DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

For

Proposed Black Granite Quarry

over an extent of 29.00.23 Ha

Production Capacity-10,500m^3

At

Survey No: 254 (Part)
Village: Pathalahalli
Taluk: Karimangalam
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/442957/2023, Dtaed: 11.09.2023

ToR: Lr No.SEIAA-TN/F.No.10401/SEAC/ToR-1599/2023 Dated: 06.11.2023

Baseline Period: March 2024 - May 2024

EIA Consultant & Laboratory
HUBERT ENVIRO CARE SYSTEMS (P) LTD, CHENNAI

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

NABL Certificate No: TC-12310 Dated: 25.09.2023 Valid Till 24.09.2025

February 2025

Revision status

Name of the Client	:	**M/s. Tamil Nadu Minerals Limited**
Name of the Project	:	Proposed Black Granite Quarry over an extent of 29.00.23 Ha
Name of the Report	:	Draft EIA Report
Project No: H/01/2023/CON/003		**Document No:** RP003

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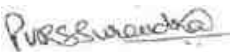
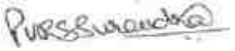
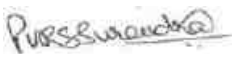
Rev No.	Date	Details	Prepared by: Name	Prepared by: Sign	Checked by: Name	Checked by: Sign	Approved by: Name	Approved by: Sign
R2	04.02.2025	3rd submission- Draft EIA for Public Hearing	P.V.R.S Surendra		Mr.Vamsee Krishna		Dr.J.R.Moses	
R1	01.02.2025	2nd submission- Draft EIA to QC Team	P.V.R.S Surendra		Mr.Vamsee Krishna		Dr.J.R.Moses	
R0	20.01.2025	1st Submission	PVRS Surendra		Vamsee Krishna		Dr JR Moses	

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 Black Granite Quarry over an extent of 29.00.23 Ha**" at S.F.254 (Part) at Pathalahalli Village, Karimangalam Taluk, Dharmapuri District, and Tamil Nadu State.

M/s Tamil Nadu Minerals Limited,

- Dr. E Ganesan- Deputy 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, Deputy 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 Black Granite Quarry over an extent of 29.00.23 Ha"** at S.F.254 (Part) of Pathalahalli Village, Karimangalam Taluk, Dharmapuri District, Tamil Nadu and the information and content provided in the report are factually correct.

for Tamil Nadu Minerals Ltd,

Authorised signatory
Deputy 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 Black Granite Quarry over an extent of 29.00.23 Ha"** at S.F. 254 (Part) of Pathalahalli Village, Karimangalam 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: 31.01.2025

Name: Dr. J. R. Moses

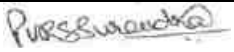
Designation: Chief Executive Officer

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 Black Granite Quarry over an extent of 29.00.23 Ha"** at S.F.254 (Part) of Pathalahalli Village, Karimangalam 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. PVRS. Surendra
Signature:	
Date:	31.01.2025
Period of Involvement:	September 2023 to Till date

Contact Information: M/s. Hubert Enviro Care Systems (P) Ltd

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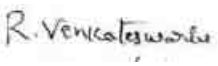
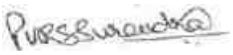
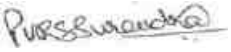
Functional Area Experts (FAEs):

S. No.	Functional Areas	Name of the Expert	Period of Involvement	Signature
1.	WP	Mr. Vamsee Krishna Navooru	**Period : September 2023 to Till date** **Task:** 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	**Period : March 2024 to Till date** **Task:** Site visit, Collection of secondary data, discussion with stake holders and Preparation of socio -economic status of the study area. Review of demographic characteristics, and supervision of	

S. No.	Functional Areas	Name of the Expert	Period of Involvement	Signature
			baseline data collection. Collection and analysis of perception study carried out for the proposed project.	
3.	EB	Dr. Rajkumar Samuel	**Period: September 2023 to Till date** **Task:** 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	**Period : March 2024 to May 2024** **Task :** 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. PVRS Surendra	**Period: September 2023 to Till date** **Task:** 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	**Period: September 2023 to Till date** **Task:** 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 modelling. Identification of impacts and proposed the suitable control measures, development of EMP.	

S. No.	Functional Areas	Name of the Expert	Period of Involvement	Signature
7.	NV	Mr. Vamsee Krishna Navooru	**Period: September 2023 to Till date** **Task:** Identification of noise monitoring locations and measured the ambient noise levels & vibrations generated due to 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	**Period: March 2024 to May 2024** **Task:** 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	**Period: September 2023 to Till date** **Task**: 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	**Period: March 2024 to May 2024** **Task:** 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	**Period: September 2023 to Till date** **Task:** 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	**Period: September 2023 to Till date** **Task:** Identification of hazardous materials, fire accidents within the quarry and validation of existing risk assessment & Disaster management plan along with	

S. No.	Functional Areas	Name of the Expert	Period of Involvement	Signature
			mitigation measures.	

S. No	Name	Role
1.	PVRS Surendra	TM for WP
2.	Abraham Abishek Moses	TM for AP & WP
3.	Pravina Rachel Moses	TM for EB & WP
4.	Dr Ramrajan S	TM for EB
5.	Praveenkumaar R	TM for EC (Sector – 1)
6.	Monadevi M	TM for EC(Sector – 1)
7.	Uma Maheshwari P	TM for LU

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-SoilConservation

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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	Existing Quarry Photographs
7	Greenbelt and Fencing Photographs
8	300m VAO Letter
9	500m AD mines Letter
10	DTCP Letter
11	Blasting Affidavit

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 Black Granite Quarry is over an extent of 29.00.23 Ha at S.F.No.254 (P) of Pathalahalli Village, Karimangalam Taluk, Dharmapuri District, Tamil Nadu State. It is a Government poramboke land.

TAMIN has obtained Lease for 13.56.0Ha Vide Lease G.O Ms. No 517 Industries (H2) Department Dated: 16.05.1986 at S.F.No 254(Part) in Kathirnaickanahalli Village (Now renamed as Pathalahalli), Harur Taluk (Now Karimangalam Taluk), Dharmapuri District for the lease period of 20 years from 23.06.1987 to 22.06.2007. Subsequently, TAMIN has surrendered 2.25.04Ha land. The Surrender proposal is accepted by the Government Vide G.O (D) No.113 Industries (MME1) dated 11.04.2002.

TAMIN has applied fresh lease an extent of 29.00.23 Ha on 19.06.2006 and obtained lease for 20 years vide precise area communication letter No.3774153/MME.1/2022-1, Dated: 14.02.2023. Precise area communication letter is enclosed as **Annexure-1**. Accordingly, Mining Plan has been approved by the Director, Department of Geology and Mining, Guindy, Chennai vide letter Rc. No.7377/MM4/2022 dated 28.08.2023 for the proposed production capacity of 10,500m^3 at 10% recovery of ROM 1,05,000m^3 during the five years of mining plan period. Mining plan approval letter is enclosed as **Annexure-2** and approved mining plan is enclosed as **Annexure-3.**

ToR application was submitted to TN-SEIAA vide online proposal No. SIA/TN/MIN/442957/2023, dated: 11.09.2023 as the area of the proposed project is more than 5.00.0Ha. The proposal was appraised during 416th SEAC meeting held on 13.10.2023 and 670th SEIAA meeting held on 06.11.2023 and ToR was issued along with public hearing vide Letter No. SEIAA-TN/F.No.10401/SEAC/ToR-1599/2023, dated: 06.11.2023 under B1 Category, Schedule 1(a) Mining of Minerals as per EIA Notification 2006 and its subsequent amendments for the minor minerals as the area of the proposed project is more than 5Ha and the ToR was enclosed as **Annexure-5**.

Based on the issued ToR, the Draft EIA report will be submitted to Tamil Nadu Pollution Contorl Board for Public Hearing. Public Hearing minutes along with compliance will be incorporated in the final EIA report and will be submitted for the appraisal of the proposed project in Tamil Nadu SEAC /SEIAA for seeking EC.

Table-1 Salient Features of the Project Site

Survey No	S.F.No.254 (Part)
Village	Pathalahalli
Taluk and District	Karimangalam Taluk, Dharmapuri District
State	Tamil Nadu
Toposheets No.	D44S8
Latitude	12° 09'00.00051"Nto 12°09'22.02671"N
Longitude	78°17'05.70541"E to 78°17'35.81481"E
Extent Area	29.00.23 Ha
Lease Period	20 years
Estimated Geological Reserves (ROM)m^3	15,59,462
Estimated Mineable Reserves (ROM) m^3	13,31,059
Proposed Production RoM m^3	1,05,000
Black Granite production @10% recovery m^3	10,500
Annual peak production in m^3	5,000
Depth of Mining	30m from top of the hill (Height of the hillock is 160m)
Method of Mining	Open cast semi mechanized method
Nearest NH/SH Roads	➢ SH-60A(Dharmapuri-Morappur-Harur), ~0.96km, SSW ➢ NH-44(Srinagar-Dharmapuri-Kanniyakumari), ~ 12.06km, WNW
Nearest town	Dharmapuri,~13km, W
Nearest railway station	Thonganur,~10.37km, SE
Nearest railway line	(Buddireddipatti RS-Thonganur RS),~10.37km, SE
Nearest airport	➢ Kempegowda International Airport,~128.43km, NNW ➢ Salem Airport,~46.41km, SSW
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) (Karimangalam Taluk falls under over exploited category as per CGWB)

2. PROJECT DESCRIPTION

2.1 Method of Quarrying

The quarrying operation is being carried out by open cast semi-mechanized method with deployment of HEMM for development and production activities under Regulation106. The quarrying work being carried out under the direct supervision of our statutory mining personal 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 15,59,462m^3. Mineable Reserves have been computed as 13,31,059m^3 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 1,33,106m^3 by applying the recovery factor 10%.

The total proposed production capacity is 10,500m^3 at 10% recovery of ROM 1,05,000m^3. The annual peak production per year would be 5,000m^3 at 10% recovery of ROM 50,000 m^3.

Table-2 Ultimate Pit Dimensional Details

S. No	Description	Ultimate Pit Dimensions (m)		
		Length	Width	Depth
1	Top	917	96	30
2	Bottom	869	55	

Table-3 Available Reserves

S. No	Geological Reserves (m^3)	Mineable Reserves (m^3)	Proposed Production at 10% recovery (m^3)
1.	15,59,462	13,31,059	10,500

Table-4 Mine Year wise production as per Mining Plan

S. No	Year	ROM (m^3)	Recovery @ 10% (m^3)	Granite Waste @ 90 % (m^3)
1	1stYear	25,000	2,500	22,500
2	2ndYear	50,000	5,000	45,000
3	3rdYear	10,000	1,000	9,000
4	4thYear	10,000	1,000	9,000
5	5thYear	10,000	1,000	9,000
Total		**1,05,000**	**10,500**	**94,500**

2.2 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 is around 1,25,819 m^3, will be dumped in the suitable area of around 2.39.00Ha which is already selected. The area of disposal waste rock has been identified in North East and South West 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.

Table-5 Proposed Generation of Waste

S. No	Year	Over Burden (m^3)	Side Burden (m^3)	Granite Rejects @ 90% (m^3)
1	1st Year	10,647	--	22,500
2	2nd Year	13,230	4,320	45,000
3	3rd Year	--	--	9,000
4	4th Year	1,251	--	9,000
5	5th Year	1,871	--	9,000
	Total	**26,999**	**4,320**	**94,500**

2.3 Greenbelt Details

The total area for the proposed green belt is 0.13.0 Ha during first 5 years of the proposed quarrying activity. TAMIN is proposing to plant 3,650 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	3,650	Neem, pungam, vengai	80	2,900

2.4 Man power Requirement

Manpower details are given in below table.

