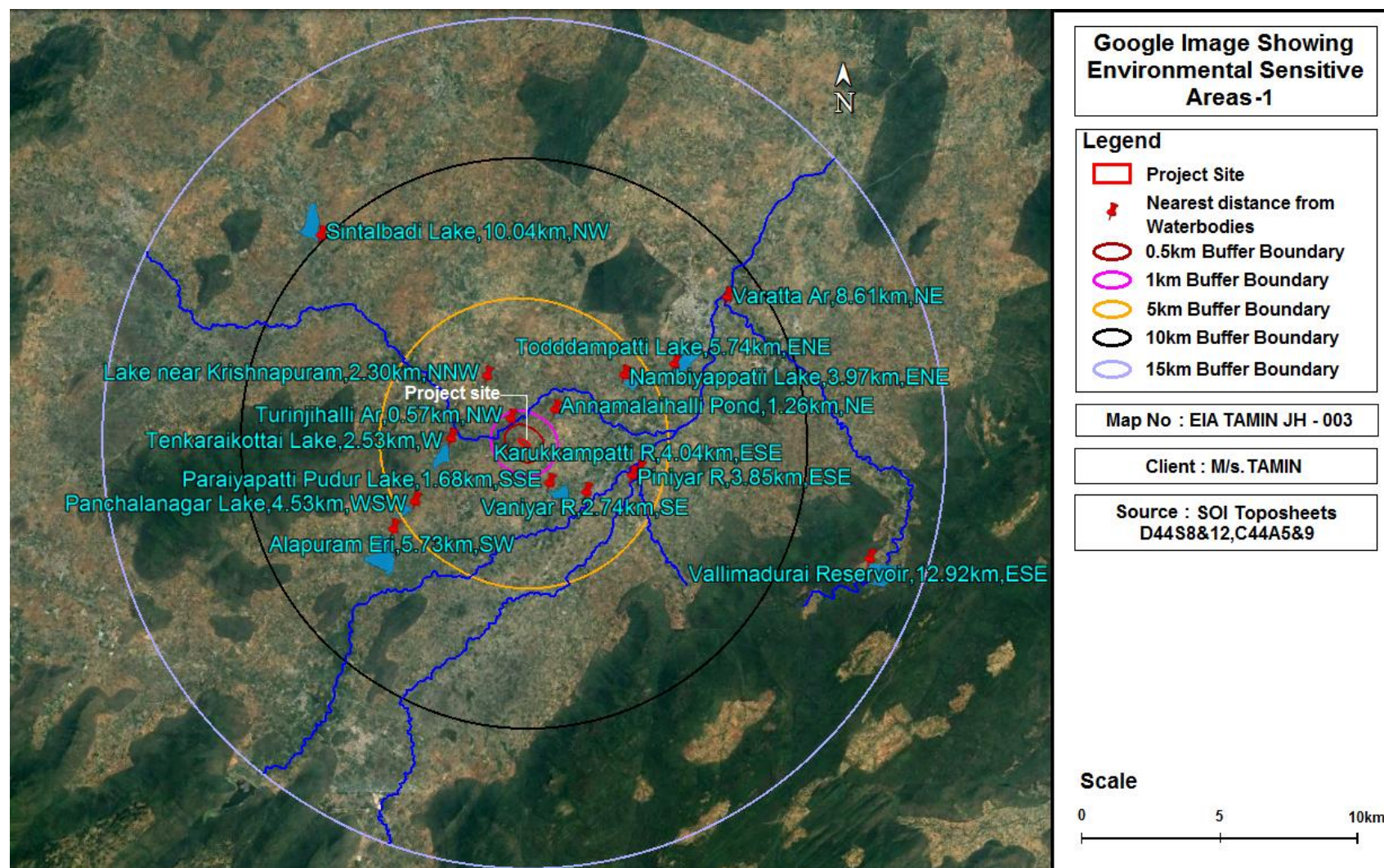


Figure 3-2 Environmental Sensitive Areas-1 Covering within 15 km from Project Boundary



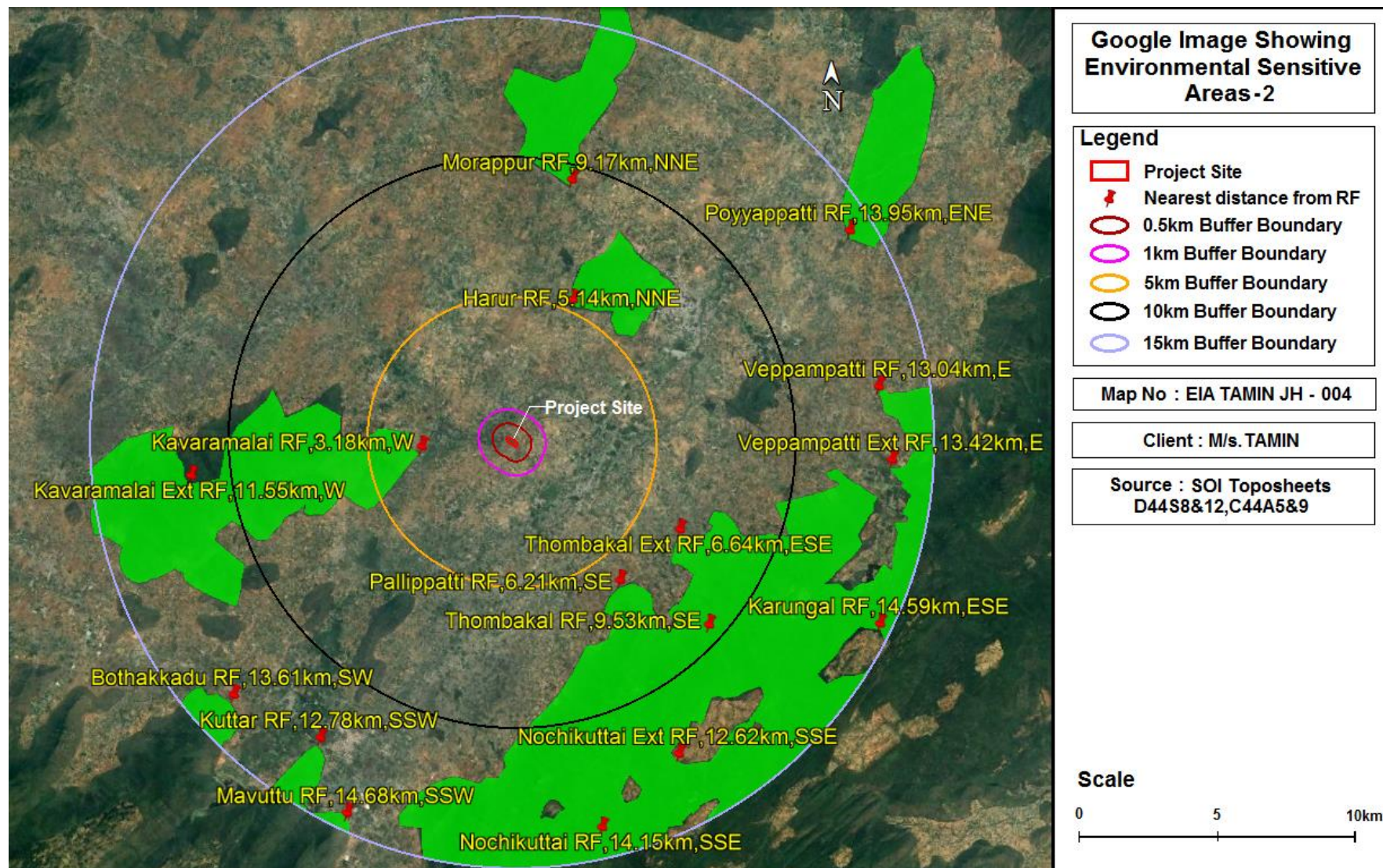


Figure 3-3 Environmental Sensitive Areas-1 Covering within 15 km from Project Boundary

### 3.4 Physical Conditions of PIA district

The physical conditions provide a comprehensive overview of its geographical and environmental attributes. This section provides a general overview of the physical conditions of the PIA district, with specific references to the study area wherever applicable. The physical conditions are discussed as under:

- District profile
- Climatic conditions
- Natural resources
- Physiographic features - Drainage, Geomorphology, Land use, Geology etc.

#### 3.4.1 PIA District Profile

Dharmapuri district lies between 11° 47' and 12° 33' of Northern latitude and 77° 02' and 78° 40'30" of Eastern longitude. This district is bounded on the north by Krishnagiri district, on the east by Tiruvannamalai districts, on the south by Salem district, and on the west by Karnataka's Chamarajanagar district. The total geographical area of the district is 4,497 sq kms, i.e. 3.46% of Tamil Nadu. This district is placed at 14<sup>th</sup> rank in comparison to other districts in terms of area in Tamil Nadu. It is located 297 kms away from Chennai and 126 kms away from Bangalore. Neighbouring cities like Bangalore, Mysore, Tumkur, Chittoor, Tirupathi, Thrissur, Palakkad, Puducherry also lie within a 300 kms radius.

**Source:** <https://censusindia.gov.in/nada/index.php/catalog/45399>

(Ref: Directorate of Census Operations-Tamil Nadu, "District Census Handbook 2011, Dharmapuri District", Series-34 Part XII-A)

#### 3.4.2 Climatic Conditions

Dharmapuri district is situated in the Western Agro climatic zone. The climate of the Dharmapuri district is generally normal and warm. The district has 37°C and the mean daily minimum temperature of about 25°C in the plains. The district temperature is a gradual decrease of both day and night from June to December, when the mean daily maximum is about 30°C and the mean daily minimum about 19°C in the plains.

April and May are the hottest months in the year with a highest temperature being 38°C in April. The climate becomes cool in December and continues up to February, touching a minimum of 17°C in January. The climate of the district on the whole is slightly humid.



In summer, the wind is hot and uncomfortable. From December to February, the wind is very cold. The district gets rainfall from both south-west and north-west monsoons. During the monsoon season, the climate is pleasant.

**Source:** <https://censusindia.gov.in/nada/index.php/catalog/45399>

(Ref: Directorate of Census Operations-Tamil Nadu, "District Census Handbook-2011, Dharmapuri District", Series-34 Part XII-A).

### **3.4.3 Natural Resources of PIA District**

#### **3.4.3.1 Forest Resources**

Dharmapuri district has tropical forests. Generally, these forest have short shrubs and throne plants. The whole district is predominantly covered with forests. Spider valley located near Hogenakkal is home for many wild animals. The district falls in the migratory path of elephants. Man and elephant conflicts are most common in these parts. Many tribal communities depend on these forests. Vathalmalai, a mountain hamlet on top of Servarayan hill chain has suitable conditions to cultivate coffee and jack fruit. Wild boars and spotted deers are commonly seen in Morappur and Harur forest region. Gaurs sometimes stroll near villages around Bommidi region. Thoppurghat section has one of the scenic highways surrounded by mountains and forests. For a massive tree planting program to increase tree cover in the district, the Environmental and Forest Department has planted 60,000 seedlings in public places, Government institutions, Industries, Schools, Colleges and roads in Harur taluks. Dharmapuri and Harur are the two forest divisions in this district.

**Source:** <https://censusindia.gov.in/nada/index.php/catalog/45399>

**Ref:** Directorate of Census Operations-Tamil Nadu, "District Census Handbook 2011, Dharmapuri District", Series-34 Part XII-A

#### **3.4.3.2 Agricultural Resources**

The district economy is mainly agrarian in nature. Nearly 70% of the work force is dependent on agriculture and allied activities. The district is one among the most backward and drought prone area in the State. To achieve the food production target, various schemes are being implemented for the benefit of the farmers and those are System of Rice Intensification, Pulses production and development, Initiative for nutritional security through intensive millets promotion and Rain fed area development programme in Dharmapuri district. The Agricultural Engineering Department is implementing a number of development programmes throughout the district. These can be classified as follows:

1. Land Development Scheme
2. Minor Irrigation Scheme

3. Soil Conservation works in Tribal Area (Integrated Tribal Development Programme)
4. Agricultural Mechanization (Farm Mechanization)
5. National Agricultural Development Programme (NADP)
6. Run off Management Programme
7. Artificial recharge ground water scheme
8. IAMWARM (Irrigated Agriculture Modernization and Water bodies Restoration Management)

The important food grains in the district are paddy, cholam, cumbu, ragi and samai. The major pulses cultivated are redgram, greengram, blackgram, horsegram, bengalgram and cowpea. The other commercial crops like cotton, chilly, sugarcane, turmeric, tamarind and coriander are also cultivated in Dharmapuri district.

**Source:** <https://censusindia.gov.in/nada/index.php/catalog/45399>

**Ref:** Directorate of Census Operations-Tamil Nadu, "District Census Handbook 2011, Dharmapuri District", Series-34 Part XII-A

### 3.4.3.3 Mineral Resources

Dharmapuri district is endowed with size able reserves of granite. The following table shows the various mining and quarrying units in each taluks of the district during 2010-11.

| S.No         | Name of the taluk | No of Mining Quarrying Units |          |             |               |              |
|--------------|-------------------|------------------------------|----------|-------------|---------------|--------------|
|              |                   | Quartz                       | Sand     | Rough stone | Black granite | Grey granite |
| 1            | Dharmapuri        | -                            | -        | 20          | 1             | 0            |
| 2            | Pennagaram        | 3                            | -        | 3           | 5             | 0            |
| 3            | Harur             | -                            | 3        | 23          | 4             | -            |
| 4            | Pappireddipatti   | -                            | 1        | 11          | 3             | 0            |
| 5            | Palakkodu         | -                            | 1        | 17          | 6             | 1            |
| <b>Total</b> |                   | <b>3</b>                     | <b>5</b> | <b>74</b>   | <b>19</b>     | <b>1</b>     |

**Source:** District Statistical Handbook, 2010-11

High quality black granite is present in this district. Quartz is available at Kendiganapalli Village of Pennagaram Taluk, A.Velampatti of Harur taluk and Pethathampatti of Pappireddipatti Taluk. Another high value mineral available in this district is Molybdenum, it was discovered near Harur by the Ministry of Mines in 2001. It is the only source of the minerals in India. The ability of molybdenum to withstand extreme temperatures without significantly expanding or softening makes it useful in

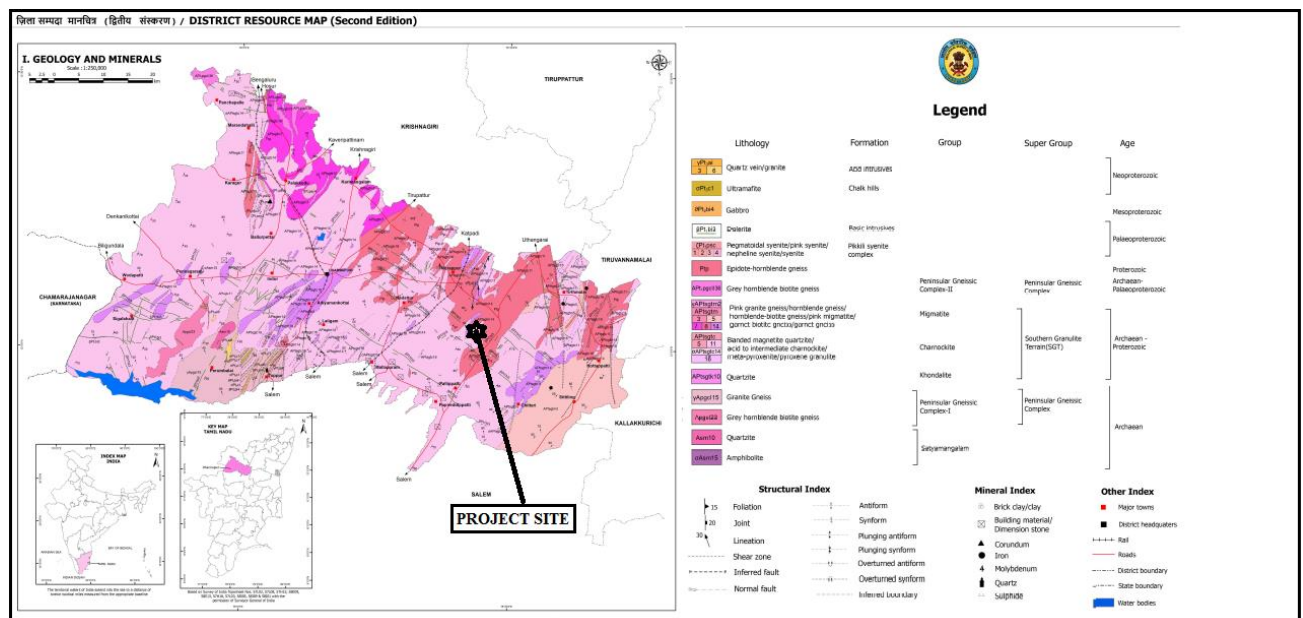
applications involving intense heat, including the manufacture of aircraft parts, electrical contacts, industrial motors and filaments. The following table shows the minerals available in the district and its quantity during 2010-11.

| S.No | Name of the minerals | Quantity   | Value     |
|------|----------------------|------------|-----------|
| 1.   | Rough stone jelly    | 10,069     | 35,14,725 |
| 2.   | Black granite        | 16,518.502 | 46,72,580 |
| 3.   | Quartz               | 4,652      | 93,040    |

**Source:** District Statistical Handbook, 2010-11

**Source:** <https://censusindia.gov.in/nada/index.php/catalog/45399>

(Ref: Directorate of Census Operations-Tamil Nadu, "District Census Handbook-2011, Dharmapuri District", Series-34 Part XII-A). The mineral map of Tamilnadu is shown in the **Figure 3-4**.



**Source:** [https://www.gsi.gov.in/webcenter/portal/OCBIS/pages\\_pageMAPS/pageMapsSeries](https://www.gsi.gov.in/webcenter/portal/OCBIS/pages_pageMAPS/pageMapsSeries)

**Figure 3-4 Mineral Map of Dharmapuri District**

### 3.4.4 Topography of the PIA District

The district is situated in the northwestern part of Tamil Nadu. Dharmapuri is located on one of the geographically important area in south India. The whole district is surrounded by hills and forests. The terrain of Dharmapuri is of rolling plains type. The district is mostly dry and ground water resources are stated to below. Land area is mostly rainfed and farmers do dry land cultivation. This district is elevated at 450 metres above mean sea level. Dharmapuri is one among the districts of Tamil Nadu, where forest covers an area of 1621.86 sq.kms.

**Source:** <https://censusindia.gov.in/nada/index.php/catalog/45399>

**Ref:** Directorate of Census Operations-Tamil Nadu, "District Census Handbook 2011, Dharmapuri District", Series-34 Part XII-A

#### **3.4.4.1 Topography of the Study Area**

The project site is located in a relatively flat terrain area with fewer close-packed contour lines, indicating gentle slopes. Areas with dense contour lines, especially toward the southwest and southeast, represent steeper terrain or hills (e.g., near Obilinayakkanpatti and Nagalur). Elevated regions are observed towards the:

- Southwest corner (up to 900 m elevation)
- Southeast corner (ranging from 400 m to 800 m)

The central region, especially within a 1–5 km radius of the project site, appears to be moderate to low elevation (likely between 400–500 meters). The topographical variation of the study site and its surrounding area, within a 10 km radius from the site's periphery, is depicted in the contour map in **Figure 3-5**.



### 3.4.5 Drainage Pattern in the PIA district

Dharmapuri district is drained by Cauvery and Ponnaiyar rivers and their tributaries. Cauvery river flows along the south western boundary of the district. It flows in an easterly direction up to Bellgundla and then takes a more or less southerly course till it reaches the Stanley Reservoir. The Doddahalla and the Chinnar are important tributaries of Cauvery river in the district. Ponnaiyar is the major river draining the district and is ephemeral in nature. It originates from Nandhi hills in Karnataka, enters Tamil Nadu west of Bagalur and flows almost in a south easterly direction till it reaches Daddampatti from where it takes an easterly course. Pambar, Vaniyar and Kallar are the important tributaries of Ponnaiyar draining the eastern part of the district whereas the Chinnar and Markandeya Nadhi drain the northern part of the district.

**Source:** <https://censusindia.gov.in/nada/index.php/catalog/45399>

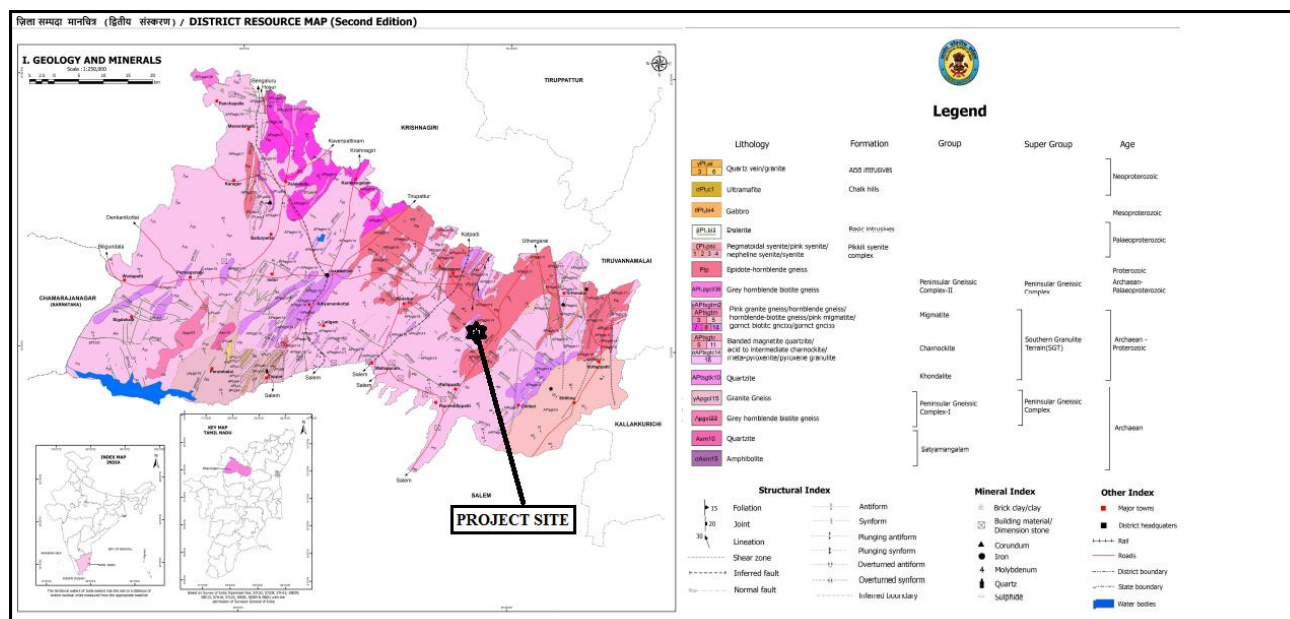
**Ref:** Directorate of Census Operations-Tamil Nadu, "District Census Handbook 2011, Dharmapuri District", Series-34 Part XII-A

### 3.4.6 Geology in the PIA District

Geologically Dharmapuri District is covered by crystalline rocks of Archaean age. The entire district is underlain by hard crystalline rocks of Archaean age comprising of various rock types such as Gneiss, Charnockite, etc., The Gneissic type of crystalline formation is found in the north and north eastern part of the district. Shoolagiri, Hosur, Denganikottai and Kelamangalam areas are covered by Granitic 4 Gneiss. Veppanapalli, Krishnagiri and parts of Kaveripaattinam areas are covered by peninsular Gneiss. Bargur, part of Kariamangalam, Palacode, Pochampalli and Uthangarai are covered by Biotite Gneiss. Part of Harur, Uthangarai and Morappur areas are covered by foliated gneiss. Charnockite occurs in the southern part of the district, covering part of Palacode, part of Morappur, Pappireddipatti, part of Dharmapuri, Pennagaram and Nallampalli. Quartzites are found in patches in Denganikottai block. Dolerite dykes varying from few feet to few miles in length cut across the country rock in this district. Alluvial deposits such as sand, silt, clay and gravels which are transported sediments by the river Ponnaiyar and Chinnar are found on either side of the river courses. These formations are overlying the hard rock's as a thin layer. In Dharmapuri district, weathered thickness ranges from 8 m to 15 m bgl. And jointed formation ranges from 15 m to 60 m in general. The strike direction is generally North East – South west, dipping towards south east. Geological map of Dharmapuri district is given in **Figure 3-6**

**Source:** <https://nwm.gov.in/sites/default/files/Notes%20on%20Dharmapuri%20District.pdf>





Source: [https://www.gsi.gov.in/webcenter/portal/OCBIS/pages\\_pageMAPS/pageMapsSeries](https://www.gsi.gov.in/webcenter/portal/OCBIS/pages_pageMAPS/pageMapsSeries)

**Figure 3-6 Geology Map of Dharmapuri District, Highlighting the Project Site**

### 3.4.7 Soils in the PIA District

The district has a wide range of soil types. In general, the soil in the district is quite loose and fresh with its colour varying from red to dark brown. The soils are mostly in-situ in nature, lateritic, earthy and pale reddish in colour. The soil has low nitrogen and phosphate content with marked variations between different taluks. Different types of the soils such as black or mixed loams, red ferruginous and gravel are found in the district. The black or red loam is very fertile due to its moisture absorbing character, which is found in Dharmapuri taluk. Red and sandy soil are seen in Harur taluk. Lateritic and sandy coastal alluvium soils are found in almost all blocks. Considerable stretches of good loam and black soil are found in Dharmapuri district. Soil map of Dharmapuri district is given in **Figure 3.7**.

**Table 3.2 Soil Types in PIA District**

| Type of Soil           | Places in the District                |
|------------------------|---------------------------------------|
| Lateritic Soil         | Harur                                 |
| Black Soil             | Dharmapuri, Palacode, Pappireddipatti |
| Sandy Coastal Alluvium | Dharmapuri, Harur, Palacode           |
| Red Sandy Soil         | Pennagaram, Palacode, Harur           |

Source: District Statistical Handbook, 2010-11

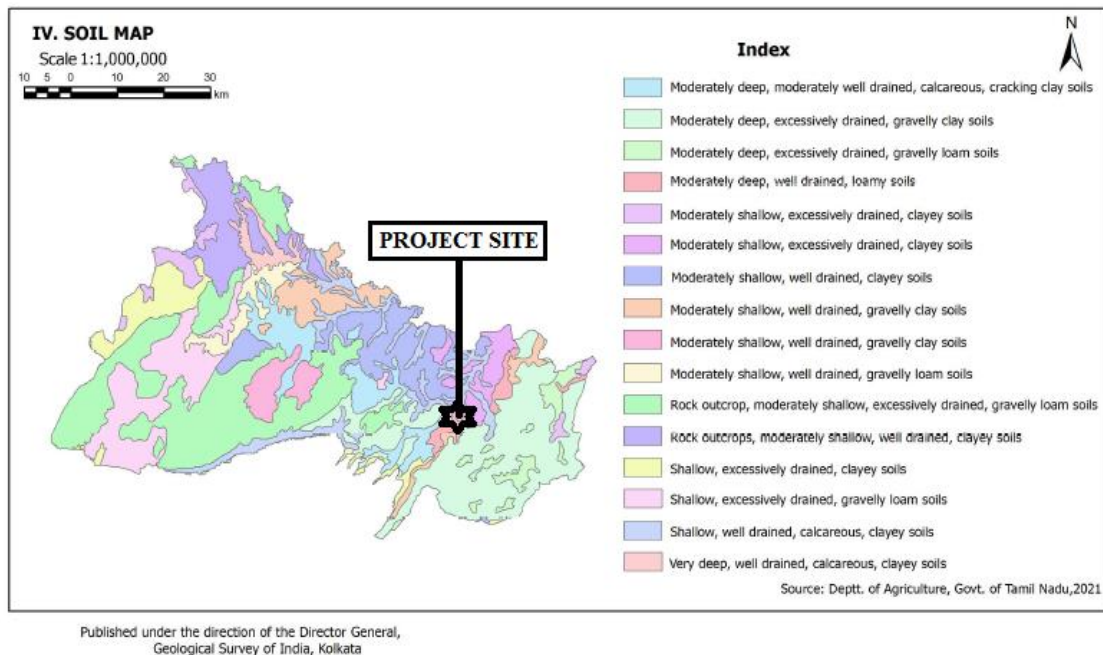
Source: <https://censusindia.gov.in/nada/index.php/catalog/45399>



**Ref:** Directorate of Census Operations-Tamil Nadu, "District Census Handbook 2011, Dharmapuri District", Series-34 Part XII-A

The district has a wide range of soil types. The soils are mostly in-situ in nature, lateritic, earthy and pale reddish in colour. The soil has low nitrogen and phosphate content with marked variations between different taluks. The soil types found in the district are mainly fine clayey/loamy calcareous, gravelly and sandy soils with poor drainage. Clayey soils have high specific water retention capacity but poor in supporting agriculture. The rate of infiltration is very low for clayey sand, sandy clay, sand and gravel and for weathered rock, fractured and jointed rock, it varies from 0.2 to 0.5 cm/hr. The black or red loam is very fertile due to its moisture absorbing character, which is found in Dharmapuri taluk. Red and sandy soil are seen in Harur taluk.

**Source:** [https://www.gsi.gov.in/webcenter/portal/OCBIS/pages\\_pageMAPS/pageMapsSeries](https://www.gsi.gov.in/webcenter/portal/OCBIS/pages_pageMAPS/pageMapsSeries)



**Source:** [https://www.gsi.gov.in/webcenter/portal/OCBIS/pages\\_pageMAPS/pageMapsSeries](https://www.gsi.gov.in/webcenter/portal/OCBIS/pages_pageMAPS/pageMapsSeries)

**Figure 3-7 Soil Map of Dharmapuri District, Highlighting the Project Site**

### 3.4.8 Geomorphology of PIA District

Dharmapuri district forms part of the upland plateau region of Tamil Nadu with many hill ranges and undulating plains. The western part of the district between Pennagaram and Denkanikottai has hill ranges of Mysore Plateau with a chain of undulating hills. The southern boundary of the district is occupied by the Shevaroy hill ranges. The plains occupying the central, eastern and southern parts of the district have an average elevation of 488 m. above Mean Sea Level. The Plateau region along the western boundary and the northwestern part of the district has an average elevation of 914 m. above Mean Sea Level.

The prominent geomorphic units identified in the district through interpretation of Satellite imagery are 1) Structural Hills 2) Inselberg 3) pediments 4) Buried pediments 5) Shallow Buried Pediments 6) Plateau 7) Flood plain and 8) Bazada Zone.

**Source :** <https://censusindia.gov.in/nada/index.php/catalog/45399>

(Ref: Directorate of Census Operations-Tamil Nadu, "District Census Handbook 2011, Dharmapuri District", Series-34 Part XII-A)

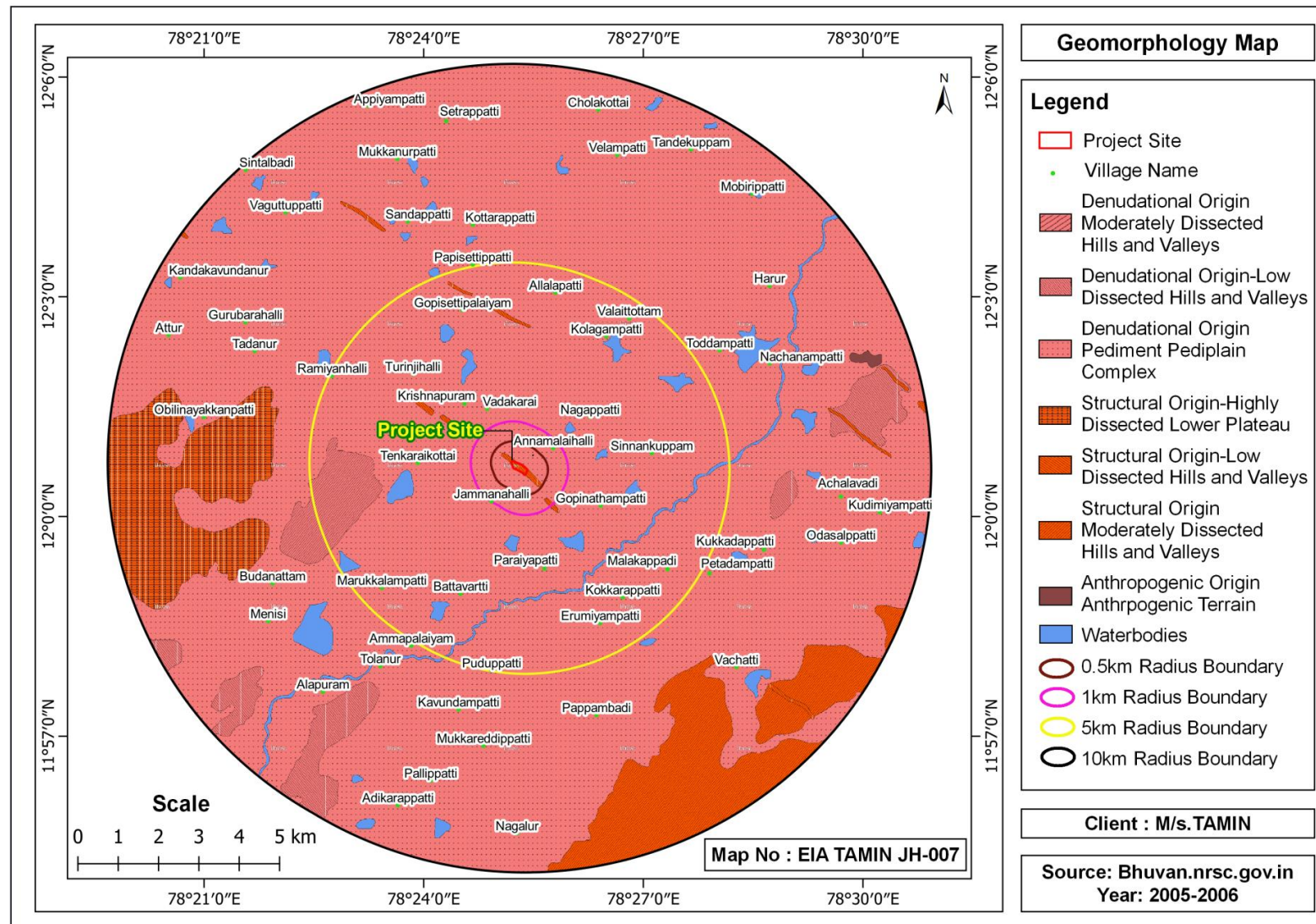
#### 3.4.8.1 Geomorphology of the Study Area

Total geographical area of the study area is 326.95 Sq.Km. The Geomorphology pattern of the study area is given in **Table 3-3**. The corresponding spatial map depicting Geomorphology of the study area is given in **Figure 3-8**.

**Table 3-3 Geomorphology Pattern of the Study Area**

| S.No. | Description                                                | Area (Sq.Km) | Area (Acres) | Area (Hectares) | Percentage (%) |
|-------|------------------------------------------------------------|--------------|--------------|-----------------|----------------|
| 1     | Denudational Origin-Pediment-PediPlain Complex             | 275.41       | 68055.1881   | 27541           | 84.24          |
| 2     | Structural Origin-Highly Dissected Lower Plateau           | 14.93        | 3689.27765   | 1493            | 4.57           |
| 3     | Denudational Origin-Moderately Dissected Hills and Valleys | 4.06         | 1003.2463    | 406             | 1.24           |
| 4     | Denudational Origin-Low Dissected Hills and Valleys        | 7.40         | 1828.577     | 740             | 2.26           |
| 5     | Waterbodies                                                | 6.89         | 1702.55345   | 689             | 2.11           |
| 6     | Anthropogenic Origin-Anthropogenic Terrain                 | 0.21         | 51.89205     | 21              | 0.06           |

|              |                                                          |               |                 |              |               |
|--------------|----------------------------------------------------------|---------------|-----------------|--------------|---------------|
| 7            | Structural Origin-Moderately Dissected Hills and Valleys | 16.96         | 4190.9008       | 1696         | 5.19          |
| 8            | Structural Origin-Low Dissected Hills and Valleys        | 1.09          | 269.34445       | 109          | 0.33          |
| <b>Total</b> |                                                          | <b>326.95</b> | <b>80790.98</b> | <b>32695</b> | <b>100.00</b> |



**Figure 3-8 Geomorphology Map of Study Area**

### 3.4.9 Land Use & Land Cover of the PIA District

#### Definition

A delineable area of the earth's terrestrial surface, embracing all attributes of the biosphere immediately above or below this surface, includes:

- Near surface climate,
- Soil and terrain forms,

Surface hydrology including shallow lakes, rivers, marshes and swamps, near-surface sedimentary layers and associated ground water and geo hydrological reserves, plant and animal populations, Human settlement pattern and physical results of past and present human activity (terracing, water storage or drainage structures, roads, buildings, etc.

#### Land Use (LU)

Territory characterized according to its current and future planned functional dimension or socio-economic purpose (e.g. residential, industrial, commercial, agricultural, forestry, recreational).

#### Land Cover (LC)

Physical and biological cover of the earth's surface including artificial surfaces, agricultural areas, forests, (semi) natural areas, wetlands, waterbodies.

#### Classification Scheme

There are three levels of classification, viz., Level-I, Level-II, Level-III. Based on NRSC-2012, Level-I consists of 8 classes, Level-II consists of 31 classes, and Level-III consists of 54 classes. In this EIA, Level-III classification in 1:50000 scale is adopted.

#### LULC classification through Satellite Image

For preparation of LULC, Resourcesat-2 LISS III satellite image is used. This satellite operates in a sun-synchronous orbit at an altitude of 817 km. It takes 101.35 minutes to complete one revolution around the earth and complete about 14 orbits per day. The entire earth is covered by 341 orbits during a 24-day cycle. The LISS-3 sensor covers a 140-km orbital swath at a spatial resolution of 24 meters with a 24-day repeat cycle. False Color Composite (FCC) images of the study area was prepared using bands 4 (NIR) 3 (Red), and 2 (Green) and discrimination of features were made by visual interpretation (on screen) using these images and Survey of India toposheet. The interpretation key was based on the relationships between ground features and image elements like, texture, tone, shape, location and pattern.

#### 3.4.9.1 Land use land cover for the study area

The land use pattern of the study area is **326.95** Sq.Km given in **Table 3-4**. Land use map of the study area is given in **Figure 3-9**.



**Table 3.4 Land Use Pattern of the Study Area**

| SL. No.      | Descriptions               | Area (Sq.km)  | Area (Acres)    | Area (Hectares) | Percentage (%) |
|--------------|----------------------------|---------------|-----------------|-----------------|----------------|
| 1.           | Crop land                  | 226.68        | 56013.76        | 22668           | 69.33          |
| 2.           | Deciduous                  | 41.70         | 10304.28        | 4170            | 12.75          |
| 3.           | Fallow                     | 26.45         | 6535.93         | 2645            | 8.09           |
| 4.           | Rural                      | 6.93          | 1712.44         | 693             | 2.12           |
| 5.           | Tanks / Lakes / Ponds      | 6.93          | 1712.44         | 693             | 2.12           |
| 6.           | Scrub land                 | 6.62          | 1635.84         | 662             | 2.02           |
| 7.           | Barren rocky               | 4.58          | 1131.74         | 458             | 1.40           |
| 8.           | Urban                      | 3.61          | 892.05          | 361             | 1.10           |
| 9.           | River / Stream / Canals    | 1.39          | 343.48          | 139             | 0.43           |
| 10.          | Plantation                 | 0.88          | 217.45          | 88              | 0.27           |
| 11.          | Forest Plantation          | 0.82          | 202.63          | 82              | 0.25           |
| 12.          | Evergreen / Semi Evergreen | 0.24          | 59.31           | 24              | 0.07           |
| 13.          | Mining                     | 0.12          | 29.65           | 12              | 0.04           |
| <b>Total</b> |                            | <b>326.95</b> | <b>80790.98</b> | <b>32695</b>    | <b>100.00</b>  |

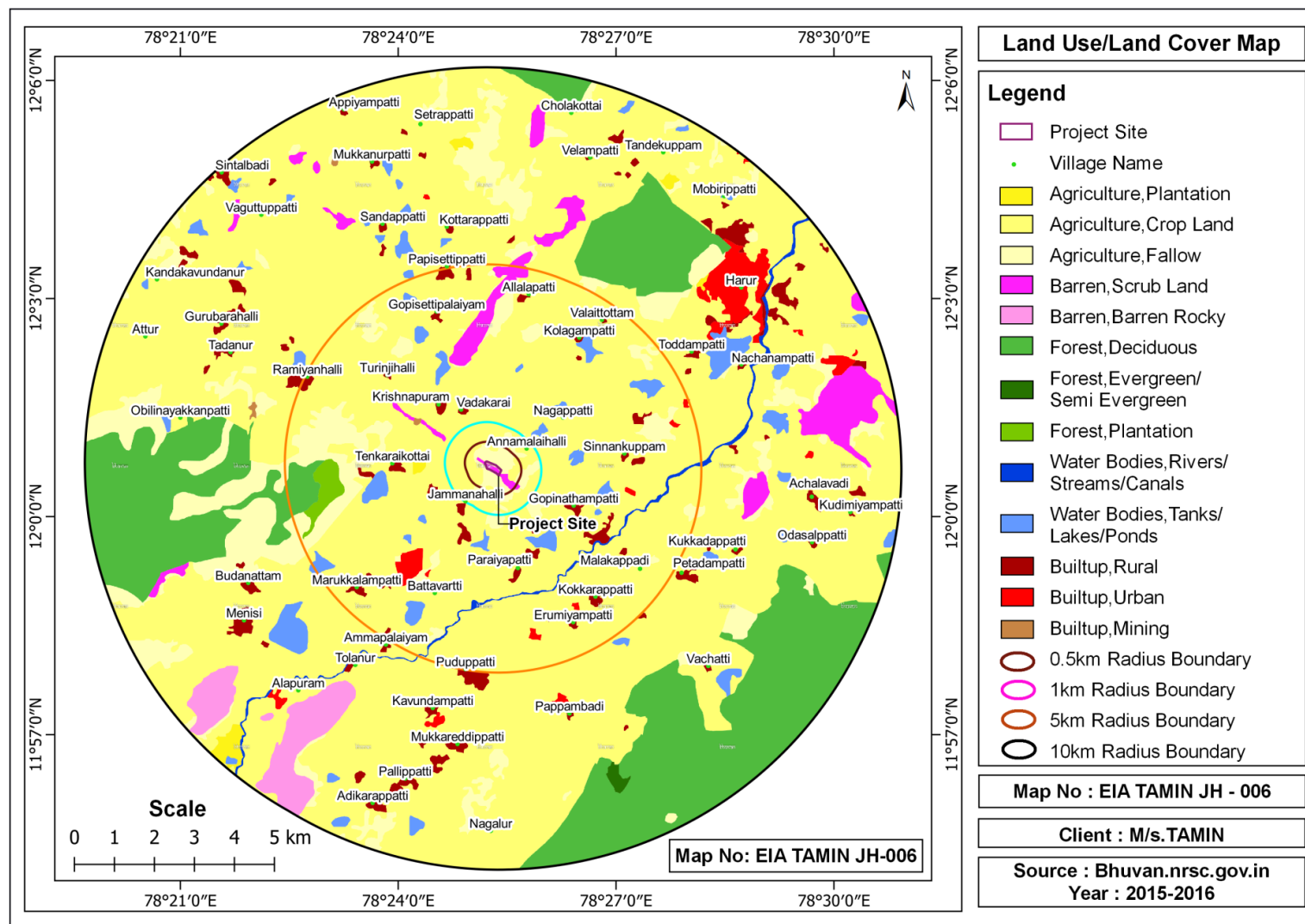


Figure 3-9 Land Use Map of the Study Area



### 3.4.10 Hydrogeology of PIA District Profile

The district is underlain by Archaean Crystalline formations with recent alluvial deposits of limited areal and vertical extents along major rivers. (Plate-II). The important aquifer systems in the district are constituted by i) unconsolidated & semi-consolidated formations and (ii) weathered and fractured crystalline rocks.

In the areas underlain by crystalline rocks, occurrence of ground water is essentially limited to zone of weathering and fracturing. Generally the hard rock aquifers are heterogeneous in nature, which is indicated by the variations in lithology, structure and texture. Ground water occurs under phreatic condition in the weathered mantle and semi confined to confined condition in the fracture and fissured zones of these rocks. Thickness of weathered material varied widely from less than 1m bgl to more than 20m bgl.

The Alluvium with intervening crystalline outcrops are noticed as patches west of Dharmapuri, and Papireddipatti areas. The ground water occurs under water table to semi-confined conditions. The discharge ranges from 10 to 20 m/day.