Table-7 Manpower Details

S.No	Description	No of persons
A	**Technical/Mining Personnel**	
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	**Workers**	
1	Skilled	1
2	Semi- Skilled	9
3	Un-skilled	10
	Total	**30**

2.5 List of Equipments

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^3/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	1.25.00	1.09.00	8.62.00
2.	Waste Dump	1.74.00	2.39.00	13.70.50
3.	Office Infrastructure	0.01.00	--	0.01.00
4.	Road	0.17.00	--	0.17.00
5.	Mine Road	0.59.00	--	0.11.50
6.	Afforestation	0.28.50	0.13.00	1.00.00
7.	Unutilized Area	24.95.73	21.34.73	5.38.23
Total		**29.00.23**	**24.95.73**	**29.00.23**

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 alters the hill lock 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-10 Ultimate Pit

S. No	Description	Average Ultimate Pit Dimensions (m)		
		Length	Width	Depth
1	Top	917	96	30
2	Bottom	869	55	

- The Total waste (Granite waste+ Over Burden + Side Burden) to be generated during the five years of mining plan period will be around 1,25,819m^3. These wastes are proposed to be dumped on the North East and South West side of lease area.
- Usage of chemicals like Rock Breaking Powder ($Ca(OH)_2$ 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	Gaseuos Emission
3.	Transportation of product	PM,NO_X,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	➢ Adopting wet drilling method ➢ Drilling machine should be provided with dust extractors
2	Blasting	➢ Use of control blasting technique ➢ Water spray before blasting ➢ Usage of Rock breaking powder($Ca(OH)_2$) ➢ Usage of Wire saw cutting method
3	Loading	➢ Water spray on granite material before loading
4	Transportation of material	➢ Covering of the trucks/dumpers to avoid spillage ➢ Water spray on the haul roads before and after transportation ➢ Maintenance of haul road ➢ Speed of vehicles will be limited upto 25km/hr ➢ Development of a green belt of suitable width on both sides of haul road

3.2.1 Air Quality Modelling

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

Table-13 Total maximum GLCs from emissions

Pollutant	Max. Base Line Conc. (µg/m³)	Estimated Incremental Conc. (µg/m³)	Total Conc. (µg/m³)	NAAQ standard
PM	53.38	10.73	64.11	100
SO_2	14.07	0.73	14.8	80
NO_X	28.13	1.11	29.24	80

The maximum ground level concentration observed due to mining activities and traffic movement through Air Modelling for PM, SO_2 and NO_x are 64.11µg/m³, 14.8µg/m³ and 29.24 µg/m³ 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 State High way SH-60A Connecting Dharmapuri - Morappur – Harur. 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	2359	2832	15000	0.31	"A"	Free Flow Traffic
After implementation	2379	2863	15000	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.

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 also for dust suppression purpose.

3.6 Noise Environment

Impact

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

- Drilling

- Controlled 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).
- 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 down slope
7	Water supply (potable or industrial)	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. ➢ 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. ➢ 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. ➢ 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.
A. Fixed Cost		
1	Land Cost	Nil. Because Govt. land
2	Labour shed	50,000/-
3	Sanitary facilities	50,000/-
4	Fencing Cost	1,25,000/-
	Total	**2,25,000/-**
B. Operational Cost		
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/-
	Total Operational Cost	**95,67,000/-**
C. EMP Cost		
1	Afforesation	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/-
	Total EMP Cost	**2,05,000/-**
	Total Cost of the Project (A+B+C)	**99,97,000/- (Say 1 Crore)**

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	February 2025
Conduction of Public Hearing	March 2025
Submitting final EIA/EMP	May 2025
Presentation to SEAC and Obtaining EC	June 2025

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 1.0% of the Project cost need to be spent for CER activities i.e., Rs. 1.0 Lakhs need to be spent for the CER activity. However, TAMIN proposing for Rs. 4.0 Lakhs which is 4.0% of Project cost under CER activities for the Odasalpatti Government High 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 30m from top of the hill. However in course of time there is a possibility of up gradation of technology for safe mining beyond 30m. 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.	Pond near Odasalpatti Pudur	0.70	SE
2.	Lake near Gollappatti	0.99	N
3.	Lake near Pamandappatti	4.30	NE
4.	Semmanda Kuppam Ar	5.05	N
5.	Pulappatti R	5.80	N
6.	Siriyampatti Lake	6.15	NW
7.	Lake near Kadattur	6.21	S
8.	Kambainellur Lake	6.37	NNE
9.	Chinna Kavundanpatti Lake	6.64	E
10.	Lake near Gollahalli	7.61	W
11.	Ponnaiyar R	9.92	NE
12.	Baisuhalli Lake	11.07	WNW
13.	Virupakshipuram Pallam	11.93	W
14.	Turinjihalli Ar	12.26	SSE
15.	Annasagaram Eri	12.55	WSW
16.	Ramakkal Eri	13.10	W
17.	Vadamangalam Lake	13.84	N

Table-20 List of Monuments

S.No	Description	Distance(~km)	Direction
Nil			

Table-21 List of Reserved Forests

S.No	Reserved Forest	Distance(~km)	Direction
1	Mukkanur RF	3.28	SW
2	Mukkanur RF	10.69	SSW
3	Morappur RF	14.00	ESE
4	Kavaramalai RF	14.49	SSE
5	Kavaramalai Ext RF	14.94	S

Table-22 Lists of nearby Habitations

S.No	Reserved Forests	Distance(~km)	Direction	Population
1	Odasalpatti Pudur	0.04	E	700
2	Kadirnayakkanahalli	0.36	E	500
3	Dinnappatti	0.51	W	350
4	Odasalpatti	0.91	S	1,000
5	Gollappatti	1.42	N	250

8. BASELINE STUDY

8.1 Study Period

The baseline environmental surveys were carried out during **(March 2024 – May 2024)** within the study area.

8.2 Ambient Air Quality

Table-23 Summary of Ambient Air Quality Monitoring

S.No	Parameters (µg/m³)	Minimum	Maximum	NAAQ Standards
1.	PM_{10} (µg/m³)	35.92	44.92	100
2.	$PM_{2.5}$ (µg/m³)	20.63	24.71	60
3.	SO_2 (µg/m³)	8.49	11.84	80
4.	NO_2 (µg/m³)	16.97	23.67	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 Industrial area (Project site), day time noise level was about 65.48 dB (A) and 52.86 dB(A) during night time, which is within prescribed limit by CPCB for Industrial area (75 dB(A) Day time & 70 dB(A)Night time).
- In residential area day time noise levels varied from 43.56 dB (A) to 53.58 dB (A) and night time noise levels varied from 40.45 dB (A) to 43.91 dB (A) across the sampling stations. The field observations during the study period the ambient noise levels except one Residential area noise is not within the limit prescribed by MoEF&CC (55 dB (A) Day time & 45 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-24 Summary of Surface Water Quality Monitoring

S.No	Parameters	Minimum	Maximum	IS 2296:1992 Standards

1.	pH	7.15	7.84	6.5 – 8.5
2.	TDS (mg/l)	391	466	500
3.	COD (mg/l)	16	24	-
4.	BOD (mg/l)	2	4	2
5.	Total Hardness(mg/l)	143	172	-

8.4.2 Ground Water Quality

Table-25 Summary of Ground Water Quality Monitoring

S.NO	Parameters	Minimum	Maximum	IS 10500: 2012 Standards	
				Acceptable Limit	Permissible Limit
1.	pH	7.12	7.85	6.5 – 8.5	NR
2.	Chloride	352	498	500	2000
3.	Total Hardness (mg/l)	261	324	200	600
4.	Sulphate	139	196	200	400
5.	TDS	905	1213	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-26 Summary of Soil Quality Monitoring

S.No	Parameters	Minimum	Maximum
1.	pH	7.52	8.32
2.	Electrical conductivity (µmho/cm)	358	658
3.	Nitrogen (mg/kg)	102.59	128.52
4.	Phosphorus (mg/kg)	6.87	8.61
5.	Potassium (mg/kg)	95.26	119.34

9. WASTE HANDLING

9.1 Solid Waste Management

The municipal solid waste generation and management details are given in **Table-28**.

Table-27 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
Total		**13.5**	

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-28**.

Table-28 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-29 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 (In downwind)	Twice a week:24 hourly period	PM_{10}, $PM_{2.5}$, SO_2, and NO_2
3.	Noise	2 (two within core area and two 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_{10}, $PM_{2.5}$, SO_2 & CO
5.	Vehicular Emissions	Parking area	Periodic monitoring of vehicles	Air emission and noise, PCU
6.	Soil	Two Locations within the Project Site	Yearly Once	Physico chemical properties, Nutrients, Heavy metals
7.	Terrestrial Ecology	Within 10km, around the project	Once in three years	Symptoms of injuries on plants

8.	Surface/ Ground water quality	Two Locations Within Project Site	Yearly Once	As per ISO 10500 Standard parameters and IS 2296:1992 Standards

11.CONCLUSION

The "**Proposed black granite quarry over an extent of 29.00.23Ha**" will be beneficial for the development of the nearby villages. Due to this proposed quarry, 30 no's of employment potential will be deployed which increase the social benefits of nearby villages. Environmental aspects like dust emission, noise, siltation due to surface run-off, etc. will have to be controlled within the permissible limit to avoid impacts on the surrounding environment. Necessary pollution control equipment, water sprinkling, plantation, personal protective equipment and diamond wire saw cutting etc., will form regular practice in the project. Additional pollution control measures and environmental conservation measures will be adopted to control/minimize impacts on the environment. The CER measures proposed to be adopted by the proponent will improve the social and economic status of the nearby villages.

1 INTRODUCTION

1.1 Purpose of the report

The proposed black granite quarry over an extent of 29.00.23Ha at S.F.No.254 (Part), Pathalahalli Village, Karimangalam Taluk, Dharmapuri District, Tamil Nadu State. It is a Government poramboke land.

As per EIA Notification 2006 and its subsequent amendment S.O.1886 (E) dated; 20th April 2022 for the mining of minerals as the area of the proposed project is 29.00.23Ha fall under B1 category. As per Hon'ble National Green Tribunal, vide order dated 13th September, 2018 in O.A. No. 186 of 2016 and MoEF&CC Office Memorandum F.No.L- 11011/175/2018-IA-II (M) Dated: 12.12.2018, clarified the requirement of EIA/EMP and Public Hearing for B1 category projects.

Based on this, the ToR was obtained vide Lr. No. SEIAA–TN/F.No.10401/SEAC/ToR-1599/2023, Dated: 06.11.2023 and the EIA report has been prepared and the report will be submitted for Public Hearing. After completion of public hearing, the query raised and its compliance will be incorporated in the final EIA report and will be submitted for the appraisal of the proposed project in Tamil Nadu SEAC /SEIAA for seeking EC.

1.2 Project background

TAMIN has obtained the lease vide G.O.Ms.No.517 Industries (H2) Department, dated 16.05.1986. The G.O has been grant lease for 20 years (23.06.1987 to 22.06.2007) for extent of 13.56.0 Ha at S.F.No 254 (Part) at Kathirnaickanahalli Village (Now renamed as Pathalahalli), Harur Taluk(Now Karimangalam), Dharmapuri District. Subsequently, the proponent has been surrendered 2.25.04 Ha land and the same was accepted by the government vide G.O (D) No.113 Indus, (MME1), dt.11.04.2002.

TAMIN has applied fresh lease an extent of 29.00.23 Ha on 19.06.2006 and obtained lease for 20 years vide precise area communication letter No.3774153/MME.1/2022-1, Dated: 14.02.2023. Precise area communication letter is enclosed as **Annexure-1**. Accordingly, Mining Plan has been approved by the Director, Department of Geology and Mining, Guindy, Chennai vide letter Rc. No.7377/MM4/2022 dated 28.08.2023 for the proposed production capacity of 10,500m^3 at 10% recovery of ROM 1,05,000m^3 during the five years of mining plan period. Mining plan approval letter is enclosed as **Annexure-2** and approved mining plan is enclosed as **Annexure-3.**

ToR application was submitted to TN-SEIAA vide online proposal No. SIA/TN/MIN/442957/2023, dated: 11.09.2023 as the area of the proposed project is more than 5.00.0Ha. The proposal was appraised during 416th SEAC meeting held on 13.10.2023 and 670th SEIAA meeting held on 06.11.2023 and ToR was issued along with public hearing vide Letter No. SEIAA-

TN/F.No.10401/SEAC/ToR-1599/2023, dated: 06.11.2023 under B1 Category, Schedule 1(a) Mining of Minerals as per EIA Notification 2006 and its subsequent amendments for the minor minerals as the area of the proposed project is more than 5Ha and the ToR was enclosed as **Annexure-5**.

Based on the issued ToR, the Draft EIA report will be submitted to Tamil Nadu Pollution Contorl Board for Public Hearing. Public Hearing minutes along with compliance will be incorporated in the final EIA report and will be submitted for the appraisal of the proposed project in Tamil Nadu SEAC /SEIAA for seeking EC.

1.3 Identification of Project & Project Proponent

1.3.1 Identification of the Project

The proposed black granite quarry is over an extent of 29.00.23 Ha located at S.F.254 (Part), Pathalahalli Village, Karimangalam 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 15,59,462m^3. Mineable Reserves have been computed as 13,31,059m^3 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 1,33,106m^3 by applying the recovery factor 10%.

The total proposed production capacity is 10,500m^3 at 10% recovery of ROM 1,05,000m^3. The annual peak production per year would be 5,000m^3 at 10% recovery of ROM 50,000m^3**.** Total waste (Granite waste+Over Burden+Side Burden) to be generated during the five years of mining plan period will be around 1,25,819m^3. These wastes are proposed to be dumped on the North East and South West of lease area.

Table 1-1 Ultimate Pit Dimensional Details

S. No	Description	Average Ultimate Pit Dimensional(m)		
		Length	Width	Depth
1	Top	917	96	30
2	Bottom	869	55	

Table 1-2 Reserves of Proposed Quarry

S. No	Geological Reserves (m^3)	Mineable Reserves (m^3)	Production Capacity at 10% Recovery (m^3)
1	15,59,462	13,31,059	10,500

1.4.2 Location of the project

The proposed project is over an extent of 29.00.23 Ha; the lease area is located at S.F.No.254 (Part) of Pathalahalli Village, Karimangalam 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°17'05.70541"E to 78°17'35.81481"E and Northern latitude from 12° 09'00.00051"Nto 12°09'22.02671"N. The quarry lease area is hillock with height of about 160m surrounded by plain lands. The altitude of the area is 630m 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	Bourndary mark point	Latitude (N)	Longitude(E)
1	BP1	12°09'00.00051"	78°17'33.38272"
2	BP2	12°09'01.00591"	78°17'30.64142"
3	BP3	12°09'00.27351"	78°17'28.96362"
4	BP4	12°09' 06.43691"	78°17'23.13071"
5	BP5	12°09'09.29560"	78°17'22.99490"
6	BP6	12°09'06.90191"	78°17'22.04590"
7	BP7	12°09'08.71041"	78°17'17.38721"
8	BP8	12°09'12.67201"	78°17'05.70541"
9	BP9	12°09'16.29082"	78°17'06.61081"
10	BP10	12°09'18.69321"	78°17'07.78712"
11	BP11	12°09'21.68370"	78°17'06.85660"
12	BP12	12°09'22.02671"	78°17'08.94321"
13	BP13	12°09'20.96842"	78°17'13.51100"
14	BP14	12°09'15.54001"	78°17'30.62481"
15	BP15	12°09'09.23891"	78°17'30.52051"
16	BP16	12°09'07.61900"	78°17'33.83622"
17	BP17	12°09'07.27341"	78°17'34.00560"
18	BP18	12°09'03.83061"	78°17'34.76412"
19	BP19	12°09'02.13862"	78°17'35.74301"
20	BP20	12°09'02.06591"	78°17'35.81481"

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 630m above MSL. Height of the hillock is 160m. The available ground water depth is 11.6m (As per TWAD) (TWAD- Dharmapuri - May 2024). The Karimangalam Taluk falls under over exploited category as per CGWB.

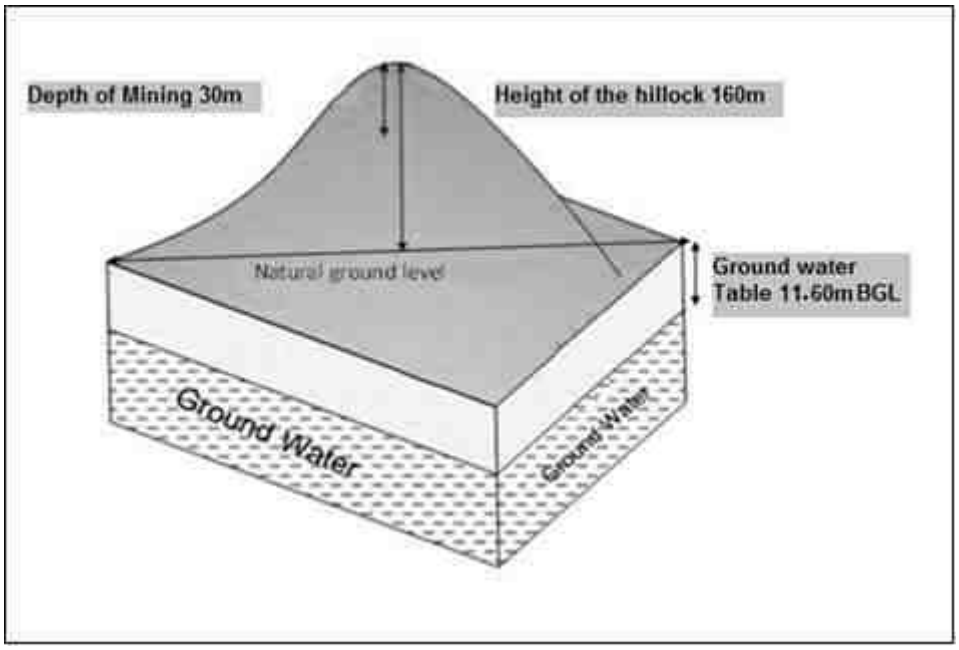


Figure 1-2 Schematic Diagram of Site Elevation and Ground Water Regime

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 work of undertaking field studies and preparation of EIA/EMP report under B1category as obtained Terms of Reference from SEIAA-TN was assigned to M/s Hubert Enviro Care Systems (P) Ltd. (HECS) Chennai by the project proponent. 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.1,72,000/- .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 quarryproject 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 negativethat, themining 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 14thSeptember 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. Studyof 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.

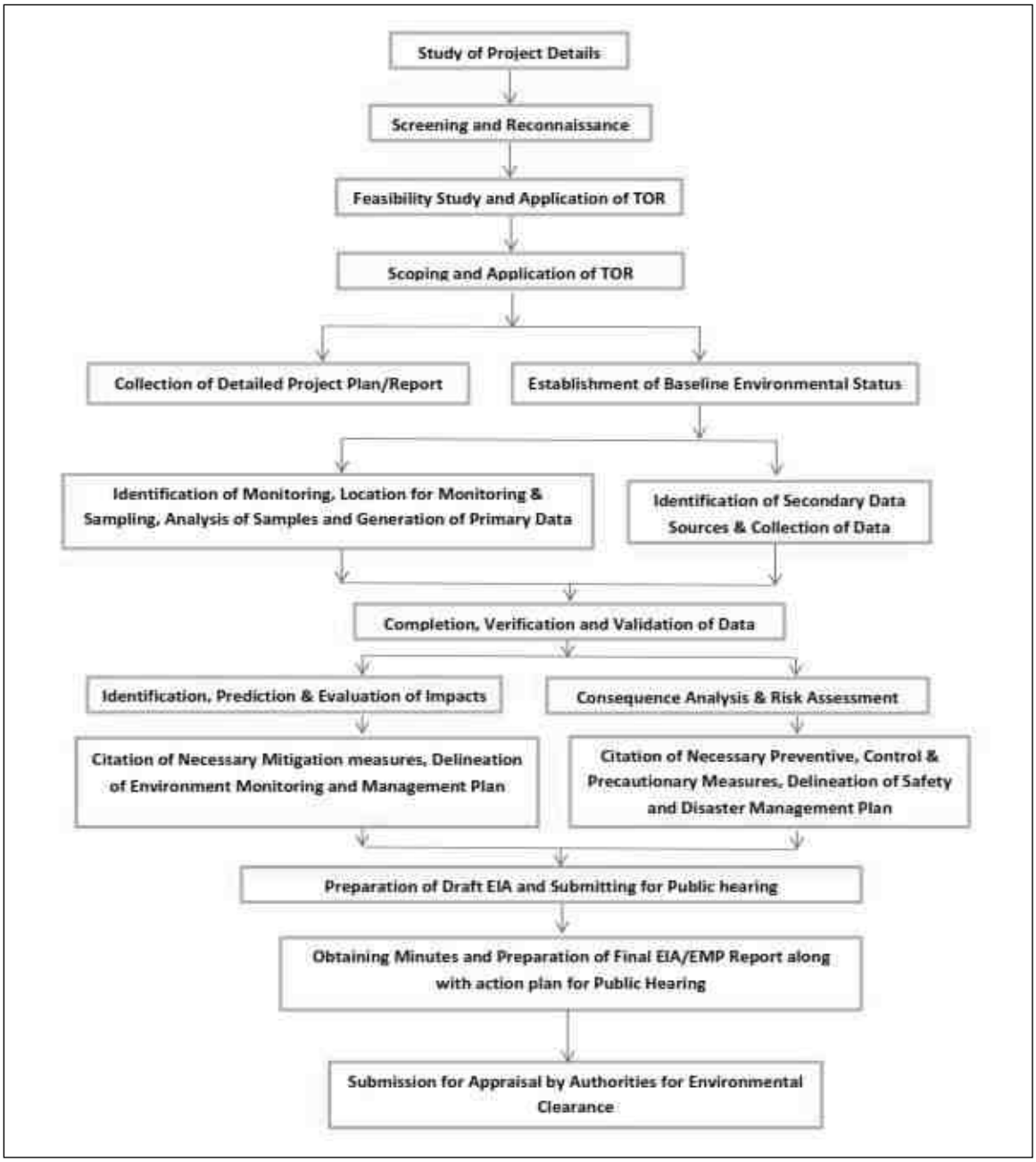


Figure 1-3 Feasibility & Environmental Assessment Process

1.8.3 Legal Complicability

The establishment and functioning of mining industry will be governed by Tamin client to provide the following environmental acts/regulations besides the local zoning and land use laws of the States.

S.No	Acts/Rules
1	The Environment Protection Act of 1986 amended in 2018
2	Environmental Impact Assessment Notification 14th 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 Refernce Compliance

The Terms of Reference (ToR) issued by SEIAA-Tamil Nadu compliance is given as

1.8.4.1 Additional Terms of Reference

<table>
<tr><th>S.No</th><th>Terms of Reference</th><th>Compliance</th></tr>
<tr><td>1</td><td>The structures within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m and (iv) 300 m 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.</td><td>The structures with 50m, 100m, 200m and 300m radius were given below.
<table>
<tr><th>S.No</th><th>Description</th><th>Count</th></tr>
<tr><td colspan="3">0-50m</td></tr>
<tr><td>1</td><td>Structures</td><td>12</td></tr>
<tr><td colspan="3">50-100m</td></tr>
<tr><td>1</td><td>Structures</td><td>9</td></tr>
<tr><td colspan="3">100-200m</td></tr>
<tr><td>1</td><td>Structures</td><td>26</td></tr>
<tr><td>2</td><td>Temple</td><td>1</td></tr>
<tr><td colspan="3">200-300m</td></tr>
<tr><td>1</td><td>Structures</td><td>32</td></tr>
<tr><td>2</td><td>Temple</td><td>1</td></tr>
</table></td></tr>
<tr><td>2</td><td>The PP shall furnish a Copy of 500 m Cluster Certificate from the Competent Authority.</td><td>The 500m radius AD mines letter enclosed as Annexure-9.</td></tr>
<tr><td>3</td><td>The PP shall furnish VAO certificate regarding the location of habitations within 300m radius from the periphery of the site.</td><td>The 300m radius VAO certificate is enclosed as Annexure-8.</td></tr>
<tr><td>4</td><td>The PP shall submit a detailed hydrological report indicating the impact of proposed quarrying operations on the waterbodies like lake, water tanks, etc</td><td>The hydrogeology report is being prepred by Government of Tamil Nadu Water Resources Department as per the Letter Vide Rc. No 3447/ML3/2015 Dated: 11.03.2024.
However, the proposed mining activity is for a depth of 30m from the top of the hill. Ground water table is available at 11.6mBGL (Ref – TWAD). So, mining activities will not intersect with</td></tr>
</table>