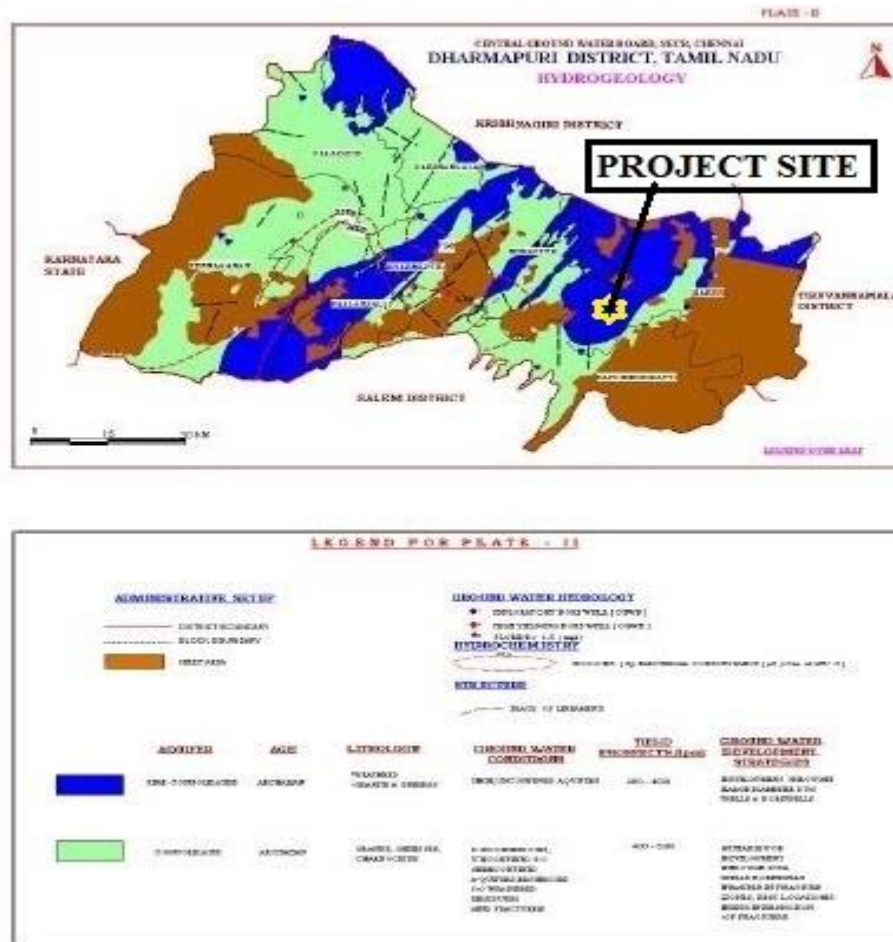
The yield of large diameter wells in the district, tapping the weathered mantle of crystalline rocks ranges from 150-200 m<sup>3</sup>/day and are able to sustain pumping for 2 to 4 hours per day. The yield of large diameter wells tested in crystalline rocks ranges from 150 to 200 m<sup>3</sup>/day for drawdown of 1 to 3 m. The yield characteristics of wells vary considerably depending on the topographic set-up, lithology and nature of weathering. The transmissivity of weathered formations computed from pumping test data using empirical methods range from 12 to 22m<sup>2</sup>/day. The specific capacity in the fissured formation ranges from 2.89 to 153.74 lpm/m/dd. In the porous formation the specific capacity values vary from 6.31 to 28.7 lpm/m/dd.

The yield of bore wells drilled down to a depth of 36 to 200 m bgl, by various state agencies mainly for domestic purposes. The discharge ranged from 2 to 33 lps. The yield of successful bore wells drilled down to a depth of 200 m bgl during the groundwater exploration programme of Central Ground Water Board ranged from 1 to 12lps. The aquifer and well parameters of the wells show wide variation, both in crystalline and sedimentary formations.

The depth to water level in the district varied between 5.27 and 16.70 m bgl during pre-monsoon (Plate-III) and varied between 2.47 and 11.32 m bgl during postmonsoon (Plate-IV). The seasonal fluctuation shows a rise in water level, which ranges from 3.71 to 7.06 m bgl. The piezometric head varied between 2.66 to 20.06m bgl (May 2006) during pre monsoon and 1.19 to 14.57 m bgl during post monsoon.

**Source:** <http://cgwb.gov.in/sites/default/files/2022-10/dharmapuri.pdf>

(Ref: Government of India Ministry of Water Resources Central Ground Water Board South Eastern Coastal Region Chennai, "District Ground Water Brochure Dharmapuri District")



**Source:** [https://cgwb.gov.in/District\\_Profile/TamilNadu/Krishnagiri.pdf](https://cgwb.gov.in/District_Profile/TamilNadu/Krishnagiri.pdf)

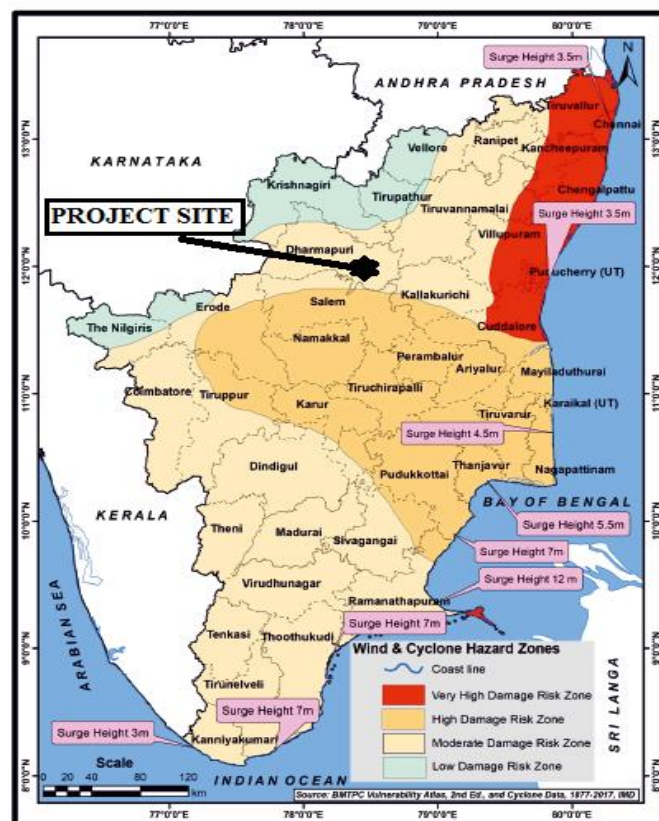
**Figure 3-10 Hydrogeology Map of Dharmapuri District**

### 3.4.11 Natural Hazards in PIA District

The Hazard may be termed as any event / object / rivers /industries / earthquake / fire / building / excess or deficit of rainfall which can cause a potential damage to a population / Animals / property / environment etc., an analysis involving occurrence magnitude, volume of hazards and the impact caused by such hazards gives a proper direction to prepare a plan to deal with such eventualities.

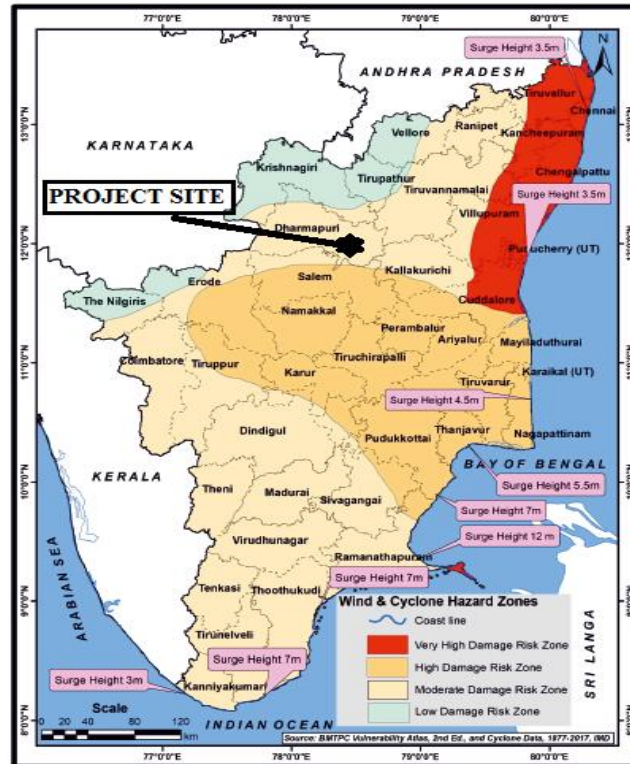
- (i) As per Map of the Flood Zones in Tamil Nadu shown in **Figure 3.11**, study area falls in **- Moderate damage risk zone.**
- (ii) As per Map of the Wind & Cyclone Zones in Tamil Nadu shown in **Figure 3.12**, study area falls in **- Moderate damage risk zone**

**Source:** <https://spc.tn.gov.in/policy/tamil-nadu-state-disaster-management-policy-2023/>



(Source: NRSC)

**Figure 3-11 Map of the Flood Zones in Tamil Nadu, Highlighting the Project Site**



(Source: NRSC)

**Figure 3-12 Map of the Wind & Cyclone Zones in Tamil Nadu, Highlighting the Project Site**

### 3.4.12 Seismicity

The entire Indian landmass, susceptible to different levels of earthquake hazard, has broadly been classified into four distinct seismic Zones, referred to as Zones II to IV as per the Seismic Zoning Map of India contained in IS 1893:2002 (Part-1). As per the Foreword to the Seismic Code IS 1893:2002, the general basis of the zones are

- **Zone V:** Covers the areas liable to seismic intensity IX and above on MSK (1964) Intensity Scale. This is the most severe seismic zone and is referred here as Very High Damage Risk Zone.
- **Zone IV:** Gives the area liable to MSK VIII. This zone is second in severity to zone V. This is referred here as High Damage Risk Zone.
- **Zone III:** The associated intensity is MSK VII. This is termed here as Moderate Damage Risk Zone.
- **Zone II:** The probable intensity is MSK VI or less. This zone is referred to as Low Damage Risk Zone.

The Vulnerability Atlas of India (BMTPC, 2019) presents a series of National and State-level maps earthquake hazard, wherein the earthquake hazard risk for Tamil Nadu has been

classified into two categories. As per the Vulnerability Atlas, the area in Tamil Nadu that falls into seismic (MSK Intensity Scale) zones is as below:

- Zone II - Low Damage Risk Zone (MSK VI or less)
- Zone III - Moderate Damage Risk Zone (MSK VII)

The Earthquake hazard map of Tamil Nadu is shown in **Figure 3.13**. Based on the Seismic Damage Risk Zones, **the study area falls in the Zone III- Moderate Damage Risk Zone (MSK VII)**.



(Source: TNSDMA)

**Figure 3-13 Seismicity Map of Tamil Nadu, Highlighting the Project Site**

### 3.5 Establishment of Baseline for Valued Environmental Components

#### 3.5.1 Air Environment

Baseline ambient air quality assessment gives the status in the vicinity of site and is an indispensable part of environmental impact assessment studies. Significant changes, in predominant winds and weather conditions are observed in winter, summer and post-monsoon seasons apart from the local topographic influences. The baseline status of air environment in the study area is assessed through a systematic air quality surveillance programme.



### 3.5.2 Meteorological Conditions

The regional air quality is influenced by the meteorology of that region. The principal weather parameters that influence the concentration of the air pollutants in the surroundings are wind speed, wind direction and temperature. The meteorological data is useful for proper interpretation of the baseline data.

### 3.5.3 Meteorological Data Collection

Available secondary data pertaining to the meteorological parameters was obtained from the IMD Climatological tables. In addition, baseline meteorological data was generated during the study period (**February 2025 to April 2025**). The methodology adopted for monitoring surface observations is as per the standard norms laid down by Bureau of Indian Standards (BIS) i.e. IS:8829 and Indian Meteorological Department (IMD).

### 3.5.4 General Meteorological Scenario based on IMD Data

The nearest India Meteorological Department (IMD) station to the project site is the Meteorological Observatory located at Dharmapuri, approximately 33 km away in the WNW direction from the site. The Climatological data of Dharmapuri is (Latitude: 12° 08' N; Longitude: 78°02' E) published by the IMD, based on daily observations at 08:30 and 17:30 hour IST for a 30 year period (1991-2020), is presented in the following sections on the meteorological conditions of the region. The monthly variations of the relevant meteorological parameters are reproduced in **Table 3-5**.

**Table 3-5 Climatological Summary– Dharmapuri (1991-2020)**

| Month | Temp (°C)   |             | Rainfall    |              | Relative Humidity (%) |       | Vapour Pressure hPa |       | Mean Wind Speed (Kmph ) | Predominan t Wind Directions (From)* |       |
|-------|-------------|-------------|-------------|--------------|-----------------------|-------|---------------------|-------|-------------------------|--------------------------------------|-------|
|       | Mean        |             |             |              |                       |       |                     |       |                         | 08:30                                | 17:30 |
|       | Dail y Max. | Dail y Min. | Total (mm ) | No. of day s | 08:30                 | 17:30 | 08:30               | 17:30 |                         | 08:30                                | 17:30 |
| Jan   | 29.7        | 17.7        | 49          | 0.3          | 81                    | 50    | 20.1                | 18.1  | 5.1                     | NE                                   | E     |
| Feb   | 32.7        | 18.9        | 64          | 0.2          | 75                    | 41    | 20.9                | 17.9  | 5.0                     | NE                                   | E     |
| Mar   | 35.8        | 20.8        | 123         | 0.9          | 68                    | 33    | 22.3                | 17.3  | 4.6                     | NE                                   | E     |
| Apr   | 36.8        | 23.8        | 177.5       | 2.8          | 68                    | 38    | 25.5                | 20.0  | 4.3                     | SW                                   | E     |
| May   | 36.5        | 24.5        | 297.0       | 6.6          | 66                    | 48    | 25.9                | 23.5  | 5.3                     | SW                                   | SW    |
| Jun   | 34.2        | 23.9        | 233.6       | 3.9          | 67                    | 52    | 24.7                | 23.3  | 6.7                     | SW                                   | SW    |
| Jul   | 33.2        | 23.4        | 246.4       | 4.1          | 69                    | 56    | 24.2                | 23.5  | 6.8                     | SW                                   | SW    |
| Aug   | 32.5        | 23.1        | 291.8       | 6.2          | 73                    | 58    | 24.5                | 24.0  | 6.2                     | SW                                   | W     |
| Sep   | 32.3        | 22.6        | 359.4       | 7.0          | 76                    | 61    | 25.6                | 24.9  | 4.7                     | SW                                   | SW    |
| Oct   | 30.7        | 21.9        | 462.6       | 9.7          | 82                    | 71    | 25.6                | 25.6  | 3.7                     | NE                                   | E     |
| Nov   | 29.0        | 20.4        | 436.5       | 6.5          | 83                    | 69    | 23.7                | 23.4  | 4.3                     | NE                                   | E     |
| Dec   | 27.9        | 18.3        | 184.5       | 2.7          | 82                    | 62    | 20.8                | 20.0  | 4.8                     | NE                                   | E     |

| Month         | Temp (°C)   |             | Rainfall    |              | Relative Humidity (%) |       | Vapour Pressure hPa |       | Mean Wind Speed (Kmph ) | Predominan t Wind Directions (From)*             |       |
|---------------|-------------|-------------|-------------|--------------|-----------------------|-------|---------------------|-------|-------------------------|--------------------------------------------------|-------|
|               | Mean        |             |             |              |                       |       |                     |       |                         | 08:30                                            | 17:30 |
|               | Dail y Max. | Dail y Min. | Total (mm ) | No. of day s | 08:30                 | 17:30 | 08:30               | 17:30 |                         | 08:30                                            | 17:30 |
| Max.          | 36.8        | 24.5        | 462.6       | 9.7          | 83                    | 71    | 25.9                | 25.6  | 6.8                     | Annual Predominan t wind direction is North East |       |
| Min.          | 27.9        | 17.7        | 49          | 0.2          | 66                    | 33    | 20.1                | 17.3  | 3.7                     |                                                  |       |
| Annua l Avg   | 32.7        | 21.6        | -           | -            | 74                    | 53    | 23.6                | 21.8  | 5.1                     |                                                  |       |
| Annua l Total | -           | -           | 1446        | 50.8         | -                     | -     | -                   | -     | -                       |                                                  |       |

As per the above IMD climatological Data given in **Table 3-5**, the observations drawn are as follows

- Highest Daily maximum temperature is 36.8°C and the lowest daily minimum temperature is 17.7°C were recorded in the months of April and January respectively.
- Maximum and minimum relative humidity of 83% and 33% were recorded in the months of November and March respectively.
- Maximum and minimum rainfall of 462.6 mm and 49 mm was recorded in the months of October & February respectively.
- Maximum and minimum Mean wind speed is 6.8 Km/hr and 3.7 Km/hr was recorded in the months of August and October respectively. Annual Wind predominant direction is **North East**.

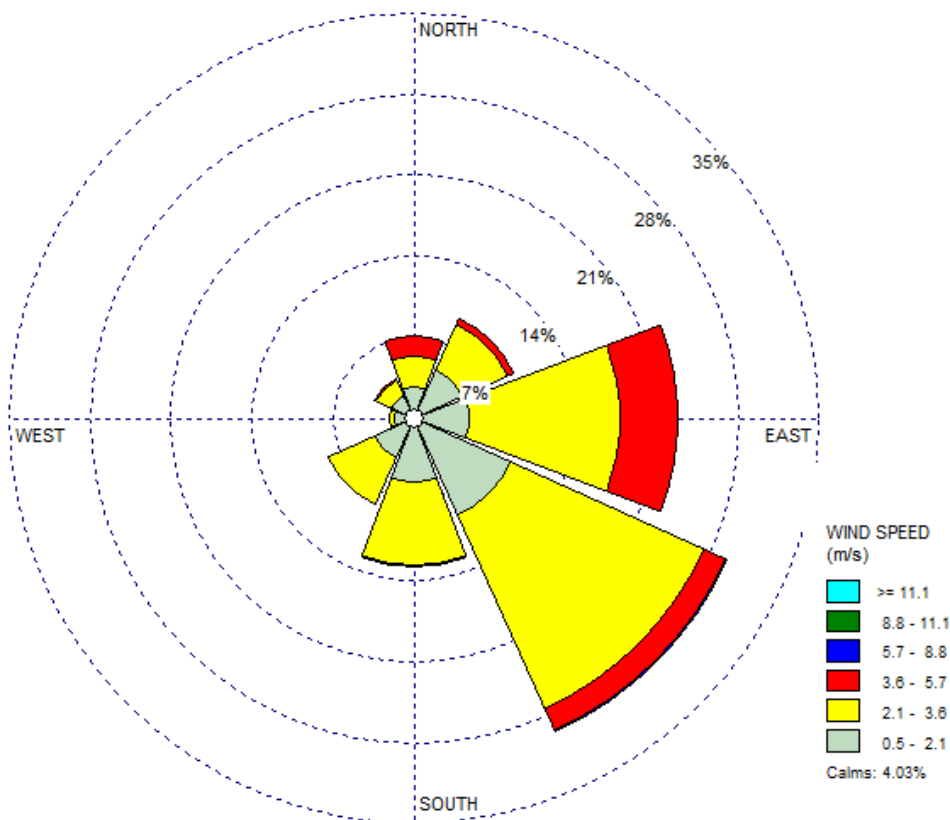
### 3.5.5 Meteorological data during Study Period

The site specific meteorological data for three months from **February 2025 to April 2025** and is presented in **Table 3-6**. These data's are obtained from secondary sources and processed in AERMET to plot wind rose diagram for the study period is given in **Figure 3-14**. Other data included for AERMET were daily wind speed, wind direction, temperature, relative humidity, air pressure, precipitation and solar radiation recorded during the period. AERMET reformat meteorological data so that it can be used as input for AERMOD model.

**Table 3-6 Meteorology Data for the Study Period (February 2025 to April 2025)**

| S.No | Parameter                  | Observation                                                                   |
|------|----------------------------|-------------------------------------------------------------------------------|
| 1    | Temperature                | Max. Temperature: 38°C<br>Min. Temperature: 18°C<br>Avg. Temperature: 31.28°C |
| 2    | Average Relative Humidity  | 51.96%                                                                        |
| 3    | Average Wind Speed         | 2.16m/s                                                                       |
| 4    | Predominant Wind Direction | South East to Northwest                                                       |





**Figure 3-14 Wind Rose during February 2025 to April 2025**

### 3.5.6 Atmospheric Inversion

Atmospheric inversion level at the project site was monitored; the results observed at the site during the study period are as follows

- Average atmospheric temperature: 31.28°C
- Average Relative humidity: 51.96%
- Average Wind speed: 2.16m/s

The daily inversion level calculated based on the average temperature and average wind speed at the project site and the maximum inversion height is derived by the graph plotted based on the average temperature and average wind speed. The daily inversion level at the project site varies from 59 to 1534 m during 12 AM to 11 PM, the maximum recorded at 1534 m during April 2025. This is shown in the following **Figure 3-15**.

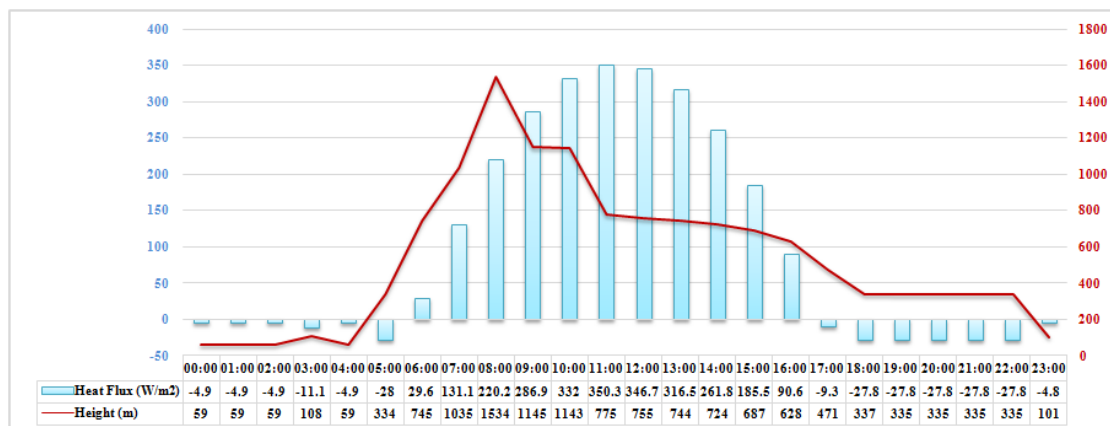


Figure 3-15 Atmospheric Inversion Level at the Project Site

### 3.6 Ambient Air Quality

The selection criteria for monitoring locations are based on the following:

- Topography/Terrain
- Meteorological conditions
- Residential and sensitive areas within the study area
- Representatives of regional background air quality/pollution levels and
- Representation of likely impacted areas

#### 3.6.1 Ambient Air Quality Monitoring Stations

To evaluate the baseline air quality of the study area, Eight (08) monitoring locations have been identified as per annual wind predominance of Dharmapuri from IMD data (1991-2020). The wind predominance during study period (February 2025 to April 2025) is North East. AAQ monitoring locations are selected based on Annual wind predominance (NE) as per **Table 3-6**, the details of the locations are given in **Table 3-7** and map showing the AAQ monitoring locations is given in **Figure 3-16**.

Table 3-7 Details of Ambient Air Quality Monitoring Locations

| Station Code | Location          | Type of Wind | Distance (~km) | Azimuth Directions |
|--------------|-------------------|--------------|----------------|--------------------|
| AAQ1         | Near Project Site | -            | 0.09           | NNE                |
| AAQ2         | Annamalaihalli    | u/w          | 0.88           | NE                 |
| AAQ3         | Gopinathampatti   | c/w          | 2.17           | ESE                |
| AAQ4         | Paraiyapatti      | c/w          | 2.39           | S                  |
| AAQ5         | Near Jammanahalli | d/w          | 0.35           | SW                 |
| AAQ6         | Marukkalamatti    | d/w          | 4.44           | SW                 |
| AAQ7         | Tenkaraikottai    | c/w          | 2.23           | W                  |
| AAQ8         | Gopisetipalaiyam  | c/w          | 3.98           | NNW                |

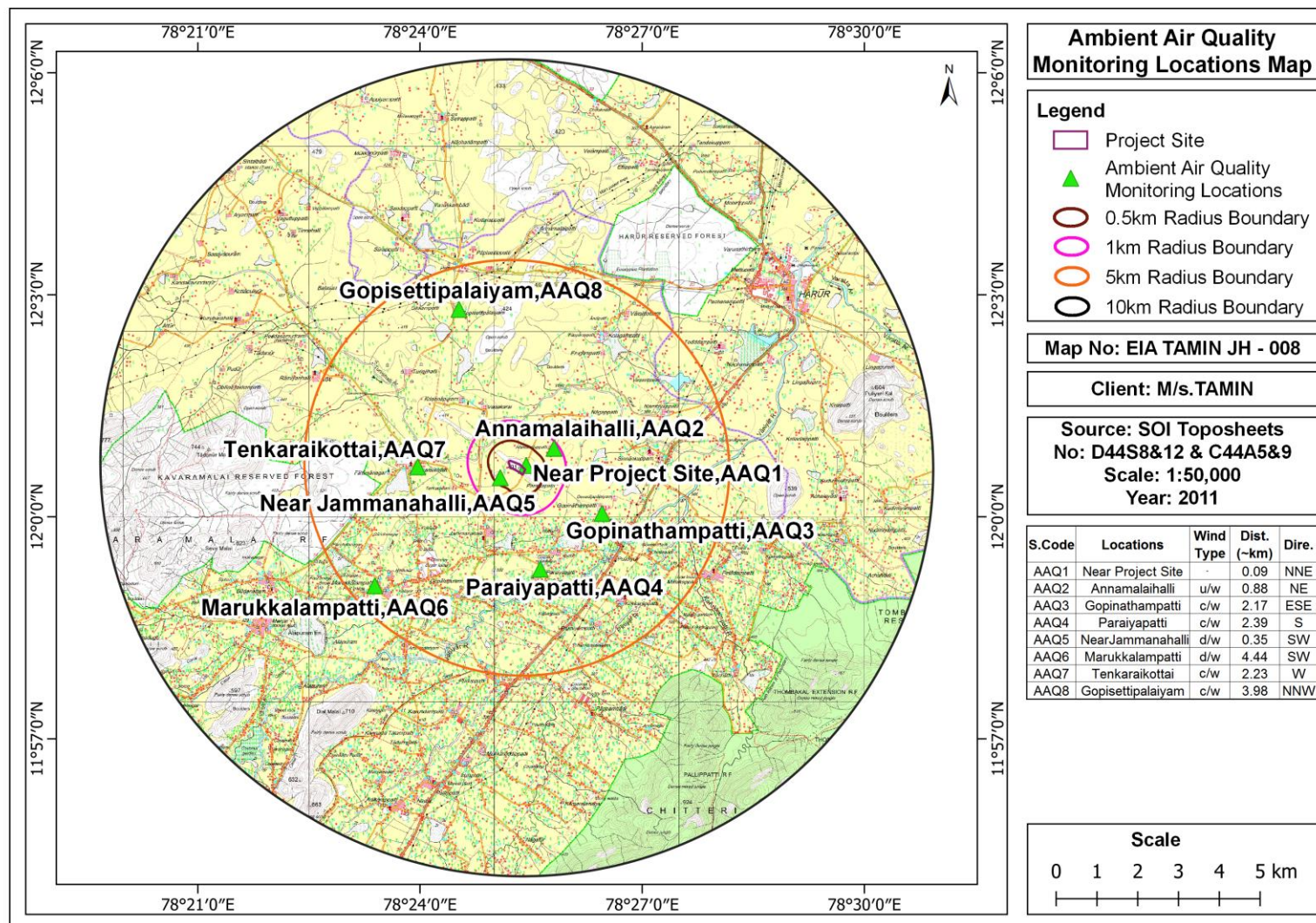


Figure 3-16 Map Showing the Ambient Air Quality Monitoring Locations

### 3.6.2 Ambient Air Quality Monitoring Techniques and Frequency

Ambient air quality was monitored twice in a week for One (01) season (shall cover 12 weeks), i.e. during **(February 2025 to April 2025)**. PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>x</sub>, CO, Pb, O<sub>3</sub>, NH<sub>3</sub>, C<sub>6</sub>H<sub>6</sub>, C<sub>20</sub>H<sub>12</sub>, As, Ni was monitored. Sampling was carried out as per Central Pollution Control Board (CPCB) monitoring guidelines at each location. Analytical methods used for analysis of parameters are given in **Table 3-8**.

**Table 3-8 Analytical Methods for Analysis of Ambient Air Quality Parameters (NAAQ)**

| S. No | Parameters                                                 | Analytical method                                         | NAAQ standards: 2009 |                | Sampling Time |
|-------|------------------------------------------------------------|-----------------------------------------------------------|----------------------|----------------|---------------|
| 1     | Sulphur Dioxide (SO <sub>2</sub> ), µg/m <sup>3</sup>      | IS:5182(Part-2):2001                                      | 50 (Annual)          | 80 (24 Hours)  | 24 Hours      |
| 2     | Nitrogen Dioxide (NO <sub>2</sub> ), µg/m <sup>3</sup>     | IS: 5182 (Part – 6): 2006                                 | 40 (Annual)          | 80 (24 Hours)  | 24 Hours      |
| 3     | Particulate Matter (PM <sub>2.5</sub> ), µg/m <sup>3</sup> | IS: 5182 (Part – 23): 2006                                | 40 (Annual)          | 60 (24 hours)  | 24 Hours      |
| 4     | Particulate Matter (PM <sub>10</sub> ), µg/m <sup>3</sup>  | IS:5182 (Part– 23): 2006                                  | 60 (Annual)          | 100 (24 hours) | 24 Hours      |
| 5     | CO, mg/m <sup>3</sup>                                      | IS:5182(Part-10):1999                                     | 2 (8 hours)          | 4 (1hour)      | 8 Hours       |
| 6     | Pb, µg/m <sup>3</sup>                                      | IS:5182(Part-22):2004                                     | 0.5 (Annual)         | 1 (24 hours)   | 24 Hours      |
| 7     | O <sub>3</sub> , µg/m <sup>3</sup>                         | IS 5182 Part 9: 1974                                      | 100 (8hours)         | 180 (1hour)    | 8 Hours       |
| 8     | NH <sub>3</sub> , µg/m <sup>3</sup>                        | IS 5182 Part 25: 2018                                     | 100 (Annual)         | 400 (24 hours) | 8 Hours       |
| 9     | Benzene, µg/m <sup>3</sup>                                 | IS 5182 Part 11: 2006                                     | 5 (Annual)           | 5 (Annual)     | 24 Hours      |
| 10    | Benzo (a) pyrene, ng/m <sup>3</sup>                        | IS 5182 Part 12 : 2004                                    | 1 (Annual)           | 1 (Annual)     | 24 Hours      |
| 11    | Arsenic, ng/ m <sup>3</sup>                                | HECS/AA/SOP/019,Issue No:01,Issue Date :16.12.:2016: 2016 | 6 (Annual)           | 6 (Annual)     | 24 Hours      |
| 12    | Nickel, ng/ m <sup>3</sup>                                 | HECS/AA/SOP/009,issue No.01,Issue Date :16.12:2016: 2016  | 20 (Annual)          | 20 (Annual)    | 24 Hours      |
| 13    | Free Silica                                                | NIOSH Manual- Method 7601                                 | --                   | --             | 8 hours       |

**Table 3-9 Summary of the Average Baseline Concentrations of Pollutants**

| Parameters                                   | Conc.      | NAAQ Standards | Locations         |              |                 |              |                   |                  |                |                 |
|----------------------------------------------|------------|----------------|-------------------|--------------|-----------------|--------------|-------------------|------------------|----------------|-----------------|
|                                              |            |                | Near Project Site | Annamalaihi  | Gopinathampatti | Paraiyapatti | Near Jammanahalli | Marukkalam patti | Tenkaraikottai | Gopisetipalayam |
|                                              |            |                | AAQ1              | AAQ2         | AAQ3            | AAQ4         | AAQ5              | AAQ6             | AAQ7           | AAQ8            |
| PM <sub>10</sub> Conc. (µg/m <sup>3</sup> )  | Min.       | 100 (24 Hours) | 32.82             | 30.81        | 38.83           | 36.82        | 39.41             | 40.50            | 36.41          | 34.49           |
|                                              | Max.       |                | 46.77             | 43.91        | 55.34           | 52.48        | 56.17             | 57.72            | 51.88          | 49.15           |
|                                              | Avg.       |                | <b>39.35</b>      | <b>36.95</b> | <b>46.56</b>    | <b>44.16</b> | <b>47.26</b>      | <b>48.57</b>     | <b>43.66</b>   | <b>41.36</b>    |
|                                              | 98th 'tile |                | 46.50             | 43.66        | 55.01           | 52.17        | 55.84             | 57.38            | 51.58          | 48.86           |
| PM <sub>2.5</sub> Conc. (µg/m <sup>3</sup> ) | Min.       | 60 (24 Hours)  | 16.41             | 15.41        | 19.41           | 18.41        | 19.71             | 20.25            | 18.20          | 17.24           |
|                                              | Max.       |                | 23.38             | 21.96        | 27.67           | 26.24        | 28.08             | 28.86            | 25.94          | 24.57           |
|                                              | Avg.       |                | <b>19.68</b>      | <b>18.48</b> | <b>23.28</b>    | <b>22.08</b> | <b>23.63</b>      | <b>24.29</b>     | <b>21.83</b>   | <b>20.68</b>    |
|                                              | 98th 'tile |                | 23.25             | 21.83        | 27.51           | 26.09        | 27.92             | 28.69            | 25.79          | 24.43           |
| SO <sub>2</sub> Conc. (µg/m <sup>3</sup> )   | Min.       | 80 (24 Hours)  | 6.84              | 5.95         | 8.71            | 8.36         | 9.49              | 10.53            | 8.05           | 7.59            |
|                                              | Max.       |                | 9.75              | 8.47         | 12.41           | 11.91        | 13.53             | 15.01            | 11.47          | 10.82           |
|                                              | Avg.       |                | <b>8.21</b>       | <b>7.13</b>  | <b>10.45</b>    | <b>10.03</b> | <b>11.39</b>      | <b>12.63</b>     | <b>9.66</b>    | <b>9.11</b>     |
|                                              | 98th 'tile |                | 9.69              | 8.42         | 12.34           | 11.84        | 13.45             | 14.92            | 11.41          | 10.75           |
| NO <sub>2</sub> Conc. (µg/m <sup>3</sup> )   | Min.       | 80 (24 Hours)  | 13.68             | 11.89        | 17.42           | 16.72        | 17.64             | 18.15            | 16.10          | 15.18           |
|                                              | Max.       |                | 19.49             | 16.95        | 24.82           | 23.82        | 25.13             | 25.87            | 22.94          | 21.63           |



| Parameters                                                                         | Conc.      | NAAQ Standards | Locations         |                 |                 |                 |                   |                  |                 |                 |
|------------------------------------------------------------------------------------|------------|----------------|-------------------|-----------------|-----------------|-----------------|-------------------|------------------|-----------------|-----------------|
|                                                                                    |            |                | Near Project Site | Annamalaihali   | Gopinathampatti | Paraiyapatti    | Near Jammanahalli | Marukkalam patti | Tenkaraikottai  | Gopisetipalayam |
|                                                                                    |            |                | AAQ1              | AAQ2            | AAQ3            | AAQ4            | AAQ5              | AAQ6             | AAQ7            | AAQ8            |
|                                                                                    | Avg.       |                | 16.41             | 14.26           | 20.89           | 20.05           | 21.15             | 21.77            | 19.31           | 18.21           |
|                                                                                    | 98th 'tile |                | 19.38             | 16.85           | 24.68           | 23.69           | 24.99             | 25.72            | 22.81           | 21.51           |
| Lead (Pb) ( $\mu\text{g}/\text{m}^3$ )                                             | Avg.       | 1 (24 hour)    | BLQ (LOQ 0.002)   | BLQ (LOQ 0.002) | BLQ (LOQ 0.002) | BLQ (LOQ 0.002) | BLQ (LOQ 0.002)   | BLQ (LOQ 0.002)  | BLQ (LOQ 0.002) | BLQ (LOQ 0.002) |
| Carbon monoxide (CO) ( $\text{mg}/\text{m}^3$ )                                    | Avg.       | 4 (1hour)      | 0.22              | 0.21            | 0.36            | 0.32            | 0.38              | 0.40             | 0.29            | 0.26            |
| Ozone O <sub>3</sub> ( $\mu\text{g}/\text{m}^3$ )                                  | Avg.       | 180 (1hour)    | 10.56             | 13.20           | 12.03           | 11.86           | 12.13             | 12.46            | 11.08           | 10.88           |
| Benzene (C <sub>6</sub> H <sub>6</sub> ) ( $\mu\text{g}/\text{m}^3$ )              | Avg.       | 5(A nnual)     | BLQ (LOQ 0.1)     | BLQ (LOQ 0.1)   | BLQ (LOQ 0.1)   | BLQ (LOQ 0.1)   | BLQ (LOQ 0.1)     | BLQ (LOQ 0.1)    | BLQ (LOQ 0.1)   | BLQ (LOQ 0.1)   |
| Benzo (a) Pyrene (C <sub>20</sub> H <sub>12</sub> (a)), ( $\text{ng}/\text{m}^3$ ) | Avg.       | 1 (Annual)     | BLQ (LOQ 0.1)     | BLQ (LOQ 0.1)   | BLQ (LOQ 0.1)   | BLQ (LOQ 0.1)   | BLQ (LOQ 0.1)     | BLQ (LOQ 0.1)    | BLQ (LOQ 0.1)   | BLQ (LOQ 0.1)   |
| Arsenic (As) ( $\text{ng}/\text{m}^3$ )                                            | Avg.       | 6 (Annual)     | BLQ (LOQ 2)       | BLQ (LOQ 2)     | BLQ (LOQ 2)     | BLQ (LOQ 2)     | BLQ (LOQ 2)       | BLQ (LOQ 2)      | BLQ (LOQ 2)     | BLQ (LOQ 2)     |
| Nickel as Ni ( $\text{ng}/\text{m}^3$ )                                            | Avg.       | 20 (Annual)    | BLQ (LOQ 2)       | BLQ (LOQ 2)     | BLQ (LOQ 2)     | BLQ (LOQ 2)     | BLQ (LOQ 2)       | BLQ (LOQ 2)      | BLQ (LOQ 2)     | BLQ (LOQ 2)     |
| Ammonia (NH <sub>3</sub> ) ( $\mu\text{g}/\text{m}^3$ )                            | Avg.       | 400 (24 hour)  | 5.94              | 6.14            | 7.86            | 7.12            | 8.06              | 8.31             | 6.99            | 6.24            |
| TVOC (ppm)                                                                         | Avg.       | -              | BLQ (LOQ 0.1)     | BLQ (LOQ 0.1)   | BLQ (LOQ 0.1)   | BLQ (LOQ 0.1)   | BLQ (LOQ 0.1)     | BLQ (LOQ 0.1)    | BLQ (LOQ 0.1)   | BLQ (LOQ 0.1)   |
| AQI Value                                                                          | -          | -              | 39                | 37              | 47              | 44              | 47                | 49               | 44              | 41              |

| Parameters          | Conc. | NAAQ Standards | Locations         |                |                 |              |                   |                  |                |                   |
|---------------------|-------|----------------|-------------------|----------------|-----------------|--------------|-------------------|------------------|----------------|-------------------|
|                     |       |                | Near Project Site | Annamalaihalli | Gopinathampatti | Paraiyapatti | Near Jammanahalli | Marukkalam patti | Tenkaraikottai | Gopisetipalaisyam |
|                     |       |                | AAQ1              | AAQ2           | AAQ3            | AAQ4         | AAQ5              | AAQ6             | AAQ7           | AAQ8              |
| <b>AQI Category</b> | -     | -              | Good              | Good           | Good            | Good         | Good              | Good             | Good           | Good              |

**Note:** BDL (Below detection limit), DL (Detection limit), BLQ (Below Limit Of Quantification), LOQ (Limit of Quantification)



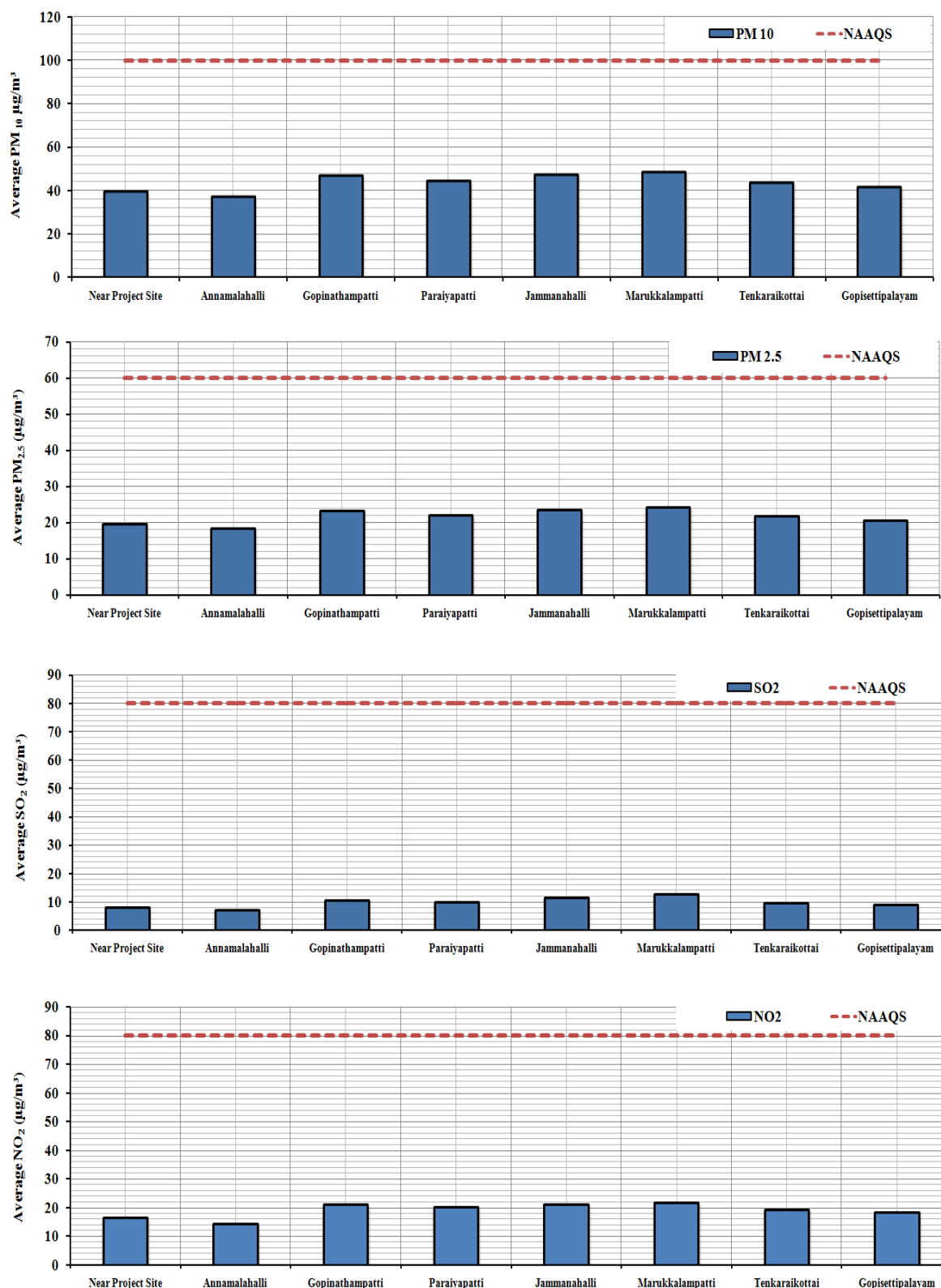


Figure 3-17 Trends of Measured Ambient Concentrations in the Study Area

### 3.6.2.1 Results and Discussions

The variations of the pollutants Particulate matter <10 micron size (PM<sub>10</sub>), Particulate matter <2.5 micron size (PM<sub>2.5</sub>), Sulphur Dioxide (SO<sub>2</sub>), Nitrogen Dioxide (NO<sub>2</sub>), Carbon Monoxide (CO), Lead (Pb), Ozone (O<sub>3</sub>), Benzene (C<sub>6</sub>H<sub>6</sub>), Benzo (a) pyrene (C<sub>20</sub>H<sub>12</sub>), Arsenic (As), Nickel (Ni), Ammonia (NH<sub>3</sub>), TVOC are compared with National Ambient Air Quality Standards (NAAQS), MoEF&CC Notification, November 2009. Ambient Air Quality Monitoring Data (February 2025 to April 2025) for the study areas were given in **Table 3.9** and trends of measured ambient concentration in the study areas were graphically represented in **Figure 3-17**.

The ambient air quality has been monitored at 8 locations as per NAAQS, 2009 within the study area. The results obtained are summarised as below:

- The average baseline levels of PM<sub>10</sub> vary from 36.95 µg/m<sup>3</sup> to 48.57 µg/m<sup>3</sup>.
- The average baseline levels of PM<sub>2.5</sub> vary from 18.48 µg/m<sup>3</sup> to 24.29 µg/m<sup>3</sup>.
- The average baseline levels of SO<sub>2</sub> vary from 7.13 µg/m<sup>3</sup> to 12.63 µg/m<sup>3</sup>.
- The average baseline levels of NO<sub>2</sub> vary from 14.26 µg/m<sup>3</sup> to 21.77 µg/m<sup>3</sup>.

It is observed that ambient air quality levels at all locations are within prescribed CPCB standards.

### 3.7 Noise Environment

The prevailing ambient noise level at a particular location is nothing but the resultant (total) of all kinds of noise sources existing at various distances around that location. The ambient noise level at a location varies continuously depending on the type of surrounding activities.

Ambient noise levels have been established by monitoring noise levels at Eight (08) locations in and around 10Km distance from project area during the study period using precision noise level meter. The noise monitoring locations in the study area were selected after giving due consideration to the various land use categories. The land use categories include commercial, residential, rural and sensitive areas. Noise levels were recorded on an hourly basis for one complete day at each location using pre-calibrated noise levels. Map showing noise monitoring locations is **Figure 3-18**.

#### 3.7.1 Results and Discussions

Based on the recorded hourly noise levels at each monitoring location, the day equivalent (L<sub>d</sub>) and night equivalent (L<sub>n</sub>) were calculated;

The Central Pollution Control Board constituted a Committee on Noise Pollution Control. The Committee recommended noise standards for ambient air and for automobiles, domestic

appliances and construction equipment, which were later notified in Environment (Protection) Rules, 1986 as Table given below

| S.NO | Code | Category         | Day time (Ld) | Night time (Ln) |
|------|------|------------------|---------------|-----------------|
| 1.   | A    | Industrial Area  | 75            | 70              |
| 2.   | B    | Commercial Area  | 65            | 55              |
| 3.   | C    | Residential Area | 55            | 45              |
| 4.   | D    | Silence Zone     | 50            | 40              |

**Source:** <https://cpcb.nic.in/noise-pollution-rules/>

**Ref:** Noise Pollution (Regulation and Control) Rules, 2000

Ld: Average noise levels between 6:00 hours to 22.00 hours

Ln: Average noise levels between 22.00 hours to 6.00 hours

The day and night equivalent noise levels are given in **Table 3-10**.