<table>
<tr><td></td><td>located within 1 km of the proposed quarry.</td><td>ground water table.</td></tr>
<tr><td>5</td><td>The Proponent shall develop greenbelt and garland drain around the boundary of the proposed quarry and the photographs indicating the same shall be shown during the EIA appraisal.</td><td>The total area for the proposed green belt is 0.13.0 Ha during first 5 years of the proposed quarrying activity. TAMIN is proposing to plant 3,650 trees which are proposed to plant within the 7.5m safety buffer zone mine lease area and in the proposed green belt area.
<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>3,650</td><td>Neem, pungam, vengai</td><td>80</td><td>2,900</td></tr>
</table></td></tr>
<tr><td>6</td><td>The PP shall mark the DGPS reference pillars painted with blue & white colour indicating the safety barrier of 7.5 m to be left under the Rule 13 (1) of MCDR, 1988 within the lease boundary and protective bunds.</td><td>The proponent has already carried out the DGPS survey and the boundary coordinates are given in the section plates as attached in Annexure-4.</td></tr>
<tr><td>7</td><td>The PP shall develop Green belt/plantation all along the mining lease boundary in a safety barrier.</td><td>The total area for the proposed green belt is 0.13.0 Ha during first 5 years of the proposed quarrying activity. TAMIN is proposing to plant 3,650 trees which are proposed to plant within the 7.5m safety buffer zone mine lease area and in the proposed green belt area
<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>3,650</td><td>Neem, pungam, vengai</td><td>80</td><td>2900</td></tr>
</table></td></tr>
<tr><td>8</td><td>The PP shall furnish the total manpower required for the proposed mining project</td><td>The list of manpower requirement for the proposed mining activity is given in Chapter-2 in Table 2-10. Preference will be given to the local people based on their eligibility and experience.</td></tr>
</table>

	including Statutory officials, Geologist, Supervisory staff, Skilled, Semi-skilled & Unskilled staff with showing the representation of the local people as per their eligibility and experience.	
ANNEXURE-I		
1	In the case of existing/operating mines, a letter obtained from the concerned AD (Mines) shall be submitted and it shall include the following: (1) Original pit dimension (ii)Quantity achieved Vs EC Approved Quantity (ii) Balance Quantity as per Mineable Reserve calculated. (iv) Mined out Depth as on date Vs EC Permitted depth (V) Details of illegal/illicit mining (vi)Violation in the quarry during the past working. (vii) Quantity of material mined out outside the mine lease area (viii) Condition of Safety zone/benches (ix) Revised/Modified Mining Plan showing the benches of not exceeding 6 m height and ultimate depth of not exceeding 50m.	Tamin has applied for the AD mines letter.
2	Details of habitations around the proposed mining area and latest VAO certificate regarding the location of	The 300m radius VAO certificate enclosed as **Annexure-8.**

<table>
<tr><td></td><td>habitations within 300m radi from the periphery of the site.</td><td></td></tr>
<tr><td>3</td><td>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.</td><td>The structures located within the radius of (i) 50 m. (ii) 100m, (iii) 200 m and (iv) 300m (v) 500m is given below.
<table>
<tr><th>S.No</th><th>Description</th><th>Count</th></tr>
<tr><td colspan="3">0-50m</td></tr>
<tr><td>1</td><td>Structures</td><td>12</td></tr>
<tr><td colspan="3">50-100m</td></tr>
<tr><td>1</td><td>Structures</td><td>9</td></tr>
<tr><td colspan="3">100-200m</td></tr>
<tr><td>1</td><td>Structures</td><td>26</td></tr>
<tr><td>2</td><td>Temple</td><td>1</td></tr>
<tr><td colspan="3">200-300m</td></tr>
<tr><td>1</td><td>Structures</td><td>32</td></tr>
<tr><td>2</td><td>Temple</td><td>1</td></tr>
</table></td></tr>
<tr><td>4</td><td>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.</td><td>The hydrogeology report is being prepred by Government of Tamil Nadu Water Resources Department as per the Letter Vide Rc. No 3447/ML3/2015 Dated: 11.03.2024.

However, the proposed mining activity is for a depth of 30m from the top of the hill. Ground water table is available at 11.6mBGL (Ref – TWAD). So, mining activities will not intersect with ground water table.</td></tr>
<tr><td>5</td><td>The proponent shall carry out Bio diversity study through reputed Institution and the same shall be included in EIA report.</td><td>The flora and fauna details within the study area are discussed in Chapter-3, Section-3.10.</td></tr>
<tr><td>6</td><td>The DFO letter stating that the proximity distance of Reserve forests,protected area,Sanctuaries, Tiger reserve etc., up to</td><td>Tamin has applied for DFO letter from the Forest Department.
However, the details of Reserved Forest, Wildlife Sanctuaries within the study area are given in Chapter-3, Section 3.3 & Table 3-1.</td></tr>
</table>

	a radius of 25km from the proposed site.	
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 prepare and submit an Action Plan for carrying out the realignment of the benches in the proposed quarry lease after it is approved by the concerned Asst. Director of Geology andMining during the time of appraisal for obtaining the EC	Benches have been formed in this proposed quarry under regulation 106 of MMR, 1961. Hence, the question of 'Action Plan' for carrying out the realignment of the benches does not rise.
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 30m depth from the top of the hill lock and the height of the hill lock is 160m AMSL. There is proposed mining activity from the top of the hill lock and the mine benches have been formed 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 proposed quarry is carried out by the statuary component person as per the MMR 1961 such as blaster, mining mate, mine foremen,II/I class mines manager appointed by the proponent.	The Blasting Affidavit enclosed as **Annexure-11.**
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	The conceptual design of blasting operation is given in **Chapter 2, Section 2.8.**

	such that the blast induced ground vibrations are controlled as well as no fly rock travel beyond 30m from the blast site.	
11	The EIA Coordinators shall obtain and furnish the details of quarry/quarries operated by the proponent in the past, either in the same location or elsewhere in the State with video and photographic evidences.	The existing quarry photographs are enclosed as **Annexure-6.**
12	If the proponent has already carried out the mining activity in the proposed mining lease area after 15.01.2016, then the proponent shall furnish the following details from AD/DD mines.	The proponent has applied AD letter.
13	What was the period of operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines?	The proponent has applied AD letter.
14	Quantity of minerals mined out. a)Highest production achieved in any one year b) Detail of approved depth of mining c) Actual depth of mining achieved earlier d) Name of the person already minded out in that lease area e) If EC and CTO already obtained, the copy of the same shall be submitted	The proponent has applied AD letter.

	f) Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches	
15	All corner coordinates of the mine lease area superimposed on a high resolution Imagery/Topo sheet, topographic sheet, geomorphology, lithoology and geology of the mining lease area should be provided. Such an imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone)	• The boundary coordinates of the site is given in **Table1-3** and Google image of the site with GPS coordinates is given in **Figure 1-1.** • Topo map of the study area is given in **Figure 3-2.** • Geomorphology of the study area is discussed in **Chapter-3, Section 3.4.6.1 and Figure 3-9.** • Geology of the dharmapuri district is given in **Chapter-3, Section 3.4.9.** • Land use and Land cover of the study area is discussed in **Chapter-3, Section 3.4.4.1 and Figure 3-6.** • Ecological Features of the study area is given in **Table 3-1 and Figure 3-3**.
16	The PP shall carry out Drone video survey covering the cluster, green belt, fencing, etc.,	The Drone video will be submitted in the Final EC presentation. However, the site photographs are attached as **Annexure-6.** The Greenbelt and Fencing photographs are enclosed as **Annexure-7.**
17	The proponent shall fumish photographs of adequate fencing, green belt along the periphery including replantation of existing trees & safety distance between the adjacent quarries & water bodies nearby provided as per the approved mining plan	The Greenbelt and Fencing photographs are enclosed as **Annexure-7.**

<table>
<tr>
<td>18</td>
<td>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.</td>
<td>
Total Reserves
<table>
<tr><th>S. No</th><th>Updated Geological Reserves as on 03.03.2023</th><th>Updated Mineable Reserves as on 03.03.2023</th><th>Mineable Saleable Reserves @ 10% Recovery(m^3)</th></tr>
<tr><td>1</td><td>15,59,462</td><td>13,31,059</td><td>1,33,106</td></tr>
</table>
Yearwise Production
<table>
<tr><th>S.No</th><th>Year</th><th>ROM (m^3)</th><th>Recovery@10% (m^3)</th><th>Granite Waste @ 90 % (m^3)</th></tr>
<tr><td>1</td><td>1st Year</td><td>25,000</td><td>2,500</td><td>22,500</td></tr>
<tr><td>2</td><td>2nd Year</td><td>50,000</td><td>5,000</td><td>45,000</td></tr>
<tr><td>3</td><td>3rd Year</td><td>10,000</td><td>1,000</td><td>9,000</td></tr>
<tr><td>4</td><td>4th Year</td><td>10,000</td><td>1,000</td><td>9,000</td></tr>
<tr><td>5</td><td>5th Year</td><td>10,000</td><td>1,000</td><td>9,000</td></tr>
<tr><td colspan="2">Total</td><td>1,05,000</td><td>10,500</td><td>94,500</td></tr>
</table>
Method of mining is given in Chapter-2, Section 2.8.
Impacts and Mitigation measures due to proposed mining activity is given in Chapter-4.
</td>
</tr>
<tr>
<td>19</td>
<td>The Project Proponent shall provide the Organization chart indicating the appointment of various statutory officials and other competent persons to be appointed as per the provisions of the Mines Act 1952 and the MMR, 1961 for carrying out the quarrying operations scientifically and systematically in order</td>
<td>The organization chart hierarchy is discussed in Chapter-10 and given in Figure 10-1.</td>
</tr>
</table>

	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.	The hydrogeology report is being prepred by Government of Tamil Nadu Water Resources Department as per the Letter Vide Rc. No 3447/ML3/2015 Dated: 11.03.2024. However, the proposed mining activity is for a depth of 30m from the top of the hill. Ground water table is available at 11.6mBGL (*Ref – TWAD*). So, mining activities will not intersect with ground water table.
21	The proponent shall furnish the baseline data for the environmental and ecological parameters with regard to surface water/ground water quality, air quality, soil quality & flora/fauna including traffic/vehicular movement study.	The baseline data for the environmental and ecological parameters with regard to surface water / groundwater quality, air quality, soil quality & flora / fauna including traffic / vehicular movement study were conducted from **March 2024 - May 2024** period are discussed in **Chapter-3**. Ambient Air Quality details are provided in **Chapter-3, Section 3.6.** Noise monitoring locations are mentioned in **Chapter-3**, **Section 3.7**. Surface Water Quality Assessment is given in **Chapter-3, Section 3.8.1.** Ground Water Quality Assessment is given in **Chapter-3**, **Section 3.8.3.** Soil quality assessment is given in **Chapter-3**, **Section 3.9.** Biological Environment is given in **Chapter-3**, **Section 3.10.** The traffic / vehicular movement study are discussed in **Chapter 4 and Section 4.6.**
22	The Proponent shall carry out the	Detailed impact study has been carried out and the Impacts and mitigation measures in terms of

	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 quanty and the surrounding habitations in the mind.	soil health, biodiversity, air pollution, and water pollution were given in **Chapter -4.** Environmental Management Plan & its Control Measures are provided in **Chapter -10.**
23	Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.	Rain water harvesting management details are provided in **Chapter-4, Section 4.7.1 and 4.24.3.**
24	Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.	Land use of the study area is given in **Chapter 3 and Section 3.4.4.1, Figure 3-5, Figure3-6 & Table3-3.** Land use plan of mine lease area is given in **Chapter 2, Section 2.5 & Table 2-2**. Impacts and mitigation measures are given in **Chapter 4.**
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	Disposal of waste is discuseed in **Chapter-2, Section 2.8.9.** As the Proposed project activity is a Governement Poramboke land Replace and Rehabilitation issues is not required.

	land use, R&R issues, if any should be provided.	
26	Proximity to Areas declared as 'Critically Polluted (or) the Project areas which attracts the court restrictions for mining operations, should also be indicated and where so required.Clearance certifications from the prescribed Authorities, such as the TNPCB (or) Dept. of Geology and Mining should be secured and furnished to the effect that the proposed mining activities could be considered.	There is no critical polluted area within the study area.
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 **Chapter-4, Section 4.24.** Rain water harvesting management details are provided in **Chapter 4, Section 4.7.1 and 4.24.3.**
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 **Chapter 4, Section 4.6.**
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 details of flora and fauna discussed in **Chapter -3, Section 3.10.1.1.**
30	A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-specific.	Mine closure plan is given in **Chapter 2, Section 2.12.**
31	As a part of the study of flora and fauna	The Importance of preserving local flora and fauna will be educated to the local students by the