**Note:**

- Day time shall mean from 6.00a.m to 10.00 p.m.
- Night time shall mean from 10.00 p.m. to 6.00a.m
- Silence Zone is an area comprising not less than 100 meters around hospitals, educational institutions, courts, religious places and any other area which is declared as such by the competent authority.
- Mixed categories of area may be declared as one of the four above mentioned categories by the competent authority.
- dB(A)  $L_{eq}$  denotes the time weighted average of the level of sound in decibels on scale A which is relatable to human hearing.
- $*L_{eq}$ : It is an energy mean of the noise level over a specific period.

**Table 3-10 Day and Night Equivalent Noise Levels**

| S. No | Location        | Location Code | Distance (~km) from Project boundary | Azimuth Direction | Noise level in dB(A) Leq |       | CPCB Standard |             | Environmental Setting |
|-------|-----------------|---------------|--------------------------------------|-------------------|--------------------------|-------|---------------|-------------|-----------------------|
|       |                 |               |                                      |                   | Day                      | Night | Lday (Ld)     | LNight (Ln) |                       |
| 1     | Project Site    | N1            | Within the Site                      |                   | 60.3                     | 51.9  | 75            | 70          | Industrial Area       |
| 2     | Annamalaihalli  | N2            | 0.66                                 | NNE               | 50.1                     | 40.5  | 55            | 45          | Residential Area      |
| 3     | Nagappatti      | N3            | 2.10                                 | NE                | 51.4                     | 41.2  | 55            | 45          | Residential Area      |
| 4     | Gopinathampatti | N4            | 1.81                                 | ESE               | 53.1                     | 43.0  | 55            | 45          | Residential Area      |
| 5     | Paraiyappati    | N5            | 2.37                                 | SSE               | 53.4                     | 43.3  | 55            | 45          | Residential Area      |
| 6     | Jammanahalli    | N6            | 0.92                                 | SW                | 52.8                     | 42.4  | 55            | 45          | Residential Area      |
| 7     | Tenkaraikottai  | N7            | 2.22                                 | W                 | 53.9                     | 43.7  | 55            | 45          | Residential Area      |
| 8     | Vadakarai       | N8            | 1.36                                 | NNW               | 52.1                     | 42.0  | 55            | 45          | Residential Area      |

### **3.7.1.1 Observations**

It is observed that the day equivalent and night equivalent noise levels at all locations are within prescribed CPCB standards.

- In Residential area day time noise levels varied from 50.1 dB (A) to 53.9dB (A) and night time noise levels varied from 40.5 dB(A) to 43.7 dB(A) across the sampling stations. The field observations during the study period indicate that the ambient noise levels in Residential area are within the limit prescribed by CPCB for Residential area (55 dB (A) Day time & 45 dB(A) Night time).
- In Industrial Area day time noise levels was recorded as 60.3 dB(A) and the night time noise levels was recorded as 51.9 dB(A) among the sampling stations. The field observations during the study period indicate that the ambient noise levels are within the prescribed limit by CPCB (75 dB(A) Day time & 70 dB(A) Night time).

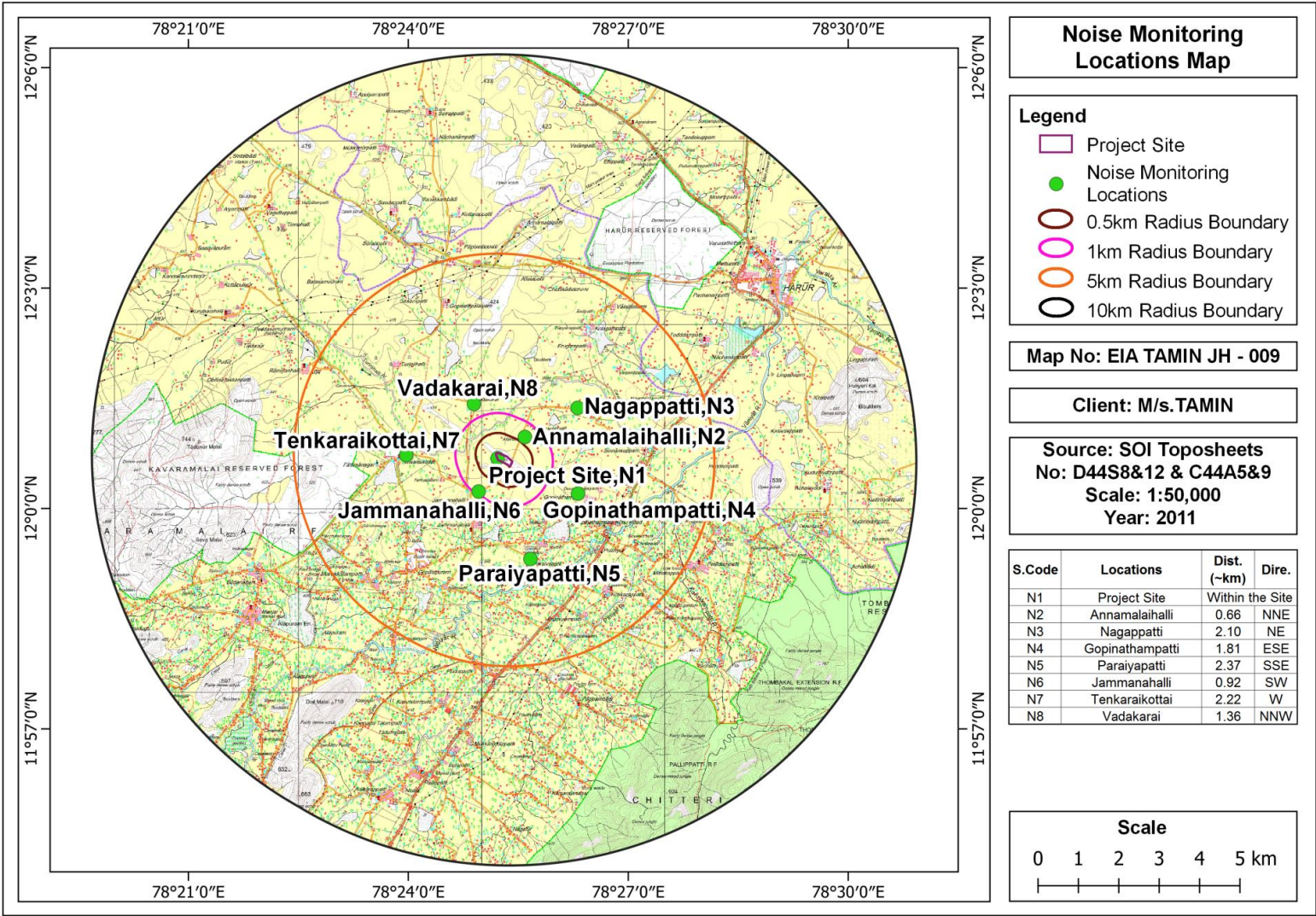


Figure 3-18 Map Showing the Noise Monitoring Locations



### 3.8 Water Environment

The water environment encompasses both surface water and groundwater as vital components of Earth's hydrological cycle. Surface water refers to water found in rivers, lakes and reservoirs, which is easily accessible and plays a crucial role in supporting ecosystems, agriculture and human activities. On the other hand, groundwater is water stored beneath the Earth's surface in aquifers, often tapped for drinking water and irrigation. Both sources are interconnected and essential for maintaining ecological balance. Water quality monitoring and assessment can be used to determine ambient water quality, the extent and causes of a water quality problem or to measure the effectiveness of best management practices being implemented in water system. Monitoring helps to determine the trends in the quality of the aquatic environment and the impact due to the release of contaminants, other anthropogenic activities or by waste treatment operations (impact monitoring).

#### 3.8.1 Surface Water Resources

The district is part of the composite east flowing river basin "Between Cauvery and Ponnaiyar as per the Irrigation Atlas of India. The detailed characteristic features of these rivers are explained in **section 3.4.5**.

*Source:* <http://cgwb.gov.in/sites/default/files/2022-10/dharmapuri.pdf>

(Ref: Government of India Ministry of Water Resources Central Ground Water Board South Eastern Coastal Region Chennai, "District Ground Water Brochure Dharmapuri District").

#### 3.8.2 Surface Water Quality Assessment

Water quality monitoring and assessment can be used to determine ambient water quality, the extent and causes of a water quality problem, or to measure the effectiveness of best management practices being implemented in water system. Monitoring helps to determine the trends in the quality of the aquatic environment and the impact due to the release of contaminants, other anthropogenic activities, and/or by waste treatment operations (impact monitoring). To establish the baseline status of water environment, the representative sampling locations for surface water within a radial distance of 10Km from project site have been selected as per CPCB guidelines of Water Quality Monitoring through an adequate survey of the project area. Test methods used for the analysis of water quality parameters is given in **Table 3-11**. Designated Best Use Water Quality Criteria is given in the **Table 3-12**. Details of the water sampling and map of sampling location are given in **Table 3-13** and **Figure 3-19**. Physicochemical Parameters of Surface water samples from the study area given in **Table 3-14**.



**Table 3-11 Test Methods Used for the Analysis of Water Quality Parameters**

| S.No | Parameters                  | Test Method                                             |
|------|-----------------------------|---------------------------------------------------------|
| 1.   | Colour                      | IS 3025 Part 4: 2021                                    |
| 2.   | Odour                       | IS 3025 Part 5: 2018                                    |
| 3.   | Temperature                 | IS 3025 Part 9: 1984                                    |
| 4.   | pH                          | IS 3025 Part 11: 2022 ( Electrometric Method)           |
| 5.   | Oil & Grease                | IS 3025 Part 39: 2021                                   |
| 6.   | Electrical Conductivity     | IS:3025 Part 14: 2013                                   |
| 7.   | Dissolved Oxygen            | IS 3025 Part 38: 1989                                   |
| 8.   | Turbidity                   | IS 3025 Part 10: 1984                                   |
| 9.   | Total Dissolved Solids      | IS 3025 Part 16: 1984                                   |
| 10.  | Total Suspended Solids      | IS 3025 Part 17 : 1984                                  |
| 11.  | NH <sub>3</sub> -N          | IS 3025 Part 34 Sec 2: 2021                             |
| 12.  | Nitrate as NO <sub>2</sub>  | IS 3025 Part 34 Sec 3 : 2021                            |
| 13.  | Nitrate as NO <sub>3</sub>  | APHA 23rd edition Method 4500 NO3B: 2017                |
| 14.  | Total Phosphorous           | IS 3025 Part 31 Sec 1: 2022                             |
| 15.  | BOD                         | IS 3025 Part 44: 1993                                   |
| 16.  | COD                         | IS 3025 Part 58: 2006                                   |
| 17.  | Potassium K                 | IS 3025 Part 45: 1993                                   |
| 18.  | Sodium Na                   | IS 3025 Part 45: 1983                                   |
| 19.  | Calcium as Ca               | IS 3025 Part 40: 1991(EDTA Titrimetric Method)          |
| 20.  | Magnesium as Mg             | IS 3025 Part 46: 1994<br>(Volumetric Method using EDTA) |
| 21.  | CO <sub>3</sub>             | IS 3025 Part 51: 2001                                   |
| 22.  | HCO <sub>3</sub>            | IS 3025 Part 51: 2001                                   |
| 23.  | Total Hardness              | IS 3025 Part 21: 2009                                   |
| 24.  | Chloride as Cl              | IS 3025 Part 32: 1988 (Argentometric Method)            |
| 25.  | Sulphate as SO <sub>4</sub> | IS 3025 Part 24 Sec 1: 2022                             |
| 26.  | Boron as B                  | IS 3025 Part 57: 2021 (Curcumin Method)                 |
| 27.  | Fluorides as F              | APHA 23rd edition Method 4500 F-B,D: 2017               |
| 28.  | Iron as Fe                  | IS 3025 Part 53: 2003                                   |
| 29.  | Copper as Cu                | USEPA 200.8 : 1994                                      |
| 30.  | Chromium as Cr              | USEPA 200.8 : 1994                                      |
| 31.  | Nickel as Ni                | USEPA 200.8 : 1994                                      |

| S.No | Parameters      | Test Method                 |
|------|-----------------|-----------------------------|
| 32.  | Lead as Pb      | USEPA 200.8 : 1994          |
| 33.  | Cadmium as Cd   | USEPA 200.8 : 1994          |
| 34.  | Zinc as Zn      | USEPA 200.8 : 1994          |
| 35.  | Mercury as Hg   | USEPA 200.8 : 1994          |
| 36.  | Arsenic as As   | USEPA 200.8 : 1994          |
| 37.  | Cyanide as CN   | IS 3025 Part 27 sec 1: 2021 |
| 38.  | Faecal Coliform | IS 1622 : 1981              |
| 39.  | Total Coliform  | IS 1622 : 1981              |

**Table 3-12 Designated Best Use Water Quality Criteria**

| S.No | Designated-Best-Use                                                         | Class of water | Criteria                                                                                                                                                                                                                                                   |
|------|-----------------------------------------------------------------------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.   | Drinking Water Source without conventional treatment but after disinfection | A              | <ol style="list-style-type: none"> <li>1. Total Coli forms Organism MPN/100ml shall be 50 or less</li> <li>2. pH between 6.5 and 8.5</li> <li>3. Dissolved Oxygen 6mg/l or more</li> <li>4. Biochemical Oxygen Demand 5 days 20C 2mg/l or less</li> </ol>  |
| 1.   | Outdoor bathing (Organised)                                                 | B              | <ol style="list-style-type: none"> <li>1. Total Coli forms Organism MPN/100ml shall be 500 or less</li> <li>2. pH between 6.5 and 8.5</li> <li>3. Dissolved Oxygen 5mg/l or more</li> <li>4. Biochemical Oxygen Demand 5 days 20C 3mg/l or less</li> </ol> |
| 2.   | Drinking water source after conventional treatment and disinfection         | C              | <ol style="list-style-type: none"> <li>1. Total Coli forms Organism MPN/100ml shall be 5000 or less</li> <li>2. pH between 6 to 9</li> <li>3. Dissolved Oxygen 4mg/l or more</li> <li>4. Biochemical Oxygen Demand 5 days 20C 3mg/l or less</li> </ol>     |
| 3.   | Propagation of Wild life and Fisheries                                      | D              | <ol style="list-style-type: none"> <li>1. pH between 6.5 to 8.5</li> <li>2. Dissolved Oxygen 4mg/l or more</li> <li>3. Free Ammonia (as N) 1.2 mg/l or less</li> </ol>                                                                                     |

|    |                                                           |   |                                                                                                                                                                                                                       |
|----|-----------------------------------------------------------|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4. | Irrigation, Industrial Cooling, Controlled Waste disposal | E | <ol style="list-style-type: none"> <li>1. pH between 6.0 to 8.5</li> <li>2. Electrical Conductivity at 25C micro mhos/cm Max.2250</li> <li>3. Sodium absorption Ratio Max. 26</li> <li>4. Boron Max. 2mg/l</li> </ol> |
|----|-----------------------------------------------------------|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Table 3-13 Details of Surface Water Sampling Locations**

| S.No | Location Code | Location                | Distance in km | Direction |
|------|---------------|-------------------------|----------------|-----------|
| 1    | SW1           | Nambiyappatti Lake      | 4.13           | ENE       |
| 2    | SW2           | Piniyar River           | 4              | ESE       |
| 3    | SW3           | Vaniyar River           | 2.92           | SE        |
| 4    | SW4           | Paraiyapatti Pudur Lake | 1.79           | SSE       |
| 5    | SW5           | Panchalanagar Lake      | 4.54           | WSW       |
| 6    | SW6           | Tenkaraikottai Lake     | 2.54           | W         |
| 7    | SW7           | Turinjihalli Ar         | 0.77           | WNW       |
| 8    | SW8           | Lake near Krishnapuram  | 2.33           | NNW       |

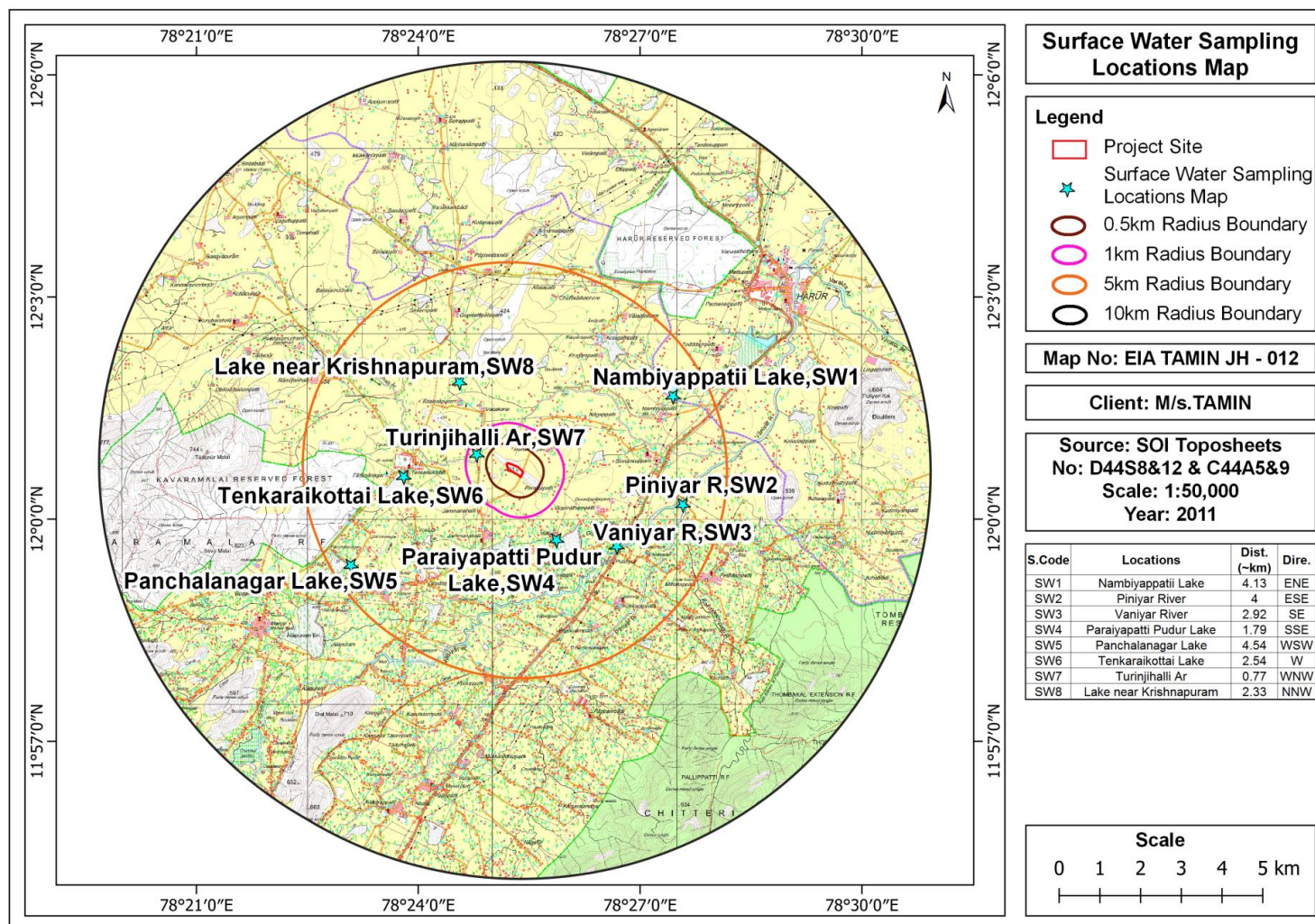


Figure 3-19 Map Showing the Surface Water Monitoring Locations

**Table 3-14 Physicochemical Parameters of Surface Water Samples from the Study Area**

| S. No | Parameter                                  | Unit  | Nambiyappatti Lake | Piniyar River   | Vaniyar River   | Paraiyapatti Pudur Lake | Panchalanagar Lake | Tenkaraikottai Lake | Turinjhalli Ar  | Lake near Krishnapuram |
|-------|--------------------------------------------|-------|--------------------|-----------------|-----------------|-------------------------|--------------------|---------------------|-----------------|------------------------|
|       |                                            |       | SW 1               | SW 2            | SW 3            | SW 4                    | SW 5               | SW 6                | SW 7            | SW 8                   |
| 1.    | Colour                                     | Hazen | BLQ (LOQ:1.0)      | BLQ (LOQ:1.0)   | BLQ (LOQ:1.0)   | BLQ (LOQ:1.0)           | BLQ (LOQ:1.0)      | BLQ (LOQ:1.0)       | BLQ (LOQ:1.0)   | BLQ (LOQ:1.0)          |
| 2.    | Odour                                      | -     | Agreeable          | Agreeable       | Agreeable       | Agreeable               | Agreeable          | Agreeable           | Agreeable       | Agreeable              |
| 3.    | Temperature                                | °C    | 27.3               | 26.9            | 26.8            | 27.2                    | 27.3               | 27.2                | 27.6            | 27.2                   |
| 4.    | pH                                         | -     | 7.82               | 7.12            | 7.48            | 7.89                    | 7.81               | 7.88                | 7.94            | 7.84                   |
| 5.    | Electrical Conductivity (as EC)            | µS/cm | 1971               | 1590            | 1477            | 1615                    | 1699               | 1669                | 1247            | 1314                   |
| 6.    | Dissolved Oxygen (as DO)                   | mg/l  | 6.0                | 6.2             | 6.2             | 5.9                     | 5.8                | 5.9                 | 5.7             | 5.8                    |
| 7.    | Turbidity                                  | NTU   | 5                  | 4               | 5               | 4                       | 3                  | 3                   | 4               | 7                      |
| 8.    | Total Suspended Solids (as TSS)            | mg/l  | 11                 | 9               | 11              | 9                       | 7                  | 7                   | 9               | 12                     |
| 9.    | Total Dissolved Solids (as TDS)            | mg/l  | 1143               | 890             | 827             | 872                     | 917                | 901                 | 673             | 723                    |
| 10.   | Ammonical Nitrogen (as NH <sub>3</sub> -N) | mg/l  | 0.24               | 0.44            | 0.32            | 0.25                    | 0.20               | 0.19                | 0.31            | 0.23                   |
| 11.   | Nitrite (as NO <sub>2</sub> )              | mg/l  | BLQ (LOQ:0.005)    | BLQ (LOQ:0.005) | BLQ (LOQ:0.005) | BLQ (LOQ:0.005)         | BLQ (LOQ:0.005)    | BLQ (LOQ:0.005)     | BLQ (LOQ:0.005) | BLQ (LOQ:0.005)        |
| 12.   | Nitrate as (NO <sub>3</sub> )              | mg/l  | 6.3                | 5.9             | 5.65            | 6.54                    | 5.12               | 4.06                | 4.02            | 5.81                   |

| S. No | Parameter                          | Unit | Nambiyappatti Lake | Piniyar River  | Vaniyar River  | Paraiyapatti Pudur Lake | Panchalanagar Lake | Tenkaraikottai Lake | Turinijhalli Ar | Lake near Krishnapuram |
|-------|------------------------------------|------|--------------------|----------------|----------------|-------------------------|--------------------|---------------------|-----------------|------------------------|
|       |                                    |      | SW 1               | SW 2           | SW 3           | SW 4                    | SW 5               | SW 6                | SW 7            | SW 8                   |
| 13.   | Total Phosphorous as P (as P)      | mg/l | 0.011              | 0.015          | 0.0023         | 0.0018                  | 0.0010             | 0.0016              | 0.0021          | 0.0020                 |
| 14.   | Biochemical Oxygen Demand (as BOD) | mg/l | 6                  | 4              | 4              | 6                       | 7                  | 5                   | 8               | 5                      |
| 15.   | Chemical Oxygen Demand (as COD)    | mg/l | 72                 | 48             | 52             | 68                      | 64                 | 72                  | 92              | 60                     |
| 16.   | Potassium (as K)                   | mg/l | 36                 | 28             | 24             | 26                      | 21                 | 19                  | 20              | 18                     |
| 17.   | Sodium (as Na)                     | mg/l | 152                | 116            | 102            | 104                     | 198                | 206                 | 116             | 120                    |
| 18.   | Calcium (as Ca)                    | mg/l | 156.31             | 128.26         | 124.25         | 132.26                  | 84.17              | 88.18               | 64.13           | 96.19                  |
| 19.   | Magnesium (as Mg)                  | mg/l | 48.6               | 41.31          | 38.88          | 43.74                   | 26.73              | 19.44               | 34.02           | 21.87                  |
| 20.   | Carbonate as (CO <sub>3</sub> )    | mg/l | BLQ (LOQ:1.0)      | BLQ (LOQ:1.0)  | BLQ (LOQ:1.0)  | BLQ (LOQ:1.0)           | BLQ (LOQ:1.0)      | BLQ (LOQ:1.0)       | BLQ (LOQ:1.0)   | BLQ (LOQ:1.0)          |
| 21.   | Total Alkalinity                   | mg/l | 160                | 180            | 190            | 210                     | 190                | 190                 | 210             | 170                    |
| 22.   | Total Hardness (as TH)             | mg/l | 590                | 490            | 470            | 510                     | 320                | 300                 | 300             | 330                    |
| 23.   | Chloride (as Cl)                   | mg/l | 460.24             | 341.47         | 291.98         | 306.83                  | 351.37             | 341.47              | 207.85          | 254.39                 |
| 24.   | Sulphate (as SO <sub>4</sub> )     | mg/l | 159.6              | 93.4           | 98.3           | 98.6                    | 88.9               | 81.3                | 73.4            | 76.34                  |
| 25.   | Boron (as B)                       | mg/l | BLQ (L OQ:0.1)     | BLQ (L OQ:0.1) | BLQ (L OQ:0.1) | BLQ (L OQ:0.1)          | BLQ (L OQ:0.1)     | BLQ (L OQ:0.1)      | BLQ (L OQ:0.1)  | BLQ (L OQ:0.1)         |
| 26.   | Fluorides (as F)                   | mg/l | 0.62               | 0.41           | 0.38           | 0.64                    | 0.58               | 0.49                | 0.68            | 0.53                   |



| S. No | Parameter        | Unit       | Nambiyappatti Lake | Piniyar River     | Vaniyar River     | Paraiyapatti Pudur Lake | Panchalanagar Lake | Tenkaraikottai Lake | Turinijhalli Ar   | Lake near Krishnapuram |
|-------|------------------|------------|--------------------|-------------------|-------------------|-------------------------|--------------------|---------------------|-------------------|------------------------|
|       |                  |            | SW 1               | SW 2              | SW 3              | SW 4                    | SW 5               | SW 6                | SW 7              | SW 8                   |
| 27.   | Iron (as Fe)     | mg/l       | 0.14               | 0.089             | 0.11              | 0.080                   | 0.076              | 0.054               | 0.069             | 0.16                   |
| 28.   | Copper (as Cu)   | mg/l       | BLQ (LOQ: 0.01)    | BLQ (LOQ: 0.01)   | BLQ (LOQ: 0.01)   | BLQ (LOQ: 0.01)         | BLQ (LOQ: 0.01)    | BLQ (LOQ: 0.01)     | BLQ (LOQ: 0.01)   | BLQ (LOQ: 0.01)        |
| 29.   | Chromium (as Cr) | mg/l       | BLQ (LOQ: 0.01)    | BLQ (LOQ: 0.01)   | BLQ (LOQ: 0.01)   | BLQ (LOQ: 0.01)         | BLQ (LOQ: 0.01)    | BLQ (LOQ: 0.01)     | BLQ (LOQ: 0.01)   | BLQ (LOQ: 0.01)        |
| 30.   | Nickel (as Ni)   | mg/l       | BLQ (LOQ: 0.01)    | BLQ (LOQ: 0.01)   | BLQ (LOQ: 0.01)   | BLQ (LOQ: 0.01)         | BLQ (LOQ: 0.01)    | BLQ (LOQ: 0.01)     | BLQ (LOQ: 0.01)   | BLQ (LOQ: 0.01)        |
| 31.   | Lead (as Pb)     | mg/l       | BLQ (LOQ: 0.005)   | BLQ (LOQ: 0.005)  | BLQ (LOQ: 0.005)  | BLQ (LOQ: 0.005)        | BLQ (LOQ: 0.005)   | BLQ (LOQ: 0.005)    | BLQ (LOQ: 0.005)  | BLQ (LOQ: 0.005)       |
| 32.   | Cadmium (as Cd)  | mg/l       | BLQ (LOQ: 0.001)   | BLQ (LOQ: 0.001)  | BLQ (LOQ: 0.001)  | BLQ (LOQ: 0.001)        | BLQ (LOQ: 0.001)   | BLQ (LOQ: 0.001)    | BLQ (LOQ: 0.001)  | BLQ (LOQ: 0.001)       |
| 33.   | Zinc (as Zn)     | mg/l       | BLQ (LOQ: 0.01)    | BLQ (LOQ: 0.01)   | BLQ (LOQ: 0.01)   | BLQ (LOQ: 0.01)         | BLQ (LOQ: 0.01)    | BLQ (LOQ: 0.01)     | BLQ (LOQ: 0.01)   | BLQ (LOQ: 0.01)        |
| 34.   | Mercury (as Hg)  | mg/l       | BLQ (LOQ: 0.0005)  | BLQ (LOQ: 0.0005) | BLQ (LOQ: 0.0005) | BLQ (LOQ: 0.0005)       | BLQ (LOQ: 0.0005)  | BLQ (LOQ: 0.0005)   | BLQ (LOQ: 0.0005) | BLQ (LOQ: 0.0005)      |
| 35.   | Arsenic (asAs)   | mg/l       | BLQ (LOQ: 0.005)   | BLQ (LOQ: 0.005)  | BLQ (LOQ: 0.005)  | BLQ (LOQ: 0.005)        | BLQ (LOQ: 0.005)   | BLQ (LOQ: 0.005)    | BLQ (LOQ: 0.005)  | BLQ (LOQ: 0.005)       |
| 36.   | Cyanide (as CN)  | mg/l       | BLQ(LOQ: 0.01)     | BLQ(LOQ: 0.01)    | BLQ(LOQ: 0.01)    | BLQ(LOQ: 0.01)          | BLQ(LOQ: 0.01)     | BLQ(LOQ: 0.01)      | BLQ(LOQ: 0.01)    | BLQ(LOQ: 0.01)         |
| 37.   | Faecal Coliform  | MPN/100 ml | 38                 | 12                | 15                | 30                      | 24                 | 30                  | 42                | 30                     |
| 38.   | Total Coliform   | MPN/100 ml | 131                | 71                | 83                | 124                     | 112                | 129                 | 161               | 120                    |



| S. No | Parameter      | Unit | Nambiyappatti Lake | Piniyar River    | Vaniyar River    | Paraiyapatti Pudur Lake | Panchalanagar Lake | Tenkaraikottai Lake | Turinijhalli Ar  | Lake near Krishnapuram |
|-------|----------------|------|--------------------|------------------|------------------|-------------------------|--------------------|---------------------|------------------|------------------------|
|       |                |      | SW 1               | SW 2             | SW 3             | SW 4                    | SW 5               | SW 6                | SW 7             | SW 8                   |
| 39.   | Oil and Grease | mg/l | BLQ<br>(LOQ:4.0)   | BLQ<br>(LOQ:4.0) | BLQ<br>(LOQ:4.0) | BLQ<br>(LOQ:4.0)        | BLQ<br>(LOQ:4.0)   | BLQ<br>(LOQ:4.0)    | BLQ<br>(LOQ:4.0) | BLQ<br>(LOQ:4.0)       |

**Note:** BLQ – Below the Limit of Quantification; LOQ – Limit of Quantification

### 3.8.2.1 Results and Discussions

Surface water sample results are discussed below:

- pH of the collected surface water samples varies between 7.12 to 7.94 which is within the limit.
- The TDS value of collected surface water sample ranges from 673 mg/l to 1143 mg/l.
- The Total hardness value of the collected surface water sample ranges between 300 mg/l to 590 mg/l.
- BOD value of surface water varies from 4 mg/l to 8 mg/l.
- COD value of surface water varies from 48 mg/l to 92 mg/l.

Surface water standards (IS 2296:1992) given in **Table 3-15**.

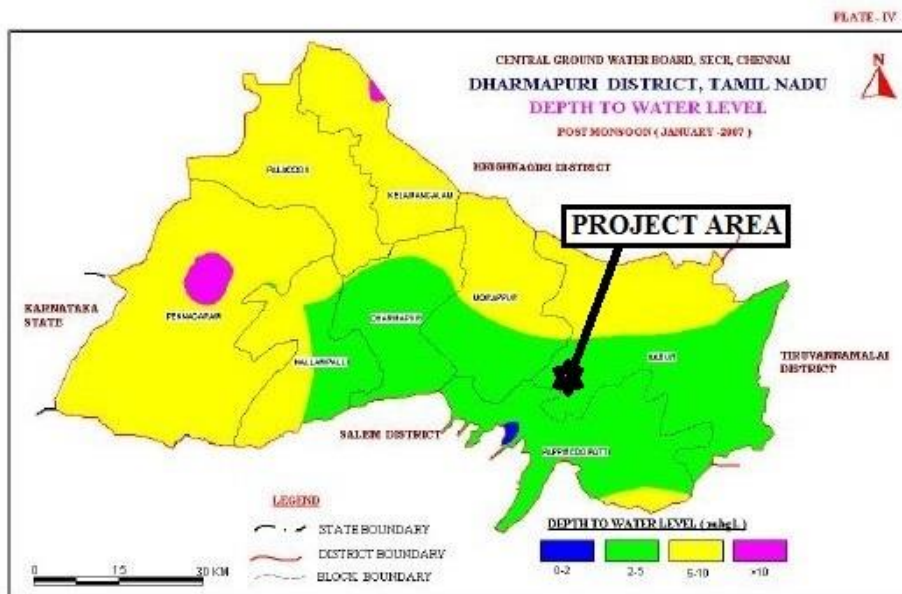
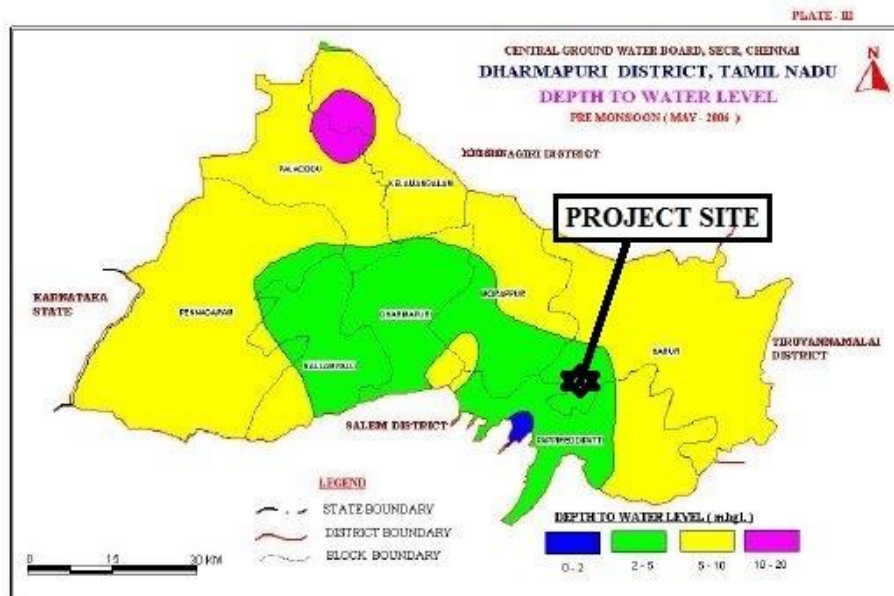
### 3.8.3 Groundwater resources

The groundwater availability in an area is governed by various natural factors like rainfall, geomorphological feature, geological set up and hydrogeological conditions. In addition to that ground water withdrawal component from storage and recharge components from irrigation also affects the groundwater balance. Rainfall is the major source of recharge for groundwater. The average rainfall is greater than the potential evapotranspiration during seven months in a year from May to November, indicating water surplus for effective recharge to the groundwater regime during these months.

The estimation of groundwater resources for the district has shown that all block is under “Over Exploited” category. The shallow alluvial aquifers along Cauvery and Ponnaiyar rivers serve as an important source of drinking water irrigation development for Dharmapuri district. Dug wells are the most common ground water abstraction structures used for irrigation in the district. The yield of dug wells range from 150 to 200 m<sup>3</sup>/day in weathered crystalline rocks and 20 to 200 m<sup>3</sup>/day in Recent alluvial formations along major drainage courses. Depth of water level in Pre monsoon season for project site is **2 to 5 mbgl** and depth of water level in Post monsoon season is **2 to 5 mbgl**. Depth to water level during Pre Monsoon & Post Monsoon for project site in Dharmapuri, Tamil Nadu, is given in **Figure 3.20**.

**Source:** <http://cgwb.gov.in/sites/default/files/2022-10/dharmapuri.pdf>

**Ref:** Government of India Ministry of Water Resources Central Ground Water Board South Eastern Coastal Region Chennai, “District Ground Water Brochure Dharmapuri District”



Source: <http://cgwb.gov.in/sites/default/files/2022-10/dharmapuri.pdf>

**Figure 3-20 Depth to water level during Pre-Monsoon & Post Monsoon in Dharmapuri District**

Depth of water level in the project site during pre-monsoon ranges from >2 -5 m bgl, and during the post monsoon period ranges from >2 -5 m bgl.

### 3.8.3.1 Groundwater Quality Assessment

Measuring groundwater quality is essential for ensuring its safety and suitability for drinking, agriculture and industrial use. Various physical, chemical and biological parameters determine

groundwater quality, affecting human health and environmental sustainability. Parameters such as pH, electrical conductivity, TDS, turbidity and temperature influence the overall water characteristics, while chemical components like nitrates, fluoride, chloride, sulphate, and heavy metals impact its safety. Contaminants from natural sources or human activities, such as industrial waste, agricultural runoff and improper waste disposal can degrade groundwater quality. Baseline monitoring helps identify contamination, assess water usability and implement corrective measures to prevent health risks and environmental damage.

Comparing groundwater quality with Indian Standards (IS 10500) ensures it meets the prescribed limits for safe consumption and usage. The IS standards define acceptable limits for parameters like pH, TDS, total hardness, nitrate, fluoride and heavy metals like lead, arsenic and cadmium, which should be minimal or absent. Parameters such as iron, copper, and zinc, though essential in trace amounts, can be harmful at higher concentrations. Comparing measured values with IS standards helps in assessing water safety, identifying pollution sources and implementing appropriate treatment methods to ensure groundwater remains a reliable resource.

In this study, a total of Eight (08) groundwater monitoring locations were identified for assessment in different villages around the project site based on the usage by the nearby settlements/ villages in the study area. The groundwater results are compared with the desirable and permissible water quality standards as per IS 10500 (2012) for drinking water. Groundwater quality monitoring locations and results are given in **Table 3-15** and **Table 3-16**. Map showing the groundwater monitoring locations are given in **Figure 3-21**

**Table 3-15 Details of Groundwater Quality Monitoring Locations**

| S.No | Location          | Location Code | Distance in Km | Direction |
|------|-------------------|---------------|----------------|-----------|
| 1    | Near Project Site | GW1           | 0.24           | W         |
| 2    | Nagappatti        | GW2           | 2.06           | NE        |
| 3    | Annamalaihalli    | GW3           | 0.70           | ENE       |
| 4    | Gopinathampatti   | GW4           | 2.17           | ESE       |
| 5    | Paraiyapatti      | GW5           | 2.39           | S         |
| 6    | Jammanahalli      | GW6           | 0.96           | SSW       |
| 7    | Tenkaraikottai    | GW7           | 2.23           | W         |
| 8    | Vadakarai         | GW8           | 1.39           | NNW       |