<table>
<tr><td></td><td>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.</td><td>EIA coordinator.</td></tr>
<tr><td>32</td><td>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.</td><td>The total area for the proposed green belt is 0.13.0 Ha during first 5 years of the proposed quarrying activity. TAMIN is proposing to plant 3,650 trees which are proposed to plant within the 7.5m safety buffer zone mine lease area and in the proposed green belt area.
<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>3,650</td><td>Neem, Pungan, Vilvam, Aathi, Panai</td><td>80%</td><td>2,900</td></tr>
</table></td></tr>
<tr><td>33</td><td>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</td><td>As per committee recommendations, taller / one year old saplings raised in eco-friendly bags, will be planted in proper espacement as per the advice of local forest authorities / botanist / horticulturist with regard to sites specific choices.
The total area for proposed green belt is 0.13.00 Ha and along the 7.5m safety buffer area during 5 years of the proposed quarrying activity and it is proposed to plant 3,650nos of trees. The details are given in Chapter 4, Section 4.26.1.</td></tr>
</table>

	an organized manner	
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 **Chapter 7, Section 7.3.**
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 **Chapter 7, Section 7.2.**
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 **Chapter 4, Section 4.15 and 4.27.**
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.	Occupational Health impacts & mitigation measures are provided in **Chapter 4, Section 4.15 and 4.27.** The detailed EMP is given in **Chapter 10, Section 10.10.**
38	The Socio-economic studies should be	The socio-economic study was carried out within a 10 km buffer zone from the mining activity.

	carried out within a 5km buffer zone from the mining activity. Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.	The detailed measure of socio-economic significance is discussed in **Chapter 3, Section 3.11.**
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.	**Benefits of the Proposed Project** • This proposed quarry will benefit to the local people by providing direct employment for 30 persons & indirect employment for 20 persons. • The direct beneficiaries will be those who get employed in the mines as skilled and unskilled workers. • Improvement in Per Capita Income. • The socio - eeconomic conditions of the village will enhance due to this proposed project. • Necessary pollution control measures like water sprinkling, plantation, personal protective equipment and diamond wire saw cutting etc., will form regular practice in the project. • Thus the project is environmentally compatible, financially viable and would be in the interest of construction industry thereby indirectly benefiting the masses.
41	If any quarrying operations were carried out in the proposed quarrying site for which now the EC is sought, the Project Proponent shall furnish the detailed compliance to EC with the site	Certified Compliance Report is not applicable.

	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 **Chapter 10, Section 10.10**.
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 proponenet are factual and no false information has been submitted.
Remarks by SEIAA		
Annexure B- Cluster Managament Committee		
1	Cluster Management Committee, which must include all the proponents in the cluster as members including the existing as well as proposed quarry:	Not applicable, as the proposed project does not attract any cluster mines with in 500m radius from the lease boundary.
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 applicable. 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	The cluster management committee does not require as the proposed project does not attracts any cluster mines with in 500m radius from the lease boundary.

	Mines before the execution of mining lease and the same shall be updated every year to the AD/Mines	
4	Detailed Operational Plan must be submitted which must include the blasting frequency with respect to the nearby quarry situated in the quarry in the form of route map and network.	Not applicable, as the proposed project does not attracts any cluster mines with in 500m radius from the lease boundary.
5	The committee shall deliberate on risk management plan 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.	Not applicable, as the proposed project does not attracts any cluster mines with in 500m radius from the lease boundary. However, Risk management of the proposed mining project is discussed in **Chapter 7, Section 7.2.**
6	The Cluster Management Committee shall forms Environmental Policy to practice sustainable mining in a scientific and the accordance with the law. The role played by in implementing the environmental policy devised shall be given in detail.	Not applicable as the proposed project does not attracts any cluster mines with in 500m radius from the lease boundary. However, Environmental management plan details are discussed in **Chapter-10.**
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.	Not applicable, as the proposed project does not attracts any cluster mines with in 500m radius from the lease boundary.
8	The committee shall furnish the Emergency Management plan within	Not applicable, as the proposed project does not attracts any cluster mines with in 500m radius from Section the lease boundary. However, Emergency Management plan is given in **Chapter-7, Section**

	the cluster.	**7.3.1.1.**
9	The committee shall deliberate on the health of the workers/staff involved in the mining as well as the health of the public.	Not applicable, as the proposed project does not attracts any cluster mines with in 500m radius from the lease boundary. However the health of the workers/staff involved in the mining as well as the health of the public discussed in **Chapter -10.**
10	The committee shall furnish an action plan to achieve sustainable development goals with reference to water, sanitation & safety	Not applicable, as the proposed project does not attracts any cluster mines with in 500m radius from the lease boundary.
11	The committee shall furnish the fire safety and evacuation plan in the case of fire accidents	Not applicable, as the proposed project does not attracts any cluster mines with in 500m radius from the lease boundary. However, fire safety and evacuation plan given in **Chapter-7, Section 7.3.1.4.**
Impact study of mining		
12	Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area covering the entire mine lease period as per precise area communication order issued from reputed research institutions on the following a) Soil health & bio-diversity. b)Climate change leading to Droughts. Floods etc. c)Pollution leading to release of Greenhouse gases (GHG), rise in Temperature. & Livelihood of the local people.	The detailed impacts study and its mitigation due to mining activity around the proposed mine lease area were discussed in **Chapter 4.**

	d)Possibilities of water contamination and impact on aquatic ecosystem health e)Agriculture, Forestry & Traditional practices f)Hydrothermal Geothermal effect due to destruction in the Environment. g)Bio-geochemical processes and its foot prints including environmental stress. h)Sediment geochemistry in the surface streams.	
Agriculture & Agro Biodiversity		
13	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 **Chapter-4, Section 4.11 and Section 4.28.**
14	Impact on soil flora & vegetation around the project site	Impact and mitigation measures of soil given in **Chapter-4, Section 4.2 and Section 4.18.** Impact and mitigation measures of flora & fauna are given in **Chapter-4, Section 4.10 and Section 4.26.** Impact and mitigation measures due to proposed mining activity on surrounding agricultural fields are discussed in **Chapter-4, Section 4.11 and Section 4.28.**
15	Details of type of vegetations including no. of trees & shrubs within the proposed mining area and If so, transplantation of such vegetations all	In the proposed lease boundary only Fabaceae and Malvaceae Shrubs are present. Hence no trees will be cut for the project activity. Also Greenbelt development around the project lease boundary will be done by planting around 3,650 trees of Vilvam, Neem, and Pungam as a part of Noise and Dust Control Measures.

	along the boundary of the proposed mining area shall committed mentioned in EMP	
16	The Environmental Impact Assessment should study the biodiversity, the natural ecosystem the so midre flora axan and suggest measures to maintain the natural ecosystem.	The details of Flora and fauna study are discussed in **Chapter-3, Section 3.10**. Also, the conservation plan for the schedule 1 species of Indian Peafowl with budgetary allocations was given in **Table 3-25.**
17	Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.	All the essential environmental protective measures will be followed by the proponent to manage the surrounding environment and restore the ecosystem.
18	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 **Chapter 4, Section 4.11 and 4.28.**
Forests		
19	The project proponent shall detailed study on impact of mining on Reserve forests free ranging wildlife.	Nearest reserved forest is Mukkanur RF which at a distance of 3.28 km (SW), so there is no any impact for free ranging of wildlife and remaining reserve forest details are given in **Chapter 3, Table 3-1.**
20	The Environmental Impact Assessment should study impact on forest, vegetation, endemic vulnerable and endangered indigenous flora and fauna.	The impacts on Biological environment and mitigation measures are discussed in **Chapter-4, Section 4.10.** The details of Flora and fauna study are discussed in **Chapter 3, Section 3.10.** Also, the conservation plans for the schedule 1 species of Indian Peafowl with budgetary allocations were discussed in **Table 3-24 and 3-25.**
21	The Environmental Impact Assessment should study impact on standing trees and the existing trees should be numbered and	The impacts and mitigation measures of Biological environment is discussed in **Chapter-4, Section 4.10.** **Action suggested for protection:** The total area for the proposed green belt is 0.13.0 Ha during first 5 years of the proposed quarrying

	action suggested for protection.	activity. TAMIN is proposing to plant 3,650 trees which are proposed to plant within the 7.5m safety buffer zone mine lease area and in the proposed green belt area.
22	The Environment Impact Assessment study impact on protected areas. Reserve Forests, National Parks. Corridors and life pathways, near project site.	There are no National parks, Biosphere Reserves, Wildlife Corridors; Tiger/ Elephant Reserves were located within 10km of the mine lease area. Nearest reserved forest is Mukkanur RF which at a distance of 3.28 km (SW), so there will be no any impact and remaining reserved forest details are given in **Chapter 3, Table 3-1.**
Water Environment		
23	Hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, 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. Necessary data and documentation in this regard may be provided, covering the entire mine lease period.	The hydrogeology report is being prepred by Government of Tamil Nadu Water Resources Department as per the Letter Vide Rc. No 3447/ML3/2015 Dated: 11.03.2024. However, the proposed mining activity is for a depth of 30m from the top of the hill. Ground water table is available at 11.6mBGL (*Ref – TWAD*). So, mining activities will not intersect with ground water table.
24	Erosion Control measures.	Erosion control measures given in **Chapter 4, Section 4.19.** Green belt development is one the important control measure of erosion which is discussed in **Chapter 4, Section 4.26.1.**
25	Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area on the nearby Villages, Water-	The impacts due to proposed mining activity on nearby Villages, Water-bodies Rivers, & any ecological fragile area are discussed in **Chapter -4.**

	bodies Rivers, & any ecological fragile area.	
26	The project proponent shall study impact on fish habitats and the food WEB food chain in the water body and Reservoir.	The project surrounding the water body is seasonal, with common aquatic fish and flora found. Thus, no effects on aquatic species or habitats relative to project activities.
27	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 **Chapter-4.**
28	The project proponent shall study and furnish the impact on aquatic plants and animals in water bodies and possible scars on the landscape, damages to nearby caves, heritage site, and archaeological sites possible land form changes visual and aesthetic impacts	The project surrounding the water body is seasonal, with common aquatic fish and flora found. So the project will not impact the ecological character of the aquatic plants and animals in water bodies. There are no any nearby caves, heritage site from the proposed site. So, there will be no impacts due to the proposed activities.
29	The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components.	The detailed base line study has been conducted and the soil quality monitoring locations & results are discussed in **Chapter 3, Section 3.9.** Impacts and mitigation measures are given in **Chapter 4.**
30	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 **Chapter- 4, Section 4.7 & Section 4.24.**
Energy		
31	The measures taken to control	Environmental Impacts and Mitigation Measures are provided in **Chapter-4.**

	Noise, Air, Water, Dust Control and steps adopted so efficiently utilize the Energy shall be furnished.	
Climate Change		
32	The Environmental Impact Assessment shall study in detail the carbon emission and also suggest the measures to mitigate carbon emission including development of carbon sinks and temperature reduction including control or other emission and climate mitigation activities	Operating a granite quarry can have several impacts on increasing carbon emissions and contributing to temperature rise, primarily through direct and indirect mechanisms. The proposed Granite Quarry has the potential to generate various GHG emissions, including carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), 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 **Chapter- 4, Section 4.5 and 4.22.**
33	The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock.	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 **Chapter -4, Section 4.4 and 4.21.**
Mine Closure Plan		
34	Detailed Mine Closure Plan covering the entire mine lease period as per precise area communication order issued.	Mine Closure Plan is provided in **Chapter -2, Section 2.12.**
EMP		
35	DetailedEnvironment Management Plan along with adaptation, mitigation & remedial strategies covering the entire issued e period as per precise area communication order issued.	The Environment Management Plan with budget allocation is discussed in **Chapter-10.**

36	The Environmental Impact Assessment should hold detailed study on EMP with budget for Green belt development and mine closure plan including disaster management plan.	The EMP details are given in **Chapter-10,** and buget for EMP is given in **Section 10.10.**
Risk Assessment		
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 **Chapter-7, Section 7.2.**
Disaster Management Plan		
38	To furnish disaster management plan and disaster mitigation measures in regard to all aspects to avoid reduce vulnerability to hazards & to cope with disaster/untoward accidents in & around the proposed mine lease 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 **Chapter -7, Section 7.3.**
Others		
39	The project proponent shall furnish VAO certificate with reference to 300m radius regard to approved habitations, schools. Archaeological	The VAO certificate is enclosed as **Annexure-8.**

	sites. Structures, railway lines, 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 of the proposed quarry will be submitted for Public Hearing. After obtaining the minutes from TNPCB, the concerned raised in the PH meeting will be incorporated in the final EIA along with the compliance. The budget on EMP will be allocated based on concern raised in 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.