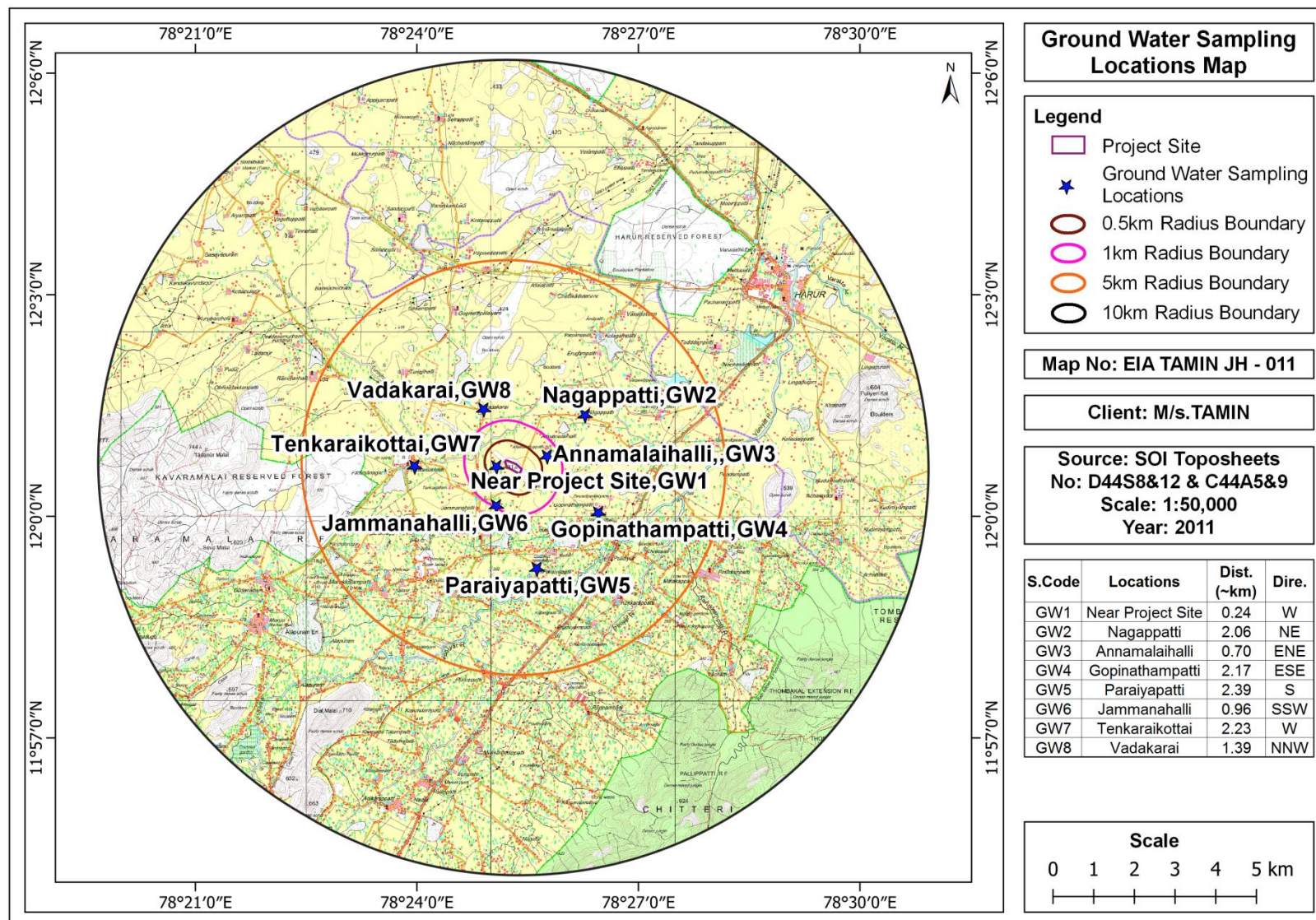


Figure 3-21 Map showing the groundwater monitoring locations

**Table 3-16 Physico chemical analysis of Ground water samples from study area**

| S. N O | Parameters             | Unit  | Drinking water Standard (IS 10500: 2012) |                    | Near Project Site | Nagappatti      | Annamalaihalli  | Gopinathampatti | Paraiyapatti    | Jammanahalli    | Tenkaraikottai  | Vadakarai       |
|--------|------------------------|-------|------------------------------------------|--------------------|-------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|        |                        |       | Accept able Limit                        | Permissi ble Limit | GW 1              | GW 2            | GW 3            | GW 4            | GW 5            | GW 6            | GW 7            | GW 8            |
| 1      | Colour                 | Hazen | 5                                        | 15                 | BLQ (LOQ: 1.0)    | BLQ (LOQ: 1.0)  | BLQ (LOQ: 1.0)  | BLQ (LOQ: 1.0)  | BLQ (LOQ: 1.0)  | BLQ (LOQ: 1.0)  | BLQ (LOQ: 1.0)  | BLQ (LOQ: 1.0)  |
| 2      | Odour                  | -     | Agreea ble                               | Agreeabl e         | Agreeabl e        | Agreeabl e      | Agreeabl e      | Agreeabl e      | Agreeabl e      | Agreeabl e      | Agreeabl e      | Agreeabl e      |
| 3      | pH at 25°C             | -     | 6.5-8.5                                  | No relaxatio n     | 7.11              | 7.55            | 7.30            | 7.74            | 7.61            | 7.23            | 7.66            | 7.39            |
| 4      | Taste                  | -     | Agreea ble                               | Agreeabl e         | Agreeabl e        | Agreeabl e      | Agreeabl e      | Agreeabl e      | Agreeabl e      | Agreeabl e      | Agreeabl e      | Agreeabl e      |
| 5      | Turbidity              | NTU   | 1                                        | 5                  | BLQ (LOQ: 0.1)    | BLQ (LOQ: 0.1)  | BLQ (LOQ: 0.1)  | BLQ (LOQ: 0.1)  | BLQ (LOQ: 0.1)  | BLQ (LOQ: 0.1)  | BLQ (LOQ: 0.1)  | BLQ (LOQ: 0.1)  |
| 6      | Total dissolved solids | mg/l  | 500                                      | 2000               | 1160              | 1690            | 1385            | 1767            | 1775            | 1170            | 1566            | 1728            |
| 7      | Boron(as B)            | mg/l  | 0.5                                      | 1                  | BLQ (LOQ: 0.1)    | BLQ (LOQ: 0.1)  | BLQ (LOQ: 0.1)  | BLQ (LOQ: 0.1)  | BLQ (LOQ: 0.1)  | BLQ (LOQ: 0.1)  | BLQ (LOQ: 0.1)  | BLQ (LOQ: 0.1)  |
| 8      | Calcium (as Ca)        | mg/l  | 75                                       | 200                | 92.18             | 176.35          | 124.25          | 188.38          | 172.34          | 104.21          | 128.26          | 156.31          |
| 9      | Chloride (as Cl)       | mg/l  | 250                                      | 1000               | 529.52            | 786.86          | 673.04          | 870.9           | 900.7           | 529.5           | 757.2           | 851.2           |
| 10     | Copper (as Cu)         | mg/l  | 0.05                                     | 1.5                | BLQ (LOQ: 0.01)   | BLQ (LOQ: 0.01) | BLQ (LOQ: 0.01) | BLQ (LOQ: 0.01) | BLQ (LOQ: 0.01) | BLQ (LOQ: 0.01) | BLQ (LOQ: 0.01) | BLQ (LOQ: 0.01) |
| 11     | Fluoride (as F)        | mg/l  | 1.0                                      | 1.5                | 0.38              | 0.61            | 0.42            | 0.78            | 0.54            | 0.47            | 0.58            | 0.64            |

| S. N O | Parameters                             | Unit | Drinking water Standard (IS 10500: 2012) |                   | Near Project Site | Nagappatti       | Annamalaihalli   | Gopinathampatti  | Paraiyapatti     | Jammanahalli     | Tenkaraikottai   | Vadakarai        |
|--------|----------------------------------------|------|------------------------------------------|-------------------|-------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
|        |                                        |      | Acceptable Limit                         | Permissible Limit | GW 1              | GW 2             | GW 3             | GW 4             | GW 5             | GW 6             | GW 7             | GW 8             |
| 12     | Iron (as Fe)                           | mg/l | 0.3                                      | No relaxation     | 0.027             | 0.049            | 0.054            | 0.081            | 0.045            | 0.037            | 0.063            | 0.058            |
| 13     | Magnesium (as Mg)                      | mg/l | 30                                       | 100               | 55.89             | 65.61            | 65.79            | 77.76            | 82.62            | 65.71            | 80.19            | 65.61            |
| 14     | Manganese (as Mn)                      | mg/l | 0.1                                      | 0.3               | BLQ (LOQ: 0.05)   | BLQ (LOQ: 0.05)  | BLQ (LOQ: 0.05)  | BLQ (LOQ: 0.05)  | BLQ (LOQ: 0.05)  | BLQ (LOQ: 0.05)  | BLQ (LOQ: 0.05)  | BLQ (LOQ: 0.05)  |
| 15     | Nitrate (as NO <sub>3</sub> )          | mg/l | 45                                       | No relaxation     | 10.1              | 12.3             | 13.4             | 15.1             | 15.3             | 12.4             | 14.7             | 15.6             |
| 16     | Sulphate (as SO <sub>4</sub> )         | mg/l | 200                                      | 400               | 100.36            | 152.47           | 110.26           | 118.37           | 121.21           | 130.52           | 119.3            | 124.58           |
| 17     | Total hardness (as CaCO <sub>3</sub> ) | mg/l | 200                                      | 600               | 460               | 710              | 581              | 790              | 770              | 530              | 650              | 660              |
| 18     | Zinc (as Zn)                           | mg/l | 5                                        | 15                | BLQ (LOQ: 0.01)   | BLQ (LOQ: 0.01)  | BLQ (LOQ: 0.01)  | BLQ (LOQ: 0.01)  | BLQ (LOQ: 0.01)  | BLQ (LOQ: 0.01)  | BLQ (LOQ: 0.01)  | BLQ (LOQ: 0.01)  |
| 19     | Cadmium (as Cd)                        | mg/l | 0.003                                    | No relaxation     | BLQ (LOQ: 0.001)  | BLQ (LOQ: 0.001) | BLQ (LOQ: 0.001) | BLQ (LOQ: 0.001) | BLQ (LOQ: 0.001) | BLQ (LOQ: 0.001) | BLQ (LOQ: 0.001) | BLQ (LOQ: 0.001) |
| 20     | Cyanide (as CN)                        | mg/l | 0.05                                     | No relaxation     | BLQ (LOQ: 0.01)   | BLQ (LOQ: 0.01)  | BLQ (LOQ: 0.01)  | BLQ (LOQ: 0.01)  | BLQ (LOQ: 0.01)  | BLQ (LOQ: 0.01)  | BLQ (LOQ: 0.01)  | BLQ (LOQ: 0.01)  |
| 21     | Lead (as Pb)                           | mg/l | 0.01                                     | No relaxation     | BLQ (LOQ: 0.01)   | BLQ (LOQ: 0.01)  | BLQ (LOQ: 0.01)  | BLQ (LOQ: 0.01)  | BLQ (LOQ: 0.01)  | BLQ (LOQ: 0.01)  | BLQ (LOQ: 0.01)  | BLQ (LOQ: 0.01)  |



| S. N O | Parameters                      | Unit  | Drinking water Standard (IS 10500: 2012) |                    | Near Project Site | Nagappatti        | Annamalaihalli    | Gopinathampatti   | Paraiyapatti      | Jammanahalli      | Tenkaraikottai    | Vadakarai         |
|--------|---------------------------------|-------|------------------------------------------|--------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
|        |                                 |       | Accept able Limit                        | Permissi ble Limit | GW 1              | GW 2              | GW 3              | GW 4              | GW 5              | GW 6              | GW 7              | GW 8              |
|        |                                 |       |                                          | n                  | 0.005)            | 0.005)            | 0.005)            | 0.005)            | 0.005)            | 0.005)            | 0.005)            | 0.005)            |
| 22     | Mercury (as Hg)                 | mg/l  | 0.001                                    | No relaxatio n     | BLQ (LOQ: 0.0005) | BLQ (LOQ: 0.0005) | BLQ (LOQ: 0.0005) | BLQ (LOQ: 0.0005) | BLQ (LOQ: 0.0005) | BLQ (LOQ: 0.0005) | BLQ (LOQ: 0.0005) | BLQ (LOQ: 0.0005) |
| 23     | Nickel (as Ni)                  | mg/l  | 0.02                                     | No relaxatio n     | BLQ (LOQ: 0.01)   | BLQ (LOQ: 0.01)   | BLQ (LOQ: 0.01)   | BLQ (LOQ: 0.01)   | BLQ (LOQ: 0.01)   | BLQ (LOQ: 0.01)   | BLQ (LOQ: 0.01)   | BLQ (LOQ: 0.01)   |
| 24     | Arsenic (as As)                 | mg/l  | 0.01                                     | 0.05               | BLQ (LOQ: 0.005)  | BLQ (LOQ: 0.005)  | BLQ (LOQ: 0.005)  | BLQ (LOQ: 0.005)  | BLQ (LOQ: 0.005)  | BLQ (LOQ: 0.005)  | BLQ (LOQ: 0.005)  | BLQ (LOQ: 0.005)  |
| 25     | Chromium (as Cr)                | mg/l  | 0.05                                     | No relaxatio n     | BLQ (LOQ: 0.01)   | BLQ (LOQ: 0.01)   | BLQ (LOQ: 0.01)   | BLQ (LOQ: 0.01)   | BLQ (LOQ: 0.01)   | BLQ (LOQ: 0.01)   | BLQ (LOQ: 0.01)   | BLQ (LOQ: 0.01)   |
| 26     | Electrical Conductivity at 25°C | µS/cm | NA                                       | NA                 | 2189              | 3188              | 2613              | 3333              | 3349              | 2208              | 2954              | 3261              |
| 27     | Total Suspended Solids          | mg/l  | NA                                       | NA                 | BLQ (LOQ: 2.0)    | BLQ (LOQ: 2.0)    | BLQ (LOQ: 2.0)    | BLQ (LOQ: 2.0)    | BLQ (LOQ: 2.0)    | BLQ (LOQ: 2.0)    | BLQ (LOQ: 2.0)    | BLQ (LOQ: 2.0)    |
| 28     | Phosphorous (as P)              | mg/l  | NA                                       | NA                 | BLQ (LOQ: 0.02)   | BLQ (LOQ: 0.02)   | BLQ (LOQ: 0.02)   | BLQ (LOQ: 0.02)   | BLQ (LOQ: 0.02)   | BLQ (LOQ: 0.02)   | BLQ (LOQ: 0.02)   | BLQ (LOQ: 0.02)   |
| 29     | Potassium(as K)                 | mg/l  | NA                                       | NA                 | 19                | 30                | 24                | 32                | 29                | 17                | 28                | 25                |
| 30     | Sodium (as Na)                  | mg/l  | NA                                       | NA                 | 244               | 342               | 280               | 340               | 354               | 220               | 320               | 384               |

| S. N O | Parameters                    | Unit | Drinking water Standard (IS 10500: 2012) |                    | Near Project Site | Nagappatti       | Annamalaihalli   | Gopinathampatti  | Paraiyapatti     | Jammanahalli     | Tenkaraikottai   | Vadakarai        |
|--------|-------------------------------|------|------------------------------------------|--------------------|-------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
|        |                               |      | Accept able Limit                        | Permissi ble Limit | GW 1              | GW 2             | GW 3             | GW 4             | GW 5             | GW 6             | GW 7             | GW 8             |
| 31     | Carbonate                     | mg/l | NA                                       | NA                 | BLQ (LOQ: 1.0)    | BLQ (LOQ: 1.0)   | BLQ (LOQ: 1.0)   | BLQ (LOQ: 1.0)   | BLQ (LOQ: 1.0)   | BLQ (LOQ: 1.0)   | BLQ (LOQ: 1.0)   | BLQ (LOQ: 1.0)   |
| 32     | Total Alkalinity              | mg/l | NA                                       | NA                 | 135               | 160              | 110              | 160              | 120              | 105              | 150              | 130              |
| 33     | Nitrite (as NO <sub>2</sub> ) | mg/l | NA                                       | NA                 | BLQ (LOQ: 0.005)  | BLQ (LOQ: 0.005) | BLQ (LOQ: 0.005) | BLQ (LOQ: 0.005) | BLQ (LOQ: 0.005) | BLQ (LOQ: 0.005) | BLQ (LOQ: 0.005) | BLQ (LOQ: 0.005) |

**Note:** BLQ – Below Limit of Quantification; LOQ – Limit Of Quantification; NR – No Relaxation

### 3.8.3.2 Results and Discussions

A summary of analytical results are presented below:

- The pH of the collected ground water sample ranges from 7.11 to 7.74.
- The concentrations of Chloride in the collected ground water sample ranges from 529.52 to 900.7 mg/l.
- TDS value of the collected ground water sample varies from 1160 mg/l to 1775 mg/l.
- Total hardness of the collected ground water sample ranges from 460 mg/l to 790 mg/l.
- The concentrations of Sodium in the collected ground water sample ranges from 220 mg/l to 384 mg/l.

### 3.9 Soil Quality

Measuring soil quality is crucial for maintaining environmental sustainability and ecosystem health. Soil quality is determined by physical, chemical and biological properties which influence plant growth, water retention and microbial activity. Soil monitoring helps understand the regional soil characteristics in and provide background knowledge about implementing suitable measures if required. Comparing soil quality with standards ensures its suitability for various land uses. A total of eight (08) soil sampling locations were identified for assessment in various villages surrounding the project site based on land use patterns in the study area. Soil quality monitoring locations & results are given in **Table 3-17** & **Table 3-18**. Map showing the soil monitoring locations are given in **Figure 3-22**.

**Table 3-17 Soil Quality Monitoring Locations**

| S.No | Location        | Location Code | Distance in Km  | Direction |
|------|-----------------|---------------|-----------------|-----------|
| 1    | Project Site    | S1            | Within the Site |           |
| 2    | Annamalaihalli  | S2            | 0.66            | NNE       |
| 3    | Nagappatti      | S3            | 2.10            | NE        |
| 4    | Gopinathampatti | S4            | 1.81            | ESE       |
| 5    | Paraiyapatti    | S5            | 2.37            | SSE       |
| 6    | Jammanahalli    | S6            | 0.92            | SW        |
| 7    | Tenkaraikottai  | S7            | 2.22            | W         |
| 8    | Vadakarai       | S8            | 1.36            | NNW       |

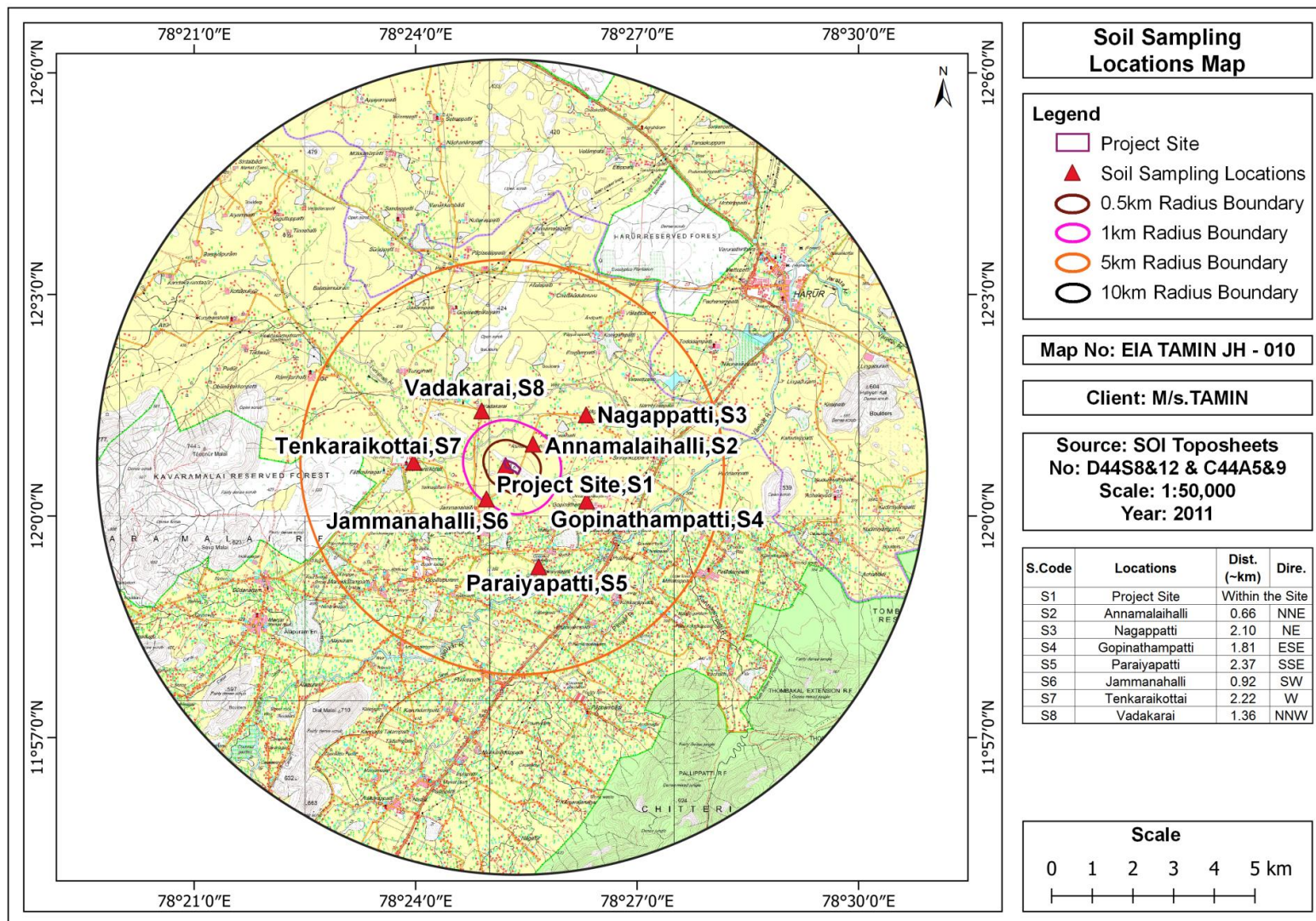


Figure 3-22 Map showing the soil monitoring location

**Table 3-18 Physico Chemical parameters of soil samples from the study area**

| S. No | Parameters                      | Units    | Project Site   | Annamalahalli  | Nagappatti     | Gopinathampatti | Paraiyapatti   | Jammanahalli   | Tenkaraikottai | Vadakarai      |
|-------|---------------------------------|----------|----------------|----------------|----------------|-----------------|----------------|----------------|----------------|----------------|
|       |                                 |          | S1             | S2             | S3             | S4              | S5             | S6             | S7             | S8             |
| 1.    | Soil Texture                    | -        | Silt Loam      | Silt Loam      | Loam           | Loam            | Loam           | Loam           | Loam           | Loam           |
| 2.    | Sand                            | %        | 30.7           | 34.3           | 40.1           | 35.7            | 33.2           | 39.1           | 33.6           | 36.2           |
| 3.    | Clay                            | %        | 16.4           | 14.4           | 21.9           | 14.4            | 18.5           | 26.4           | 19.1           | 24.6           |
| 4.    | Silt                            | %        | 52.9           | 51.3           | 38.0           | 49.9            | 48.3           | 34.5           | 47.3           | 39.2           |
| 5.    | pH                              | -        | 6.83           | 7.14           | 7.50           | 7.78            | 7.86           | 7.31           | 7.49           | 7.67           |
| 6.    | Electrical conductivity (as EC) | µS/cm    | 188.0          | 147.5          | 97.0           | 80.7            | 69.0           | 88.3           | 68.0           | 84.0           |
| 7.    | Phosphorous (as P)              | µg/g     | BLQ (LOQ:5.0)  | BLQ (LOQ:5.0)  | BLQ (LOQ:5.0)  | BLQ (LOQ:5.0)   | BLQ (LOQ:5.0)  | BLQ (LOQ:5.0)  | BLQ (LOQ:5.0)  | BLQ (LOQ:5.0)  |
| 8.    | Potassium (as K)                | mEq/100g | 11.85          | 13.07          | 19.48          | 18.97           | 17.18          | 23.58          | 17.94          | 20.76          |
| 9.    | Boron (as B)                    | mg/kg    | BLQ(LOQ: 0.1)  | BLQ(LO Q: 0.1) | BLQ(LO Q: 0.1) | BLQ(LO Q: 0.1)  | BLQ(LO Q: 0.1) | BLQ(LO Q: 0.1) | BLQ(LO Q: 0.1) | BLQ(LO Q: 0.1) |
| 10.   | Nitrogen (as N)                 | %        | 0.0010         | 0.0019         | 0.0059         | 0.0023          | 0.0031         | 0.0051         | 0.0033         | 0.0038         |
| 11.   | Porosity                        | -        | 0.48           | 0.48           | 0.45           | 0.44            | 0.44           | 0.45           | 0.44           | 0.44           |
| 12.   | Water Holding Capacity          | %        | 35.2           | 33.4           | 28.6           | 30.6            | 33.4           | 29.4           | 26.4           | 29.2           |
| 13.   | Chromium (as Cr)                | mg/kg    | BLQ (LOQ: 0.1) | BLQ(LO Q: 0.1) | BLQ(LO Q: 0.1) | BLQ(LO Q: 0.1)  | BLQ(LO Q: 0.1) | BLQ(LO Q: 0.1) | BLQ(LO Q: 0.1) | BLQ(LO Q: 0.1) |
| 14.   | Cadmium (as Cd)                 | mg/kg    | BLQ (LOQ: 0.1) | BLQ(LO Q: 0.1) | BLQ(LO Q: 0.1) | BLQ(LO Q: 0.1)  | BLQ(LO Q: 0.1) | BLQ(LO Q: 0.1) | BLQ(LO Q: 0.1) | BLQ(LO Q: 0.1) |
| 15.   | Manganese (as Mn)               | mg/kg    | 5.11           | 4.99           | 3.89           | 3.18            | 3.01           | 3.91           | 3.09           | 3.24           |
| 16.   | Nickel (as Ni)                  | mg/kg    | BLQ(LOQ: 0.1)  | BLQ(LO Q: 0.1) | BLQ(LO Q: 0.1) | BLQ(LO Q: 0.1)  | BLQ(LO Q: 0.1) | BLQ(LO Q: 0.1) | BLQ(LO Q: 0.1) | BLQ(LO Q: 0.1) |
| 17.   | Selenium (as Se)                | mg/kg    | BLQ(LOQ:       | BLQ(LO         | BLQ(LO         | BLQ(LO          | BLQ(LO         | BLQ(LO         | BLQ(LO         | BLQ(LO         |

| S. No | Parameters                        | Units                            | Project Site | Annamalaihalli | Nagappatti | Gopinathampatti | Paraiyapatti | Jammanahalli | Tenkaraikottai | Vadakarai |
|-------|-----------------------------------|----------------------------------|--------------|----------------|------------|-----------------|--------------|--------------|----------------|-----------|
|       |                                   |                                  | S1           | S2             | S3         | S4              | S5           | S6           | S7             | S8        |
|       |                                   |                                  | 0.1)         | Q: 0.1)        | Q: 0.1)    | Q: 0.1)         | Q: 0.1)      | Q: 0.1)      | Q: 0.1)        | Q: 0.1)   |
| 18.   | Zinc (as Zn)                      | mg/kg                            | 0.54         | 0.50           | 0.48       | 0.33            | 0.45         | 0.37         | 0.30           | 0.34      |
| 19.   | Copper (as Cu)                    | mg/kg                            | 0.24         | 0.21           | 0.37       | 0.24            | 0.35         | 0.21         | 0.21           | 0.25      |
| 20.   | Organic Carbon                    | %                                | 0.83         | 0.79           | 0.52       | 0.44            | 0.32         | 0.54         | 0.59           | 0.41      |
| 21.   | Organic Matter                    | %                                | 1.44         | 1.37           | 0.91       | 0.77            | 0.56         | 0.94         | 1.03           | 0.72      |
| 22.   | Exchangeable Calcium (as Ca)      | mEq/L                            | 8.03         | 9.08           | 8.78       | 7.34            | 8.13         | 9.03         | 8.78           | 7.63      |
| 23.   | Exchangeable Magnesium (as Mg)    | mEq/L                            | 4.28         | 6.42           | 5.84       | 4.77            | 5.18         | 6.50         | 5.84           | 5.18      |
| 24.   | Available Sodium (as Na)          | mg/kg                            | 187.2        | 201.9          | 197.4      | 167.1           | 178.6        | 199.7        | 198.6          | 164.1     |
| 25.   | Cation Exchange Capacity (as CEC) | mEq/100g                         | 2.03         | 2.54           | 2.23       | 1.98            | 2.16         | 2.55         | 2.40           | 2.16      |
| 26.   | Iron (as Fe)                      | mg/kg                            | 1.98         | 1.88           | 2.18       | 1.39            | 1.79         | 2.82         | 1.16           | 1.42      |
| 27.   | Infiltration Rate                 | -                                | 1.1          | 0.99           | 0.75       | 0.70            | 0.68         | 0.72         | 0.66           | 0.70      |
| 28.   | Bulk Density                      | gm/cm <sup>3</sup>               | 0.95         | 0.94           | 1.01       | 1.03            | 0.98         | 1.01         | 1.01           | 0.99      |
| 29.   | Moisture                          | %                                | 2.93         | 2.91           | 4.83       | 3.84            | 3.74         | 4.89         | 4.75           | 4.53      |
| 30.   | Sodium Absorption ratio (as SAR)  | Square root of (millimole/litre) | 3.277        | 3.139          | 3.168      | 2.951           | 2.999        | 3.105        | 3.184          | 2.817     |

**Note:** BLQ – Below Limit of Quantification; LOQ – Limit Of Quantification



### 3.9.1 Results and Discussions

#### Summary of analytical results

- The pH of the soil samples ranged from 6.83 to 7.86.
- Conductivity of the soil samples ranged from 68.0 to 188.0  $\mu\text{S}/\text{cm}$ .
- Nitrogen content ranged from 0.0010% to 0.0059%.
- Phosphorous ranged from BLQ (LOQ 5.0)  $\mu\text{g}/\text{kg}$ .
- Potassium content ranges from 11.85 mEq/100g to 23.58 mEq/100g.

### 3.10 Biological Environment

An ecological study of the ecosystem is essential to understand the impact of industrialization and urbanization on existing flora and fauna of the study area. Studies on various aspects of ecosystem play an important role in identifying sensitive issues for under taking appropriate action to mitigate the impact, if any. The biological study was under taken as a part of the EIA study report to understand the present status of ecosystem prevailing in the study area, to compare it with past condition with the help of available data, to predict changes in the biological environment as a result of present activities and to suggest measures for maintaining its health. Secondary information was collected to study the flora & fauna in 10 km radius. Some of the information was gathered from the local habitants. All the collected data were classified to interpret the impact of pollution on the flora and fauna of that region. All the available information was recorded about the wild plants and cultivated crop plants.

During secondary information, following aspects were considered for ecological studies:

- ❖ Assessment of present status of flora and fauna;
- ❖ Identification of rare and endangered species of plants and animals (if any);
- ❖ Identification of ecologically sensitive areas within the study area;
- ❖ Assessment of migratory route of wildlife (if any); and
- ❖ Assessment of Aquatic Ecology with specific reference to aquatic birds and plankton resources.

#### 3.10.1 Methodology

Terrestrial investigations for flora and fauna records were collected by secondary information like research article, periodicals, floras and forest checklist.

##### 3.10.1.1 Floral Study

- ❖ Plants species were identified based on their specific diagnostics characters of family, genus and species using available floral, other related literature.



- ❖ Besides the identification of plant species, information was collected on the vernacular names and uses of plants made by local inhabitants.

### 3.10.1.2 Faunal Study

- ❖ Secondary information collected from published government data etc.
- ❖ List of the endangered and endemic species as per the schedule of The Wildlife Protection Act, 1972.
- ❖ Emphasis is given to identify avifauna and mammals to determine the presence and absence of Schedule-1 species, listed in The Wildlife Protection Act 1972, as well as in Red List of IUCN.

### 3.10.2 Floristic composition within the study area

For secondary information based on a total 112 species found in the study area. The detailed list of plant species found in each quadrat provided **Table 3-19**.

**Table 3-19 Overall IUCN status floral species in and around the study area**

| S.No | Species                        | Family           | Common Name        | Habit | IUCN |
|------|--------------------------------|------------------|--------------------|-------|------|
| 1.   | <i>Abrus precatorius</i>       | Fabaceae         | Kundumani          | Shrub | NA   |
| 2.   | <i>Abutilon indicum</i>        | Malvaceae        | Perun thuthi       | Shrub | NA   |
| 3.   | <i>Acacia catechu</i>          | Mimosaceae       | Karai              | Tree  | LC   |
| 4.   | <i>Acacia nilotica</i>         | Mimosaceae       | Karuvelam          | Tree  | LC   |
| 5.   | <i>Acacia planifrons</i>       | Mimosaceae       | Kodaivelam         | Tree  | NA   |
| 6.   | <i>Acalypha indica</i>         | Euphorbiaceae    | Kuppaimeni         | Herb  | NA   |
| 7.   | <i>Acanthospermum hispidum</i> | Compositae       | --                 | Herb  | NA   |
| 8.   | <i>Achyranthes aspera</i>      | Amaranthaceae    | Nayurivi           | Herb  | NA   |
| 9.   | <i>Aegle marmelos</i>          | Rutaceae         | Vilvam             | Tree  | NA   |
| 10.  | <i>Aerva lanata</i>            | Amaranthaceae    | Peelai, Sirupeelai | Shrub | NA   |
| 11.  | <i>Aerva persica</i>           | Amaranthaceae    | Perumpeelai        | Shrub | NA   |
| 12.  | <i>Aeschynomene americana</i>  | Fabaceae         | --                 | Herb  | NA   |
| 13.  | <i>Aeschynomene aspera</i>     | Fabaceae         | Thakkai            | Shrub | NA   |
| 14.  | <i>Ageratum conyzoides</i>     | Compositae       | Poom pillu         | Herb  | NA   |
| 15.  | <i>Ailanthus excelsa</i>       | Simaroubaceae    | Perumaram          | Tree  |      |
| 16.  | <i>Alysicarpus vaginalis</i>   | Fabaceae         | --                 | Herb  |      |
| 17.  | <i>Alloteropsiscimicina</i>    | Poaceae          | --                 | Grass | NA   |
| 18.  | <i>Alternanthera sessilis</i>  | Amaranthaceae    | Ponnanganni        | Herb  | NA   |
| 19.  | <i>Anisomeles indica</i>       | Labiatae         | --                 | Herb  | NA   |
| 20.  | <i>Annona squamosa</i>         | Annonaceae       | Seetha             | Tree  | NA   |
| 21.  | <i>Arachis hypogaea</i>        | Fabaceae         | Verkadalai         | Herb  | NA   |
| 22.  | <i>Argemone mexicana</i>       | Papaveraceae     | Braman Thandu      | Herb  | NA   |
| 23.  | <i>Aristida adscensionis</i>   | Poaceae          | --                 | Grass | NA   |
| 24.  | <i>Aristida hystrix</i>        | Poaceae          | --                 | Grass | NA   |
| 25.  | <i>Aristolochiabracteolata</i> | Aristolochiaceae | Aduthinnappalai    | Herb  | NA   |

| S.No | Species                         | Family          | Common Name        | Habit      | IUCN |
|------|---------------------------------|-----------------|--------------------|------------|------|
| 26.  | <i>Azadiracta indica</i>        | Meliaceae       | Vembu              | Tree       |      |
| 27.  | <i>Barleria acuminata</i>       | Acanthaceae     | --                 | Shrub      | NA   |
| 28.  | <i>Barlerialongiflora</i>       | Acanthaceae     | --                 | Shrub      | NA   |
| 29.  | <i>Barlerianoctiflora</i>       | Acanthaceae     | --                 | Shrub      | NA   |
| 30.  | <i>Boerhaviadiffusa</i>         | Nyctaginaceae   | Mookarattai        | Herb       | NA   |
| 31.  | <i>Boerhaviaerecta</i>          | Nyctaginaceae   | Seemaimookarattai  | Herb       | NA   |
| 32.  | <i>Carica papaya</i>            | Caricaceae      | Pappali            | Tree       | NA   |
| 33.  | <i>Carissa carandas</i>         | Apocynaceae     | Kalaa, Perun kala  | Shrub      | NA   |
| 34.  | <i>Cassia fistula</i>           | Caesalpiniaceae | Kondrai            | Tree       | NA   |
| 35.  | <i>Celosia argentea</i>         | Amaranthaceae   | Pannaikeerai       | Herb       | NA   |
| 36.  | <i>Cissus quadrangularis</i>    | Vitaceae        | Pirandai           | Shrub      | NA   |
| 37.  | <i>Citrullus colocynthis</i>    | Cucurbitaceae   | Peikkumatti        | Herb       | NA   |
| 38.  | <i>Citrus aurantifolia</i>      | Rutaceae        | Elumichai          | Tree       | NA   |
| 39.  | <i>Cleome viscosa</i>           | Capparidaceae   | Nai kadugu         | Herb       | NA   |
| 40.  | <i>Coccinia grandis</i>         | Cucurbitaceae   | Kovai              | Climber    | NA   |
| 41.  | <i>Croton bonplandianum</i>     | Euphorbiaceae   | Rail poondu        | Herb       | NA   |
| 42.  | <i>Cucumis sativus</i>          | Cucurbitaceae   | Vellarikkaai       | Climber    | NA   |
| 43.  | <i>Eleocharis acutangula</i>    | Cyperaceae      | --                 | Sedge      | NA   |
| 44.  | <i>Eragrostis tenella</i>       | Poaceae         | --                 | Grass      | NA   |
| 45.  | <i>Euphorbia antiquorum</i>     | Euphorbiaceae   | Sadura-kalli       | Tree       | NA   |
| 46.  | <i>Euphorbia hirta</i>          | Euphorbiaceae   | Ammanpacharisi     | Herb       | NA   |
| 47.  | <i>Euphorbia indica</i>         | Euphorbiaceae   | Ammanpacharisi     | Herb       | NA   |
| 48.  | <i>Evolvulusalsinoides</i>      | Convolvulaceae  | Vishnukarandi      | Herb       | NA   |
| 49.  | <i>Ficus benghalensis</i>       | Moraceae        | Aala maram         | Tree       | NA   |
| 50.  | <i>Ficus religiosa</i>          | Moraceae        | Arasu              | Tree       | NA   |
| 51.  | <i>Fimbristylis ovata</i>       | Cyperaceae      | -                  | Sedge      | NA   |
| 52.  | <i>Glinuslotoides</i>           | Molluginaceae   | Siruseruppada      | Herb       | NA   |
| 53.  | <i>Gynandropsisgynandra</i>     | Capparidaceae   | Nal vaelai, Vaelai | Herb       | NA   |
| 54.  | <i>Hedyotis aspera</i>          | Rubiaceae       | -                  | Herb       | NA   |
| 55.  | <i>Heliotropium indicum</i>     | Boraginaceae    | Thaelkodu          | Herb       | NA   |
| 56.  | <i>Hibiscus surattensis</i>     | Malvaceae       | --                 | Undershrub | NA   |
| 57.  | <i>Hybanthusenneaspermus</i>    | Violaceae       | Orilaithamarai     | Herb       | NA   |
| 58.  | <i>Hygrophilaschulli</i>        | Acanthaceae     | Neermulli          | Herb       | NA   |
| 59.  | <i>Hyptissuaveolens</i>         | Labiatae        | --                 | Shrub      | NA   |
| 60.  | <i>Indigofera aspalathoides</i> | Fabaceae        | Sivanaarvaambu     | Herb       | NA   |
| 61.  | <i>Indigofera linnaei</i>       | Fabaceae        | -                  | Herb       | NA   |
| 62.  | <i>Indigofera tinctoria</i>     | Fabaceae        | Avuri, Neeli       | Herb       | NA   |
| 63.  | <i>Ipomoea pes-caprae</i>       | Convolvulaceae  | Attukkal           | Creeper    | NA   |
| 64.  | <i>Jasminum sambac</i>          | Oleaceae        | Malli              | Shrub      | NA   |
| 65.  | <i>Jatropha curcas</i>          | Euphorbiaceae   | Kaatu-amanakku     | Shrub      | NA   |
| 66.  | <i>Jatropha gossypifolia</i>    | Euphorbiaceae   | Kaatu-amanakku     | Shrub      | NA   |
| 67.  | <i>Justicia adhatoda</i>        | Acanthaceae     | Adathodai          | Shrub      | NA   |
| 68.  | <i>Justicia simplex</i>         | Acanthaceae     | -                  | Herb       | NA   |

| S.No | Species                         | Family          | Common Name       | Habit   | IUCN |
|------|---------------------------------|-----------------|-------------------|---------|------|
| 69.  | <i>Kylinga bulbosa</i>          | Cyperaceae      | -                 | Sedge   | NA   |
| 70.  | <i>Lagenaria siceraria</i>      | Cucurbitaceae   | Surakkaai         | Climber | NA   |
| 71.  | <i>Lantana camara</i>           | Verbenaceae     | Unnichi           | Shrub   | NA   |
| 72.  | <i>Leucaena leucocephala</i>    | Mimosaceae      | Soundil           | Tree    | NA   |
| 73.  | <i>Leucas aspera</i>            | Labiatae        | Thumbai           | Herb    | NA   |
| 74.  | <i>Ludwigia perennis</i>        | Onagraceae      | --                | Herb    | NA   |
| 75.  | <i>Martynia annua</i>           | Martyniaceae    | ThaelKodukku      | Herb    | NA   |
| 76.  | <i>Melia azedarach</i>          | Meliaceae       | Malai vaambu      | Tree    | NA   |
| 77.  | <i>Merremia hederacea</i>       | Convolvulaceae  | --                | Herb    | NA   |
| 78.  | <i>Nyctanthes arbor-tristis</i> | Nyctanthaceae   | Parijaatham       | Tree    | NA   |
| 79.  | <i>Ocimum americanum</i>        | Labiatae        | Ganjaankorai      | Herb    | NA   |
| 80.  | <i>Pavonia odorata</i>          | Malvaceae       | Peramutti         | Herb    | NA   |
| 81.  | <i>Pedaliium murex</i>          | Pedaliaceae     | Perunerunji       | Herb    | NA   |
| 82.  | <i>Phyllanthus acidus</i>       | Euphorbiaceae   | Aranelli          | Tree    | NA   |
| 83.  | <i>Phyllanthus amarus</i>       | Euphorbiaceae   | Kizha-nelli       | Herb    | NA   |
| 84.  | <i>Phyllanthus emblica</i>      | Euphorbiaceae   | Nelli, Muzhunelli | Tree    | NA   |
| 85.  | <i>Phyllanthus reticulatus</i>  | Euphorbiaceae   | Inkipazham        | Shrub   | NA   |
| 86.  | <i>Pithecellobium dulce</i>     | Mimosaceae      | Kodukkaipuli      | Tree    | NA   |
| 87.  | <i>Plumbago zeylanica</i>       | Plumbaginaceae  | Chitthiragam      | Herb    | NA   |
| 88.  | <i>Polygala javana</i>          | Polygalaceae    | --                | Shrub   | NA   |
| 89.  | <i>Pongamia pinnata</i>         | Fabaceae        | Punga maram       | Tree    | NA   |
| 90.  | <i>Portulaca oleracea</i>       | Portulacaceae   | Kari keerai       | Herb    | NA   |
| 91.  | <i>Prosopis juliflora</i>       | Mimosaceae      | Velikkaathan      | Tree    | NA   |
| 92.  | <i>Psidium guajava</i>          | Myrtaceae       | Koyya             | Tree    | NA   |
| 93.  | <i>Punica granatum</i>          | Punicaceae      | Madhulai          | Shrub   | NA   |
| 94.  | <i>Ricinus communis</i>         | Euphorbiaceae   | Amanakku          | Shrub   | NA   |
| 95.  | <i>Rivea hypocrateriformis</i>  | Convolvulaceae  | Boodhikeerai      | Climber | NA   |
| 96.  | <i>Ruellia tuberosa</i>         | Acanthaceae     | --                | Herb    | NA   |
| 97.  | <i>Sansevieria roxburghiana</i> | Dracaenaceae    | Marun             | Herb    | NA   |
| 98.  | <i>Senna auriculata</i>         | Caesalpiniaceae | Avaram            | Shrub   | NA   |
| 99.  | <i>Senna occidentalis</i>       | Caesalpiniaceae | Peiyavarai        | Tree    | NA   |
| 100. | <i>Sesamum indicum</i>          | Pedaliaceae     | Ellu              | Herb    | NA   |
| 101. | <i>Sida acuta</i>               | Malvaceae       | Malai thangi      | Herb    | NA   |
| 102. | <i>Sida cordata</i>             | Malvaceae       | Pazhampaasi       | Herb    | NA   |
| 103. | <i>Sida cordifolia</i>          | Malvaceae       | Nilatutthi        | Herb    | NA   |
| 104. | <i>Solanum americanum</i>       | Solanaceae      | Manatakkali       | Herb    | NA   |
| 105. | <i>Solanum melongena</i>        | Solanaceae      | Kathiri           | Herb    | NA   |
| 106. | <i>Solanum torvum</i>           | Solanaceae      | Chundai           | Shrub   | NA   |
| 107. | <i>Solanum trilobatum</i>       | Solanaceae      | Thoodhuvalai      | Climber | NA   |
| 108. | <i>Solanum virginianum</i>      | Solanaceae      | Kandankathiri     | Herb    | NA   |
| 109. | <i>Spermacocehispid</i>         | Rubiaceae       | Nathaichoori      | Herb    | NA   |
| 110. | <i>Spermacoceocymoides</i>      | Rubiaceae       | --                | Herb    | NA   |
| 111. | <i>Tamarindus indica</i>        | Caesalpiniaceae | Puliyamaram       | Tree    | NA   |

| S.No | Species                   | Family   | Common Name | Habit      | IUCN |
|------|---------------------------|----------|-------------|------------|------|
| 112. | <i>Tephrosia purpurea</i> | Fabaceae | Kozhinji    | Undershrub | NA   |

LC- Least Concern, NT- Near Threatened, EN- Endangered, NE-Not Evaluated, DD -Data Deficient, VU-Vulnerable, IUCN- International Union for Conservation of Nature

### 3.10.3 Faunal composition of the study area

Based on the secondary source data, a total of 106 faunal species were recorded from the study area, comprising 77 species of birds, 5 species of mammals, 19 species of butterflies, and 5 species of reptiles. Among these, bird species were the most dominant group, representing a wide range of families and ecological roles. The butterfly diversity also indicates a healthy ecosystem with various flowering plants. The presence of mammals and reptiles further confirms the availability of suitable terrestrial habitats. A list of fauna reported from secondary the study area is given in **Table 3.20**.