1.8.4.2 Standard Terms of Reference

S.No	Terms of Reference	Compliance

<table>
<tr>
<td>1</td>
<td>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.</td>
<td>It is a fresh lease quarry. The proponent has obtained lease for 20 years vide letter No. 3774153/MME.1/2022-1, dated: 14.02.2023 is enclosed as Annexure -1. The proposed yearwise production details are given below.
<table>
<tr><th>S. No</th><th>Year</th><th>ROM (m^3)</th><th>Recovery @ 10% (m^3)</th><th>Granite waste @ 90% (m^3)</th></tr>
<tr><td>1</td><td>1st Year</td><td>25,000</td><td>2,500</td><td>22,500</td></tr>
<tr><td>2</td><td>2nd Year</td><td>50,000</td><td>5,000</td><td>45,000</td></tr>
<tr><td>3</td><td>3rd Year</td><td>10,000</td><td>1,000</td><td>9,000</td></tr>
<tr><td>4</td><td>4th Year</td><td>10,000</td><td>1,000</td><td>9,000</td></tr>
<tr><td>5</td><td>5th Year</td><td>10,000</td><td>1,000</td><td>9,000</td></tr>
<tr><td colspan="2">Total</td><td>1,05,000</td><td>10,500</td><td>94,500</td></tr>
</table>
</td>
</tr>
<tr>
<td>2</td>
<td>A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.</td>
<td>TAMIN is rightful lessee in accordance with the above Government of Tamil Nadu has granted precise area communication letter from Industries Investment Promotion and Commerce (MME.1) Department vide letter No.3774153/MME.1/2022-1, dated: 14.02.2023 is enclosed as Annexure–1.</td>
</tr>
<tr>
<td>3</td>
<td>All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.</td>
<td>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.</td>
</tr>
<tr>
<td>4</td>
<td>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</td>
<td>

The boundary coordinates of the site is given in Table1-3 and Google image of the site with GPS coordina tes is given in Figure 1-1.
Topo map of the study area is given in Figure 3-2.
Geomorphology of the study area is discussed in Chapter-3, Section 3.4.6.1 and Figure

</td>
</tr>
</table>

	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).	**3-9.** • Geology of the dharmapuri district is given in **Chapter-3, Section 3.4.9.** • Land use and Land cover of the study area is discussed in **Chapter-3, Section 3.4.4.1 and Figure 3-6.** • Ecological Features of the study area is given in **Table 3-1 and Figure 3-3**.
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.	• Topo map of the study area was prepared in 1:50,000 scale and given as **Chapter-3, Figure 3-2.** • Geomorphology Map of study area is given in **Figure 3-9.** • Geology of the dharmapuri district is provided in **Chapter-3, Figure 3-12.** • Water bodies, streams and rivers and soil characteristics have been explained in **Chapter-3.**
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 have approval from State land use board or the concerned authority.	TAMIN has obtained lease for 20 years vide IIPC (MME.1) Department, Lr. No.3774153/MME.1/2022-1, dated: 14.02.2023. Precise area communication letter is enclosed as **Annexure-1.**
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	TAMIN has a well laid down Environment Policy approved by its Board of Directors. Environmental Policy of TAMIN is given in **Chapter -10, Figure10-1.**

	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.	
8	Issues relating to Mine safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should be provided.	➢ It is open cast semi mechanized mining and no underground mining will be done. So no subsidence study is required. Workable depth of mining will be 30m from top of the hill. ➢ A detail regarding slope of the pit, drilling and blasting is mentioned in **Chapter-2** and **Section 2.8.** ➢ Safeguard measures are provided in **Chapter-10**, **Section 10.9.**
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.	• The study area of 10km zone around the periphery of the mines lease area is considered. • Life time of the mine is 27 years. • 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 **Chapter-2, Section 2.5, Table 2-3 ,Table 2-4** and **Table 2-5.**

<table>
<tr>
<td>10</td>
<td>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.</td>
<td>Land use pattern of the Study Area:
Land use/land coverof study area is given in Chapter-3 and Section 3.4.4, Table 3-2, Figure 3-5 & Figure 3-6.
Land use details of the quarry area:
A Land use detail of the quarry area is provided in Chapter -2, Section 2.5, and Table 2-2.
<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>1.25.00</td><td>1.09.00</td><td>8.62.00</td></tr>
<tr><td>2.</td><td>Waste Dump</td><td>1.74.00</td><td>2.39.00</td><td>13.70.50</td></tr>
<tr><td>3.</td><td>Office Infrastructure</td><td>0.01.00</td><td>--</td><td>0.01.00</td></tr>
<tr><td>4.</td><td>Road</td><td>0.17.00</td><td>--</td><td>0.17.00</td></tr>
<tr><td>5.</td><td>Mine Road</td><td>0.59.00</td><td>--</td><td>0.11.50</td></tr>
<tr><td>6.</td><td>Afforestation</td><td>0.28.50</td><td>0.13.00</td><td>1.00.00</td></tr>
<tr><td>7.</td><td>Unutilized Area</td><td>24.95.73</td><td>21.34.73</td><td>5.38.23</td></tr>
<tr><td colspan="2">Total</td><td>29.00.23</td><td>24.95.73</td><td>29.00.23</td></tr>
</table>
</td>
</tr>
<tr>
<td>11</td>
<td>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.</td>
<td>The waste generation details are discussed in Chapter-2, Section2.5.</td>
</tr>
<tr>
<td>12</td>
<td>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</td>
<td>No forest land is involved in the proposed project site. The proposed quarry site is a government poramboke land & Additional Chief Secretary, Industries, Investment Promotion and Commerce (MME.1) Department, Secretariat, Chennai has been issued the Precise area communication letter by vide Letter Lr.No.3774153/MME.1/2022-1, dated: 14.02.2023 to grant lease for 20 years and is enclosed as Annexure–1.</td>
</tr>
</table>

	inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.	
13	State of forestry clearance for the broken up area and virgin forestland involved in the Project including deposition of net present value (NPV) and compensatory afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.	As the lease area is Government poramboke land and there is no forest land involved.
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 **Chapter-3, Section 3.3, Table 3-1 and Figure 3-3.**
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	There are no protected wildlife areas within the 15km radius of the project. Hence there will be no impact envisaged.

	area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.	
17	Locations of National parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, 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.	There are no National parks, Sanctuaries, Biosphere Reserves, Ramsar site, Tiger/ Elephant Reserves within the 10km radius. The details of environmental sensitive areas covering within 15km from project boundary are given in **Chapter-3, Section 3.3** and **Table 3-1.**
18	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 study area, the necessary plan along with budgetary provisions for their	The details of Flora and fauna study are discussed in **Chapter-3, Section 3.10.** Also, the conservation plan for the schedule 1 species of Indian Peafowl with budgetary allocations was discussed in **Table 3-24 and Table 3-25.**

	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 whereso 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. HTL, CRZ area, location of the mine lease w.r.t CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority)	Not applicable.
21	R&R Plan/compensation details for the Project Affected People (PAP) should be	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

	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 access 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 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.	settlement in the allotted mine lease area. Socio economic study has been done and incorporated in **Chapter-3, Section 3.11.**
22	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 nd 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	The primary baseline data monitored covered three (3) months i.e., from **March 2024 – May 2024** and secondary data was collected from Government and Semi-Government organizations. • Ambient Air Quality details are provided in **Chapter -3, Section 3.6.** • Noise Monitoring details are mentioned in **Chapter-3, Section 3.7**. • Surface Water Quality Assessment is given in **Chapter-3, Section 3.8.1.** • Ground Water Quality Assessment is given in **Chapter-3, Section 3.8.3.** • Soil quality assessment is given in **Chapter-3, Section 3.9.** • Biological Environment is given in **Chapter-3, Section 3.10.** • The traffic / vehicular movement study are discussed in **Chapter-4 and Section 4.6.**

<table>
<tr><td></td><td>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-dominant downwind direction.
The mineralogical composition of PM10, particularly for free silica, should be given.</td><td></td></tr>
<tr><td>23</td><td>Air quality modelling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of Vehicles for transportation of mineral. The details of the model used and input parameters used for modelling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.</td><td>Total maximum GLCs from emissions:
The maximum ground level concentration observed due to mining activities and traffic movement through Air Modelling for PM, SO_2 and NO_x are 64.11µg/m³, 14.8µg/m³ , 29.24µg/m³ respectively.

<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>53.38</td><td>10.73</td><td>64.11</td><td>100</td></tr>
<tr><td>SO_2</td><td>14.07</td><td>0.73</td><td>14.8</td><td>80</td></tr>
<tr><td>NO_X</td><td>28.13</td><td>1.11</td><td>29.24</td><td>80</td></tr>
</table>

The details are provided in Chapter- 4, Section 4.3 and Table 4-11.
Map showing the Ambient Air Quality monitoring locations are given in Chapter-3, Secion 3.6, and Figure 3-18.
Wind rose diagram considered for dispersion modeling is shown in Chapter-4, Section 4.3 Figure 4.1.
Traffic Volume after Implementation of the Project:</td></tr>
</table>

		The details are provided in **Chapter-4, Section 4.6, and Table 4.14 & Table 4-15.**
24	The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.	The water requirement for the project is addressed in **Chapter-2** and **Section 2.9.1. Table 2-7.** The total water requirement is sourced from Private tank suppliers.
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 Mitigation Measures are given in **Chapter-4, Section 4.24.** Rain water harvesting management details are provided in **Chapter 4, Section 4.7.1 and 4.24.3.**
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 **Chapter-4, Section 4.7 and 4.24.**
28	Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should be undertaken and Report furnished. The Report inter-alia shall include details of	The hydrogeology report is being prepred by Government of Tamil Nadu Water Resources Department as per the Letter Vide Rc. No 3447/ML3/2015 Dated: 11.03.2024. However, the proposed mining activity is for a depth of 30m from the top of the hill. Ground water table is available at 11.6mBGL (*Ref – TWAD*). So, mining activities will not intersect with ground water table.

<table>
<tr><td></td><td>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.</td><td></td></tr>
<tr><td>29</td><td>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.</td><td>There is no any stream passing within the proposed mine lease area.
The hydrogeology report is being prepred by Government of Tamil Nadu Water Resources Department as per the Letter Vide Rc. No 3447/ML3/2015 Dated: 11.03.2024.</td></tr>
<tr><td>30</td><td>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.</td><td>Site Elevation: 630 AMSL
Height of the Hill: 160m
Groundwater level is 11.6m depth (Ref- TWAD)
Proposed Depth of Mining is 30m from the top of the hillock is given in the Mining Plan as enclosed as Annexure-3.</td></tr>
<tr><td>31</td><td>A time bound Progressive Greenbelt Development Plan shall be prepared in a tabular form (indicating the linear and quantitative coverage, plant species and time frame) and submitted, keeping in mind, the same will have to be executed up front on commencement of the Project. Phase-wise plan of plantation and compensatory afforestation should be charted clearly indicating the area to</td><td>The total area for the proposed green belt is 0.13.0 Ha during first 5 years of the proposed quarrying activity. TAMIN is proposing to plant 3,650 trees are proposed to plant within the 7.5m safety buffer zone mine lease area and also in the proposed green belt area.
Proposed Greenbelt Details:
<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>3,650</td><td>Neem, pungam, vengai</td><td>80</td><td>2,900</td></tr>
</table></td></tr>
</table>

	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.	
32	Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.	Impacts and mitigation measures on transportation is given in **Chapter-4, Section 4.6 and 4.23.**
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 Mining plan and the same is enclosed as **Annexure-3.** Land use details of the quarry area are given in **Chapter-2, Section 2.5.**
34	Conceptual post mining land use and Reclamation and Restoration of mined	There will be no reclamation and restoration. It is proposed not to fill back the ultimate pit, in as much as good quantity of reserve is available

	out areas (with plans and with adequate number of sections) should be given in the EIA report.	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 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 & preventive measures detail are given in **Chapter-4, Section 4.15 and 4.27.** The EMP details are given separately as **Chapter-10** along with EMP Cost details are provided in **Section 10.10.**
36	Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be 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 **Chapter 8, Section 8.4.** Project Benefits are discussed in **Chapter 8.**
38	Detailed Environmental Management	The detailed EMP was discussed in **Chapter-10** along with EMP Cost details are provided in

	Plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.	**Section 10.10.**
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 prepared to submit for Public Hearing, The Public Hearing points and commitment of the project applicant will be incorporated in Chapter-7 "Additional Studies" in Final EIA/EMP Report after PH completion.
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 **99,97,000/-** as addressed in **Chapter-2 and Section 2.7**. The cost spent for EMP is discussed in **Chapter -10, Section 10.10.**
42	A Disaster Management Plan shall be prepared and include in the EIA/EMP Report.	Detailed Disaster management plan are provided in **Chapter -7** and **Section 7.3.**
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 **Chapter- 8.**

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 160m surrounding by plain lands. The altitude of the area is 630 AMSL. The total proposed production capacity is 10,500m^3 at 10% recovery of ROM 1,05,000m^3. The annual peak production will be 5,000m^3 at 10% recovery of ROM 50,000m^3.