**Table 3-20 List of Mammals**

| S.No         | Scientific Name               | Common Name               | Family         | IUCN | WPA   |
|--------------|-------------------------------|---------------------------|----------------|------|-------|
| <b>Birds</b> |                               |                           |                |      |       |
| 1.           | <i>Accipiter badius</i>       | Shikra                    | Accipitridae   | LC   | Sch I |
| 2.           | <i>Acridotheres tristis</i>   | Common Myna               | Sturnidae      | LC   | -     |
| 3.           | <i>Actitis hypoleucos</i>     | Common Sandpiper          | Scolopacidae   | LC   | -     |
| 4.           | <i>Alcedo atthis</i>          | Common kingfisher         | Alcedinidae    | LC   | -     |
| 5.           | <i>Amaurornis phoenicurus</i> | White breasted waterhen   | Rallidae       | LC   | -     |
| 6.           | <i>Anas acuta</i>             | Northern Pintail          | Anatidae       | LC   | -     |
| 7.           | <i>Anastomus oscitans</i>     | Asian Openbill            | Ciconiidae     | LC   | -     |
| 8.           | <i>Anhinga melanogaster</i>   | Oriental Darter           | Anhingidae     | LC   | -     |
| 9.           | <i>Anser indicus</i>          | Bar-headed Goose          | Anatidae       | LC   | -     |
| 10.          | <i>Anthus rufulus</i>         | Paddyfield pipit          | Motacillidae   | LC   | -     |
| 11.          | <i>Apus affinis</i>           | House Swift               | Apodiformes    | LC   | -     |
| 12.          | <i>Ardea alba</i>             | Great Egret               | Ardeidae       | LC   | -     |
| 13.          | <i>Ardea cinerea</i>          | Grey Heron                | Ardeidae       | LC   | -     |
| 14.          | <i>Ardeola grayii</i>         | Indian Pond Heron         | Ardeidae       | LC   | -     |
| 15.          | <i>Argya malcolmi</i>         | Large Grey Babbler        | Leiothrichidae | LC   | -     |
| 16.          | <i>Bubulcus ibis</i>          | Cattle Egret              | Ardeidae       | LC   | -     |
| 17.          | <i>Calidris minuta</i>        | Little Stint              | Scolopacidae   | LC   | -     |
| 18.          | <i>Centropus sinensis</i>     | Greater Coucal            | Cuculidae      | LC   | -     |
| 19.          | <i>Ceryle rudis</i>           | Pied kingfisher           | Alcedinidae    | LC   | -     |
| 20.          | <i>Ciconia episcopus</i>      | Asian Woolly-necked Stork | Ciconiidae     | NT   | -     |
| 21.          | <i>Cinnyris asiaticus</i>     | Purple Sunbird            | Nectariniidae  | LC   | -     |
| 22.          | <i>Columba livia</i>          | Rock Pigeon               | Columbidae     | LC   | -     |
| 23.          | <i>Copsychus saularis</i>     | Oriental Magpie Robin     | Muscicapidae   | LC   | -     |
| 24.          | <i>Coracias benghalensis</i>  | Indian roller             | Coraciidae     | LC   | -     |

| S.No | Scientific Name                  | Common Name               | Family            | IUCN | WPA   |
|------|----------------------------------|---------------------------|-------------------|------|-------|
| 25.  | <i>Corvus splendens</i>          | House Crow                | Corvidae          | LC   | -     |
| 26.  | <i>Dicrurus macrocercus</i>      | Black Drongo              | Dicruridae        | LC   | -     |
| 27.  | <i>Egretta garzetta</i>          | Little Egret              | Ardeidae          | LC   | -     |
| 28.  | <i>Egretta gularis</i>           | Western Reef-Heron        | Ardeidae          | LC   | -     |
| 29.  | <i>Elanus caeruleus</i>          | Black-winged Kite         | Accipitridae      | LC   | -     |
| 30.  | <i>Eudynamys scolopaceus</i>     | Asian Koel                | Cuculidae         | LC   | -     |
| 31.  | <i>Euodice malabarica</i>        | Indian silverbill         | Estrildidae       | LC   | -     |
| 32.  | <i>Haliastur indus</i>           | Brahminy Kite             | Accipitridae      | LC   | Sch I |
| 33.  | <i>Halcyon smyrnensis</i>        | White-throated kingfisher | Alcedinidae       | LC   | -     |
| 34.  | <i>Himantopus himantopus</i>     | Black-winged Stilt        | Recurvirostridae  | LC   | -     |
| 35.  | <i>Lanius schach</i>             | Long-tailed Shrike        | Laniidae          | LC   | -     |
| 36.  | <i>Limosa lapponica</i>          | Bar-tailed Godwit         | Scolopacidae      | NT   | -     |
| 37.  | <i>Lonchura punctulata</i>       | Scaly-breasted Munia      | Estrildidae       | LC   | -     |
| 38.  | <i>Merops orientalis</i>         | Green Bee-eater           | Meropidae         | LC   | -     |
| 39.  | <i>Microcarbo niger</i>          | Little cormorant          | Phalacrocoracidae | LC   | -     |
| 40.  | <i>Milvus migrans</i>            | Black Kite                | Accipitridae      | LC   | -     |
| 41.  | <i>Motacilla maderaspatensis</i> | White browed Wagtail      | Motacillidae      | LC   | -     |
| 42.  | <i>Mycteria leucocephala</i>     | Painted Stork             | Ciconiidae        | NT   | -     |
| 43.  | <i>Numenius arquata</i>          | Eurasian Curlew           | Scolopacidae      | NT   | -     |
| 44.  | <i>Nycticorax nycticorax</i>     | Black-crowned Night-Heron | Ardeidae          | LC   | -     |
| 45.  | <i>Ocyrceros birostris</i>       | Indian Grey Hornbill      | Bucerotidae       | LC   | -     |
| 46.  | <i>Orthotomus sutorius</i>       | Common tailorbird         | Cisticolidae      | LC   | -     |
| 47.  | <i>Ortygornis pondicerianus</i>  | Grey francolin            | Phasianidae       | LC   | -     |
| 48.  | <i>Pavo cristatus</i>            | Peafowl                   | Phasianidae       | LC   | Sch I |
| 49.  | <i>Passer domesticus</i>         | House Sparrow             | Passeridae        | LC   | -     |
| 50.  | <i>Pelecanus philippensis</i>    | Spot-billed Pelican       | Pelecanidae       | NT   | -     |
| 51.  | <i>Phalacrocorax carbo</i>       | Great Cormorant           | Phalacrocoracidae | LC   | -     |
| 52.  | <i>Phalacrocorax fuscicollis</i> | Indian Cormorant          | Phalacrocoracidae | LC   | -     |
| 53.  | <i>Platalea leucorodia</i>       | Eurasian Spoonbill        | Threskiornithidae | LC   | -     |
| 54.  | <i>Plegadis falcinellus</i>      | Glossy Ibis               | Threskiornithidae | LC   | -     |
| 55.  | <i>Prinia inornata</i>           | Plain prinia              | Cisticolidae      | LC   | -     |
| 56.  | <i>Prinia socialis</i>           | Ashy Prinia               | Cisticolidae      | LC   | -     |
| 57.  | <i>Pseudibis papillosa</i>       | Red-naped Ibis            | Threskiornithidae | LC   | -     |
| 58.  | <i>Psittacula krameri</i>        | Rose-ringed Parakeet      | Psittaculidae     | LC   | -     |
| 59.  | <i>Pycnonotus cafer</i>          | Red-vented Bulbul         | Pycnonotidae      | LC   | -     |

| S.No             | Scientific Name                    | Common Name                | Family            | IUCN | WPA |
|------------------|------------------------------------|----------------------------|-------------------|------|-----|
| 60.              | <i>Saxicoloides fulicatus</i>      | Indian Robin               | Muscicapidae      | LC   | -   |
| 61.              | <i>Spatula clypeata</i>            | Northern Shoveler          | Anatidae          | LC   | -   |
| 62.              | <i>Sterna hirundo</i>              | Common Tern                | Laridae           | LC   | -   |
| 63.              | <i>Sternula albifrons</i>          | Little Tern                | Laridae           | LC   | -   |
| 64.              | <i>Streptopelia chinensis</i>      | Spotted Dove               | Columbidae        | LC   | -   |
| 65.              | <i>Streptopelia decaocto</i>       | Eurasian collared dove     | Columbidae        | LC   | -   |
| 66.              | <i>Streptopelia senegalensis</i>   | Laughing Dove              | Columbidae        | LC   | -   |
| 67.              | <i>Sturnia pagodarum</i>           | Brahminy Starling          | Sturnidae         | LC   | -   |
| 68.              | <i>Tachybaptus ruficollis</i>      | Little Grebe               | Podicipedidae     | LC   | -   |
| 69.              | <i>Thalasseus bengalensis</i>      | Lesser Crested Tern        | Laridae           | LC   | -   |
| 70.              | <i>Threskiornis melanocephalus</i> | Black-headed Ibis          | Threskiornithidae | NT   | -   |
| 71.              | <i>Tringa erythropus</i>           | Spotted Redshank           | Scolopacidae      | LC   | -   |
| 72.              | <i>Tringa glareola</i>             | Wood Sandpiper             | Scolopacidae      | LC   | -   |
| 73.              | <i>Tringa ochropus</i>             | Green Sandpiper            | Scolopacidae      | LC   | -   |
| 74.              | <i>Tringa stagnatilis</i>          | Marsh Sandpiper            | Scolopacidae      | LC   | -   |
| 75.              | <i>Tringa totanus</i>              | Common Redshank            | Scolopacidae      | LC   | -   |
| 76.              | <i>Vanellus indicus</i>            | Red-wattled Lapwing        | Charadriidae      | LC   | -   |
| 77.              | <i>Vanellus malabaricus</i>        | Yellow-wattled Lapwing     | Charadriidae      | LC   | -   |
| <b>Mammals</b>   |                                    |                            |                   |      |     |
| 1.               | <i>Funambulus pennantii</i>        | Five striped Palm squirrel | Sciuridae         | LC   | -   |
| 2.               | <i>Urva edwardsii</i>              | Indian grey mongoose       | Herpestidae       | LC   | -   |
| 3.               | <i>Rattus argentiventer</i>        | Field Rat                  | Muridae           | LC   | -   |
| 4.               | <i>Lepus nigricollis</i>           | Indian hare                | Leporidae         | LC   | -   |
| 5.               | <i>Sus scrofa</i>                  | Wild boar                  | Suidae            | LC   | -   |
| <b>Butterfly</b> |                                    |                            |                   |      |     |
| 1.               | <i>Euthalia nais</i>               | Baronet                    | Nymphalidae       | NT   | -   |
| 2.               | <i>Tirumala limniace</i>           | Blue tiger                 | Nymphalidae       | LC   | -   |
| 3.               | <i>Belenois aurota</i>             | Pioneer                    | Pieridae          | LC   | -   |
| 4.               | <i>Euploea core</i>                | Common crow                | Nymphalidae       | LC   | -   |
| 5.               | <i>Catopsilia pomona</i>           | Common Emigrant            | Pieridae          | NT   | -   |
| 6.               | <i>Melanitis leda</i>              | Common evening brown       | Nymphalidae       | LC   | -   |
| 7.               | <i>Eurema hecabe</i>               | Common grass yellow        | Pieridae          | LC   | -   |
| 8.               | <i>Delias eucharis</i>             | Common jezebel             | Pieridae          | NT   | -   |
| 9.               | <i>Phalanta phalantha</i>          | Common leopard             | Nymphalidae       | LC   | -   |
| 10.              | <i>Papilio demoleus</i>            | Common lime                | Papilionidae      | NT   | -   |
| 11.              | <i>Papilio polytes</i>             | Common mormon              | Papilionidae      | NT   | -   |
| 12.              | <i>Hypolimnas misippus</i>         | Danaid eggfly              | Nymphalidae       | LC   | -   |
| 13.              | <i>Hypolimnas bolina</i>           | Great eggfly               | Nymphalidae       | NT   | -   |
| 14.              | <i>Junonia atlites</i>             | Grey pansy                 | Nymphalidae       | NT   | -   |
| 15.              | <i>Junonia lemonias</i>            | Lemon pansy                | Nymphalidae       | NT   | -   |



| S.No            | Scientific Name              | Common Name            | Family      | IUCN | WPA   |
|-----------------|------------------------------|------------------------|-------------|------|-------|
| 16.             | <i>Catopsilia pyranthe</i>   | Mottled Emigrant       | Pieridae    | NT   | -     |
| 17.             | <i>Pseudozizeeria maha</i>   | Pale Grass Blue        | Lycaenidae  | NT   | -     |
| 18.             | <i>Junonia almana</i>        | Peacock pansy          | Nymphalidae | LC   | -     |
| 19.             | <i>Danaus chrysippus</i>     | Plain tiger            | Nymphalidae | LC   | -     |
| <b>Reptiles</b> |                              |                        |             |      |       |
| 1.              | <i>Calotes versicolor</i>    | Oriental Garden lizard | Agamidae    | LC   | -     |
| 2.              | <i>Ptyas mucosa</i>          | Indian Rat Snake       | Colubridae  | LC   | Sch I |
| 3.              | <i>Daboia russelii</i>       | Russels Viper          | Viperidae   | LC   | -     |
| 4.              | <i>Psammophilus dorsalis</i> | Peninsular Rock Agama  | Agamidae    | LC   | -     |
| 5.              | <i>Xenochrophis piscator</i> | Checkered keelback     | Colubridae  | LC   | -     |

LC- Least Concern, NT- Near Threatened, EN- Endangered, NE-Not Evaluated, DD -Data Deficient, VU-Vulnerable, IUCN- International Union for Conservation of Nature

### 3.10.4 Conservation Plan for Schedule 1 Species

As per the secondary survey, the following three species listed under Schedule I of the Wildlife (Protection) Act, 1972, were observed. The conservation plan will primarily focus on the protection and restoration of habitats critical to these Schedules I species.

**Table 3.21 Schedules I species of Fauna**

| S.No | Category | Common Name      | Species Name            | IUCN | WPA, 1972  |
|------|----------|------------------|-------------------------|------|------------|
| 1.   | Birds    | Shikra           | <i>Accipiter badius</i> | LC   | Schedule I |
| 2.   | Birds    | Brahminy Kite    | <i>Haliastur indus</i>  | LC   | Schedule I |
| 3.   | Birds    | Peafowl          | <i>Pavo cristatus</i>   | LC   | Schedule I |
| 4.   | Reptiles | Indian Rat Snake | <i>Ptyas mucosa</i>     | LC   | Schedule I |

The budgetary provision has been made for implementation of wildlife conservation measures. The PP will allocate Rs.4 Lakhs towards the conservation plan for implementing the following activities with the help of and in consultation with the Forest Department.

- **Bird species** - Shikra, Brahminy Kite and Peafowl
- **Capacity Building:** Capacity building program on protection would be of high significance. Creation of awareness among local people as well as employees about the importance of protecting the habitat and foraging grounds.
- **Anti-Poaching Plan:** Poaching being one of the causes for depletion of wildlife in general and it being one of the main reasons for the poor faunal assemblage, it is necessary to increase protection for the RET species. The people living in the surrounding area should be rewarded for timely information about disturbing and/or poaching of the bird more specifically the threatened species.
- **Habitat Improvement:** Sufficient food, water resources, vegetation cover, and breeding sites must be available at the release location.



• **Development of Wetland Habitat:**

1. The edges and the periphery of the water sources shall be planted with native tree species that can provide habitat for perching and nesting for the aquatic birds species.
2. Provision of veterinary care and cages for injured or sick deformed birds with the help of and in consultation with the forest department.

• **Reptile Species - Indian Rat Snake**

1. As the species are hunted for their meat, skins, and for use in medicine, awareness campaigns to be carried out among village communities, focusing on local schools for protection of the species.
2. Habitat improvement to be carried out near the forest area with the help of and in consultation with the forest department.

**Good Practices:**

- Project Proponent I will be bound by rules and regulation of Wildlife (Protection) Act, 1972 of India and any others rule and guidelines, stipulated by the State Government.
- State Forest Department will be consulted for development of greenbelt within the project site. Further unauthorized pesticides / toxic materials will not be used for plant species.
- Project Proponent will not plant any alien and/or invasive species in the project site, which may spread in the forest areas.
- Employees will be made aware of presence of a few threatened and Schedule species in the area and legal consequences of hunting, poaching of animals and harvesting of forest produces.
- The proponent has proposed a sum of Rs. 4,00,000/-for the “Schedule – I species” conservation plan under the following heads:

**Table 3.22 Proposed budgetary allocation for scheduled-I conservation measures**

| Work / Activity                | Description                                                                         | Year 1 (₹) | Year 2 (₹) | Year 3 (₹) | Year 4 (₹) | Year 5 (₹) |
|--------------------------------|-------------------------------------------------------------------------------------|------------|------------|------------|------------|------------|
| Habitat Improvement Programme  | Plantation-250 tree plants/Year (@ 200/- per plant)                                 | 50,000     | 50,000     | 50,000     | 50,000     | 50,000     |
| Awareness Programs in Villages | Village meetings, school-level campaigns, IEC material preparation and distribution | 10,000     | 10,000     | 10,000     | 10,000     | 10,000     |

|                           |                                                                     |               |               |               |               |               |
|---------------------------|---------------------------------------------------------------------|---------------|---------------|---------------|---------------|---------------|
| Water Tank                | Small water tank -20<br>in number @ 5000/-<br>per tank(4 no's/year) | 20,000        | 20,000        | 20,000        | 20,000        | 20,000        |
| <b>Total- Rs.4,00,000</b> |                                                                     | <b>80,000</b> | <b>80,000</b> | <b>80,000</b> | <b>80,000</b> | <b>80,000</b> |

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### 3.11 Socio Economic profile

Dharmapuri district having a population of 1,50,6843 consists of 7,74,303 male populations and 7,32,540 female populations.

**Source:** [http://censusindia.gov.in/2011census/dchb/DCHB\\_A/33/3301\\_PART\\_A\\_DCHB\\_DHARMAPURI.pdf](http://censusindia.gov.in/2011census/dchb/DCHB_A/33/3301_PART_A_DCHB_DHARMAPURI.pdf)

(Ref: Directorate of Census Operations-Tamil Nadu, "District Census Handbook-2011, Dharmapuri District", Series-34 Part XII-A)

#### 3.11.1 Socio Economic Aspects

A socio-economic study was undertaken in assessing aspects which are dealing with social and cultural conditions, and economic status in the study area. The study provides information such as demographic structure, population dynamics, infrastructure resources, and the status of human health and economic attributes like employment, per-capita income, agriculture, trade, and industrial development in the study area. The study of these characteristic helps in identification, prediction and evaluation of impacts on socio-economic and parameters of human interest due to proposed project developments. The parameters are:

- Demographic structure
- Infrastructure Facility
- Economic Status
- Health status
- Cultural attributes
- Awareness and opinion of people about the project and Industries in the area.

The following **Table 3-23** provides the certain important social indicators of Krishnagiri districts in Tamil Nadu.

**Table 3-23 Social Indicators of Dharmapuri Districts**

| S.No | Social Indicators                          | Dharmapuri District | Unit                  |
|------|--------------------------------------------|---------------------|-----------------------|
| 1    | Decadal growth rate %                      | 16.34               | %                     |
| 2    | Urban population %                         | 17.3                | %                     |
| 3    | Sex ratio                                  | 946                 | -                     |
| 4    | 0-6 age group %                            | 10.02               | %                     |
| 5    | Population density (Persons per square Km) | 335                 | Persons per square Km |
| 6    | Scheduled caste population %               | 16.30               | %                     |
| 7    | Scheduled tribe population %               | 4.18                | %                     |
| 8    | Literacy rate %                            | 68.50               | %                     |
| 9    | Work Participation rate %                  | 49.9                | %                     |

|    |                                   |       |   |
|----|-----------------------------------|-------|---|
| 10 | Main Workers %                    | 86.90 | % |
| 11 | Marginal Workers %                | 13.10 | % |
| 12 | Cultivators %                     | 26.80 | % |
| 13 | Agricultural labourers %          | 35.59 | % |
| 14 | Workers in household industries % | 2.04  | % |
| 15 | Other workers %                   | 35.57 | % |

**Source:** <https://censusindia.gov.in/nada/index.php/catalog/1146>

(Ref: Census of India 2011 - Series 34 - District Census Handbook Tamil Nadu, Part A - Dharmapuri).

### 3.11.2 Social Economic Profile of the study area

The villages and towns covering 10 km radius from the boundary of the project site is taken for the study. There are 65 villages in the study area of Pappireddipatti and Harur talus of Dharmapuri district. The population of the study area is 1,37,728 as per 2011 Census. The projected population is 1,60,315. The family size is 4. The area is rural and people depend on agriculture and its allied activities. **Table 3-24** shows the list of locations which comes under the study area.

**Table 3-24 Population profile within the study area**

| S. No                                             | Name              | Households | Total Population | Male | Female | Children below 6 | Scheduled Caste | Scheduled Tribe |
|---------------------------------------------------|-------------------|------------|------------------|------|--------|------------------|-----------------|-----------------|
| <b>0 to 5 Km</b>                                  |                   |            |                  |      |        |                  |                 |                 |
| <b>Pappireddipatti Taluk- Dharmapuri district</b> |                   |            |                  |      |        |                  |                 |                 |
| 1.                                                | Allalapatty       | 115        | 479              | 248  | 231    | 53               | 376             | 0               |
| 2.                                                | Annamalahalli     | 340        | 1227             | 634  | 593    | 112              | 28              | 0               |
| 3.                                                | Chinnankuppam     | 303        | 1139             | 551  | 588    | 103              | 294             | 4               |
| 4.                                                | Devarajapalayam   | 762        | 2737             | 1342 | 1395   | 257              | 1006            | 614             |
| 5.                                                | Erumiyampatty     | 498        | 1925             | 959  | 966    | 226              | 1355            | 7               |
| 6.                                                | Gopalapuram       | 325        | 1122             | 573  | 549    | 114              | 126             | 0               |
| 7.                                                | Gopichettipalayam | 132        | 406              | 202  | 204    | 48               | 0               | 0               |
| 8.                                                | Jammanahalli      | 637        | 2363             | 1168 | 1195   | 224              | 761             | 0               |
| 9.                                                | Kadaranampatty    | 22         | 83               | 44   | 39     | 4                | 83              | 0               |
| 10.                                               | Kokkarapatty      | 593        | 3013             | 1700 | 1313   | 225              | 268             | 40              |
| 11.                                               | Kolagampatty      | 804        | 3057             | 1547 | 1510   | 304              | 968             | 0               |
| 12.                                               | Malagapadi        | 246        | 940              | 486  | 454    | 99               | 258             | 12              |
| 13.                                               | Nambippatti       | 448        | 1947             | 1022 | 925    | 195              | 907             | 10              |
| 14.                                               | Naranapuram       | 386        | 1465             | 753  | 712    | 162              | 25              | 0               |
| 15.                                               | Parayapatti       | 1045       | 4612             | 2467 | 2145   | 387              | 616             | 51              |
| 16.                                               | Peddur            | 210        | 897              | 454  | 443    | 116              | 896             | 0               |
| 17.                                               | Puludiyur         | 182        | 676              | 355  | 321    | 61               | 40              | 7               |
| 18.                                               | Rameyanahalli     | 765        | 2859             | 1430 | 1429   | 283              | 239             | 0               |
| 19.                                               | Sikkampatti       | 55         | 182              | 91   | 91     | 28               | 0               | 0               |
| 20.                                               | Tenkaraikottai    | 1337       | 5142             | 2603 | 2539   | 585              | 1017            | 49              |
| 21.                                               | Thurinihalli      | 198        | 660              | 330  | 330    | 70               | 12              | 118             |
| <b>6 to 10 Km</b>                                 |                   |            |                  |      |        |                  |                 |                 |
| <b>Pappireddipatti Taluk- Dharmapuri district</b> |                   |            |                  |      |        |                  |                 |                 |

|                                         |                     |      |       |       |       |      |      |     |
|-----------------------------------------|---------------------|------|-------|-------|-------|------|------|-----|
| 22                                      | A. Pallipatti       | 1160 | 4156  | 2096  | 2060  | 365  | 1605 | 766 |
| 23                                      | Adigarapatty        | 1092 | 3957  | 2004  | 1953  | 371  | 1487 | 19  |
| 24                                      | Alapuram            | 1360 | 4784  | 2444  | 2340  | 493  | 939  | 14  |
| 25                                      | Ammapalayam         | 134  | 522   | 269   | 253   | 66   | 3    | 254 |
| 26                                      | Annamalaipatty      | 137  | 520   | 265   | 255   | 59   | 241  | 0   |
| 27                                      | Balasamudram        | 64   | 238   | 123   | 115   | 25   | 172  | 0   |
| 28                                      | Basuvapuram         | 923  | 3383  | 1706  | 1677  | 343  | 1542 | 232 |
| 29                                      | Chintalpadi         | 1429 | 5448  | 2713  | 2735  | 536  | 2606 | 167 |
| 30                                      | Gurubarahalli       | 546  | 1990  | 970   | 1020  | 157  | 973  | 0   |
| 31                                      | Irulapatty          | 789  | 2921  | 1481  | 1440  | 286  | 226  | 707 |
| 32                                      | Kavandampatty       | 522  | 2007  | 1009  | 998   | 167  | 817  | 12  |
| 33                                      | Mekalanayakanahalli | 42   | 159   | 78    | 81    | 12   | 0    | 0   |
| 34                                      | Menasi              | 1555 | 5280  | 2641  | 2639  | 540  | 1213 | 4   |
| 35                                      | Mookkareddipatti    | 578  | 2186  | 1065  | 1121  | 195  | 766  | 320 |
| 36                                      | Obilinayakanahalli  | 202  | 675   | 337   | 338   | 51   | 46   | 263 |
| 37                                      | Pallipatti          | 876  | 3684  | 1942  | 1742  | 315  | 584  | 9   |
| 38                                      | Pappambadi          | 510  | 1965  | 1009  | 956   | 141  | 357  | 133 |
| 39                                      | Pethasamudram       | 211  | 729   | 374   | 355   | 64   | 139  | 0   |
| 40                                      | Pethathampatti      | 1015 | 4137  | 2088  | 2049  | 408  | 2593 | 6   |
| 41                                      | Pudupatti           | 822  | 3242  | 1665  | 1577  | 313  | 601  | 25  |
| 42                                      | Thadhanur           | 297  | 1086  | 550   | 536   | 98   | 649  | 0   |
| 43                                      | Thinnahalli         | 153  | 554   | 282   | 272   | 46   | 26   | 0   |
| 44                                      | Vachathi            | 250  | 1032  | 517   | 515   | 96   | 6    | 951 |
| <b>Harur Taluk -Dharmapuri district</b> |                     |      |       |       |       |      |      |     |
| 45                                      | Achalvadi           | 808  | 2907  | 1436  | 1471  | 269  | 527  | 51  |
| 46                                      | Agraharam           | 279  | 1007  | 526   | 481   | 102  | 258  | 5   |
| 47                                      | Dodampatty          | 545  | 1874  | 953   | 921   | 174  | 204  | 3   |
| 48                                      | Ellepudayampatti    | 534  | 2066  | 1074  | 992   | 200  | 832  | 0   |
| 49                                      | Harur (TP)          | 6607 | 25469 | 12543 | 12926 | 2559 | 6169 | 178 |



|              |                   |              |               |              |              |              |              |             |
|--------------|-------------------|--------------|---------------|--------------|--------------|--------------|--------------|-------------|
| 50           | Kalladipatti      | 121          | 454           | 229          | 225          | 38           | 31           | 0           |
| 51           | Kottarapatty      | 78           | 268           | 134          | 134          | 13           | 0            | 0           |
| 52           | Kudumiyampatty    | 368          | 1429          | 713          | 716          | 183          | 447          | 49          |
| 53           | Mobirippatti      | 417          | 1594          | 798          | 796          | 152          | 613          | 1           |
| 54           | Mookanurpatti     | 129          | 438           | 213          | 225          | 43           | 6            | 0           |
| 55           | Morasapatti       | 117          | 466           | 217          | 249          | 55           | 346          | 1           |
| 56           | Nachanampatty     | 85           | 271           | 135          | 136          | 21           | 8            | 0           |
| 57           | Pachanampatty     | 352          | 1353          | 673          | 680          | 163          | 118          | 12          |
| 58           | Sandappatti       | 209          | 760           | 368          | 392          | 97           | 33           | 4           |
| 59           | Setrapatti        | 101          | 361           | 179          | 182          | 24           | 0            | 0           |
| 60           | Soriyampatti      | 301          | 1197          | 633          | 564          | 148          | 915          | 0           |
| 61           | Sundangipatti     | 183          | 745           | 366          | 379          | 80           | 186          | 0           |
| 62           | Tandekuppam       | 407          | 1618          | 828          | 790          | 215          | 712          | 4           |
| 63           | Thadampatti       | 209          | 841           | 426          | 415          | 123          | 451          | 0           |
| 64           | Thambichettipatti | 105          | 416           | 208          | 208          | 35           | 11           | 1           |
| 65           | Velampatti        | 163          | 608           | 336          | 272          | 50           | 0            | 0           |
| <b>Total</b> |                   | <b>36188</b> | <b>137728</b> | <b>69575</b> | <b>68153</b> | <b>13547</b> | <b>38733</b> | <b>5103</b> |

(Source: Census 2011)

### 3.11.2.1 Employment and Livelihood within study area

Majority of population in the study area comes under other working categories. As agriculture cannot be a main sustenance for most of farmers, they have dual professions. Farming is mostly seasonal, they involve in other livelihood activities like business, non-agriculture labour, agriculture labour and other service sectors. Fragmentation of landholding leads to adopt to have additional occupation. During our field visit, we could observe a greater number of women in the workforce in different activities.

Over the past few decades, women's participation in the workforce has significantly increased, leading to a more substantial contribution to household income.

Several factors contribute to this shift:

1. **Increased Workforce Participation:** More women are pursuing higher education and entering a wider range of professions. This has led to higher earning potential and greater financial contributions to families.
2. **Economic Necessity:** In many households, dual incomes are necessary to maintain a desired standard of living or to meet financial obligations.
3. **Changing Social Norms:** Attitudes toward gender roles have evolved, leading to a more equitable distribution of financial responsibilities within households.

Summaries of employment and livelihood within the study are given in **Table 3-25**.

**Table 3-25 Summaries of Employment and Livelihood within the study area**

| S. No                                      | Name            | Total Workers | Main Workers | Marginal Workers | Agriculture Workers |          |                 |          | Household Industry Workers |          | Other Workers |          |
|--------------------------------------------|-----------------|---------------|--------------|------------------|---------------------|----------|-----------------|----------|----------------------------|----------|---------------|----------|
|                                            |                 |               |              |                  | Cultivators         |          | Agri. Labourers |          |                            |          |               |          |
|                                            |                 |               |              |                  | Main                | Marginal | Main            | Marginal | Main                       | Marginal | Main          | Marginal |
| 0 to 5 Km                                  |                 |               |              |                  |                     |          |                 |          |                            |          |               |          |
| Pappireddipatti Taluk- Dharmapuri district |                 |               |              |                  |                     |          |                 |          |                            |          |               |          |
| 1.                                         | Allalapatty     | 204           | 199          | 5                | 55                  | 0        | 58              | 5        | 0                          | 0        | 86            | 0        |
| 2.                                         | Annamalahalli   | 737           | 735          | 2                | 196                 | 0        | 443             | 2        | 21                         | 0        | 75            | 0        |
| 3.                                         | Chinnankuppam   | 565           | 556          | 9                | 98                  | 1        | 249             | 4        | 10                         | 3        | 199           | 1        |
| 4.                                         | Devarajapalayam | 1550          | 1530         | 20               | 469                 | 3        | 908             | 11       | 8                          | 0        | 145           | 6        |
| 5.                                         | Erumiyampatty   | 1049          | 1037         | 12               | 211                 | 1        | 661             | 9        | 5                          | 1        | 160           | 1        |

| S. No | Name              | Total Workers | Main Workers | Marginal Workers | Agriculture Workers |          |                 |          | Household Industry Workers |          | Other Workers |          |
|-------|-------------------|---------------|--------------|------------------|---------------------|----------|-----------------|----------|----------------------------|----------|---------------|----------|
|       |                   |               |              |                  | Cultivators         |          | Agri. Labourers |          | Main                       | Marginal | Main          | Marginal |
|       |                   |               |              |                  | Main                | Marginal | Main            | Marginal |                            |          |               |          |
| 6.    | Gopalapuram       | 664           | 579          | 85               | 240                 | 4        | 194             | 57       | 8                          | 0        | 137           | 24       |
| 7.    | Gopichettipalayam | 256           | 252          | 4                | 146                 | 1        | 56              | 0        | 4                          | 0        | 46            | 3        |
| 8.    | Jammanahalli      | 1330          | 1317         | 13               | 207                 | 4        | 718             | 4        | 24                         | 2        | 368           | 3        |
| 9.    | Kadaranampatty    | 39            | 39           | 0                | 26                  | 0        | 8               | 0        | 0                          | 0        | 5             | 0        |
| 10.   | Kokkarapatty      | 1304          | 1247         | 57               | 502                 | 3        | 433             | 7        | 7                          | 2        | 305           | 45       |
| 11.   | Kolagampatty      | 1669          | 1631         | 38               | 766                 | 2        | 641             | 11       | 17                         | 2        | 207           | 23       |
| 12.   | Malagapadi        | 580           | 576          | 4                | 376                 | 1        | 162             | 3        | 0                          | 0        | 38            | 0        |
| 13.   | Nambippatti       | 983           | 783          | 200              | 274                 | 14       | 331             | 153      | 16                         | 3        | 162           | 30       |
| 14.   | Naranapuram       | 744           | 727          | 17               | 420                 | 4        | 148             | 12       | 7                          | 0        | 152           | 1        |
| 15.   | Parayapatti       | 1833          | 1751         | 82               | 385                 | 5        | 495             | 39       | 12                         | 1        | 859           | 37       |
| 16.   | Peddur            | 530           | 514          | 16               | 13                  | 0        | 467             | 14       | 0                          | 1        | 34            | 1        |
| 17.   | Puludiyur         | 409           | 388          | 21               | 129                 | 6        | 134             | 9        | 9                          | 0        | 116           | 6        |
| 18.   | Rameyanahalli     | 1636          | 1556         | 80               | 589                 | 4        | 520             | 25       | 23                         | 0        | 424           | 51       |
| 19.   | Sikkampatti       | 119           | 119          | 0                | 103                 | 0        | 3               | 0        | 0                          | 0        | 13            | 0        |
| 20.   | Tenkaraikottai    | 2661          | 1725         | 936              | 586                 | 170      | 911             | 474      | 14                         | 79       | 214           | 213      |
| 21.   | Thurinihalli      | 420           | 420          | 0                | 175                 | 0        | 177             | 0        | 0                          | 0        | 68            | 0        |

| S. No                                      | Name                | Total Workers | Main Workers | Marginal Workers | Agriculture Workers |          |                 |          | Household Industry Workers |          | Other Workers |          |
|--------------------------------------------|---------------------|---------------|--------------|------------------|---------------------|----------|-----------------|----------|----------------------------|----------|---------------|----------|
|                                            |                     |               |              |                  | Cultivators         |          | Agri. Labourers |          |                            |          |               |          |
|                                            |                     |               |              |                  | Main                | Marginal | Main            | Marginal | Main                       | Marginal | Main          | Marginal |
| 6 to 10 Km                                 |                     |               |              |                  |                     |          |                 |          |                            |          |               |          |
| Pappireddipatti Taluk- Dharmapuri district |                     |               |              |                  |                     |          |                 |          |                            |          |               |          |
| 22.                                        | A. Pallipatti       | 2286          | 2232         | 54               | 582                 | 3        | 1199            | 16       | 31                         | 4        | 420           | 31       |
| 23.                                        | Adigarapatty        | 2341          | 2261         | 80               | 1119                | 12       | 738             | 38       | 35                         | 7        | 369           | 23       |
| 24.                                        | Alapuram            | 2705          | 2658         | 47               | 744                 | 15       | 1488            | 15       | 45                         | 0        | 381           | 17       |
| 25.                                        | Ammapalayam         | 340           | 276          | 64               | 120                 | 2        | 125             | 59       | 3                          | 2        | 28            | 1        |
| 26.                                        | Annamalaipatty      | 311           | 288          | 23               | 145                 | 16       | 98              | 6        | 1                          | 0        | 44            | 1        |
| 27.                                        | Balasamudram        | 146           | 146          | 0                | 62                  | 0        | 60              | 0        | 0                          | 0        | 24            | 0        |
| 28.                                        | Basuvapuram         | 1913          | 1837         | 76               | 644                 | 2        | 933             | 59       | 3                          | 0        | 257           | 15       |
| 29.                                        | Chintalpadi         | 2955          | 2796         | 159              | 1143                | 9        | 827             | 98       | 35                         | 8        | 791           | 44       |
| 30.                                        | Gurubarahalli       | 1105          | 472          | 633              | 328                 | 84       | 9               | 492      | 1                          | 10       | 134           | 47       |
| 31.                                        | Irulapatty          | 1583          | 1426         | 157              | 516                 | 10       | 602             | 137      | 11                         | 0        | 297           | 10       |
| 32.                                        | Kavandampatty       | 1196          | 1177         | 19               | 344                 | 3        | 657             | 5        | 12                         | 0        | 164           | 11       |
| 33.                                        | Mekalanayakanahalli | 97            | 95           | 2                | 69                  | 0        | 16              | 2        | 0                          | 0        | 10            | 0        |
| 34.                                        | Menasi              | 3030          | 2884         | 146              | 1048                | 34       | 1322            | 76       | 30                         | 1        | 484           | 35       |
| 35.                                        | Mookkareddipatti    | 1178          | 1152         | 26               | 284                 | 3        | 621             | 12       | 8                          | 0        | 239           | 11       |

| S. No                                    | Name                | Total Workers | Main Workers | Marginal Workers | Agriculture Workers |          |                 |          | Household Industry Workers |          | Other Workers |          |
|------------------------------------------|---------------------|---------------|--------------|------------------|---------------------|----------|-----------------|----------|----------------------------|----------|---------------|----------|
|                                          |                     |               |              |                  | Cultivators         |          | Agri. Labourers |          | Main                       | Marginal | Main          | Marginal |
|                                          |                     |               |              |                  | Main                | Marginal | Main            | Marginal |                            |          |               |          |
| 36.                                      | Obilinayakkanahalli | 451           | 449          | 2                | 242                 | 0        | 184             | 2        | 1                          | 0        | 22            | 0        |
| 37.                                      | Pallipatti          | 1637          | 1478         | 159              | 323                 | 5        | 711             | 127      | 33                         | 6        | 411           | 21       |
| 38.                                      | Pappambadi          | 1088          | 923          | 165              | 304                 | 7        | 419             | 131      | 6                          | 1        | 194           | 26       |
| 39.                                      | Pethasamudram       | 472           | 464          | 8                | 100                 | 1        | 254             | 1        | 1                          | 0        | 109           | 6        |
| 40.                                      | Pethathampatti      | 2358          | 2290         | 68               | 497                 | 9        | 1450            | 32       | 17                         | 3        | 326           | 24       |
| 41.                                      | Pudupatti           | 1797          | 1787         | 10               | 294                 | 1        | 764             | 0        | 76                         | 0        | 653           | 9        |
| 42.                                      | Thadhanur           | 600           | 588          | 12               | 155                 | 3        | 217             | 4        | 5                          | 0        | 211           | 5        |
| 43.                                      | Thinnahalli         | 337           | 252          | 85               | 139                 | 14       | 65              | 53       | 3                          | 2        | 45            | 16       |
| 44.                                      | Vachathi            | 565           | 557          | 8                | 237                 | 2        | 273             | 3        | 0                          | 0        | 47            | 3        |
| <b>Harur Taluk - Dharmapuri district</b> |                     |               |              |                  |                     |          |                 |          |                            |          |               |          |
| 45.                                      | Achalvadi           | 1600          | 1364         | 236              | 553                 | 27       | 383             | 109      | 20                         | 12       | 408           | 88       |
| 46.                                      | Agraharam           | 569           | 544          | 25               | 258                 | 3        | 125             | 12       | 3                          | 1        | 158           | 9        |
| 47.                                      | Dodampatty          | 853           | 689          | 164              | 257                 | 22       | 186             | 122      | 11                         | 4        | 235           | 16       |
| 48.                                      | Ellepudayampatti    | 1247          | 1245         | 2                | 606                 | 0        | 453             | 1        | 7                          | 0        | 179           | 1        |
| 49.                                      | Harur (TP)          | 9697          | 8565         | 1132             | 750                 | 47       | 1162            | 282      | 133                        | 67       | 6520          | 736      |
| 50.                                      | Kalladipatti        | 288           | 285          | 3                | 239                 | 0        | 35              | 2        | 2                          | 0        | 9             | 1        |

| S. No        | Name              | Total Workers | Main Workers | Marginal Workers | Agriculture Workers |            |                 |             | Household Industry Workers |            | Other Workers |             |
|--------------|-------------------|---------------|--------------|------------------|---------------------|------------|-----------------|-------------|----------------------------|------------|---------------|-------------|
|              |                   |               |              |                  | Cultivators         |            | Agri. Labourers |             | Main                       | Marginal   | Main          | Marginal    |
|              |                   |               |              |                  | Main                | Marginal   | Main            | Marginal    |                            |            |               |             |
| 51.          | Kottarapatty      | 166           | 151          | 15               | 97                  | 2          | 27              | 9           | 5                          | 1          | 22            | 3           |
| 52.          | Kudumiyampatty    | 813           | 703          | 110              | 161                 | 22         | 447             | 79          | 2                          | 2          | 93            | 7           |
| 53.          | Mobirippatti      | 675           | 590          | 85               | 106                 | 3          | 204             | 61          | 4                          | 0          | 276           | 21          |
| 54.          | Mookanurpatti     | 262           | 259          | 3                | 170                 | 0          | 37              | 1           | 0                          | 0          | 52            | 2           |
| 55.          | Morasapatti       | 282           | 281          | 1                | 67                  | 0          | 204             | 1           | 0                          | 0          | 10            | 0           |
| 56.          | Nachanampatty     | 169           | 168          | 1                | 134                 | 0          | 11              | 0           | 0                          | 0          | 23            | 1           |
| 57.          | Pachanampatty     | 540           | 377          | 163              | 77                  | 18         | 52              | 25          | 21                         | 1          | 227           | 119         |
| 58.          | Sandappatti       | 391           | 377          | 14               | 153                 | 4          | 71              | 8           | 11                         | 0          | 142           | 2           |
| 59.          | Setrapatti        | 226           | 226          | 0                | 192                 | 0          | 7               | 0           | 1                          | 0          | 26            | 0           |
| 60.          | Soriyampatti      | 684           | 661          | 23               | 141                 | 3          | 401             | 5           | 10                         | 5          | 109           | 10          |
| 61.          | Sundangipatti     | 406           | 395          | 11               | 74                  | 1          | 232             | 1           | 7                          | 8          | 82            | 1           |
| 62.          | Tandekuppam       | 938           | 767          | 171              | 252                 | 13         | 361             | 116         | 14                         | 14         | 140           | 28          |
| 63.          | Thadampatti       | 581           | 464          | 117              | 142                 | 3          | 266             | 26          | 2                          | 1          | 54            | 87          |
| 64.          | Thambichettipatti | 288           | 270          | 18               | 176                 | 0          | 48              | 14          | 0                          | 1          | 46            | 3           |
| 65.          | Velampatti        | 412           | 407          | 5                | 362                 | 0          | 17              | 5           | 3                          | 0          | 25            | 0           |
| <b>Total</b> |                   | <b>70860</b>  | <b>64957</b> | <b>5903</b>      | <b>20372</b>        | <b>626</b> | <b>25478</b>    | <b>3086</b> | <b>798</b>                 | <b>255</b> | <b>18309</b>  | <b>1936</b> |

(Source: Census 2011)

### 3.11.2.2 Educational Infrastructure within study area

The study area has good Pre-Primary, primary, middle and secondary education infrastructure. The people around the study area are well connected to educational infrastructures. The following **Table 3-26** shows the literate and the percentage within the study area.

**Table 3-26 Literates population and the percentage within the study area**

| S. No                                             | Name              | Total Population | Literates Population | Literates Population Male | Literates Population Female | % Literates |
|---------------------------------------------------|-------------------|------------------|----------------------|---------------------------|-----------------------------|-------------|
| <b>0 to 5 Km</b>                                  |                   |                  |                      |                           |                             |             |
| <b>Pappireddipatti Taluk -Dharmapuri district</b> |                   |                  |                      |                           |                             |             |
| 1.                                                | Allalapatty       | 479              | 295                  | 171                       | 124                         | 61.59       |
| 2.                                                | Annamalaihalli    | 1227             | 781                  | 454                       | 327                         | 63.65       |
| 3.                                                | Chinnankuppam     | 1139             | 783                  | 425                       | 358                         | 68.74       |
| 4.                                                | Devarajapalayam   | 2737             | 1630                 | 911                       | 719                         | 59.55       |
| 5.                                                | Erumiyampatty     | 1925             | 1078                 | 608                       | 470                         | 56.00       |
| 6.                                                | Gopalapuram       | 1122             | 667                  | 396                       | 271                         | 59.45       |
| 7.                                                | Gopichettipalayam | 406              | 215                  | 126                       | 89                          | 52.96       |
| 8.                                                | Jammanahalli      | 2363             | 1582                 | 895                       | 687                         | 66.95       |
| 9.                                                | Kadaranampatty    | 83               | 44                   | 25                        | 19                          | 53.01       |
| 10.                                               | Kokkarapatty      | 3013             | 2189                 | 1384                      | 805                         | 72.65       |
| 11.                                               | Kolagampatty      | 3057             | 1953                 | 1084                      | 869                         | 63.89       |
| 12.                                               | Malagapadi        | 940              | 592                  | 334                       | 258                         | 62.98       |
| 13.                                               | Nambippatti       | 1947             | 1220                 | 724                       | 496                         | 62.66       |
| 14.                                               | Naranapuram       | 1465             | 873                  | 494                       | 379                         | 59.59       |
| 15.                                               | Parayapatti       | 4612             | 3445                 | 1960                      | 1485                        | 74.70       |
| 16.                                               | Peddur            | 897              | 468                  | 272                       | 196                         | 52.17       |



| S. No                                             | Name                | Total Population | Literates Population | Literates Population Male | Literates Population Female | % Literates |
|---------------------------------------------------|---------------------|------------------|----------------------|---------------------------|-----------------------------|-------------|
| 17.                                               | Puludiyur           | 676              | 504                  | 284                       | 220                         | 74.56       |
| 18.                                               | Rameyanahalli       | 2859             | 1931                 | 1067                      | 864                         | 67.54       |
| 19.                                               | Sikkampatti         | 182              | 106                  | 65                        | 41                          | 58.24       |
| 20.                                               | Tenkaraikottai      | 5142             | 3266                 | 1872                      | 1394                        | 63.52       |
| 21.                                               | Thurinihalli        | 660              | 483                  | 272                       | 211                         | 73.18       |
| <b>6 to 10 Km</b>                                 |                     |                  |                      |                           |                             |             |
| <b>Pappireddipatti Taluk- Dharmapuri district</b> |                     |                  |                      |                           |                             |             |
| 22.                                               | A. Pallipatti       | 4156             | 2779                 | 1575                      | 1204                        | 66.87       |
| 23.                                               | Adigarapatty        | 3957             | 2668                 | 1513                      | 1155                        | 67.42       |
| 24.                                               | Alapuram            | 4784             | 2903                 | 1679                      | 1224                        | 60.68       |
| 25.                                               | Ammapalayam         | 522              | 287                  | 166                       | 121                         | 54.98       |
| 26.                                               | Annamalaipatty      | 520              | 332                  | 189                       | 143                         | 63.85       |
| 27.                                               | Balasamudram        | 238              | 178                  | 101                       | 77                          | 74.79       |
| 28.                                               | Basuvapuram         | 3383             | 2069                 | 1206                      | 863                         | 61.16       |
| 29.                                               | Chintalpadi         | 5448             | 3598                 | 2002                      | 1596                        | 66.04       |
| 30.                                               | Gurubarahalli       | 1990             | 1413                 | 778                       | 635                         | 71.01       |
| 31.                                               | Irulapatty          | 2921             | 1776                 | 1032                      | 744                         | 60.80       |
| 32.                                               | Kavandampatty       | 2007             | 1325                 | 732                       | 593                         | 66.02       |
| 33.                                               | Mekalanayakanahalli | 159              | 109                  | 63                        | 46                          | 68.55       |
| 34.                                               | Menasi              | 5280             | 3331                 | 1916                      | 1415                        | 63.09       |
| 35.                                               | Mookkareddipatti    | 2186             | 1393                 | 750                       | 643                         | 63.72       |
| 36.                                               | Obilinayakkanahalli | 675              | 458                  | 235                       | 223                         | 67.85       |
| 37.                                               | Pallipatti          | 3684             | 2722                 | 1571                      | 1151                        | 73.89       |
| 38.                                               | Pappambadi          | 1965             | 1272                 | 732                       | 540                         | 64.73       |
| 39.                                               | Pethasamudram       | 729              | 463                  | 258                       | 205                         | 63.51       |

| S. No                                    | Name             | Total Population | Literates Population | Literates Population Male | Literates Population Female | % Literates |
|------------------------------------------|------------------|------------------|----------------------|---------------------------|-----------------------------|-------------|
| 40.                                      | Pethathampatti   | 4137             | 2498                 | 1431                      | 1067                        | 60.38       |
| 41.                                      | Pudupatti        | 3242             | 1969                 | 1117                      | 852                         | 60.73       |
| 42.                                      | Thadhanur        | 1086             | 754                  | 435                       | 319                         | 69.43       |
| 43.                                      | Thinnahalli      | 554              | 335                  | 191                       | 144                         | 60.47       |
| 44.                                      | Vachathi         | 1032             | 592                  | 331                       | 261                         | 57.36       |
| <b>Harur Taluk - Dharmapuri district</b> |                  |                  |                      |                           |                             |             |
| 45.                                      | Achalvadi        | 2907             | 1923                 | 1070                      | 853                         | 66.15       |
| 46.                                      | Agraharam        | 1007             | 637                  | 381                       | 256                         | 63.26       |
| 47.                                      | Dodampatty       | 1874             | 1211                 | 693                       | 518                         | 64.62       |
| 48.                                      | Ellepudayampatti | 2066             | 1276                 | 731                       | 545                         | 61.76       |
| 49.                                      | Harur (TP)       | 25469            | 18913                | 9932                      | 8981                        | 74.26       |
| 50.                                      | Kalladipatti     | 454              | 258                  | 143                       | 115                         | 56.83       |
| 51.                                      | Kottarapatty     | 268              | 190                  | 110                       | 80                          | 70.90       |
| 52.                                      | Kudumiyampatty   | 1429             | 892                  | 495                       | 397                         | 62.42       |
| 53.                                      | Mobirippatti     | 1594             | 1152                 | 637                       | 515                         | 72.27       |
| 54.                                      | Mookanurpatti    | 438              | 284                  | 166                       | 118                         | 64.84       |
| 55.                                      | Morasapatti      | 466              | 280                  | 145                       | 135                         | 60.09       |
| 56.                                      | Nachanampatty    | 271              | 198                  | 107                       | 91                          | 73.06       |
| 57.                                      | Pachanampatty    | 1353             | 834                  | 453                       | 381                         | 61.64       |
| 58.                                      | Sandappatti      | 760              | 450                  | 252                       | 198                         | 59.21       |
| 59.                                      | Setrapatti       | 361              | 263                  | 143                       | 120                         | 72.85       |
| 60.                                      | Soriyampatti     | 1197             | 763                  | 452                       | 311                         | 63.74       |
| 61.                                      | Sundangipatti    | 745              | 456                  | 242                       | 214                         | 61.21       |
| 62.                                      | Tandekuppam      | 1618             | 1031                 | 562                       | 469                         | 63.72       |
| 63.                                      | Thadampatti      | 841              | 469                  | 259                       | 210                         | 55.77       |

| S. No        | Name              | Total Population | Literates Population | Literates Population Male | Literates Population Female | % Literates  |
|--------------|-------------------|------------------|----------------------|---------------------------|-----------------------------|--------------|
| 64.          | Thambichettipatti | 416              | 268                  | 148                       | 120                         | 64.42        |
| 65.          | Velampatti        | 608              | 491                  | 284                       | 207                         | 80.76        |
| <b>Total</b> |                   | <b>137728</b>    | <b>91568</b>         | <b>51231</b>              | <b>40337</b>                | <b>66.48</b> |

(Source: Census 2011)

### 3.11.2.3 Health facility within the study area

The majority of people visit nearby Hospitals/health services provided by the Government. The area has got good public health facilities at easily reachable distances. There was no major health issues reported in our survey. Even for any minor ailments, they contact medical facilities immediately as it is very accessible to them. The local transport facilities and the communication facilities are the main reasons to get immediate medical attention. The incidents of institutional delivery are high due to awareness, education, economic development, proximity to health delivery system. The Infant mortality rate and the maternal mortality rate have significantly reduced.