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 Regulation106.

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 fetch a good foreign exchange to the nation.

2.4 Location of the project

The quarry is located at SF.No.254 (Part), Pathalahalli Village, Karimangalam 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°17'05.70541"E to 78°17'35.81481"E and Northern latitude from 12°09'00.00051"N to 12°09'22.02671"N. The quarry lease area is hillock with height of about 160m surrounded by plain lands. The altitude of the area is 630m AMSL (Above Mean Sea Level).

Location map of the lease area is given in **Figure 2-1.** 300 m Radius google image of the lease area is shown in **Figure 2-2.** 500 m Radius google image of the lease area is shown in **Figure 2-3.** 1km radius google image of the lease area is shown in **Figure 2-4**. 5 km Radius google image of the lease area is shown in **Figure 2-5.** 10 km Radius google imageof the lease area is shown in **Figure 2-6**.

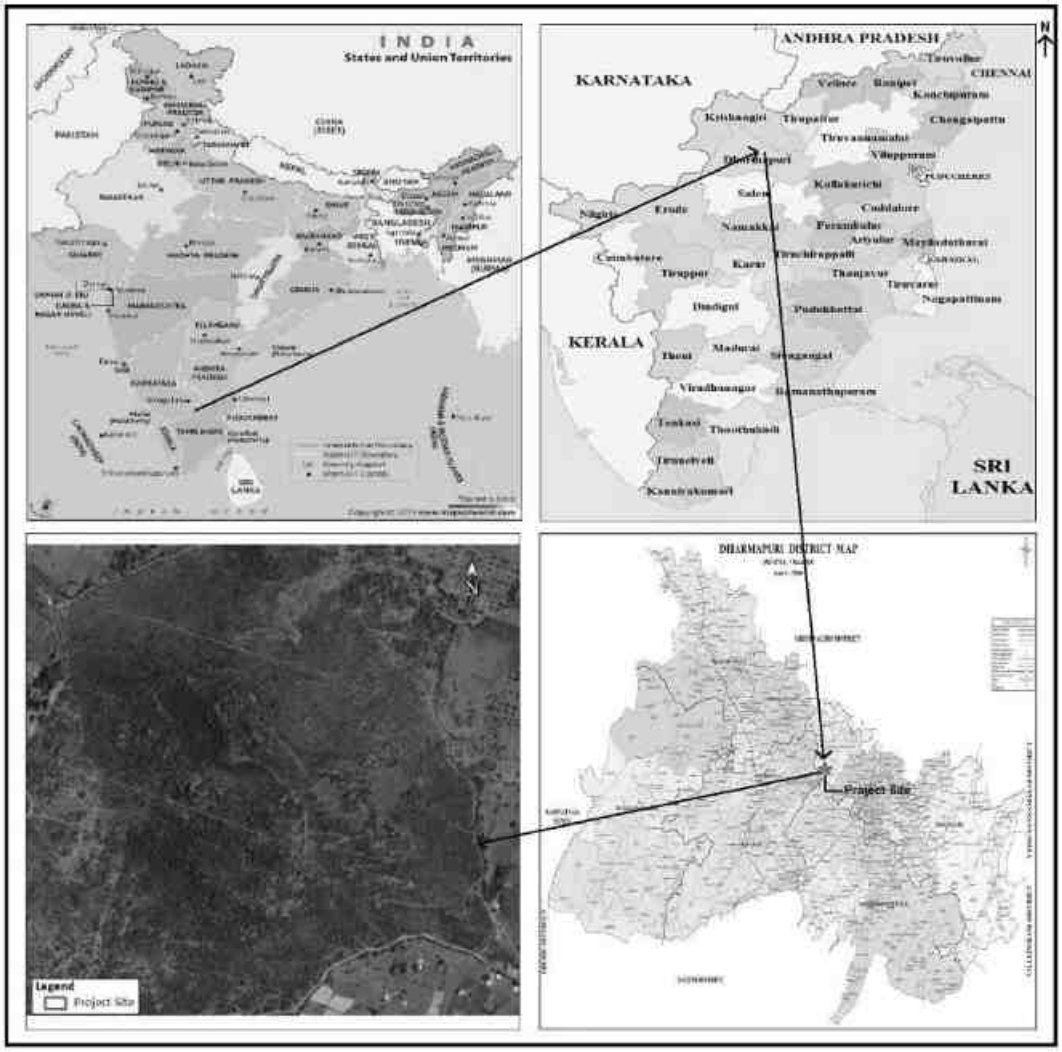


Figure 2-1 Location map of the leased area

Figure 2-2 300m Radius google image of the lease area

Figure 2-3 500m Radius google image of the lease area

Figure 2-4 1 km Radius google image of of the lease area

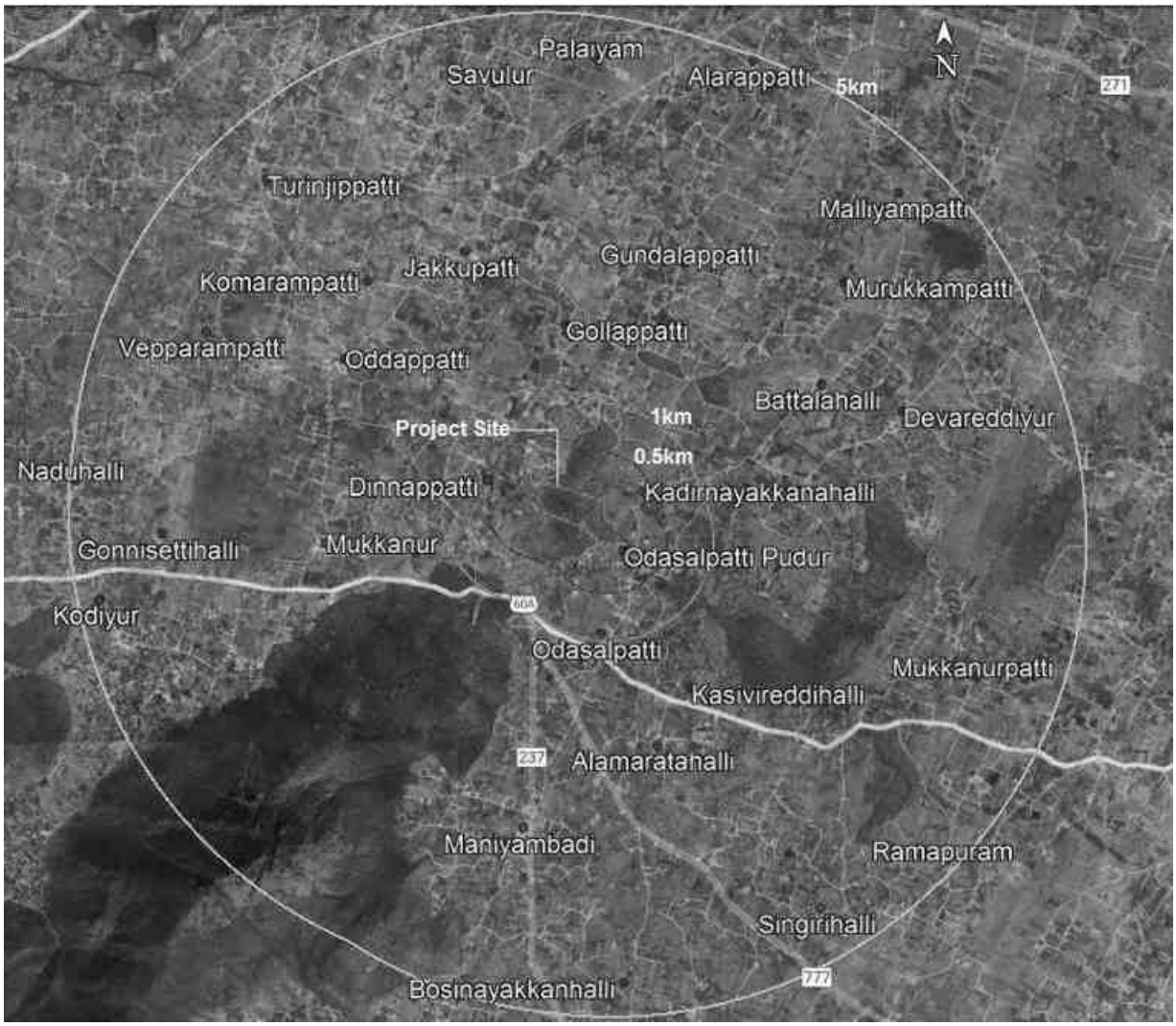


Figure 2-5 5km Radius google image of the lease area

Figure 2-6 10km Radius google Image of the lease area

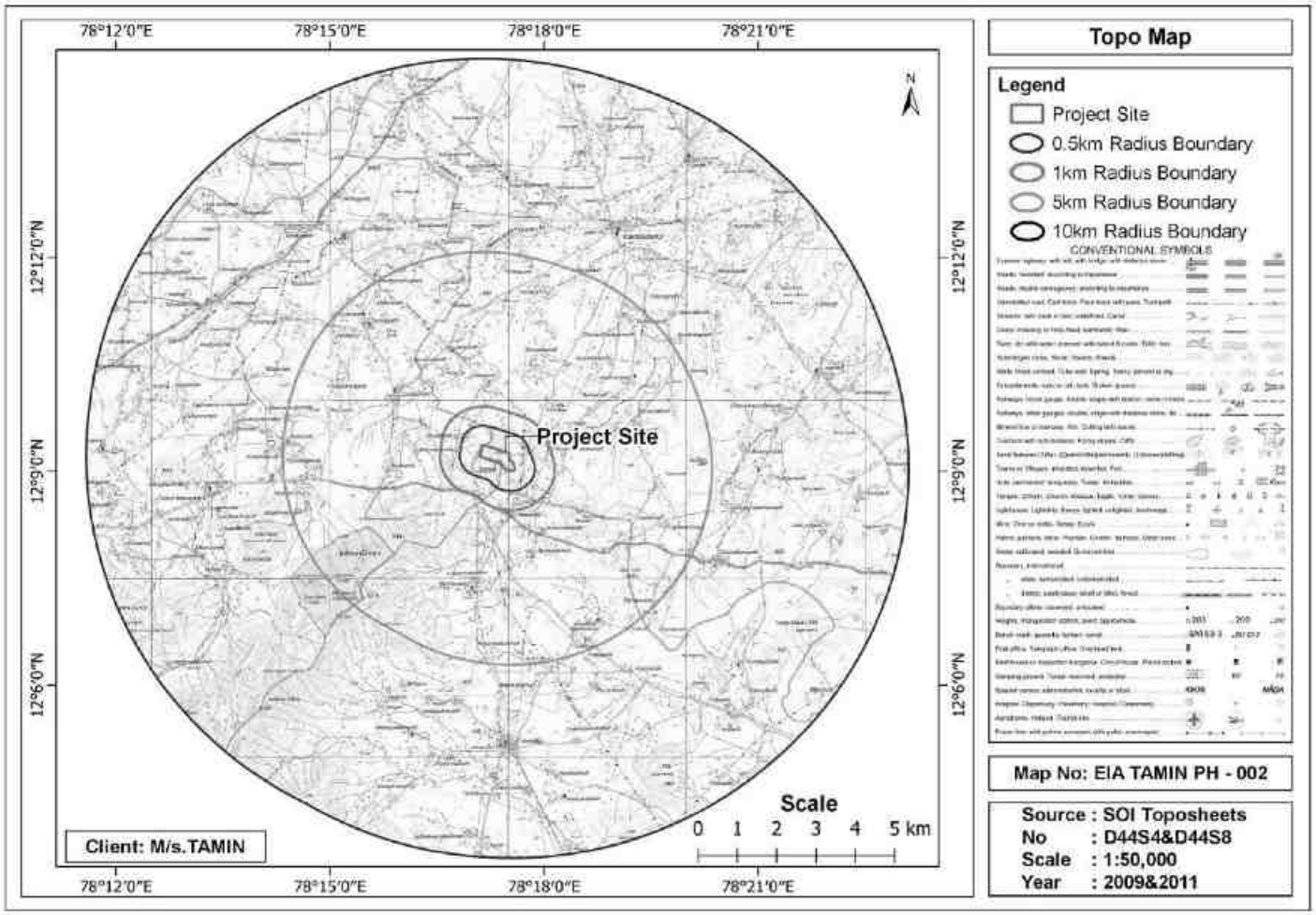


Figure 2-7 Topo Map of the Study Area

Table 2-1 Project summary

S. No	Particulars	Details
1.	Project Location	S.F.No.254 (Part), Pathalahalli Village, Karimangalam Taluk, Dharmapuri District, Tamil Nadu State.
2.	Land classification	Government Poramboke Land
3.	Extent of lease area (Ha.)	29.00.23
4.	Precise area communication	Precise area communication letter was granted vide Industries (MME.1) Department, Rc. No. 3774153/MME.1/2022-1, dated: 14.02.2023.
5.	Lease Period	20 years
6.	Estimated Geological Reserves (ROM) m^3	15,59,462
7.	Estimated Mineable Reserves (ROM) m^3	13,31,059
8.	Proposed productin m^3	10,500
9.	Depth of Mining	30m from the top of hill
10.	Method of Mining	Open cast semi mechanized method
11.	Water Requirement (KLD)	3.5
12.	Source of Water	Road 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 Regulation106.