### 3.11.3 Summary

The Socioeconomic profile of the study area shows that the majority of people in the study area work in non-agricultural sector, however in rural area majority of the people in the rural area depends on agricultural sector. They have good educational infrastructures and the people in the study area are well connected to the educational infrastructures. The people in the study area are well connected to Government primary health centres and Primary health sub-centresshows the socio-economic indicators within the study area given in **Table 3-27**.

**Table 3-27 Summaries of Socio-economic indicators within the study area**

| S. No | Particulars                          | 0-10 km  | Unit |
|-------|--------------------------------------|----------|------|
| 1.    | Number of villages in the Study Area | 65       | No's |
| 2.    | Total Households                     | 36,188   | No's |
| 3.    | Total Population                     | 1,37,728 | No's |

|     |                                    |        |      |
|-----|------------------------------------|--------|------|
| 4.  | Children Population (<6 Years Old) | 13,547 | No's |
| 5.  | SC Population                      | 38,733 | No's |
| 6.  | ST Population                      | 5,103  | No's |
| 7.  | Total Working Population           | 70,860 | No's |
| 8.  | Main Workers                       | 64,957 | No's |
| 9.  | Marginal Workers                   | 5,903  | No's |
| 10. | Cultivators                        | 20,998 | No's |
| 11. | Agricultural labours               | 28,564 | No's |
| 12. | Household Industries               | 1,053  | No's |
| 13. | Other Workers                      | 20,245 | No's |
| 14. | Literates                          | 91,568 | No's |

*(Source: Census 2011)*

## 4 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

### 4.1 Details of Investigated Environmental impacts due to project location, possible accidents, project design, project construction, regular operations, final decommissioning or rehabilitation of a completed project

The impacts due to mining operation and its mitigation measures adopted are detailed in this chapter. The opencast mining operations involve development of benches, approach roads, haul roads, blasting, excavation and handling & transportation of materials operations cause environmental problems such as degradation of land, air, water, soil, also affecting the biological and socio-economic environment of the study area. So, adequate control measures will be implemented to mitigate the adverse environmental impacts caused due to mining operation. Various environmental impacts, which have been identified due to the mining operation of the proposed project, are discussed in the following sections. The environmental parameters most commonly affected by mining activities are:

- Land Environment
- Air Environment
- Noise Environment
- Water Environment
- Biological Environment
- Socio-Economic Environment

### 4.2 Impact of Land Environment

Potential impacts envisaged due to mining operations on land environment are,

- The topsoil and bushes observed in the hill slides over the dyke will be removed completely. Hence the top hill ridge will be excavated which will interrupt the aesthetic view of the locality.
- The proposed quarrying operation will alters the hillock slope and natural drainage pattern.
- Due to the proposed mining activity, a pit will be created over the hill lock and left open with the approximate dimension as follows.

**Table 4-1 Ultimate Pit Dimension Details**

| S. No | Description | Average Ultimate Pit Dimensions (m) |       |       |
|-------|-------------|-------------------------------------|-------|-------|
|       |             | Length                              | Width | Depth |
| 1     | Top         | 324                                 | 68    | 33    |

|   |        |     |       |  |
|---|--------|-----|-------|--|
| 2 | Bottom | 193 | 22.50 |  |
|---|--------|-----|-------|--|

- The Total waste (Granite waste + Over Burden + Side Burden) to be generated during the five years of mining plan period will be around 64,962m<sup>3</sup>. These wastes are proposed to be dumped on the Southeast side of lease area.
- Usage of chemicals like Rock Breaking Powder (Ca(OH)<sub>2</sub>) for secondary blasting, fuel and lubricants used for machineries will affect the soil quality and fertility.
- Generation of hazardous and non-hazardous wastages.
- Creation of infrastructure facilities like office building, rest shelter, first-aid centre, toilets and other service facilities.

### 4.3 Impact of Air Environment

#### Source

The major sources of air pollution due to mining operations are DG sets, Machineries and Vehicular transportation. The activities causing air pollution due to the mining operations will be excavation, drilling, blasting and transportation. The sources of air emission are detailed below in **Table 4-2**.

**Table 4-2 Sources of air pollution at quarry**

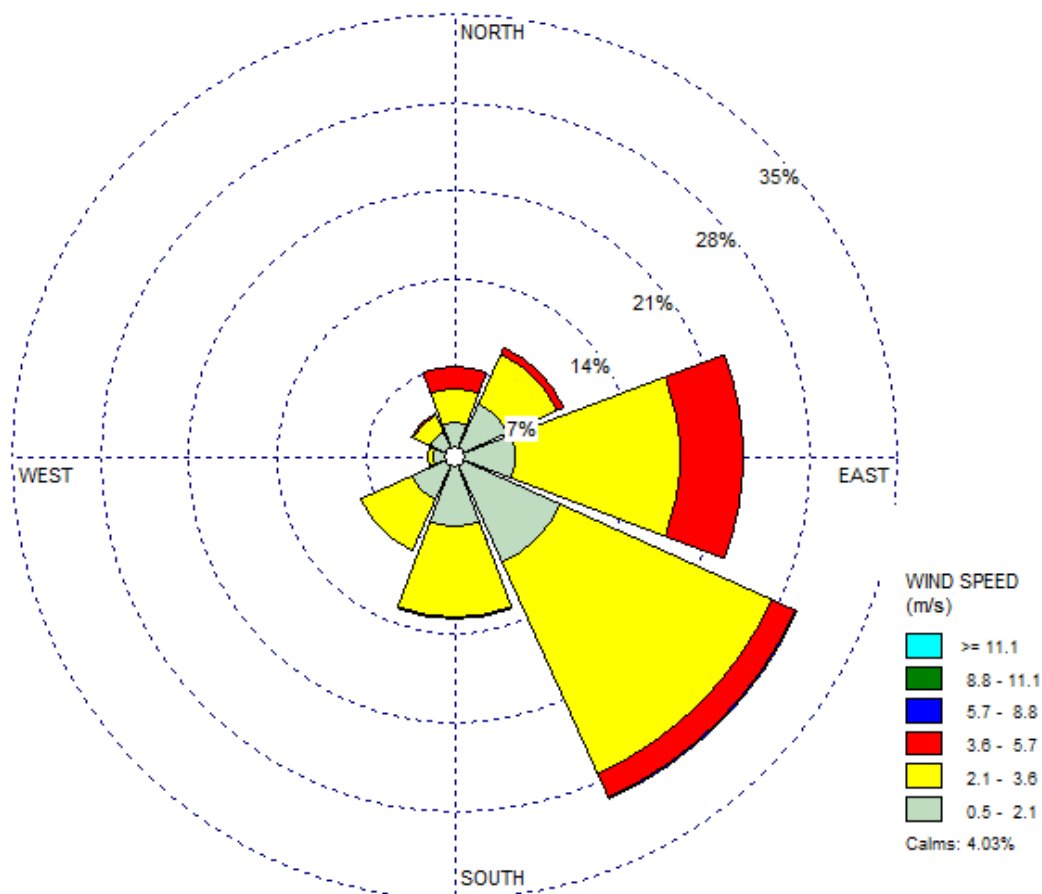
| S. No | Source of emission                   | Pollutant        |
|-------|--------------------------------------|------------------|
| 1.    | Excavation of Granite                | PM               |
| 2.    | Operation of diesel driven equipment | Gaseous emission |
| 3.    | Transportation of product            | PM               |

#### Impacts

- Due to mining activity, Air pollution will cause respiratory problems.
- Air pollution will affect nearby ecosystems, vegetation, livestock habitats and water sources.

#### 4.3.1 Meteorological Data

The meteorological data for three months, i.e. from **February 2025 to April 2025** was considered for the study. Data included for AERMET were daily wind speed, wind direction, temperature, relative humidity, air pressure, precipitation, and solar radiation recorded during the period. AERMET reformats meteorological data so that it can be used as input for AERMOD model. Meteorology considered for modeling is shown below.



**Figure 4-1 Wind rose diagram considered for dispersion modeling  
(February 2025 to April 2025)**

#### **AERMET Process**

For the 3 phase AERMET processing of the meteorological data, specifications of the land use in the area are required to determine the terrain roughness for modeling. The land use was characterized for in and around the site. The surface characteristics for the site and surroundings were selected and used to calculate the Albedo, Bowen ratio and surface roughness parameter. The meteorological data were processed in the AERMET software to generate wind flow pattern & to generate surface meteorological data and profile meteorological data in a prescribed format that can be fed to AERMOD for modeling.

#### **AERMOD Process**

AERMOD Software Version 8.0.5 was used for air dispersion modeling and is applicable to a wide range of buoyant or neutrally buoyant emissions up to a range of 50 km. In addition to more straight forward cases, AERMOD is also suitable for complex terrain and urban dispersion scenarios.



AERMOD is a steady-state plume model. In the Stable Boundary Layer (SBL), it assumes the concentration distribution to be Gaussian in both the vertical and horizontal. In the Convective Boundary Layer (CBL), the horizontal distribution is also assumed to be Gaussian, but the vertical distribution is described with a bi-Gaussian probability density function (pdf). This behavior of the concentration distributions in the CBL was demonstrated by Willis and Deardorff (1981) and Briggs (1993). Additionally, in the CBL, AERMOD treats “plume lofting,” whereby a portion of plume mass, released from a buoyant source, rises to and remains near the top of the boundary layer before becoming mixed into the CBL. AERMOD also tracks any plume mass that penetrates into the elevated stable layer, and then allows it to re-enter the boundary layer when and if appropriate. For sources in both the CBL and the SBL, AERMOD treats the enhancement of lateral dispersion resulting from plume meander. The emissions mainly generated from the mining activities are Blasting, Drilling, Scrapping, Excavation, Loading, Unloading, and transportation etc. Machinery like compressors and jack hammers are used for Drilling are estimated and used as inputs for the air dispersion modeling as shown in **Table 4-4 to Table 4-7**.

Maximum incremental value for SO<sub>2</sub>, NO<sub>x</sub> and PM are shown in **Figure 4-2 to Figure 4-4** and Top 10 highest Ground Level Concentration (GLC) obtained from modeling are given in **Table 4-8 to Table 4-10** respectively.

### Emission Calculations

Each mining activity is a source of emission and the estimation of emissions depends on parameters such as meteorological, topographic conditions and material characteristics. It is necessary to calculate the qty of emissions for work or a source on site to the atmosphere. The following emission formulas are used to calculate the emission rate for the different emission source.

**Table 4-3 Overview of the Source Parameters**

| S. NO | Description                 | Symbol | Quantity |
|-------|-----------------------------|--------|----------|
| 1     | Moisture Content (%)        | m      | 1.64     |
| 2     | Silt Content (%)            | s      | 6        |
| 3     | Production / Day (Tonn/Day) |        | 7.6083   |
| 4     | Waste Dumping Area (Sq.Km)  | a      | 0.0066   |
| 5     | Open Pit Area (Sq.Km)       | Aa     | 0.0078   |

### Source:

Emission Estimation Technique Manual for Mining and Processing of Non-Metallic Minerals by NPI, Nov 1999

Determination of the emission rate from various opencast mining operations, S. K. CHAULYA\*, M. K. CHAKRABORTY, etc. *Al. Water, Air, and Soil Pollution 140: 21-55, 2002.*

Chaulya, S., 2006. Emission rate formulae for surface iron mining activities. *Environmental Modeling Assessment*, Issue 11, pp. 361-370.

EPA. August, 2004. Section 11.19.2, Crushed Stone Processing and Pulverized Mineral Processing. In: *Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, Fifth Edition, AP-42.* U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. Research Triangle Park, North Carolina.

### Emission dispersion models

Each mining activity is a source of emission and the estimation of emissions depends on parameters such as meteorological, topographic conditions and material characteristics. The emission factors for PM<sub>2.5</sub>, which is particulate matter of 2.5µm or less in diameter, were not available in literature.

**Table 4-4 Emission from Mining Equipment's**

| Source     | Fuel used | Stack Details |                |         |           |                     | Emissions (g/s) |                 |                 |
|------------|-----------|---------------|----------------|---------|-----------|---------------------|-----------------|-----------------|-----------------|
|            |           | No of Stack   | Height (m) AGL | Dia (m) | Temp (°C) | Exit Velocity (m/s) | PM              | SO <sub>x</sub> | NO <sub>x</sub> |
| 125 KVA DG | Diesel    | 1             | 3              | 0.3     | 180       | 10                  | 5.81E-03        | 5.38E-03        | 8.16E-02        |

**Table 4-5 Vehicular Source Emission details**

| Source                      | Emission (g/s)  |                 |
|-----------------------------|-----------------|-----------------|
|                             | PM              | NO <sub>x</sub> |
| 4 Wheeler (1 no.)           | 6.94E-05        | 6.94E-04        |
| Heavy Duty Vehicles (2 no.) | 1.11E-04        | 1.94E-02        |
| <b>Total</b>                | <b>1.81E-04</b> | <b>2.01E-02</b> |

**Table 4-6 Emissions considered for mining**

| Activities         | PM Emission rate |
|--------------------|------------------|
| Wet Drilling (g/s) | 1.60E-07         |
| Haulage (g/s)      | 4.16E-05         |

|                                |          |
|--------------------------------|----------|
| Waste Dumping (g/s)            | 2.32E-06 |
| Open Pit (g/s.m <sup>2</sup> ) | 1.08E-07 |

**Table 4-7 Emission input for modelling**

| Activities                                   | PM       | SO <sub>2</sub> | NO <sub>x</sub> |
|----------------------------------------------|----------|-----------------|-----------------|
| Line Source (Haul Road) (g/s)                | 4.16E-05 | -               | -               |
| Area Source (Open Pit) (g/s.m <sup>2</sup> ) | 1.08E-07 | -               | -               |
| Area Source (Waste Dumping) (g/s)            | 2.32E-06 | -               | -               |
| Point Source (DG) (g/s)                      | 5.81E-03 | 5.38E-03        | 8.16E-02        |
| Point Source (Drilling) (g/s)                | 1.60E-07 | -               | -               |
| Line Source (Vehicle)(g/s)                   | 1.81E-04 | -               | 2.01E-02        |

**Note:**

a. Since emission factors are available for PM<sub>10</sub> the following assumptions are made for PM<sub>10</sub> and PM<sub>2.5</sub> estimation

- 60% of PM<sub>10</sub> is considered as PM<sub>2.5</sub>

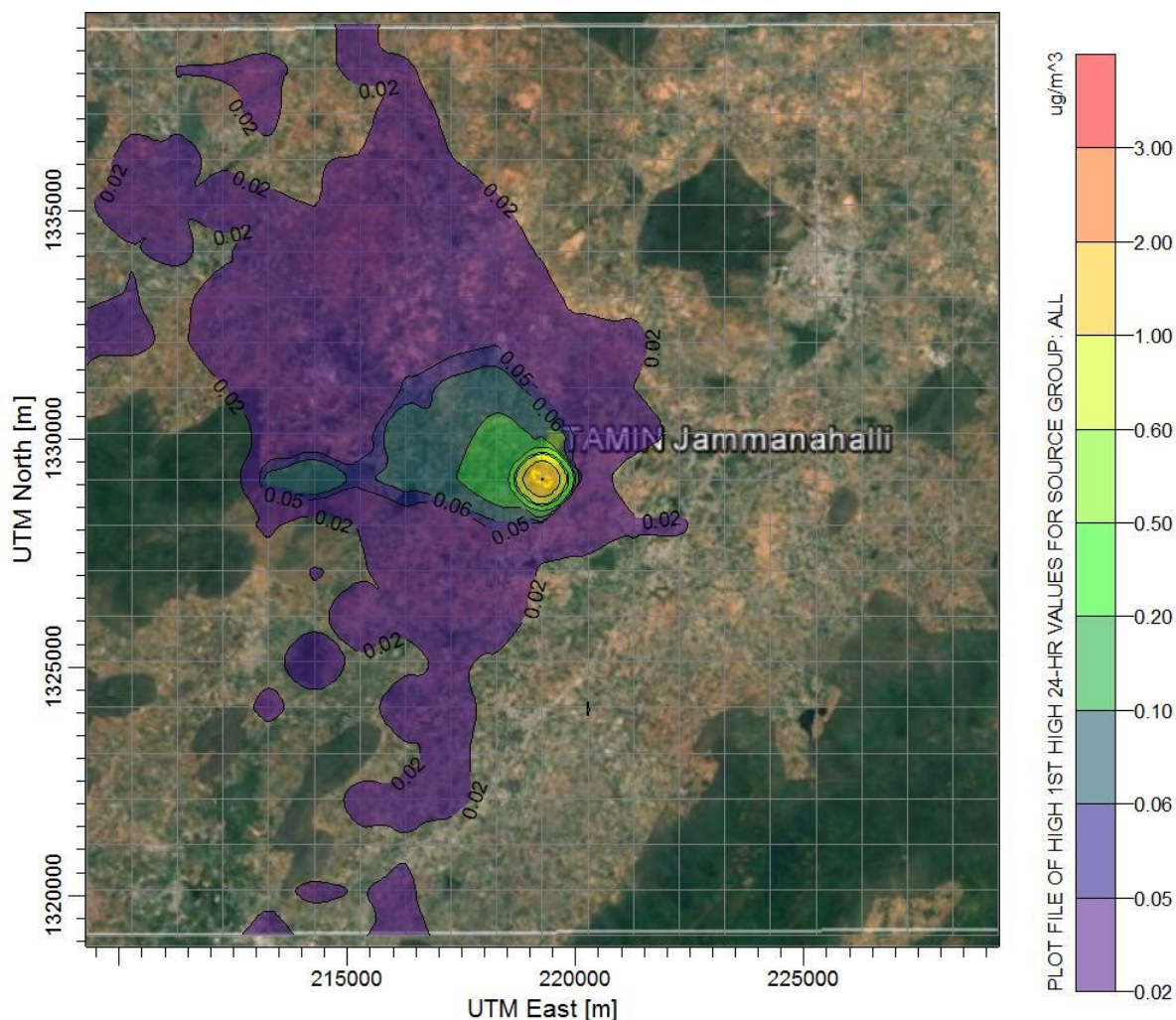
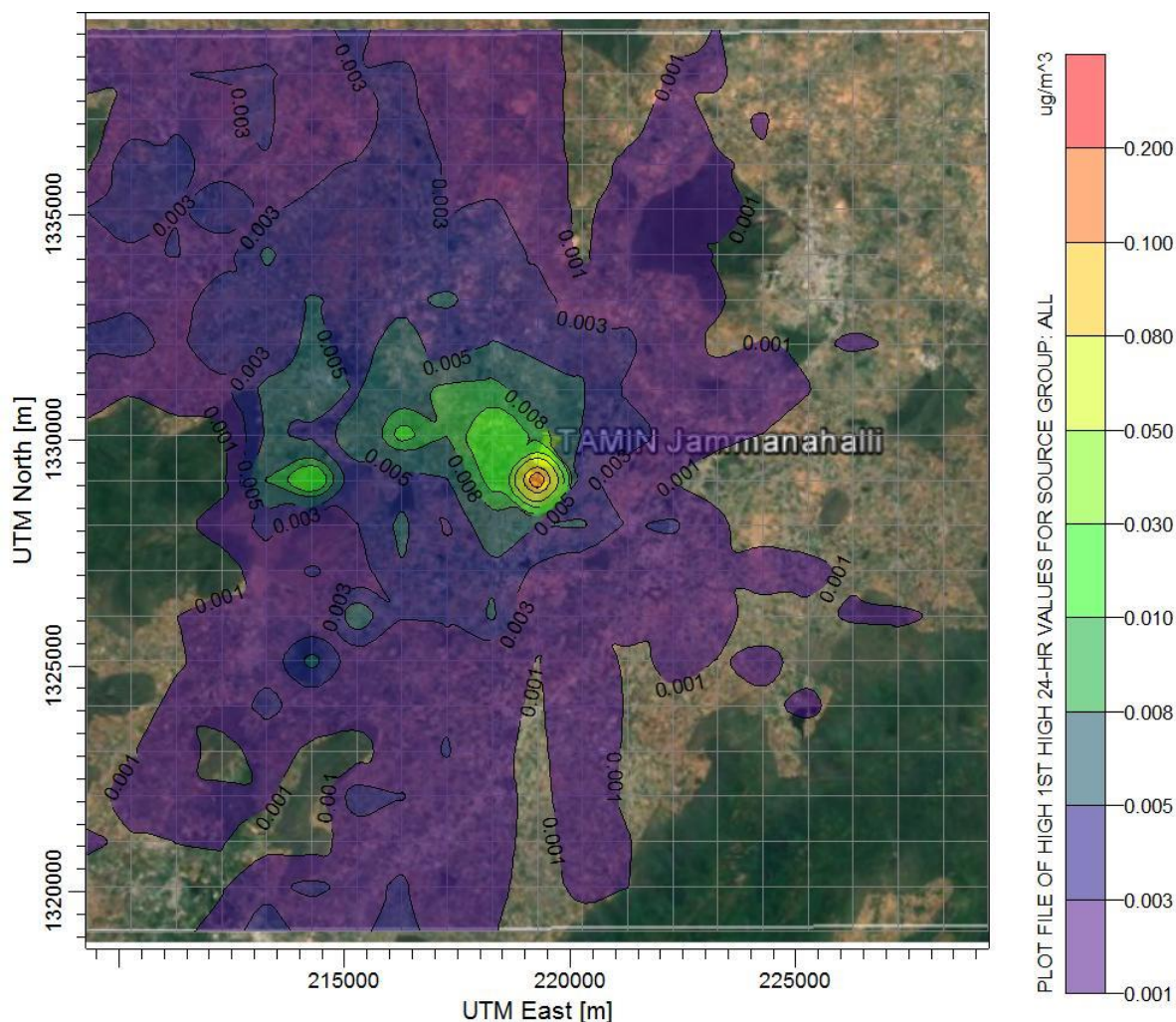


Figure 4-2 Predicted 24 Hrs GLC's of PM<sub>10</sub> within 10km radius of the study area

Table 4-8 Predicted Top 10 Highest Concentrations Particulate Matter PM<sub>10</sub>

| S.NO | UTM coordinates (m) |         | Conc.<br>( $\mu\text{g}/\text{m}^3$ ) | Distance from<br>Centre of the<br>project (km) | Direction<br>from project<br>Centre |
|------|---------------------|---------|---------------------------------------|------------------------------------------------|-------------------------------------|
|      | E                   | N       |                                       |                                                |                                     |
| 1.   | 219271              | 1329115 | 2.05064                               | Project Site                                   | Project Site                        |
| 2.   | 218271              | 1329115 | 0.18283                               | 1.00                                           | W                                   |
| 3.   | 218271              | 1330115 | 0.13646                               | 1.41                                           | NW                                  |
| 4.   | 214271              | 1329115 | 0.09524                               | 5.00                                           | W                                   |
| 5.   | 217271              | 1329115 | 0.09292                               | 2.00                                           | W                                   |
| 6.   | 216271              | 1330115 | 0.08666                               | 3.16                                           | WNW                                 |
| 7.   | 219271              | 1330115 | 0.08486                               | 1.00                                           | N                                   |
| 8.   | 218271              | 1331115 | 0.07464                               | 2.23                                           | NNW                                 |
| 9.   | 216271              | 1329115 | 0.069                                 | 3.00                                           | W                                   |
| 10.  | 213271              | 1329115 | 0.067                                 | 6.00                                           | W                                   |





**Figure 4-3 Predicted 24-Hrs' GLC's of SO<sub>2</sub> within 10 km Radius of the Study Area**

**Table 4-9 Predicted Top 10 Highest Concentrations of Sulphur Dioxide**

| S.NO | UTM coordinates (m) |         | Conc.<br>( $\mu\text{g}/\text{m}^3$ ) | Distance from<br>Centre of the<br>project (km) | Direction<br>from project<br>Centre |
|------|---------------------|---------|---------------------------------------|------------------------------------------------|-------------------------------------|
|      | E                   | N       |                                       |                                                |                                     |
| 1.   | 219271              | 1329115 | 0.12568                               | Project Site                                   | Project Site                        |
| 2.   | 214271              | 1329115 | 0.01426                               | 5.00                                           | W                                   |
| 3.   | 218271              | 1330115 | 0.01375                               | 1.41                                           | NW                                  |
| 4.   | 218271              | 1329115 | 0.01124                               | 1.00                                           | W                                   |
| 5.   | 216271              | 1330115 | 0.01119                               | 3.16                                           | WNW                                 |
| 6.   | 219271              | 1330115 | 0.00952                               | 1.00                                           | N                                   |
| 7.   | 218271              | 1331115 | 0.00917                               | 2.23                                           | NNW                                 |
| 8.   | 217271              | 1331115 | 0.00885                               | 2.82                                           | NW                                  |
| 9.   | 213271              | 1329115 | 0.00824                               | 6.00                                           | W                                   |
| 10.  | 217271              | 1330115 | 0.00811                               | 2.23                                           | WNW                                 |

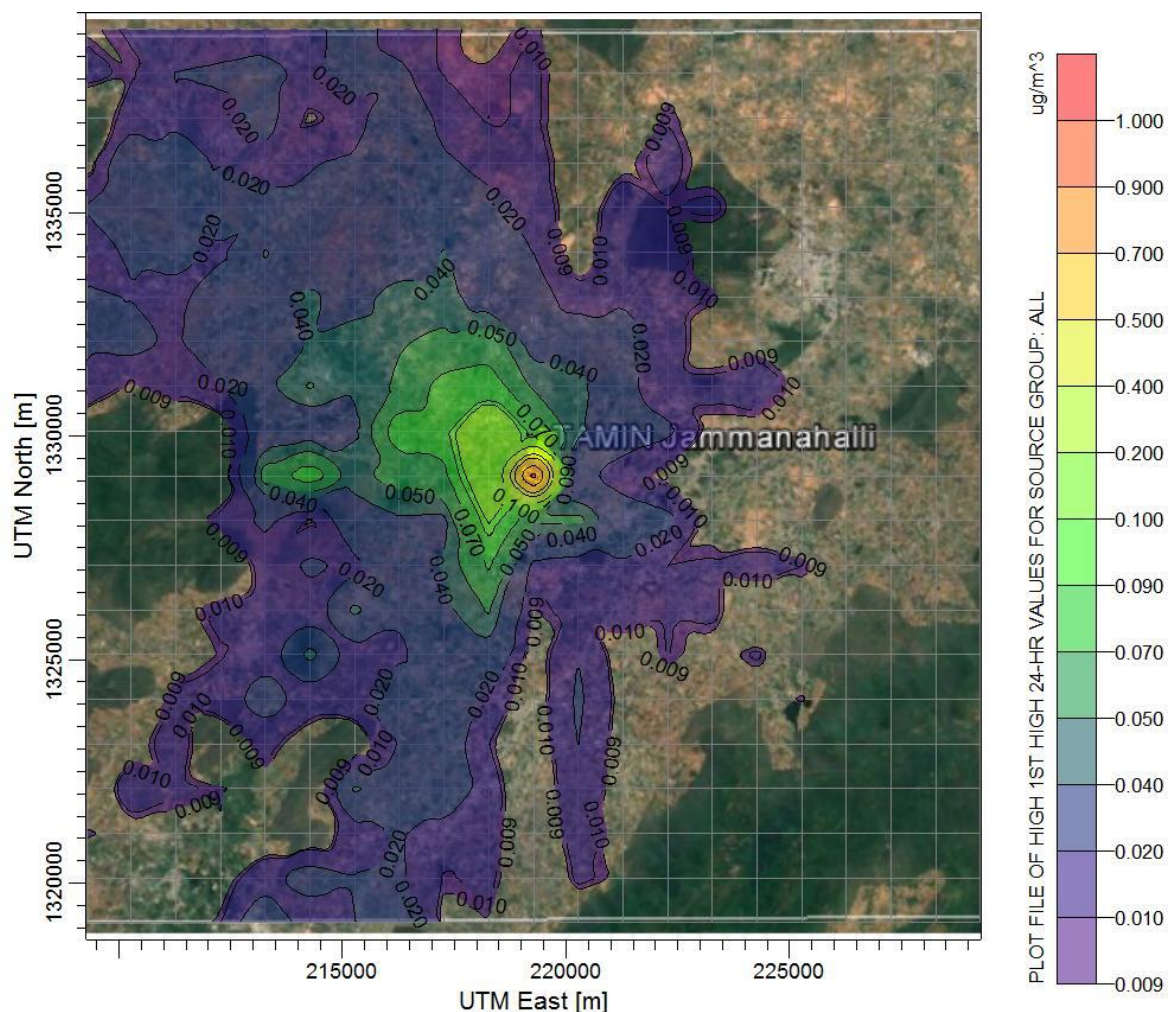


Figure 4-4 Predicted 24-Hrs' GLC's of NO<sub>x</sub> within 10 km Radius of the Study Area

Table 4-10 Predicted Top 10 Highest Concentrations Nitrogen Oxide

| S.NO | UTM coordinates (m) |         | Conc.<br>( $\mu\text{g}/\text{m}^3$ ) | Distance from<br>Centre of the<br>project (km) | Direction<br>from project<br>Centre |
|------|---------------------|---------|---------------------------------------|------------------------------------------------|-------------------------------------|
|      | E                   | N       |                                       |                                                |                                     |
| 1.   | 219271              | 1329115 | 0.96169                               | Project Site                                   | Project Site                        |
| 2.   | 218271              | 1330115 | 0.16294                               | 1.41                                           | NW                                  |
| 3.   | 218271              | 1329115 | 0.14424                               | 1.00                                           | W                                   |
| 4.   | 218271              | 1328115 | 0.10244                               | 1.41                                           | SW                                  |
| 5.   | 216271              | 1330115 | 0.08588                               | 3.16                                           | WNW                                 |
| 6.   | 214271              | 1329115 | 0.08502                               | 5.00                                           | W                                   |
| 7.   | 218271              | 1331115 | 0.08198                               | 2.23                                           | NNW                                 |
| 8.   | 217271              | 1330115 | 0.0819                                | 2.23                                           | WNW                                 |
| 9.   | 219271              | 1330115 | 0.08051                               | 1.00                                           | N                                   |
| 10.  | 217271              | 1331115 | 0.07889                               | 2.82                                           | NW                                  |

#### 4.3.2 Conclusion

The total increase in concentrations above baseline increase is summarized in the below **Table 4-11**.

**Table 4-11 Total maximum GLCs from emissions**

| Pollutant       | Max. Base Line Conc. ( $\mu\text{g}/\text{m}^3$ ) | Estimated Incremental Conc. ( $\mu\text{g}/\text{m}^3$ ) | Total Conc. ( $\mu\text{g}/\text{m}^3$ ) | NAAQ standard |
|-----------------|---------------------------------------------------|----------------------------------------------------------|------------------------------------------|---------------|
| PM              | 57.72                                             | 2.05                                                     | 59.77                                    | 100           |
| SO <sub>2</sub> | 15.01                                             | 0.12                                                     | 15.13                                    | 80            |
| NO <sub>x</sub> | 25.87                                             | 0.96                                                     | 26.83                                    | 80            |

#### 4.4 Impact due to Carbon Emission

The proposed Quarry has the potential to generate various GHG emissions, including carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), fluorinated gases, water vapour, and ozone. These emissions can arise from different phases of quarrying operations, such as excavation, transportation, energy consumption, and land-use changes. A detailed study has been conducted to analyse and mitigating these emissions for minimizing environmental impact and promoting sustainable quarrying practices.

##### Impacts on Above and Below Soil Carbon Stock

**Above Soil Carbon Stock:** Deforestation and soil disturbance reduce above ground carbon stocks by releasing stored carbon from vegetation into the atmosphere.

**Below Soil Carbon Stock:** Soil erosion and disturbance associated with quarrying activities lead to the loss of soil organic carbon, compromising soil fertility and ecosystem health.

Operating a granite quarry can have several impacts on increasing carbon emissions and contributing to temperature rise, primarily through direct and indirect mechanisms. The key impacts are identified as:

**Table 4-12 Impact Due to Carbon Emission**

| S.No | Activity                                                    | Impacts /Consequences                                                                                                                                        | Mitigation Measures                                                                                                        |
|------|-------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| 1    | Operation of Heavy Machinery and Equipment-Direct Emissions | The continuous operation of such machinery results in the direct release of CO <sub>2</sub> into the atmosphere, contributing to increased carbon emissions. | Implementing energy-efficient technologies and practices, such as using low-emission equipment or transitioning to cleaner |



|   |                                                                                                |                                                                                                                                                                                                                                                                     |                                                                                                                                                                      |
|---|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   |                                                                                                |                                                                                                                                                                                                                                                                     | fuels, can help reduce direct emissions from machinery.                                                                                                              |
| 2 | Energy-intensive processes, such as drilling, cutting, and transportation of granite materials | The combustion of fossil fuels releases CO <sub>2</sub> and other GHGs, contributing to indirect emissions associated with quarry operations.                                                                                                                       | Transitioning to renewable energy sources, such as solar can reduce indirect emissions associated with energy consumption in quarry operations.                      |
| 3 | Land-Use Changes and Deforestation                                                             | Deforestation results in the release of carbon stored in trees and soil into the atmosphere, thereby contributing to increased carbon emissions. Additionally, the loss of vegetative cover reduces the area's capacity to sequester carbon through photosynthesis. | Plantation in and around the quarry area can help offset carbon emissions and restore ecosystem functions.                                                           |
| 4 | Soil Disturbance, Excavation and Carbon Loss                                                   | Soil disturbance disrupts the natural carbon cycle by accelerating the decomposition of organic matter, releasing carbon dioxide into the atmosphere. Moreover, soil erosion reduces the soil's ability to retain carbon, further exacerbating carbon loss.         | Implementing sustainable land management practices, such as minimizing soil disturbance and erosion control measures, can help preserve soil and reduce carbon loss. |
| 5 | All Operations-Impacts on Microclimate and                                                     | Quarry operations can alter local microclimates                                                                                                                                                                                                                     | Plantation in and around the quarry area                                                                                                                             |

|  |             |                                                                                                                                                                                                                                                                                                                                                                                      |                                                              |
|--|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
|  | Temperature | and contribute to temperature rise in the surrounding areas. Removal of vegetation and exposure of bare rock surfaces can increase surface temperatures through the absorption and retention of solar radiation. Additionally, the heat generated by machinery and equipment, as well as dust emissions from quarrying activities, can contribute to localized temperature increases | can mitigate temperature rise and restore ecosystem balance. |
|--|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|

#### 4.5 Impact on climate change, temperature rise, pollution

The proposed quarry will have various impacts on climate change, temperature rise, pollution, and carbon stocks, both above and below the soil. A detailed study has been conducted the results are given below.

**Table 4-13 Climate Change and Temperature Rise**

| S.No | Activity                                                      | Impacts /Consequences                                                                                                                                                                                                    | Mitigation Measures                                                                                                                                                                                                                                                                                                      |
|------|---------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Operation of Heavy Machinery and Equipment – Direct Emissions | Quarrying activities involving machinery, diesel vehicles, and energy consumption emit greenhouse gases (GHGs) such as carbon dioxide (CO <sub>2</sub> ) and methane (CH <sub>4</sub> ), contributing to climate change. | Adopt energy-efficient technologies and practices to reduce energy consumption and associated GHG emissions in quarry operations. Transition to renewable energy sources such as solar power to power quarry operations, minimizing reliance on fossil fuels. The other mitigation measures given in the previous point. |

|   |                                               |                                                                                                                                                                            |                                                                                                                                                                                                                                                                        |
|---|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2 | Deforestation                                 | Clearing vegetation for quarry operations releases stored carbon into the atmosphere, leading to reduced carbon sequestration capacity and contributing to climate change. | Greenbelt development will restore vegetation cover and sequester carbon, offsetting emissions from deforestation and land-use changes.<br><br>Restore degraded areas within and around the quarry site to enhance carbon sequestration and biodiversity conservation. |
| 3 | Alteration of land cover and soil composition | Alteration of land cover and soil composition can disrupt local microclimates, affecting temperature, humidity, and precipitation patterns in the surrounding area.        | Implement soil conservation measures such as erosion control, reclamation and soil stabilization to preserve soil carbon and maintain ecosystem integrity. Minimize soil disturbance during quarry operations to reduce carbon loss from soils and prevent erosion.    |

#### 4.6 Impacts due to Transportation

The Granite is transported to consumer directly as per buyer's requirement. The granite will be transported through existing road by tippers and approx. no. of trips required is 2 times per week. This minimum trip does not create impact on existing transportation. The traffic study has been conducted in the NH-179A connecting Salem – Vaniyambadi located 2.89km away from the project site in which is located in ESE direction. The traffic study was conducted for 1 hour in Peak hour of observation day. The vehicular movement for the proposed project is given in **Table 4-14**.



Figure 4-5 Site Connectivity Map of the Study Area

Table 4-14 Existing & proposed vehicular movement per Hour (Peak Hour) SH-60A

| S. No        | Type of Vehicle        | Existing vehicles | Existing PCU  | Proposed vehicles | Proposed PCU | Total vehicles after project implementation | PCU Factors IRC (SP 41) | Total PCU after project implementation |
|--------------|------------------------|-------------------|---------------|-------------------|--------------|---------------------------------------------|-------------------------|----------------------------------------|
| 1            | 2 wheeler              | 4150              | 3113          | 0                 | 0            | 4150                                        | 0.75                    | 3113                                   |
| 2            | 3 wheelers             | 826               | 991           | 0                 | 0            | 826                                         | 1.2                     | 991                                    |
| 3            | 4 wheelers / cars      | 1942              | 1942          | 0                 | 0            | 1942                                        | 1                       | 1942                                   |
| 4            | truck/Lorry            | 959               | 3548          | 4                 | 15           | 963                                         | 3.7                     | 3563                                   |
| 5            | agricultural tractor   | 51                | 204           | 0                 | 0            | 51                                          | 4                       | 204                                    |
| 6            | light emission vehicle | 1086              | 2172          | 0                 | 0            | 1086                                        | 2.0                     | 2172                                   |
| <b>Total</b> |                        | <b>9,014</b>      | <b>11,970</b> | <b>4</b>          | <b>15</b>    | <b>9,018</b>                                | <b>-</b>                | <b>11,985</b>                          |

**Table 4-15 Traffic Volume after Implementation of the Project**

| For the Road         | Volume of Traffic | Volume (V) | Road Capacity (C) | V/C Ratio | LOS Category* | Traffic Classification |
|----------------------|-------------------|------------|-------------------|-----------|---------------|------------------------|
| Existing             | 9014              | 11970      | 35000             | 0.34      | "A"           | Free Flow Traffic      |
| After implementation | 9018              | 11985      | 35000             | 0.34      | "A"           | Free Flow Traffic      |

\*LOS (Level of Service) categories are A-Free Flow, B- Stable Traffic Flow, C- Restricted Flow, D- High Density Flow, E- Unstable flow, F- Forced or breakdown flow.

Due to propose project there will be slight increment in the vehicle movement but the level of service (LOS) anticipated will be Free Flow Traffic.

#### **4.7 Impact of Water Environment**

Impacts envisaged due to wastewater generation during mining operations are,

- Wastewater generated from the mines can pollute surface water and groundwater, which can harm wildlife and human health.
- Runoff from mining wastewater can devastate surrounding vegetation.
- Explosive blasting in a mine can cause groundwater to seep to lower depths or connect aquifers, exposing them to contamination by toxic heavy metals.

##### **4.7.1 Rainwater Harvesting**

###### **Impacts**

Impacts envisaged due to rainwater on mining operations are

- Heavy rainfall can cause high water levels at a mining site, which can damage equipment and threaten worker safety.
- Rainwater can carry pollutants from a mining site into nearby water bodies; these pollutants can include heavy metals, acids, and other substances that can contaminate the water.
- When it rains, the loosened topsoil can be washed away, carrying sediments that pollute water bodies.

#### **4.8 Impact of Noise**

###### **Source**

The main sources of noise in the mine are as follows:

- Drilling
- Blasting
- Transportation vehicles

- Loading & unloading of minerals.

### Impacts

Due to mining activity, Noise pollution will cause hearing loss, cardiovascular problems, sleep disturbances, stress and anxiety to the workers

#### 4.8.1 Noise due to Mining Activity

The noise levels in the working environment will be maintained within the standards prescribed by Occupational Safety and Health Administration (OSHA). These standards were established with the emphasis on reducing the hearing loss. The permissible limits, as laid down by OSHA, are presented in **Table 4-16**.

**Table 4-16 Permissible Exposure in Cases of Continuous Noise (OSHA, Govt. of India)**

| S.No | Sound Level (dB A) | Continuous Duration (Hours) |
|------|--------------------|-----------------------------|
| 1    | 85                 | 8                           |
| 2    | 88                 | 4                           |
| 3    | 91                 | 2                           |
| 4    | 94                 | 1                           |
| 5    | 97                 | 0.5                         |
| 6    | 100                | 0.25                        |

#### 4.9 Impact of Vibration

##### Source

The main sources of vibration in the proposed mine are as follows:

- Drilling
- Blasting
- Loading & unloading of minerals.
- Transportation vehicles

##### Impacts

Due to mining activities, the following impacts of vibration are envisaged as follows:

- Structural damage to infrastructure facilities within the mine lease area.
- Ground Subsidence
- Vibrations cause human health impacts such as fatigue, muscle strain, joint pain, sleep disturbances, cardiovascular problems etc.

#### 4.10 Impact on Biological Environment

The impacts on biological environment is given in the below table.

**Table 4-17 Impacts on Biodiversity**

| S. No | Activity                             | Examples of aspects                                       | Examples of biodiversity impact                                                                          |
|-------|--------------------------------------|-----------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| 1     | Extraction                           | Land clearing                                             | Loss of habitat, introduction of plant diseases, Siltation of water courses                              |
| 2     | Blasting, Digging and hauling        | Dust, noise ,vibration, water pollution                   | Disruption of water courses ,impacts on aquatic ecosystems due to changes in hydrology and water quality |
| 3     | Waste dumping                        | Clearing, water and soil pollution                        | Loss of habitat, soil and water contamination, sedimentation.                                            |
| 4     | Air emissions                        | Air pollution                                             | Loss of habitat or species                                                                               |
| 5     | Waste disposal                       | Oil and water pollution                                   | Encouragement of pests, disease transfer, contamination of groundwater and soil                          |
| 6     | Building power lines                 | Land clearing                                             | Loss or fragmentation of habitat                                                                         |
| 7     | Provision of accommodation           | Land clearing, soil and water pollution, waste generation | Loss of habitat, sewage disposal and disease impacts                                                     |
| 8     | Access roads                         | Land clearing                                             | Habitat loss or fragmentation, water logging upslope and drainage shadows down slope                     |
| 9     | Population growth                    | Land clearing or increased hunting                        | Loss of habitat or species, stress on local and regional resources, pest introduction, clearing          |
| 10    | Water supply (potable or industrial) | Water abstraction or mine dewatering                      | Loss or changes in habitat or species composition                                                        |

#### 4.11 Impact on Agricultural, Forestry & Traditional Practices

We have observed some agricultural lands surrounding the proposed mine lease area. The major cultivation practices are

- Sorghum
- Millet
- Groundnut
- Coconut

The following livestock details near to the proposed mine lease area and within the study area are

##### **Cattle:**

##### 1. Indigenous breeds:

- Ongole



- Kangeyam
- Pulikulam

2. Crossbreed varieties:

- Jersey
- Holstein Friesian

**Small Ruminants:**

1. Sheep:

- Mecheri
- Vembur
- Nali

2. Goats:

- Tellicherry
- Osmanabad

**Poultry:**

- Backyard poultry (desi birds)
- Commercial broilers
- Layers

**Other Livestock:**

- Buffalo (Murrah, Surti)
- Horses and Ponies
- Donkeys
- Rabbits
- Pigs

Mild impacts could occur around the mine pits and along transport route within a radius of 100m in the form of dust and air emissions. This shall be a temporary effect and not anticipated to affect the surrounding vegetation significantly.

#### **4.12 Hydrothermal Effect due to the Proposed Project**

- Changes in groundwater flow and quality: Open-cast mining can alter groundwater flow patterns, leading to changes in water quality and potentially contaminating nearby water sources.
- Increased surface runoff: Removal of vegetation and soil can increase surface runoff, leading to erosion and sedimentation in nearby water bodies.
- Acid mine drainage (AMD): Exposure of sulfide-bearing rocks can lead to AMD, which can contaminate surface and groundwater with heavy metals and acidity.

- Mining operations can release heated water into nearby water bodies, altering aquatic ecosystems.

#### **4.13 Geothermal Effects due to the Proposed Project**

- Heat generation: Mining operations can generate heat through mechanical and chemical reactions, potentially altering local geothermal gradients.
- Subsidence and land deformation: Open-cast mining can lead to subsidence and land deformation, affecting local heat transfer and groundwater flow.
- Geochemical changes: Mining can alter geochemical reactions, potentially releasing greenhouse gases (e.g., CO<sub>2</sub>, CH<sub>4</sub>) and affecting local geothermal conditions.
- Thermal impact on ecosystems: Changes in soil temperature and moisture can impact local ecosystems, potentially altering plant and animal distributions.

#### **4.14 Impact on Sediment Geochemistry in the Surface streams**

- Acid Mine Drainage (AMD): Mining can expose sulfide-bearing rocks, leading to AMD, which can acidify surface streams and mobilize heavy metals.
- Increased turbidity: Mining-related sedimentation can increase stream turbidity, reducing light penetration and affecting aquatic plant growth.
- Changes in sediment grain size: Mining can alter the grain size distribution of sediments, potentially affecting stream morphology and aquatic habitats.
- Decreased nutrient availability: Mining can lead to decreased nutrient availability in streams, affecting aquatic productivity.
- Increased salinity: Mining can increase stream salinity due to the release of salts and minerals.
- Microbial community disruption: Mining can disrupt microbial communities in streams, affecting nutrient cycling and ecosystem function.
- Increased dissolved solids: Mining can increase dissolved solids, such as sulfate, chloride, and fluoride.
- Changes in redox conditions: Mining can alter redox conditions, affecting the speciation and mobility of metals.

#### **4.15 Impacts on Occupational Health**

- Continuous drilling, blasting, and excavation generate dust containing respirable particulate matter (RPM) and crystalline silica, leading to respiratory diseases such as silicosis, bronchitis, and other pulmonary disorders.
- Noise and vibration from blasting, drilling, and heavy machinery can cause hearing loss, sleep disturbance, and stress-related illnesses.

- Exposure to diesel exhaust, chemical rock-breaking agents, lubricants, and fuel residues may result in skin irritation, eye problems, and long-term systemic effects.
- Workers are at risk of accidents from machinery operations, slope failures, and fly-rock during blasting.

#### **4.16 Impacts on Public Health**

- Dust dispersion into nearby habitations can increase respiratory problems like asthma, coughing, and lung infections.
- Noise and ground vibrations may cause sleep disturbance, mental stress, and general discomfort among local communities.
- Water pollution from mining waste, chemical usage, or fuel leakage can deteriorate water quality, increasing gastrointestinal diseases.
- Open mine pits can lead to water stagnation, providing breeding grounds for mosquitoes and other vectors, thereby increasing risks of malaria, dengue, and other vector-borne diseases.

#### **4.17 Project Measures for Minimizing and/or offsetting Adverse Impacts Identified**

##### **4.17.1 Land Degradation Control Measures**

- Dust suppression on exposed areas using water tankers and automatic sprinkling systems
- Contour overburden dump to minimize erosion
- Plantation using native plant sapling.
- Compliance with mine decommissioning plan.
- Drainage control structures like garland drain to be made around OB dump area to avoid water flow during monsoon below the OB dump.
- Leveling, grading and drainage arrangement for top of OB dumps.
- Topsoil to be stored in small heaps (5m high) at appropriate moisture content with proper vegetation.
- Top soil shall be used in afforestation work, as early as possible.
- Top soil will be removed & stored on the inner boundary of the mining lease area. To improve its quality, soil stabilizers shall be mixed and leguminous plantation will be done over these stacks.
- After complete extraction of estimated reserves of granite. The deeper working pits, after completion of Mining/Quarrying left as it is which would serve as water ponds / water reservoirs.
- The quarried pits after the end of the life of lease will be fenced to prevent inherent

entry of public and cattle's.

- Management plan for topsoil utilization and conservation.
- Progressive year-wise green belt development inside and outside the lease area.
- The DG set are provided with stacks of adequate height so as to disperse the emanating flue gases containing suspended particulate matters, oxides of sulphur and nitrogen without affecting the ground level concentrations.

#### **4.18 Mitigation Measures of Impact on Sediment Geochemistry**

- Implementation of sedimentation ponds and water treatment systems
- Monitoring of water and sediment quality
- Use of best management practices (BMPs) to minimize erosion and sedimentation

#### **4.19 Land Environment Mitigation Measures**

##### **Mitigation Measures**

- Good housekeeping and best practices of waste handling shall be adopted to eliminate/minimize the risks of soil contamination.
- The wastes generated will be stored in temporary storage facility and disposed through nearby municipal disposal bins. Waste oil generated from quarry machineries will be disposed through TNPCB authorized dealers.
- Dust suppression using water tankers.
- Greenbelt around infrastructure within the mine lease area and along the periphery of the mine lease area by using native plants.
- Proper fencing will be provided around the mine lease area

#### **4.20 Erosion Control Measures**

- Re-vegetation of unused areas to prevent erosion.
- Mulching or seeding of disturbed areas.
- Installation of sedimentation ponds and silt traps.
- Diversion of water flows to prevent erosion.
- Regular monitoring of water quality and sediment loads.
- Check dams or sedimentation basins.
- Riprap or rock armor to protect against water erosion.
- Gabions or wire mesh to stabilize slopes.
- Culverts and drainage systems.

- Terracing or benching to reduce slope length.
- Soil nailing or ground anchoring.

#### 4.21 Air Environment Mitigation Measures

The mitigation measures due to the proposed mining activity for air environment are given below.

**Table 4-18 Fugitive dust control in mine**

| S. No | Activities                 | Control Measures                                                                                                                                                                                                                                                                                                                                                |
|-------|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1     | Drilling                   | <ul style="list-style-type: none"> <li>➤ Adopting wet drilling method</li> <li>➤ Drilling machine should be provided with dust extractors</li> </ul>                                                                                                                                                                                                            |
| 2     | Blasting                   | <ul style="list-style-type: none"> <li>➤ Use of control blasting technique</li> <li>➤ Water spray before blasting</li> <li>➤ Usage of Rock breaking powder (Ca(OH)<sub>2</sub>)</li> <li>➤ Usage of Wire saw cutting method</li> </ul>                                                                                                                          |
| 3     | Loading                    | <ul style="list-style-type: none"> <li>➤ Water spray on granite material before loading</li> </ul>                                                                                                                                                                                                                                                              |
| 4     | Transportation of material | <ul style="list-style-type: none"> <li>➤ Covering of the trucks/dumpers to avoid spillage</li> <li>➤ Water spray on the haul roads before and after transportation</li> <li>➤ Maintenance of haul road</li> <li>➤ Speed of vehicles will be limited upto 25km/hr</li> <li>➤ Development of a green belt of suitable width on both sides of haul road</li> </ul> |

#### 4.22 Mitigation measures to address these impacts may include development of Carbon Sinks

Carbon sinks are natural or artificial systems that absorb and store carbon dioxide (CO<sub>2</sub>) from the atmosphere, helping to mitigate climate change by reducing the concentration of greenhouse gases. There are several options for carbon sinks, each with varying degrees of effectiveness and feasibility. Some common carbon sink options include:

- Implementing vegetation and afforestation programs to restore vegetative cover and sequester carbon.
- Adopting sustainable land management practices to minimize soil disturbance and erosion, thereby preserving soil carbon.
- Incorporating carbon offset projects, such as reforestation initiatives or carbon capture and storage (CCS) technologies, to offset emissions generated by quarry operations.
- Install renewable energy sources such as solar, in lieu of operating DGs, for non-

quarrying operations.

- Expand afforestation (planting trees on lands that historically lacked forests) and reforestation (restoring degraded forests) efforts to enhance carbon sequestration and biodiversity conservation.
- Healthy soils have the capacity to store significant amounts of carbon in the form of organic matter. Implementing sustainable land management practices such as no-till agriculture, cover cropping, and agroforestry can enhance soil carbon sequestration and improve soil health, wherever possible.

#### **4.23 Mitigation Measures of Climate Change & Temperature**

- Implement vegetation and afforestation programs to restore vegetation cover and sequester carbon, offsetting emissions from deforestation and land-use changes.
- Adopt energy-efficient technologies and renewable energy sources like solar or wind power to reduce emissions from quarry operations and minimize environmental impact.
- Implement soil conservation measures such as erosion control, reclamation, and soil stabilization to preserve soil carbon and maintain ecosystem integrity.
- Install dust suppression systems, sedimentation ponds, and water treatment facilities to mitigate air and water pollution from quarrying activities.
- Implement habitat restoration and conservation measures to protect biodiversity and ecosystem services affected by quarry operations.
- Engage with local communities, stakeholders, and regulatory authorities to address concerns, promote transparency, and ensure sustainable quarrying practices.

By implementing these mitigation measures, it is possible to minimize the environmental impacts of the proposed quarry, reduce carbon emissions, preserve ecosystem health, and promote sustainable development in the region.

#### **4.24 Mitigation Measures for Impacts due to Transportation**

Proper mitigation measures are practiced during mining activities to control air pollution are as follows:

- Covering of the trucks/dumpers to avoid spillage
- Water spray on the haul roads before and after transportation
- Maintenance of haul road
- Speed control on vehicles

Development of a green belt of suitable width on both sides of haul roads

#### **4.25 Water Environment Mitigation Measures**

##### **4.25.1 Surface Water Pollution Control Measures**

- Construction of garland drains of appropriate size around the mine area and dumps to prevent rainwater from entering active mining zones.
- Construction of baffle wall or trenches nearby water bodies to prevent runoff water from mines.
- The dumping will be provided with slopes and covered with grasses, shrubs, etc to prevent erosion.

##### **4.25.2 Ground Water Pollution Control Measures**

- The domestic sewage of 1.2 KLD will be disposed through septic tank followed by soak pit.
- Regular monitoring of water levels and quality in the existing open wells and bore well in the vicinity will be carried out.

##### **4.25.3 Rain Water Harvesting**

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

- Construct barriers at suitable intervals along the path of the drains to restrict the flow of water.
- Construction of baffle wall or trenches nearby water bodies to prevent runoff water from mines.
- Provide necessary overflow arrangement to maintain the natural drainage system.
- The rainwater will be diverted by garland drains to the sump area within the mine lease. The stored water will be used for agriculture activities and also for dust suppression purpose

#### **4.26 Noise Environment Mitigation Measures**

The following mitigation measures should be taken to control noise pollution:

- Controlled blasting with proper spacing, burden and stemming will be maintained, to reduce noise emission.
- All vehicles and machinery will be properly lubricated and maintained regularly.
- Speed of the vehicles entering and leaving the quarrying lease will be limited to 25 kmph.
- Unnecessary use of horns by the vehicle drivers shall be avoided
- Minimum quantity of detonating fuse will be consumed by using alternatively excel non- electrical initiation system.



- Provision of sound insulated chambers for the workers deployed on machines.
- A thick green belt will be provided in phased manner around the periphery of the mine and on both sides of haul roads to attenuate noise.
- Usage of NONEL Blasting (Non-Electric Detonator).
- Usage of Rock breaking powder ( $\text{Ca(OH)}_2$ ) for secondary splitting .
- Personal Protective Equipment (PPE) like ear muffs/ear plugs will be provided to the operators of HEMM and persons working near HEMM and reducing the exposure time of workers to the higher noise levels.

#### 4.27 Biological Environment Mitigation Measures

- To reduce the adverse effects on flora/fauna status that are found in project area due to deposition of dust generating from mining operations, water sprinkling and water spraying systems will be ensured in all dust prone areas to arrest dust generation.
- Greenbelt development will be done all along the periphery of the mine lease area and haul roads.
- Renovation of ponds
- Construction of check dams and water holes

##### 4.27.1 Green Belt Development

The green belt plantation programme will be continued till the end of the mining operation in the area. In framing out this programme on a sustainable and scientific base, due consultation and coordination with the forest department will be sought.

The project proponent has started to plant green belt species including neem, vilvam, panai around the periphery of the project site as recommended in ToR. The proposed green belt plan is given below.

| Year    | No of trees proposed to plant | Name of the species to be plant | Survival rate expected | No of trees expected to grow |
|---------|-------------------------------|---------------------------------|------------------------|------------------------------|
| 2025-26 | 825                           | Neem, Vilvam, Aathi & Panai     | 80%                    | 660                          |

The total area for the proposed green belt is 0.06.5 Ha during 5 years of the proposed quarrying activity TAMIN is proposing to plant 825 trees are proposed to plant within the 7.5m safety buffer zone mine lease area and also in the proposed green belt area.

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

- Noise absorption.

- Reuse of waste water.
- Prevention of soil erosion
- Ecological restoration
- Aesthetic, biological and visual improvement of area due to improved vegetative and plantation covers.
- Green belt around mine, dumps, etc
  - Tall growing, closely spaced, evergreen trees native to the area
  - Easy, quick early growth and establishment
  - Trees with high foliage density, leaves with larger leaf area
  - Attractive appearance with both good flowering and fruit bearing
  - Bird and insect attracting species
  - Suitable green cover with minimal maintenance
- Avenue Trees:
  - Trees with conical canopy and with attractive flowering
  - Trees with medium spreading branches to avoid obstruction to the traffic
  - Trees with branching at 10 feet and above.

#### 4.28 Mitigate Measures for Occupational Health and Public Health

The mitigation measures for occupational health & public health are as follows,

**Table 4-19 Mitigation for occupational health and public health**

| S. No | Activity              | Mitigation measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1     | Excavation            | ➤ Planned excavation, avoid haphazard mining                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 2     | Drilling and blasting | ➤ Driller should be equipped with a closed cabin to reduce exposure to noise and dust. Adopting wet drilling method to reduce adverse impacts.<br>➤ Implement regular water sprinkling and dust suppression systems to minimize particulate emissions.<br>➤ Provide personal protective equipment (PPE) such as masks, earplugs, helmets, and safety boots to all workers.<br>➤ Adopt controlled blasting techniques and restrict blasting to daytime hours to minimize noise and vibration impacts. |
| 3     | Safety zone           | ➤ Provisions for a buffer zone between the local habitation and the mine lease in the form of a green belt of suitable width.<br>➤ Restricted entry, use of sirens and cordoning of the blasting area are some of the good practices to avoid accidents.                                                                                                                                                                                                                                             |

|   |                             |                                                                                                                                                                                                                                                                                                                |
|---|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4 | Overburden stabilization    | <ul style="list-style-type: none"> <li>➤ Accidents are known to happen due to overburden collapse.</li> <li>➤ Therefore, slope stabilization and dump stability are critical issues for safety and environment.</li> </ul>                                                                                     |
| 5 | Workers health surveillance | <ul style="list-style-type: none"> <li>➤ Conduct periodic health check-ups and maintain medical records for all mine workers.</li> <li>➤ Health survey programmes for local community.</li> <li>➤ Regular training and awareness of employees to be conducted to meet health and safety objectives.</li> </ul> |

#### 4.29 Mitigation Measures due to the Impact on Agriculture

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.
- Mine 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 m safety zone around the quarry to contain the dust from the quarry and prevent the dust from spreading to the adjacent agricultural land.
- Transportation of material will be carried out during day time and material will be covered with tarpaulin
- The speed of tippers plying on the haul road will be limited to < 20 km/hr to avoid generation of dust.

#### 4.30 Mitigation Measures of Hydrothermal and Geothermal Effects

- Water management planning and implementation
- Rehabilitation and reclamation of mined land
- Implementation of AMD prevention and treatment technologies
- Energy efficiency and renewable energy integration
- Geotechnical monitoring and subsidence management
- Ecological restoration and biodiversity conservation

#### 4.31 Assessment of Potential Fragmentation Impacts on the Natural Environment

Due to the mining activity, there may be breakup of continuous natural habitats into smaller, isolated patches, which may adversely affect local biodiversity, ecological connectivity, and wildlife movement.

**Impacts:**

- Habitat Impacts – Due to mining activity, there will be possibility of disrupt the continuity of natural vegetation, water bodies, or wildlife corridors in the project area and its surroundings.
- Flora and Fauna Impacts – Due to mining activity, there will be possibility of impacts to the presence of native plant species, faunal habitats and endangered species.
- Soil and Hydrological Impacts – Due to mining activity, the change in land-use could alter natural drainage patterns or groundwater recharge, thereby indirectly fragmenting ecosystems.

**Mitigation Measures:**

- Greenbelt and buffer plantation along the quarry lease boundary to serve as ecological barriers and improve habitat continuity.
- Progressive reclamation of mined-out areas using native plant species to restore ecological balance.
- Surface runoff and drainage management to prevent siltation of nearby natural habitats.
- Monitoring program to periodically evaluate ecological conditions and effectiveness of mitigation strategies.

**4.32 Irreversible and Irretrievable commitments of environmental components**

Irreversible and Irretrievable commitments of environmental components are not envisaged in the proposed project.

**4.33 Assessment of Significance of Impacts**

This chapter comprises the information regarding the identified beneficially or adversely environmental impacts due to possible aspects predicted because of location of the plant, expected / predicted accidents scenario, conceptualization of project, preconstruction & construction activities and due to operation of machineries/equipment. Environmental aspect-impact relationship will be identified and quantified with its scale of magnitude and scale of importance, accordingly significance of impact will be determined along with mitigation measures.

The impact assessment essentially consists of three steps:

1. Impact Identification
2. Impact Predictions
3. Impact Analysis for determination of significance of impacts

Here, impact assessment has been done based on Leopold Matrix in which each action and its

potential in creating impact is expressed in terms of its magnitude and importance. For quantitative representation, both magnitude & importance are represented by values as described below:

#### 4.34 Scale of Importance

Importance of an interaction is related to its significance, or an assessment of probable consequences of anticipated impact. It ranges from 1 to 10; with 10 representing a very important interaction and 1 of relatively low.

#### 4.35 Scale of Magnitude

Impact score or magnitude ranges from 0-5 with positive and negative values, depending upon the impact rising out of the project activity.

**Table 4-20 Severity Criteria for Magnitude of Impacts**

| S. No | Category              | Description of category           | Impact  |            |
|-------|-----------------------|-----------------------------------|---------|------------|
|       |                       |                                   | Adverse | Beneficial |
| 1     | No impact             | -                                 | 0       | 0          |
| 2     | No appreciable impact | Short term reversible             | -1      | 1          |
| 3     | Significant impact    | Long term reversible              | -2      | 2          |
| 4     | Major impact          | Irreversible but of lesser extent | -3      | 3          |
| 5     | High impact           | Irreversible but of medium extent | -4      | 4          |
| 6     | Permanent impact      | Severe irreversible impact        | -5      | 5          |

Score of each of the component is to be multiplied by "Importance factor" and totals core is to be obtained by summation of products. Score ranges of impact evaluation based on matrix score is given below

**Table 4-21 Score ranges for Beneficial and Adverse Impacts**

| S. No | Total score | Outcome                                                                                                 |
|-------|-------------|---------------------------------------------------------------------------------------------------------|
| 1     | +ve / -ve   | Beneficial impact / adverse impact                                                                      |
| 2     | 0-300       | No appreciable Beneficial impact / adverse impact                                                       |
| 3     | 300-600     | Appreciable but reversible adverse impact-mitigation measures are needed                                |
| 4     | 600-900     | Significant adverse impacts: most of the impacts are reversible. Mitigation measures are crucial.       |
| 5     | 900-1200    | Major adverse impacts; most of the impacts are reversible. Alternative site selection to be considered. |
| 6     | >1200       | Permanent irreversible impact; alternatives to the project need to be explored                          |

**Table 4-22 Impact Matrix without EMP**

| S.No | Environmental components likely to be affected          | Air quality |            |         | Noise & Vibration |            |         | Surface water |            |         | Ground water |            |         | Soil quality |            |         | Flora & fauna |            |         | Land use pattern |            |         | Socio economics |            |         | Impact score   |
|------|---------------------------------------------------------|-------------|------------|---------|-------------------|------------|---------|---------------|------------|---------|--------------|------------|---------|--------------|------------|---------|---------------|------------|---------|------------------|------------|---------|-----------------|------------|---------|----------------|
|      |                                                         | Magnitude   | Importance | (M * I) | Magnitude         | Importance | (M * I) | Magnitude     | Importance | (M * I) | Magnitude    | Importance | (M * I) | Magnitude    | Importance | (M * I) | Magnitude     | Importance | (M * I) | Magnitude        | Importance | (M * I) | Magnitude       | Importance | (M * I) | (Sum of M * I) |
| 1    | Site clearance and removal of vegetation                | -           | -          | 0       | -                 | -          | 0       | -             | -          | 0       | -            | -          | 0       | -3           | 5          | -15     | -1            | 4          | -4      | -4               | 6          | -24     | -               | -          | 0       | -43            |
| 2    | Drilling and blasting operation                         | -5          | 8          | -40     | -5                | 8          | -40     | -             | -          | 0       | -            | -          | 0       | -4           | -6         | 24      | -1            | 4          | -4      | -2               | 7          | -14     | -               | -          | 0       | -74            |
| 3    | Dust generation due to mining activity                  | -5          | 8          | -40     | -                 | -          | 0       | -3            | 5          | -15     | -            | -          | 0       | -            | -          | 0       | -2            | 4          | -8      | -                | -          | 0       | -5              | 6          | -30     | -93            |
| 4    | Loading & Unloading of granite                          | -4          | 7          | -28     | -3                | 6          | -18     | -             | -          | 0       | -            | -          | 0       | -2           | 4          | -8      | -1            | 3          | -3      | -                | -          | 0       | -2              | 4          | -8      | -65            |
| 5    | Fall in pit, Accidents, fall of side walls etc.         | -           | -          | 0       | -                 | -          | 0       | -             | -          | 0       | -            | -          | 0       | -            | -          | 0       | -4            | 6          | -24     | -2               | 4          | -8      | -3              | 5          | -15     | -47            |
| 6    | Change in Topography and slopes                         | -           | -          | 0       | -                 | -          | 0       | -             | -          | 0       | -            | -          | 0       | -            | -          | 0       | -             | -          | 0       | -3               | 6          | -18     | -               | -          | 0       | -18            |
| 7    | Granite Resource Depletion                              | -           | -          | 0       | -                 | -          | 0       | -             | -          | 0       | -            | -          | 0       | -3           | 8          | -24     | -             | -          | 0       | -2               | 8          | -16     | -               | -          | 0       | -40            |
| 8    | Stacking and handling of Mineral Rejects and Overburden | -2          | 5          | -10     | -                 | -          | 0       | -             | -          | 0       | -            | -          | 0       | -3           | 6          | -18     | -             | -          | 0       | -2               | 7          | -14     | -               | -          | 0       | -42            |
| 9    | Noise generation due to vehicular movement              | -           | -          | 0       | -3                | 5          | -15     | -             | -          | 0       | -            | -          | 0       | -            | -          | 0       | -1            | 4          | -4      | -                | -          | 0       | -2              | 4          | -8      | -27            |

|                    |                          |     |    |      |     |    |     |    |    |     |    |    |     |     |    |     |    |    |     |     |    |     |     |    |     |      |
|--------------------|--------------------------|-----|----|------|-----|----|-----|----|----|-----|----|----|-----|-----|----|-----|----|----|-----|-----|----|-----|-----|----|-----|------|
| 10                 | Usage of DG sets         | -2  | 5  | -10  | -2  | 5  | -10 | -  | -  | 0   | -  | -  | 0   | -   | -  | 0   | -  | -  | 0   | -   | -  | 0   | -   | -  | 0   | -20  |
| 11                 | Sewage Generation        | -   | -  | 0    | -   | -  | 0   | -3 | 6  | -18 | -2 | 6  | -12 | -3  | 5  | -15 | -  | -  | 0   | -   | -  | 0   | -   | -  | 0   | -45  |
| 12                 | Consumption of water     | -   | -  | 0    | -   | -  | 0   | -1 | 5  | -5  | -2 | 5  | -10 | -   | -  | 0   | -  | -  | 0   | -   | -  | 0   | -1  | 2  | -2  | -17  |
| 13                 | Employment opportunities | -   | -  | 0    | -   | -  | 0   | -  | -  | 0   | -  | -  | 0   | -   | -  | 0   | -  | -  | 0   | -   | -  | 0   | 3   | 6  | 18  | 18   |
| 14                 | Greenbelt development    | 2   | 7  | 14   | 2   | 7  | 14  | -  | -  | 0   | -  | -  | 0   | 2   | 4  | 8   | 2  | 5  | 10  | 2   | 4  | 8   | -   | -  | 0   | 46   |
| Total impact score |                          | -16 | 40 | -114 | -11 | 31 | -69 | -7 | 16 | -38 | -4 | 11 | -22 | -16 | 26 | -48 | -8 | 30 | -37 | -13 | 42 | -86 | -10 | 27 | -45 | -459 |

#### Interpretation:

Based on assumption of importance and magnitude, the final impact score without EMP is -459 which concludes that the proposed project has, **“Appreciable but reversible adverse impact-mitigation measures are needed”**.

**Table 4-23 Impact Matrix with EMP**

| S.No | Environmental components likely to be affected | Air quality   |                |         | Noise & Vibration |                |         | Surface water |                |         | Ground water  |                |         | Soil quality  |                |         | Flora & fauna |                |         | Land use pattern |                |         | Socio economics |                |         | Impact score      | Mitigation Measures                                                                                                             |
|------|------------------------------------------------|---------------|----------------|---------|-------------------|----------------|---------|---------------|----------------|---------|---------------|----------------|---------|---------------|----------------|---------|---------------|----------------|---------|------------------|----------------|---------|-----------------|----------------|---------|-------------------|---------------------------------------------------------------------------------------------------------------------------------|
|      |                                                | Magnitud<br>e | Importan<br>ce | (M * I) | Magnitud<br>e     | Importan<br>ce | (M * I) | Magnitud<br>e | Importan<br>ce | (M * I) | Magnitud<br>e | Importan<br>ce | (M * I) | Magnitud<br>e | Importan<br>ce | (M * I) | Magnitud<br>e | Importan<br>ce | (M * I) | Magnitud<br>e    | Importan<br>ce | (M * I) | Magnitud<br>e   | Importan<br>ce | (M * I) | (Sum of<br>M * I) |                                                                                                                                 |
| 1    | Site clearance and removal of vegetation       | -             | -              | 0       | -                 | -              | 0       | -             | -              | 0       | -             | -              | 0       | -2            | 5              | -10     | -1            | 4              | -4      | -2               | 6              | -12     | -               | -              | 0       | -26               | Development of green belt                                                                                                       |
| 2    | Drilling and blasting operation                | -3            | 8              | -24     | -3                | 8              | -24     | -             | -              | 0       | -             | -              | 0       | -2            | -6             | 12      | -1            | 4              | -4      | -2               | 7              | -14     | -               | -              | 0       | -54               | 1. Ensure to use PPEs and well-maintained vehicles<br>2. Regular Water Sprinkling<br>3. Safe blasting zones are kept around the |



|   |                                                 |    |   |     |    |   |     |    |   |    |   |   |   |    |   |     |    |   |    |    |   |     |    |   |    |     | periphery of the quarry                                                                                                                                |
|---|-------------------------------------------------|----|---|-----|----|---|-----|----|---|----|---|---|---|----|---|-----|----|---|----|----|---|-----|----|---|----|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3 | Dust generation due to mining activity          | -2 | 8 | -16 | -  | - | 0   | -1 | 5 | -5 | - | - | 0 | -  | - | 0   | -1 | 4 | -4 | -  | - | 0   | -1 | 3 | -3 | -23 | Water Sprinkling to control dust emission                                                                                                              |
| 4 | Loading & Unloading of granite                  | -3 | 7 | -21 | -2 | 6 | -12 | -  | - | 0  | - | - | 0 | -  | - | 0   | -1 | 3 | -3 | -  | - | 0   | -2 | 4 | -8 | -44 | 1. Dust filter mask to be provided to all workers<br>2. Vehicles will be covered by Tarpaulin sheets<br>3. Speed limits of vehicles will be maintained |
| 5 | Fall in pit, Accidents, fall of side walls etc. | -  | - | 0   | -  | - | 0   | -  | - | 0  | - | - | 0 | -  | - | 0   | -1 | 6 | -6 | -1 | 4 | -4  | -1 | 5 | -5 | -15 | Proper fencing and PPE's will be provided.                                                                                                             |
| 6 | Change in Topography and slopes                 | -  | - | 0   | -  | - | 0   | -  | - | 0  | - | - | 0 | -  | - | 0   | -  | - | 0  | -2 | 5 | -10 | -  | - | 0  | -10 | Mine closure plan will be implemented after completion of mining activity.                                                                             |
| 7 | Granite Resource Depletion                      | -  | - | 0   | -  | - | 0   | -  | - | 0  | - | - | 0 | -2 | 8 | -16 | -  | - | 0  | -2 | 8 | -16 | -  | - | 0  | -32 | Deletion of granite has positive & negative impacts. Even though it plays a vital role in improvement of country's economic development.               |

|    |                                                         |    |   |     |    |   |    |   |   |   |   |   |   |    |   |     |    |   |    |    |   |     |    |   |    |     |                                                                                                                                                                                      |
|----|---------------------------------------------------------|----|---|-----|----|---|----|---|---|---|---|---|---|----|---|-----|----|---|----|----|---|-----|----|---|----|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8  | Stacking and handling of Mineral Rejects and Overburden | -1 | 5 | -5  | -  | - | 0  | - | - | 0 | - | - | 0 | -2 | 6 | -12 | -  | - | 0  | -2 | 7 | -14 | -  | - | 0  | -31 | 1. Garland drains will be provided to prevent the back flow of OB material into nearby water bodies.<br>2. Granite rejects will be dumped into southeast side of the quarry          |
| 9  | Noise generation due to vehicular movement              | -  | - | 0   | -1 | 5 | -5 | - | - | 0 | - | - | 0 | -  | - | 0   | -1 | 4 | -4 | -  | - | 0   | -1 | 4 | -4 | -13 | 1. All vehicles and machinery will be properly lubricated and maintained regularly.<br>2. Speed of the vehicles entering and leaving the quarrying lease will be limited to 25 kmph. |
| 10 | Usage of DG sets                                        | -2 | 5 | -10 | -1 | 5 | -5 | - | - | 0 | - | - | 0 | -  | - | 0   | -  | - | 0  | -  | - | 0   | -  | - | 0  | -15 | The DG set are provided with stacks of adequate height so as to disperse the emanating flue gases containing suspended particulate matters, oxides of sulphur and nitrogen           |

|                    |                          |    |    |     |    |    |     |    |    |     |    |    |     |    |    |     |    |    |     |     |    |     |    |    |    |      |                                                                                                                                                           |
|--------------------|--------------------------|----|----|-----|----|----|-----|----|----|-----|----|----|-----|----|----|-----|----|----|-----|-----|----|-----|----|----|----|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
|                    |                          |    |    |     |    |    |     |    |    |     |    |    |     |    |    |     |    |    |     |     |    |     |    |    |    |      | without affecting the ground level concentrations.                                                                                                        |
| 11                 | Sewage Generation        | -  | -  | 0   | -  | -  | 0   | -1 | 6  | -6  | -1 | 6  | -6  | -  | -  | 0   | -  | -  | 0   | -   | -  | 0   | -  | -  | 0  | -12  | Sewage will be disposed in soak pit<br>Garland drains are provided                                                                                        |
| 12                 | Consumption of water     | -  | -  | 0   | -  | -  | 0   | -1 | 5  | -5  | -1 | 5  | -5  | -  | -  | 0   | -  | -  | 0   | -   | -  | 0   | -1 | 1  | -1 | -11  | Water requirement will be met by private tankers<br>Rain water management will be provided                                                                |
| 13                 | Employment opportunities | -  | -  | 0   | -  | -  | 0   | -  | -  | 0   | -  | -  | 0   | -  | -  | 0   | -  | -  | 0   | -   | -  | 0   | 3  | 6  | 18 | 18   | Employment will be provided to local workers                                                                                                              |
| 14                 | Greenbelt development    | 2  | 7  | 14  | 2  | 7  | 14  | -  | -  | 0   | -  | -  | 0   | -  | -  | 0   | 2  | 5  | 10  | -   | -  | 0   | -  | -  | 0  | 38   | 1. The plantation will be developed around 7.5m safety zone of the quarry.<br>2. Plants are chosen to provide aesthetic, ecological and economical value. |
| Total impact score |                          | -9 | 40 | -62 | -5 | 31 | -32 | -3 | 16 | -16 | -2 | 11 | -11 | -8 | 13 | -26 | -4 | 30 | -15 | -11 | 37 | -70 | -3 | 23 | -3 | -235 |                                                                                                                                                           |

**Interpretation:** Based on the assumption of importance and magnitude, the final impact score with the implementation of mitigation measures is -235, which concludes that the proposed project has, “No appreciable beneficial impact / adverse impact”.

## 5 ANALYSIS OF ALTERNATIVES

### 5.1 Introduction

The Proposed jammanahalli black granite quarry is over an extent of 6.59.5 Ha located in S.F.No.83, located at Jammanahalli Village, Pappireddypatty Taluk, and Dharmapuri District.

### 5.2 Selection & Description of each alternatives with its adverse impacts

Alternative site is not considered, since the project is site specific because of the availability of mineral in this location. The total geological reserves of black granite is 4,09,500 m<sup>3</sup>.

### 5.3 Site Connectivity

The site connectivity details are given in **Table 5-1**.

**Table 5-1 Site Connectivity Details**

|                          |                                                |
|--------------------------|------------------------------------------------|
| Nearest State Highway    | SH- 6A (Tiruvannamalai- Harur), ~ 7.69 km, ENE |
| Nearest National Highway | NH-179A (Salem-Vaniyambadi), ~ 2.89 km, ESE    |
| Nearest Railway Station  | Thonganur Railway Station, ~ 10.17 km, NW      |
| Nearest Town             | Harur, ~ 7 km, NE                              |

### 5.4 Technology Alternatives

The various alternative technologies adopted in quarry operations are given below

**Table 5-2 Alternative Technology Analysed**

| S.No | Activity involved in mining Operation | Technology                                                      | Impact                             |
|------|---------------------------------------|-----------------------------------------------------------------|------------------------------------|
| 1.   | Cutting                               | Burner Cutting                                                  | Adverse level of Noise             |
|      |                                       | Wire saw Cutting                                                | No adverse impact to environment   |
| 2.   | Drilling                              | Manual Drilling using jack hammer                               | Dust emission and Noise            |
|      |                                       | Wet drilling                                                    | Negligible dust emission           |
|      |                                       | Tamrac - Machine Drilling                                       | Negligible dust emission and Noise |
|      |                                       | Wagon Drill                                                     | Dust emission and Noise            |
|      |                                       | LD Bore                                                         | Dust emission                      |
|      |                                       | PRD Drilling                                                    | Negligible dust emission           |
| 3.   | Blasting                              | Conventional Blasting                                           | Noise                              |
|      |                                       | Muffle Blasting                                                 | Mininmal Noise impact              |
|      |                                       | Rock Breaking Powder or Explosive Mortar for secondary breaking | Negligible impact on noise         |

## 6 ENVIRONMENTAL MONITORING PROGRAMME

### 6.1 Introduction

Environmental monitoring is an essential tool for sustainable development & ensuring effective implementation of environmental management plan & mitigation measures adopted. The monitoring schedules are planned for systematic study of various pollution levels with respect to air and water qualities, noise levels, etc. to ensure that they conform to the standards laid down by Environmental Protection Act and various Central and State Pollution Control Board Limits. The various methodologies and frequency of studies of all environmental quality parameters also conform to norms laid down by MOEF& CC, CPCB and SPCB in this respect.

The Project proponent will be overseeing/reviewing following activities:

- To observe the implementation of environmental control measures.
- To ensure implementation of planned plantation programme with monitoring of survival rate, etc.
- To keep monitoring records properly for submission of periodical returns to statutory authorities and for checking by them.
- To evaluate periodically the performance of existing pollution control equipment and systems for taking prompt action in this respect to rectify the defects.
- Conducting safety audits and programmes to create safety awareness in workers/staff.
- Monitoring of dumps and benches for slope stability, monitoring of OB dumps, laying of check dams, garland drains around the dumps and excavated areas and their regular maintenance for de-silting.
- To study the effects of project activities on the environment.
- To interact and liaise with State and Central Government Departments.
- To take immediate preventive action in case of some unforeseen environmental pollution attributable to the project.
- Imparting training on safety and conduct safety drills to educate employees.
- To ensure that firefighting equipment, etc, are kept in ready-to-use condition.

For each of the environmental attributes, the monitoring plan specifies the parameters to be monitored, location of monitoring sites, frequency and duration of monitoring and it denotes the applicable standards, implementation and supervising responsibilities.

### 6.2 Technical Aspects of Post Project Environmental Monitoring Program

The summarized forms of post monitoring details are presented in **Table 6-1**.

**Table 6-1 Post Project Environmental Monitoring Program**

| S. No        | Area of Monitoring            | Number of Sampling Stations                       | Frequency of Sampling         | Parameters to be Analyzed                                                                 | Monitoring Budget Per Year (Rs) |
|--------------|-------------------------------|---------------------------------------------------|-------------------------------|-------------------------------------------------------------------------------------------|---------------------------------|
| 1.           | Meteorology                   | One                                               | Hourly and Daily basis        | Wind speed and direction, Temperature, Relative Humidity, Atmospheric pressure, Rainfall. | 1000                            |
| 2.           | Ambient Air Quality           | 2 Stations (one in up wind and one in downwind)   | Twice a week:24 hourly period | All the 12 parameters as per NAAQ Standards                                               | 6000                            |
| 3.           | Noise                         | 2 (one within core area and one in buffer area)   | Once every season             | Ambient Equivalent continuous Sound Pressure Levels (Leq) at day and Night time.          | 1300                            |
| 4            | Exhaust from DG set           | Stack of DG set                                   | Quarterly                     | PM <sub>10</sub> , SO <sub>2</sub> , NO <sub>x</sub> & CO                                 | 2000                            |
| 5            | Soil                          | Two Locations within the Project Site             | Yearly Once                   | Physico chemical properties, Nutrients and Heavy metals                                   | 4500                            |
| 6            | Terrestrial Ecology           | Within 10km radius around the project             | Once in three years           | Flora & Fauna                                                                             | 20000                           |
| 7            | Surface/ Ground water quality | One surface and ground water sample near the site | Yearly Once                   | As per ISO 10500:2012 & IS 2996:1992 Standard parameters                                  | 2500                            |
| <b>Total</b> |                               |                                                   |                               |                                                                                           | <b>37,300</b>                   |

### 6.3 Measurement Methodologies

The monitoring schedules are planned for systematic study of various pollution levels with respect to air and water qualities, noise levels, etc. to ensure that they conform to the standards laid down by Environmental Protection Act and various Central and State Pollution Control Board Limits. The various methodologies and frequency of studies of all environmental quality parameters also conform to norms laid down by MOEF, CPCB and SPCB in this respect.

### 6.4 Emergency procedures on reporting & documentation

All the necessary reports and documents shall be prepared complying with the statutory rules & regulations. Proper and due care shall be taken to adhere to the laid down rules and regulation by the government. Regular and periodic record shall be kept in order to ensure easier,

comparable and brisk review and projection of past, present and future performances. Also, the management shall ensure to prepare separate records for water, wastewater, solid waste, air, emission, regularly and periodically in order to provide better and smooth vigilance.

The management shall look into the fact that as soon as the preparation of reports gets over it shall be forwarded to the concerned authority with due care for the purpose of reviewing. Adhering to the rules and regulations the management shall ensure that the outcome of the reports and the conclusions been drawn shall be prepared as per the laid down regulations and procedures. No breach of any convention shall be availed.

These reports/documents shall be regularly and periodically reviewed and any changes/discrepancies found in mitigation measures/ operation/ management/ technology shall be brought into notice instantaneously and all possible corrective actions shall be taken to match the discrepancies been witnessed.



## **7 ADDITIONAL STUDIES**

### **7.1 Public Consultation**

The proposed project is categorized as 'B1' category Schedule 1(a) as per EIA Notification 2006 and its amendments thereafter. The total area of the quarry is 6.59.5 Ha.

However, the proposed project falls under 'B1' category, Schedule 1(a), Public Hearing is Mandatory. So, EIA report has been prepared as per the obtained ToR vide. Identification No.TO25B0108TN5769635N, dated 19.05.2025. Draft EIA report will be submitted for Public Hearing (PH). After PH, the minutes obtained will be incorporated in the EIA report along with action plan by the proponent. Final EIA will be submitted to TN-SEAC for further appraisal of the project and obtaining Environment Clearance.

### **7.2 Risk Identification & Management**

#### **7.2.1 Introduction**

Mining and allied activities are associated with several potential hazards both to the employees and the public at large. A worker in a mine should be able to work under conditions that are adequately safe and healthy. At the same time the environmental conditions should be such as not to impair his working efficiency. The various safeguards to be taken to ensure the safety of the mine and that of employees are provided in the Mines Act, 1952. Risk involves the occurrence or potential occurrence of some accidents consisting of an event or sequence of events. The risk assessment study covers the following:

- Identification of potential hazard areas.
- Identification of representative failure cases.
- Visualization of the resulting scenarios in terms of fire (thermal radiation) and explosion.
- Assess the overall damage potential of the identified hazardous events and their impact zones from the accidental scenarios
- Assess the overall suitability of the site from hazard minimization and disaster mitigation point of view
- Furnish specific recommendations on the minimization of the worst accident possibilities.
- Preparation of broad DMP, On-site and Off-site Emergency Plan.
- Occupational Health and Safety Plan.

The complete mining will be carried out under the management control and direction of a qualified mine manager holding a first class manager's certificate of competency. Moreover,

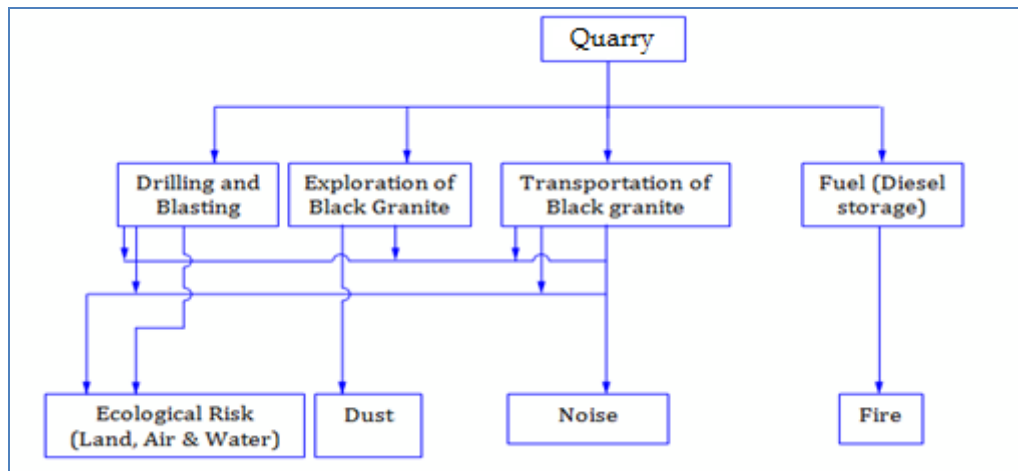
mining staff will be sent to refresher courses from time to time to keep them alert. However, following natural/industrial hazards may occur during normal operation:

- Accident due to explosives
- Accident due to heavy mining equipment; and
- In order to take care of above hazard/disasters, the following control measures will be adopted.
- All safety precautions and provisions of the Mine Act, 1952, the MMR 1961 and the Mines Rules, 1955 will be strictly followed during all mining operations
- Entry of unauthorized persons will be prohibited
- Firefighting and first-aid provisions in the mines office complex and mining area;
- Provisions of all the safety appliances such as safety boot, helmets, goggles etc. will be made available to the employees and regular check for their use
- Training and refresher courses for all the employees working in hazardous premises; Under mines rules all employees of mines will have to undergo the training at a regular interval
- Working of mine, as per approved plans and regularly updating the mine plans;
- Cleaning of mine faces will be regularly done
- Handling of explosives, charging and blasting will be carried out by competent persons only.
- Regular maintenance and testing of all mining equipment as per manufacturer's guidelines.
- Suppression of dust on the haulage roads
- Increasing the awareness of safety and disaster through competitions, posters and other similar drives.
- For any type of above disaster, a rescue team will be formed by training the mining staff with specialized training.

#### **7.2.2 Identification of Hazards in Open Cast Mining**

There are various factors, which can cause disaster in the mines. These hazards are as follows:

- Drilling
- Blasting
- Overburden handling
- Heavy Machinery



**Figure 7-1 Identification of hazards in opencast mine**

#### **7.2.2.1 Drilling**

Drilling is an important activity in mining. This activity releases particulate matter into the air and noise in the vicinity of the operation. The particulate matter/dust can be arrested by employing dust extractor, wet or dry type. The usage of standard drill bits also reduces the dust formation. The noise is also arrested by the usage of dust extractors. The compressors which feed the compressor air to the drilling jackhammers can be covered in acoustic enclosures which reduce the dust and noise. The hard strata will be excavated after drilling and blasting. Drilling will be done with jack hammers up to 1.2 to 1.5m depth having a diameter of 30-32 mm.

#### **7.2.2.2 Blasting**

Most of the accidents from blasting occur due to the projectiles, as they may sometimes go even beyond the danger zone, mainly due to overcharging of the shot-holes as a result of certain special features of the local ground. Flying rocks are encountered during initial and final blasting operations. Vibrations also lead to displacement of adjoining areas. Dust and noise are also problems commonly encountered during blasting operations.

- The damaging impacts on environment are evident noise, gas, and flyrock and ground vibration.
- The last factor is most important for safety of constructions, buildings and various natural objects in the vicinity of mining area.
- The ground vibration parameters, crucial for safety of endangered objects have a significant correlation with charge weight and distance of blasting.
- This study tried to associate the main vibration parameter, particle velocity with blasting parameters and properties of vibration medium.

### **7.2.2.3 Precautionary Measures to Avoid Accidents Due to Blasting**

- The provisions laid down in the MMR 1961 related to Blasting shall strictly be followed. However, some of the main provisions are written here
- The Wire saw and rock breaking powder will be utilized extensively to reduce the requirement for blasting.
- The blasting will be done under supervision of blaster/mine mate/mine foreman/mine manager
- Shots shall not be fired except during the hours of daylight.
- The holes charged on any particular day shall be fired on the same day.
- Adequate blasting shelters or other protection shall be provided at mines.
- The shot-firer shall give sufficient warning by effective signals over the entire area falling within a radius of danger zone.
- Multi-shot exploder shall be used. A shot-firer will fire maximum 120 Shots.
- During the approach and progress of electrical storm, adequate precautions shall be taken.

### **7.2.2.4 Overburden Handling**

Over burden and side burden dump may cause landslides. High side burden dump created at the quarry edge may cause sliding of the side burden dump or may cause failure of the pit slope due to excessive loading, thereby causing loss of life and property.

### **7.2.2.5 Heavy Machinery**

Most of the accidents during transport of dumpers, trucks, proclain, ripper dozers and other heavy vehicles are often attributable to mechanical failures and human errors.

### **7.2.2.6 Precautionary Measures to Prevent Accidents due to Trucks and Dumpers**

- All transportation within the main working shall be carried out directly under the supervision and control of the management.
- The vehicles must be maintained in good conditions and checked thoroughly at least once a week by the competent person authorized for the purpose by the Management.
- Road signs shall be provided at each and every turning point especially for the guidance of the drivers.
- To avoid danger while reversing of vehicles especially at the embankment and tipping points, all areas for reversing of lorries should as far as possible be made man free. A statutory provision of the fences, constant education, training etc. will go a long way in reducing the incidents of such accidents.

- Generally, oversize rocks shall be dealt with in the pit by secondary blasting.
- A Load consisting of large rocks must not be over the edge. This is unsafe and may damage equipment.
- The movement of the dumpers will be governed under the Code of Traffic rule, this is already formulated & implemented.

#### **7.2.2.7 Storage of Explosives**

The explosive requirement of the quarry operation is minimal. The blasting requirement will be carried out using contractors approved by the Controller of Explosives. No Explosive storage is envisaged in this quarry.

#### **7.2.2.8 Safety Measures at the quarry**

- Adequate care has been taken in deciding the size of the bench for the working pit.
- The benches are properly sloped at an angle of 60 degree to avoid any spillage of benches.
- Adequate drainage system at the top of the pit and also on the benches shall be made to prevent erosion of the benches.
- Garland drains around the periphery for storm water drainage will protect the quarries.

### **7.3 Disaster Management Plan**

The disaster management plans aimed to ensure safety of life, protection of environment, protection of installation, restoration of production and salvage operations in this same order of priorities. For effective implementation of the disaster management plan, it should be widely circulated and personnel training through rehearsals/drills. The objectives of the disaster management plan are to make use of the combined resources of the mining operation and the outside services to achieve the following:

- Effect the 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
- Identify any dead
- Provide for the needs of relatives
- Provide authoritative information to the news media
- Secure the safe rehabilitation of affected area
- Preserve relevant records and equipment for the subsequent inquiry into the cause and circumstances of the emergency

- In effect, it is to optimize operational efficiency to rescue rehabilitation and render medical help and to restore normalcy.

#### **7.3.1.1 Emergency Organization (EO)**

It is recommended to setup an emergency organization. A senior executive (Mine Manager) who has control over the affairs of the mine would be heading the emergency organization. He would be designated as site controller. As per the general organization chart, in the mines, the Mines Foreman would be designated as the Incident Controller (IC). The incident controller would be reporting to the site controller. Emergency coordinators would be appointed who would undertake the responsibilities like firefighting, rescue, rehabilitation, transport and provide essential and support services.

#### **7.3.1.2 Emergency Communication (EC)**

Whoever notices an emergency situation such as fire, growth of fire etc. would inform the Mines Foreman. The Mines Foreman would appraise the site controller. Site Controller verifies the situation from the incident controller takes a decision about an impending on site emergency. Simultaneously, the emergency warning system would be activated on the instructions of the site controller.

In order to handle disaster/emergency situations, the following personnel shall deal with the disaster/Emergency

- Mines Manager-site controller
- Mines Forman-incident controller
- Mine mate –Fire controller
- Senior most Driver-Transport coordinator
- Senior most operator- Medical coordinator

#### **7.3.1.3 Emergency Services**

This includes the fire-fighting system, first aid center, etc. Alternate sources of power supply for operating fire pumps, communication with local bodies, fire brigade etc. will also be clearly identified. Adequate number of external and internal telephone connections shall be installed.

1. Fire Protection System
2. Off Site Emergency Plan

#### **7.3.1.4 Fire Protection System**

The fire protection system for the project maintained will consist of Portable hand appliances of suitable types/capacities for extinguishing small fires in selected mine areas, storages areas such as that of Diesel, Explosives, etc.

#### **7.3.1.5 Off-Site Emergency Plan**

The offsite emergency plan defining the various steps to tackle any offsite emergencies, which may affect surrounding areas of the project, has to be prepared after due finalizing discussion in this respect with local Panchayat official, Revenue officials and District Collector. As per this off site plan, in case of any off site emergencies, actions have to be promptly initiated to deal with the situation in consultation with Collector and other revenue officials.

#### **7.3.1.6 Water Quality Management**

The ground water quality in the region indicates neutral range with pH values. Most of the analytical results for ground and surface water showed parameter concentrations well within the permissible limits. Garland drains will be provided all along the periphery of the mining pit and along the toes of the side burden dumps. These drains will be aligned in such a way that all the surface drainage water will be carried away from the mining zone to settling tanks.

The mining pit's catchment water will be coursed to the main sump and used for dust suppression and green belt development & plantation activities.

#### **7.3.1.7 Mines Seepage Water**

The experience of mining during past three years suggests a very little, almost negligible seepage of water in the mining pit. It will be collected in a well guarded pond / sump for settling of solids. The treated water will be used for dust suppression on working faces, haul roads and dump surfaces.

#### **7.3.1.8 Air Quality Management**

Ambient air quality was monitored twice in a week for One (01) season (shall cover 12 weeks), i.e., during Pre-Monsoon season (**February 2025-April 2025**). PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>x</sub>, Pb, NH<sub>3</sub>, C<sub>6</sub>H<sub>6</sub>, C<sub>20</sub>H<sub>12</sub>, As, Ni, were monitored. Sampling was carried out as per Central Pollution Control Board (CPCB) monitoring guidelines at each location.

The following precautions have been considered for a batement of air pollution in the black granite mine area:



- Water sprinkling shall be carried out at the active working faces, on all haul-roads and the dump surfaces.
- Regular cleaning and removal of spillage black granite from haul roads and weighbridge areas.
- Proper and regular maintenance of mining equipments.

Development of comprehensive green belt around overburden dumps to reduce fugitive dust emissions in order to create clean and healthy environment.

#### **7.3.1.9 Solid waste Management**

As is stated earlier, mining will be carried out by opencast semi-mechanized method using conventional mining equipments i.e., hydraulic excavators / shovels and dumpers combination with ancillary mining equipment like compressor, wire cutting machine, generator etc.

The mine waste in the mine includes the over lain unrecoverable boulders / rock fragments and rubbles generated as granite rejects during the production works and the waste fragments generated during development works will be utilized for forming approach road and dumping yard purposes. Adequate space has been identified within the lease applied area for dumping such waste material on barren land covered with soil.

#### **7.3.1.10 Stabilization of Dump**

As the waste generation in the mine includes hard rock fragments of considerable size and irregular shape with varying angularity, the waste dump will be stable on its own even at higher slopes of the sides. However, suitable variety of soil will be identified and brought from outside and used for increasing the stability of the sides of the waste dumps and also for planting trees over the dumps in a phased manner.

#### **7.3.1.11 Mine Drainage**

The lease-applied area is hillock 32m height with slope. Through the area receives scanty rainfall, the ground water level is at 11.6m depth. The Production faces are operated at shallow depths. During the rainy seasons, the surface run of water and the ground water are collected at one point called as sump and dewatered nearby agricultural field with the help of 10HP oil engines.

#### **7.3.1.12 Disposal of Waste**

The Mine waste in the mine includes the over burden, side burden, rock fragments and rubbles generated as mineral rejects during production works and the country rock fragments generated during development works as approach road formation, formation of dumping yard

sites etc., During the first five years of mining plan period, such waste material are proposed to be dumped along the southeast portion part of the lease area where it comprises of country rock terrain.

#### **7.3.1.13 Top Soil Management**

Topsoil will be properly stacked at earmarked dumpsite with adequate measures. It will be used for growing plants along the fringes of the site roads and reclamation of external dump and backfilled area. The topsoil stockpiles will be low height and will be grassed to retain fertility. Besides these topsoil stacks there will be temporary stacks near the excavation area and area to be reclaimed which will be made use of for concurrent lying without bringing the topsoil to the soil stack near the OB dump.

#### **7.3.1.14 Disposal of Mining Machinery**

Mining operations are planned to be operated using Company owned machinery. The company has its own Excavators, Mining Tippers, compressors; wire saw machine, jack hammers, and other mining equipment. These machines are compliant to the RTO conditions and CPCB conditions. Further, the company also operates a central workshop at Salem, to cater to major repairs/Rectifications of company Equipment.

These machineries are written off and disposed on completion of their normal life as per the set guidelines of the Government and TAMIN Board. The surplus machinery in working order, will be transferred to Company's other projects.

#### **7.3.1.15 Other Infrastructure**

Mine office, store room, first-aid room etc, will be provided on semi-permanent structures within the lease applied area.

#### **7.3.1.16 Safety & Security**

The water ponds developed in the reclaimed areas shall be properly fenced for safety. The water from these ponds is likely to be potable and shall be used for human & cattle consumption and for agriculture purposes.

### **7.3.2 Social Impact Assessment R & R Action plan**

There will be no Rehabilitation and Resettlement in this proposed project.

## 8 PROJECT BENEFITS

### 8.1 Benefits in the Physical Infrastructure

Carrying out various developmental works in the nearby region based on the need of the locals.

### 8.2 Benefits in the Social Infrastructure

- Improvement in Per Capita Income.
- The socio - economic conditions of the village will be enhanced due to the proposed project, hence the project should be allowed after considering all the parameters.
- It can thus be concluded that the project is environmentally compatible, financially viable and would be in the interest of construction industry thereby indirectly benefiting the masses.

### 8.3 Employment potential- Skilled, Semi-Skilled and Unskilled

- The quarry activity will provide job opportunities, which will help them to develop economically
- The quarrying activities provide employment to the 30 No's of local people.
- The direct beneficiaries will be those who get employed in the mines as skilled and unskilled workers.

**Table 8-1 Required Manpower Details**

| S.No         | Description                                                                | No of persons |
|--------------|----------------------------------------------------------------------------|---------------|
| <b>A</b>     | <b>Technical/Mining Personnel</b>                                          |               |
| 1            | Geologist/Agent (M.sc Qualified)                                           | 1             |
| 2            | Mine Manager ( Holder of Manager Certificate of Competency under MMR, 1961 | 1             |
| 3            | Mining Mate cum Blaster                                                    | 1             |
| 4            | Machinery operator                                                         | 6             |
| 5            | Diesel Mechanic                                                            | 1             |
| <b>B</b>     | <b>Workers</b>                                                             |               |
| 1            | Skilled                                                                    | 1             |
| 2            | Semi- Skilled                                                              | 9             |
| 3            | Un-skilled                                                                 | 10            |
| <b>Total</b> |                                                                            | <b>30</b>     |

### 8.4 CER activity

Based on O.M F.No. 22-65/2017-IA.III dated: 01.05.2018, 2.0% of the Project cost need to be spent for CER activities i.e., Rs. 2 Lakhs. However, TAMIN is proposing for Rs. 4 Lakhs which is

4.0% of Project cost under CER activities for the Jammanahalli Government Higher Secondary School.

**Table 8-2 Proposed CER activity**

| <b>S.No</b>  | <b>CER Activities for Jammanahalli Government Higher Secondary School</b> | <b>Amount in Lakhs</b> |
|--------------|---------------------------------------------------------------------------|------------------------|
| 1.           | Developing Drinking water facility within the school premises             | 1.0                    |
| 2.           | Toilet facilities for Government School                                   | 2.0                    |
| 3.           | Providing Library facility                                                | 0.5                    |
| 4.           | Greenbelt development within the school premises                          | 0.5                    |
| <b>Total</b> |                                                                           | <b>4.0</b>             |

### **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.

## **9 ENVIRONMENTAL COST & BENEFIT ANALYSIS**

(Not recommended during scoping stage)

## **10 ENVIRONMENTAL MANAGEMENT PLAN**

### **10.1 Description of the administrative aspects of ensuring that mitigative measures are implemented and their effectiveness monitored, after approval of the EIA Management Plan**

The Environmental Management Plan for Jammanahalli Black Granite Quarry identifies the principles, procedures and methods that will be used to control and minimize the environmental impacts for the proposed project.

### **10.2 EMP structure and organization**

#### **10.2.1 Environment Policy of TAMIL NADU MINERALS LTD**

Tamil Nadu Minerals Ltd, believes that good safety, Health & Pollution control practices contribute to individual well-being and organization morale. Our commitment to Safety, Health and Environment stretch beyond statutory obligations and we are committed to manage and continually improve the overall safety, Health and Environmental performance.

We M/s Tamil Nadu Minerals Ltd are committed to ensure that:

We develop safe working methods and practices, with as objective of no injuries and accidents at the work place and provide a safe work place for our employees, contractors and other who perform their duties. We shall provide adequate Health care to our employees, and create processes to reduce the adverse effect of the operations on the health of the employees.

- We provide safety appliances and continuous training in safety to our employees and contract workmen to ensure safe production and achieve the target of zero accidents. We are committed to supporting actions aimed at increase in employees" safety outside work hours.
- We protect the environment by control and prevention of pollution and promote green environment.
- We continuously evaluate and improve our conduct and carryout regular audit, analysis and studies to eliminate potential concerns and continuously improve upon our Safety, Health and Environmental standards.
- We communicate our Safety, Health and Environmental Policy to all our employees" contractors and to the public for better understanding and practice.
- Management has knowledge of relevant issues regarding Safety, Health and Environment and provides a foundation for setting objectives and targets.

Management shall fulfill its responsibility to inform, educate and motivate employees and others to understand and comply with this policy and applicable laws.

- M/s. Tamil Nadu Minerals Ltd shall use its resources in order to live up to this policy and thereby promote our business.

Besides, the company has formulated well-planned and integrated Environmental policies as shown below:

M/s Tamil Nadu Minerals Ltd is committed to welfare and development needs of the society around it.

- All rules and conditions prescribed in the Indian Mines Act, Metalliferous Mines Regulation etc., will be adopted to ensure risks-free and safe mining operations. All personal protective devices supplied to workers and staff should be used while they work in the mines and any violation in this respect will be dealt with inflict of warnings first, followed subsequently by punitive punishments including fines and ultimately dismissal, if repeated continuously.
- Any infringement / violation of any rule or unsafe mining operations should be reported to Mines Manager / Mine Foremen /Mine Mate/ Blaster who will take immediate corrective measures for avoiding major disasters. The report will ultimately reach the Board of Directors through upwardly hierarchical communicative channels from the lowest level to superior levels in quick time bound duration.
- The Agent and the Mines Manager should exercise overall control over entire mining and connected operations and all infringements / violations on any count pertaining to unsafe operations, environmental degradation, etc., should be brought to the notice of the Board of Directors. Remedial measures for such violations and deviations should be taken by the Mines Manager to avoid any hazards or disasters in the mine and nearby areas. The persons responsible for such violations will be punished through appropriate disciplinarily penal actions.
- The EC conditions and stipulations will be strictly followed by all supervisory staff of the mine, and will co-ordinate in various issues like prescribed environmental monitoring schedules, vibration monitoring studies during blasting, green belt development, management of dumps etc.
- Penal actions will be taken by the company in cases of continuous negligence resulting in violations deviations in this respect.



- A time schedule of once in 15 days for review of all operational factors as mentioned above is in force, for proper and quick corrective actions. Hierarchical System of the TAMIN is shown in **Figure 10-1**.

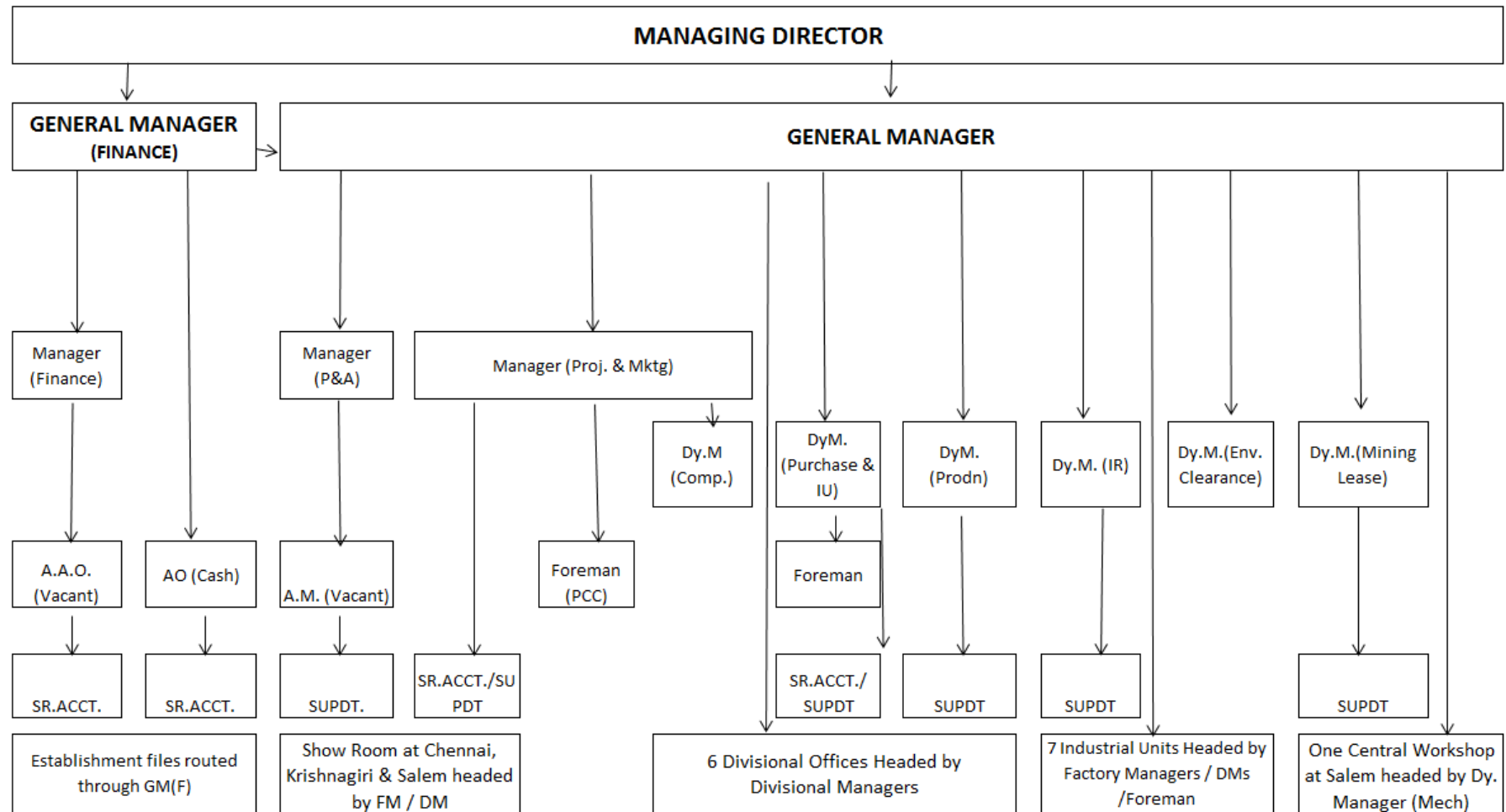


Figure 10-1 Hierarchical System of the TAMIN

### **Description of the Administration and Technical Setup Environment Management**

The Environment Monitoring Cell will ensure effective implementation of environment management plan and to ensure compliance of environmental statutory guidelines through Mine Management Level of the proposed quarry.

The said team will be responsible for:

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

### **10.3 Land Environment Management**

Landscape of the area will be changed due to the quarrying operation, restoration of the land by converting the quarry pit into temporary reservoir and the remaining part of the area (un utilized areas, infrastructure, haul Roads) will be utilized for greenbelt development. Aesthetic of the Environment will not be affected. After completion of the quarry operation, a thick plantation will be developed under greenbelt development programme.

**Table 10-1 Proposed Controls for Land Environment**

| <b>Control</b>                                                                                                        | <b>Responsibility</b>      |
|-----------------------------------------------------------------------------------------------------------------------|----------------------------|
| Designing vehicle wash-down system so that all washed water is captured and passed through grease and oil separators. | Mines Manager              |
| Re fuelling will be carried out in a safe location, away from vehicle movement pathways                               | Mine Foreman & Mining Mate |
| No external dumping i.e., outside the project area                                                                    | Mine Foreman               |

|                                                                                                                                                     |                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| Greenbelt on dumps and its maintenance                                                                                                              | Environment Officer |
| Garland drains with catch pits to be provided all around the project area to prevent run off affecting the surrounding lands.                       | Environment Officer |
| The periphery of Project area will be planted with thick plantation to arrest the fugitive dust, which will also act as acoustic barrier.           | Mines Manager       |
| Thick plantation using native flora species will be carried out on the backfilled area.                                                             | Mines Manager       |
| There will be formation of a small surface water body in the mined-out area, which can be used for watering the greenbelt at the conceptual stages. | Environment Officer |

### 10.3.1 Ground Vibration and Fly Rock Control

**Table 10-2 Proposed Management Controls for Ground Vibration & Fly Rocks**

| Control                                                                                                                                                                                                                                         | Responsibility      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| Controlled blasting using NONEL will be carried as per standards of DGMS.                                                                                                                                                                       | Mines Manager       |
| Drilling and blasting during initial stage will be carried under the supervision of qualified persons                                                                                                                                           | Mines Manager       |
| Proper stemming of holes should be carried out with statutory competent qualified blaster under the supervision of statutory mines manager to avoid any anomalies during blasting                                                               | Mines Manager       |
| Prior to blasting within 500 meters of the lease boundary, establish a fly rock exclusion zone within adjacent properties and check with landholders that the area is not occupied by humans, blast clearance zones are applied for all blasts. | Environment Officer |

## 10.4 Soil Management

### Granite Waste Management

The waste generated during the mining operation i.e., side burden, granite rejects and the non-recoverable/un sized boulders and rubbles etc, will be dumped in the suitable area already selected. The total generation of waste will be 64,962 m<sup>3</sup>. The area of disposal waste rock has been identified in south east portion of the lease area. The unsold blocks are kept within the boundary on the country rock area.

**Table 10-3 Proposed Controls for Soil Management**

| <b>Control</b>                                                                                                                                                                                            | <b>Responsibility</b>      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| The dump slopes will be planted with deep rooting shrubs, grasses and creepers for stabilizing them                                                                                                       | Environment Officer        |
| Garland drains are to be paved around the dump area to arrest possible wash off in the rainy seasons                                                                                                      | Mines Manager              |
| Surface run-off from the surface dumps via garland drains will be diverted to the mine pits                                                                                                               | Mine Foreman & Mining Mate |
| The backfilled area shall be covered with the soil for green belt development                                                                                                                             | Environment Officer        |
| Design haul roads and other access roads with drainage systems to minimize concentration of flow and erosion risk                                                                                         | Environment Officer        |
| keeping records of mitigation of erosion events, to improve on management techniques                                                                                                                      | Environment Officer        |
| The overall slope of the dump is maintained at angle of repose not exceeding 45° from horizontal                                                                                                          | Mines Manager              |
| The retaining wall has to be made to arrest the waste dump spills                                                                                                                                         | Mines Manager              |
| A monitoring map with information including their GPS coordinates, erosion type, intensity, and the extent of the affected area, as well as existing control measures and assessment of their performance | Environment Officer        |
| Empty sediment from sediment traps Maintain, repair or upgrade garland drain system                                                                                                                       | Environment Officer        |
| Test soils for pH, EC, chloride, exchangeable cations, particle size and water holding capacity                                                                                                           | Mines Manager              |

### 10.5 Water Management

Water is a key component in mining projects as it is required for, and affected by, mining activities. Effective water management is important for a variety of reasons including: uninterrupted operation of the mine, compliance with operational permissions and applicable legislation, and minimization of effects on the receiving environment.

This section focuses on actions for avoidance, mitigation, and control, as well as a water management monitoring program –

- To protect water-related resources, and avoid harmful impacts;
- To supply and retain water for mine operations;
- To define water-related environmental control structures; and
- To manage water to ensure that any discharges are following the applicable water

quality levels and guidelines.

**Table 10-4 Proposed Management Controls for Water management**

| <b>Control</b>                                                                                                                                                               | <b>Responsibility</b> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| To maximize the reuse of pit water for water supply                                                                                                                          | Mines Manager         |
| Temporary and permanent garland drain will be constructed to contain the catchments of the mining area and to divert runoff from undisturbed areas through the mining areas. | Environment Officer   |
| Natural drains/nallahs/brooklets outside the project area should not be disturbed at any point of mining operations.                                                         | Mines Manager         |
| Mine pit water is used for dust suppression and greenbelt development utilization of mine pit water is optimal and effective ways                                            | Environment Officer   |
| Ensure there is no process effluent generation or discharge from the project area into water bodies                                                                          | Environment Officer   |
| Domestic sewage generated from the project area will be disposed in septic tank and soak pit system                                                                          | Mines Manager         |
| Fast growing grasses, small plants and bushes will be grown on the overburden dumps to control soil erosion and siltation                                                    | Mines Manager         |
| Retention walls and garland drains will be constructed around toe of waste dumps to arrest silt wash off from dumps during monsoon                                           | Environment Officer   |
| Rainwater harvesting measures will be adopted in the project area and in nearby villages to maintain and enhance the ground water table of the area                          | Environment Officer   |
| Regularly assess and modify Water Management Plan to adapt to changing work plans and site conditions                                                                        | Environment Officer   |
| Familiarize all site personnel with the purpose and content of the Water Management Plan, and their responsibilities in its implementation                                   | Environment Officer   |
| Water management and sediment control structures and facilities will be regularly inspected and maintained according to the monitoring schedules                             | Environment Officer   |
| Monthly or after rainfall, inspection for performance of water management structures and systems                                                                             | Environment Officer   |
| Conduct ground water and surface water monitoring for parameters specified by State Pollution Control Board (SPCB)                                                           | Mines Manager         |

## 10.6 Air Quality Management

The proposed mining activity would result in the increase of particulate matter concentrations due to fugitive dust. Daily water sprinkling on the haul roads, approach roads in the vicinity would be undertaken and will be continued as there is possibility for dust generation due to truck mobility. It will be ensured that vehicles are properly maintained to comply with exhaust emission requirements.

**Table 10-5 Proposed Controls for Air Environment**

| <b>Control</b>                                                                                                                                                                                                                                                                                                                                            | <b>Responsibility</b>               |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| Generation of dust during excavation is minimized by water sprinkling on working face.                                                                                                                                                                                                                                                                    | Mines Manager                       |
| Develop thick Greenbelt with tall growing trees and thick foliage cover all along the boundary of the project (7.5 Meter Buffer Zone) to arrest dust spreading outside the project area and to be maintained. This plantation cover will also act as an acoustic barrier.                                                                                 | Environment Officer                 |
| Daily maintenance of haul roads and daily water sprinkling to minimize the generation of fugitive dust due to movement of heavy earth moving machineries on it.                                                                                                                                                                                           | Mines Manager                       |
| Handle the waste from the mine pit to respective dumps and backfilling during closure process, fugitive dust is anticipated. This fugitive emission can be controlled by well-maintained machineries, well maintained haul roads water sprinkling on haul roads twice a day. Besides it is also advised not to handle the waste during high windy periods | Mines Manager & Environment Officer |
| Wet drilling procedure drills with dust extractor system to control dust generation during drilling at source itself to be implemented                                                                                                                                                                                                                    | Environment Officer                 |
| Plantation will be carried out on surface dumps, backfilled area and top benches of the mined out area                                                                                                                                                                                                                                                    | Environment Officer                 |
| Water reservoir will be developed in the left over mined out pit, which will serve as additional surface water resources for the nearby villages                                                                                                                                                                                                          | Environment Officer                 |
| Maintenance as per operator manual of the equipment and machinery in the mines to minimizing air pollution and noise generation                                                                                                                                                                                                                           | Mines Manager                       |
| Over loading of trucks should be avoided                                                                                                                                                                                                                                                                                                                  | Mines Manager                       |
| All the mining equipment and trucks has been controlled with emission norms                                                                                                                                                                                                                                                                               | Environment Officer                 |
| The village roads used for mineral transport will be maintained weekly and monthly basis to avoid fugitive dust emissions                                                                                                                                                                                                                                 | Mines Manager                       |
| Dust mask are provided to the workers working in high dust generating areas and continue to provide the same                                                                                                                                                                                                                                              | Mines Manager                       |
| Weekly and Monthly maintenance of deployed machineries, to reduce gaseous emission                                                                                                                                                                                                                                                                        | Mines Manager                       |
| Ambient Air Quality Monitoring carried out in the project area and in surrounding villages to access the impact due to the mining activities and the efficacy of the adopted air pollution control measures                                                                                                                                               | Environment Officer                 |
| Monitor meteorological conditions (temperature, wind, rainfall)                                                                                                                                                                                                                                                                                           | Environment Officer                 |



## 10.7 Noise Management

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

**Table 10-6 Proposed Controls for Noise Management**

| Control                                                                                                                                                                                                                                                                                                                   | Responsibility      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| A thick greenbelt to be developed all along the Buffer Zone (7.5 Meters) of the project area to attenuate the noise and the same will be maintained                                                                                                                                                                       | Mines Manager       |
| Plantation activities to be carried out on surface dumps and infrastructure facilities, these plantations will help in attenuating the noise levels                                                                                                                                                                       | Environment Officer |
| Preventive maintenance of mining machinery and replacement of worn-out accessories to control noise generation                                                                                                                                                                                                            | Mines Manager       |
| Deployment of mining equipment with an inbuilt mechanism to reduce noise                                                                                                                                                                                                                                                  | Environment Officer |
| Provision of earmuff / ear plugs to workers working in noise prone zones in the mines                                                                                                                                                                                                                                     | Environment Officer |
| Provision of effective silencers for mining machinery and transport vehicles                                                                                                                                                                                                                                              | Environment Officer |
| Controlled blasting technologies are adopted by using NONEL to minimize noise from blasting                                                                                                                                                                                                                               | Mines Manager       |
| Annual ambient noise level monitoring to be carried out in the project area and in surrounding villages to assess the impact due to the mining activities and the efficacy of the adopted noise control measures. Additional noise control measures will be adopted if required as per the observations during monitoring | Environment Officer |
| Undertake noise or vibration monitoring in response to a complaint (from any sensitive receptor).                                                                                                                                                                                                                         | Mines Manager       |
| Change the burden and spacing by altering the drilling pattern and/or delay layout, or altering the hole inclination during initial stage of operation.                                                                                                                                                                   | Mines Manager       |
| If a noise or vibration complaint is received, follow the complaints and inquiries.                                                                                                                                                                                                                                       | Environment Officer |
| Undertake noise or vibration monitoring half yearly                                                                                                                                                                                                                                                                       | Environment Officer |

## 10.8 Occupational Safety & Health Management

Occupational safety and health are very closely related to productivity and good employer - employee relationship. The main factors of occupational health in mines are fugitive dust and noise and vibration. Safety of employees during mining operation and maintenance of mining equipment will be taken care as per Mines Act 1952 and Rule 29 of Mines Rules 1955. To avoid

any adverse effect on the health of workers due to dust, noise and vibration sufficient measures have been provided.

### **Medical Surveillance and Examinations**

Identifying workers with conditions that may be aggravated by exposure to dust & noise and establishing baseline measures for determining changes in health.

- Evaluating the effect of noise on workers
- Enabling corrective actions to be taken when necessary
- Providing health education

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

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

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

### **10.9 Proposed Health and safety Measures**

- Providing a clean working environment that is conducive to safety & health annually
- Employee involvement and commitment in the implementation of health and safety guidelines
- Implementing safety and health management system and assessing the effectiveness through periodic audits
- Setting of safety and health objectives based on comprehensive strategic plans and measure performance against these plans
- Provision of necessary standard personal protective equipment's (PPE)
- Ensuring that all employees at all levels receive appropriate training and are competent to carry out their duties and responsibilities.
- Provision of rest shelters for mine workers with amenities like drinking water, fans, toilets urinals, canteen etc.,

- Rotation of workers exposed to noisy areas.
- Daily dust suppression on haul roads by water sprinkling and proper housekeeping to prevent fugitive dust emission in to the air.
- Provision of First-aid facility at the mine office

#### 10.10 Budget for Environmental Protection

Adequate budget provision has been made by TAMIN for the execution of Environmental Management Plan. Environmental Management cost is given in **Table 10-7**.

**Table 10-7 Environmental Management Cost**

| Parameters               | Mitigation Measure                                                                           | Capital cost (INR) | Recurring Cost |
|--------------------------|----------------------------------------------------------------------------------------------|--------------------|----------------|
| <b>Air Environment</b>   | Compaction, gradation and drainage on both sides for Haulage Road                            | 65,950             | 65,950         |
|                          | Fixed Water Sprinkling Arrangements + Water sprinkling by own water tankers                  | 8,00,000           | 50,000         |
|                          | Muffle blasting – To control fly rocks during blasting                                       | -                  | 5,000          |
|                          | Wet drilling procedure / latest eco-friendly drill machine with separate dust extractor unit | 1,50,000           | 15,000         |
|                          | No overloading of trucks/tippers/tractors                                                    | -                  | 5,000          |
|                          | Stone carrying trucks will be covered by tarpaulin                                           | -                  | 10,000         |
|                          | Enforcing speed limits of 20 km/hr within ML area                                            | 5,000              | 500            |
|                          | Regular monitoring of exhaust fumes as per RTO norms                                         | 0                  | 5,000          |
|                          | Regular sweeping and maintenance of approach roads for at least about 200 m from ML Area     | -                  | 1,31,900       |
|                          | Installing wheel wash system near gate of quarry                                             | 50,000             | 20,000         |
| <b>Noise Environment</b> | Provision for Portable blaster shed                                                          | 50,000             | 2,000          |
|                          | NONEL Blasting will be practiced to control Ground vibration and fly rocks                   | 0                  | 65,000         |
| <b>Waste Management</b>  | Waste management (Spent Oil, Grease etc.,)                                                   | 25,000             | 20,000         |
|                          | Installation of dust bins                                                                    | 5,000              | 2,000          |
| <b>Mine Closure</b>      | Progressive closure activity-Surface runoff management (Provision for Garland drain)         | 65,950             | 5,000          |

|                                                               |                                                                                                                                                                                      |                  |                  |
|---------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|------------------|
|                                                               | Progressive closure activity barbed wire fencing to quarry area will be provisioned                                                                                                  | 13,19,000        | 10,000           |
|                                                               | Progressive closure activity greenbelt development -100 trees per one hectare                                                                                                        | 1,65,000         | 24,750           |
| <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                                                                                   | 10,000           | 1,000            |
|                                                               | Air, water, Noise and Soil quality Sampling every 6 months for compliance report of EC conditions                                                                                    | 0                | 50,000           |
|                                                               | Workers will be provided with Personal Protective Equipment's                                                                                                                        | 1,20,000         | 30,000           |
|                                                               | Health check up for workers will be provisioned                                                                                                                                      | 0                | 30,000           |
|                                                               | First aid facility will be provided                                                                                                                                                  | 0                | 13,000           |
|                                                               | Slope stability Action plan                                                                                                                                                          | 2,00,000         | 0                |
|                                                               | Mine will have safety precaution signages, boards.                                                                                                                                   | 10,000           | 2,000            |
|                                                               | No parking will be provided on the transport routes. Separate provision on the bottom of the hill will be made for vehicles /HEMMs. Flaggers will be deployed for traffic management | 3,29,750         | 10,000           |
|                                                               | Installation of CCTV cameras in the mines and mine entrance                                                                                                                          | 30,000           | 5,000            |
|                                                               | Implementation as per Mining Plan and ensure safe quarry working                                                                                                                     | -                | 7,80,000         |
| <b>Conservation Measures</b>                                  | Conservation Measures for Scheduled I species                                                                                                                                        | 4,00,000         | -                |
| <b>Total</b>                                                  |                                                                                                                                                                                      | <b>38,00,650</b> | <b>13,58,100</b> |

In order to implement the environmental protection measures, an amount of Rs.38,00,650/- as capital cost and recurring cost of Rs.13,58,100/- will be utilised.

## **11 SUMMARY & CONCLUSION**

### **11.1 Overall justification for the implementation of project**

An Environmental Impact Assessment Study has been carried out and assessed for the proposed project, based on the ToR and baseline quality data collected for the study area. Identification and anticipation of the potential environmental impacts due to the proposed project with a delineation of appropriate impact mitigation measures in an Environmental Management plan is provided in the EIA report.

The marginal impacts that might be caused by the proposed activity will be mitigated by the pollution control and environmental management measures. In a true and a larger sense, in view of the considerable benefits from the project with no major impacts, the proposed project is said to be more beneficial to the country.

The EMP implemented for the proposed project will include:

- Soil Pollution and Control Management
- Air Pollution control and Management
- Noise Control and Management
- Solid and Hazardous Waste Management
- Water Pollution Control and Management

In order to effectively implement the EMP, an environmental management system will be formulated.

### **11.2 Explanation on how adverse effects will be mitigated**

The baseline study carried out for the study area indicates that all the physical, chemical and biological characteristics of the environmental attributes in the surrounding area are well within the permissible limits.

Based on this environmental assessment, the possible impacts during both pre-project and post-project phase are anticipated and the necessary adequate control measures are formulated to meet the statutory compliances.

Following mitigation measures are proposed for the project:

- Usage of diamond wire saw cutting method instead of blasting
- Usage of Rock breaking powder ( $\text{Ca}(\text{OH})_2$ ) to avoid secondary splitting by blasting.
- Usage of NONEL Blasting (Non-Electric Detonator) for controlled primary blasting.
- Greenbelt around infrastructure within the mine lease area and along the periphery of the mine lease area by using native plants.

- Construction of garland drains of suitable size around mine area and dumps to prevent rain water descent into active mine areas.
- Proper fencing will be provided around the mine lease area to avoid rock rolling and trespassing.
- Personal Protective Equipment (PPE) like ear muffs/ear plugs will be provided to the operators of HEMM and persons working near HEMM and reducing the exposure time of workers to the higher noise levels.
- To reduce the adverse effects on flora/fauna status that are found in project area due to deposition of dust generating from mining operations, water sprinkling and water spraying systems will be ensured in all dust prone areas to arrest dust generation.

Also as discussed in **Chapter 10** - proper Environment Management Cell will be formed for the proper monitoring and implementation of Environment Management Plan and to ensure compliance of Environmental Statutory Guidelines. The Proposed Team of Environment Management cell will be responsible for Management of Monitoring and compliance activities on all aspects of environment including land, water and air. With very minimal impacts, the project positively leads to commercial business opportunities, employment opportunities, increased revenue and infrastructural development. Thus, this project may kindly be granted Environmental Clearance.

## 12 DISCLOSURE OF CONSULTANTS

In order to assess the potential environmental impacts due to the proposed project at Survey No: 83 (Part) Jammanahalli Village, Pappireddypatty Taluk, Dharmapuri District, Tamil Nadu State to undertake EIA study. The nature of consultancy service rendered covers terrestrial environmental assessment.

### 12.1 Brief Profile of HubertEnviro Care Systems (P) Limited (HECS)

Hubert Enviro Care Systems (P) Limited is a leading Environmental Management Company and service provider serving as a catalyst for environmental protection in the industrial & service sectors.

Enviro care Systems was started in 1997 as a proprietor company. In the year 2004, Enviro Care Systems became a Private Limited Company and registered as Hubert Enviro Care Systems (P) Limited.

Across two decades of operation, we have developed into a matured corporate house to meet client's requirements to provide products and services of Global standards at the most competitive price within committed schedule of time.

We have full-fledged office and laboratory at Chennai, Mangalore, Trivandrum & Hyderabad.

### 12.2 Strengths of HECS

Number of Employees as on till date

|                              |             |
|------------------------------|-------------|
| Consultancy                  | 42          |
| Laboratory                   | 100         |
| Projects                     | 29          |
| Operation & Maintenance      | 999         |
| <b>Total No of Employees</b> | <b>1170</b> |

### 12.3 QCI-NABET - EIA Accreditation

|                      |                                                    |
|----------------------|----------------------------------------------------|
| Consultancy          | Hubert Enviro Care Systems Pvt. Ltd., Chennai      |
| NABET Certificate No | NABET/ EIA/ 24-27/ RA 0335 Valid up to 31.03.2027  |
| MoEF Reg. Lab        | F. No. LB/99/7/2021-INST LAB-HO-CPCB-HO/ Pvt./8984 |



## 12.4 Copy of QCI NABET Accreditation



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



### National Accreditation Board for Education and Training

## Certificate of Accreditation

**Hubert Enviro Care Systems, Chennai**

# A-21, III Phase, Thiru Vi Ka Industrial Estate– 600032

*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 / underground mining                                                                                  | 1               | 1 (a) (i) | A    |
| 2.   | Offshore and onshore oil and gas exploration, development & production                                                                      | 2               | 1 (b)     | A    |
| 3.   | River Valley projects                                                                                                                       | 3               | 1 (c)     | A    |
| 4.   | Thermal power plants                                                                                                                        | 4               | 1 (d)     | A    |
| 5.   | Mineral beneficiation                                                                                                                       | 7               | 2 (b)     | A    |
| 6.   | Metallurgical industries (ferrous & non-ferrous)                                                                                            | 8               | 3 (a)     | A    |
| 7.   | Cement plants                                                                                                                               | 9               | 3 (b)     | A    |
| 8.   | Petroleum refining industry                                                                                                                 | 10              | 4 (a)     | A    |
| 9.   | Pesticides industry and pesticide specific intermediates (excluding formulations)                                                           | 17              | 5 (b)     | A    |
| 10.  | Petro-chemical complexes                                                                                                                    | 18              | 5 (c)     | A    |
| 11.  | Petrochemical based processing                                                                                                              | 20              | 5 (e)     | A    |
| 12.  | Synthetic organic chemicals industry                                                                                                        | 21              | 5 (f)     | A    |
| 13.  | Industrial estates/ parks/ complexes/areas, export processing Zones (EPZs), Special Economic Zones (SEZs), Biotech Parks, Leather Complexes | 31              | 7 (c)     | A    |
| 14.  | Bio-medical waste treatment facilities                                                                                                      | 32A             | 7(d a)    | B    |
| 15.  | Ports, harbours, break waters and dredging                                                                                                  | 33              | 7 (e)     | A    |
| 16.  | Highways,                                                                                                                                   | 34              | 7 (f)     | B    |
| 17.  | Common Effluent Treatment Plants (CETPs)                                                                                                    | 36              | 7 (h)     | B    |
| 18.  | Common Municipal Solid Waste Management Facility (CMSWMF)                                                                                   | 37              | 7 (i)     | B    |
| 19.  | Building and construction projects                                                                                                          | 38              | 8 (a)     | B    |
| 20.  | Townships and Area development projects                                                                                                     | 39              | 8 (b)     | B    |

**Note:** Names of approved EIA Coordinators and Functional Area Experts are mentioned in RAAC minutes dated May 31, 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/24/3292 dated June 25, 2024. The accreditation needs to be renewed before the expiry date by Hubert Enviro Care Systems, Chennai following due process of assessment.

**Issue Date**  
June 25, 2024

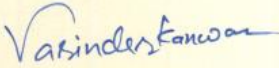


**Mr. Ajay Kumar Jha**  
(Sr. Director, NABET)



**Certificate No.**  
NABET/EIA/24-27/RA 0335

**Valid up to**  
March 31, 2027



**Prof (Dr) Varinder S Kanwar**  
(CEO- NABET)

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

Further details may be seen on the following URL: [www.hecs.in](http://www.hecs.in).