The Geological reserves of black granite have been computed based on the Geological Plan &Sections up to the economically workable average depth of 30m from the top of the hillock works out to 15,59,462m^3. Mineable reserves have been computed as 13,31,059m^3 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 1,33,106m^3 by applying the recovery factor 10%. The total proposed production capacity 10,500m^3 is at 10% recovery of ROM 1,05,000m^3. The annual peak production will be 5,000m^3 at 10% recovery of ROM 50,000m^3.

Total waste (Granite waste + Side Burden+Over Burden) to be generated during the five years of Mining Plan period will be around 1,25,819m^3. These wastes are proposed to be dumped on the South eastern side of lease area. The Land use details of the quarry area were summarized in **Table 2-2.**

Table 2-2 Land use details of the quarry area

S. No	Land Use	Present Area (Ha)	Area to be required during the mining plan(Ha)
1	Area under Quarry	1.25.00	1.09.00
2	Waste Dump	1.74.00	2.39.00
3	Infrastructure	0.01.00	-
4	Village Road	0.17.00	-
5	Mines Road	0.59.00	-
6	Green Belt	0.28.50	0.13.00
7	Un utilized Area	24.95.73	21.34.73
Total		**29.00.23**	**24.95.73**

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 2-8.** Geological plan and cross section of the quarry is shown in **Figure 2-9.** The yearwise production and development details are given in the **Figure 2-10.** Land use and afforestation of the quarry is shown as **Figure 2-11.** Conceptual Plan of the quarry area is shown as**Figure 2-12.**

Table 2-3 Granite Quarry Reserves

S. No	Description	Granite (m^3)	Recovery 10% (m^3)	Granite waste 90% (m^3)
1	Geological Resource	15,59,462	1,55,946	94,500
2	Mineable Reserves	13,31,059	1,33,106	

Table 2-4 Yearwise Production details

S. No	Year	ROM (m^3)	Recovery @ 10% (m^3)	Granite waste @ 90% (m^3)
1	1stYear	25,000	2,500	22,500
2	2ndYear	50,000	5,000	45,000
3	3rdYear	10,000	1,000	9,000
4	4thYear	10,000	1,000	9,000
5	5thYear	10,000	1,000	9,000
Total		**1,05,000**	**10,500**	**94,500**

Table 2-5 Waste Generation details

S.No	Year	Overburden (m^3)	Sideburden (m^3)	Granite Reject (m^3)
1	First	10,647	--	22,500
2	Second	13,230	4,320	45,000
3	Third	--	--	9,000
4	Four	1,251	--	9,000
5	Five	1,871	--	9,000
Total		**26,999**	**4,320**	**94,500**

Estimated Life of the Quarry:

- Mineable Reserves @10% recovery: 1,33,106m^3
- Annual Peak Production @10% recovery: 5,000m^3
- Estimated Life of the Quarry= ~27 years

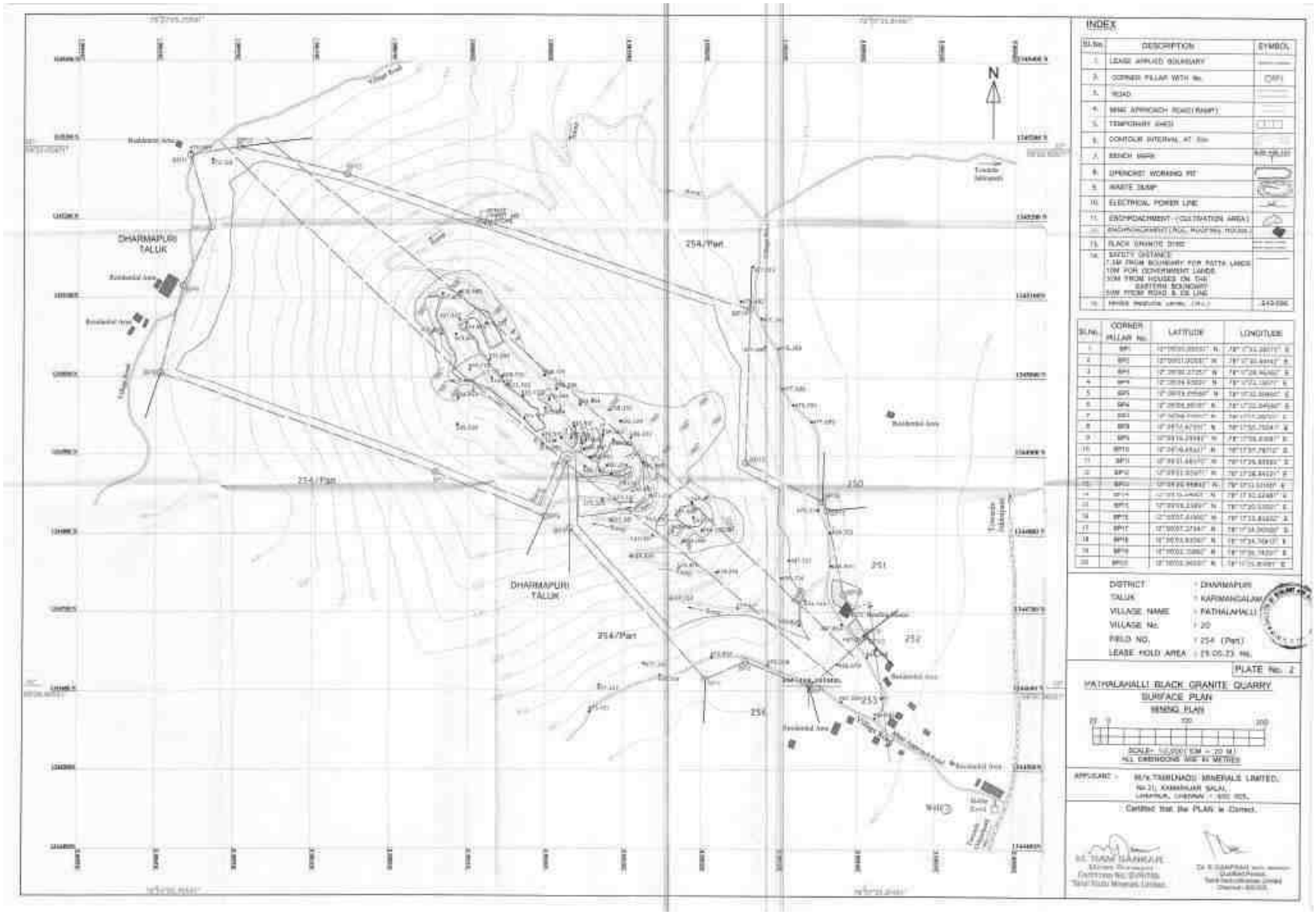


Figure 2-8 Surface Plan of the Quarry

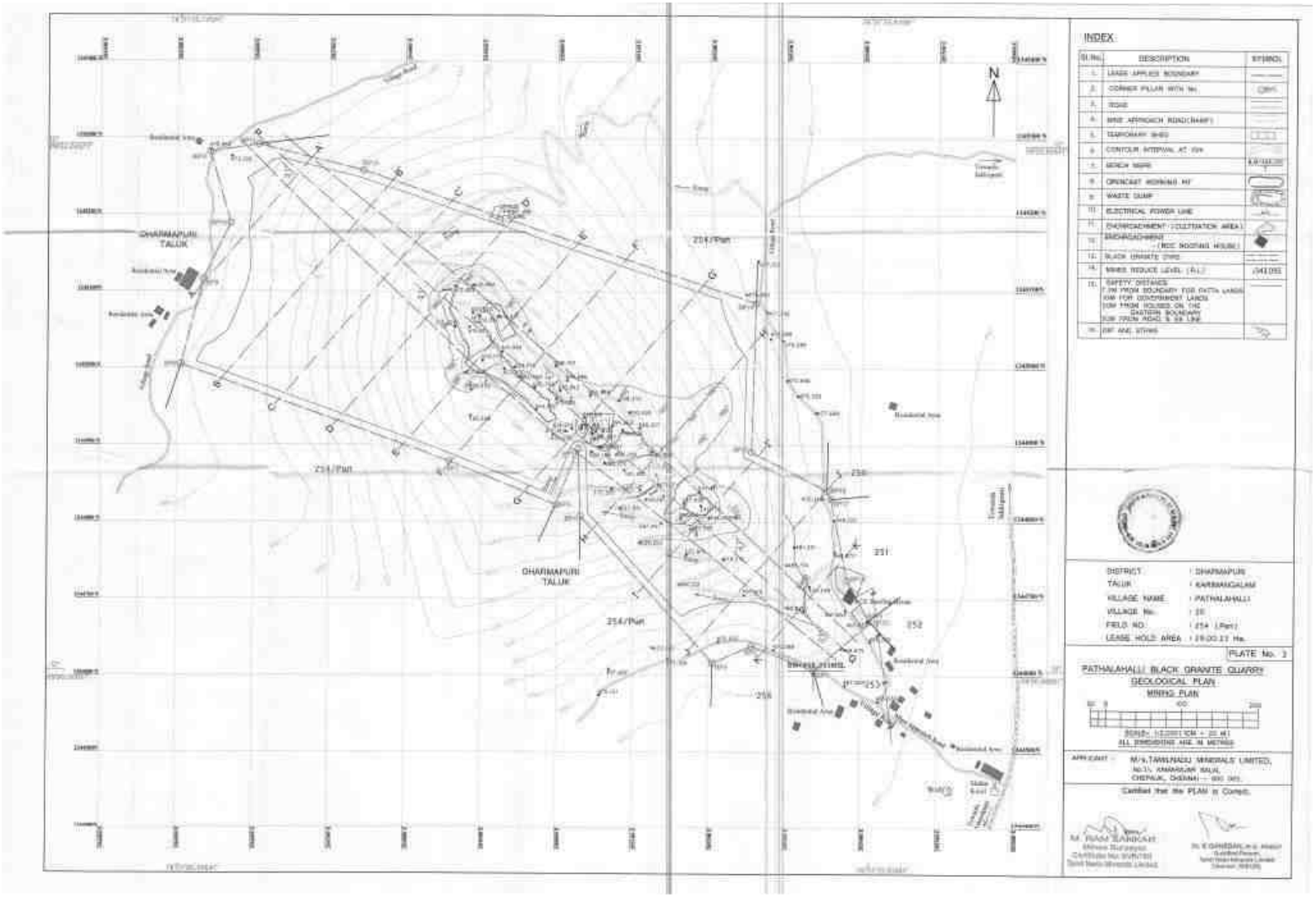


Figure 2-9 Geological plan of the quarry

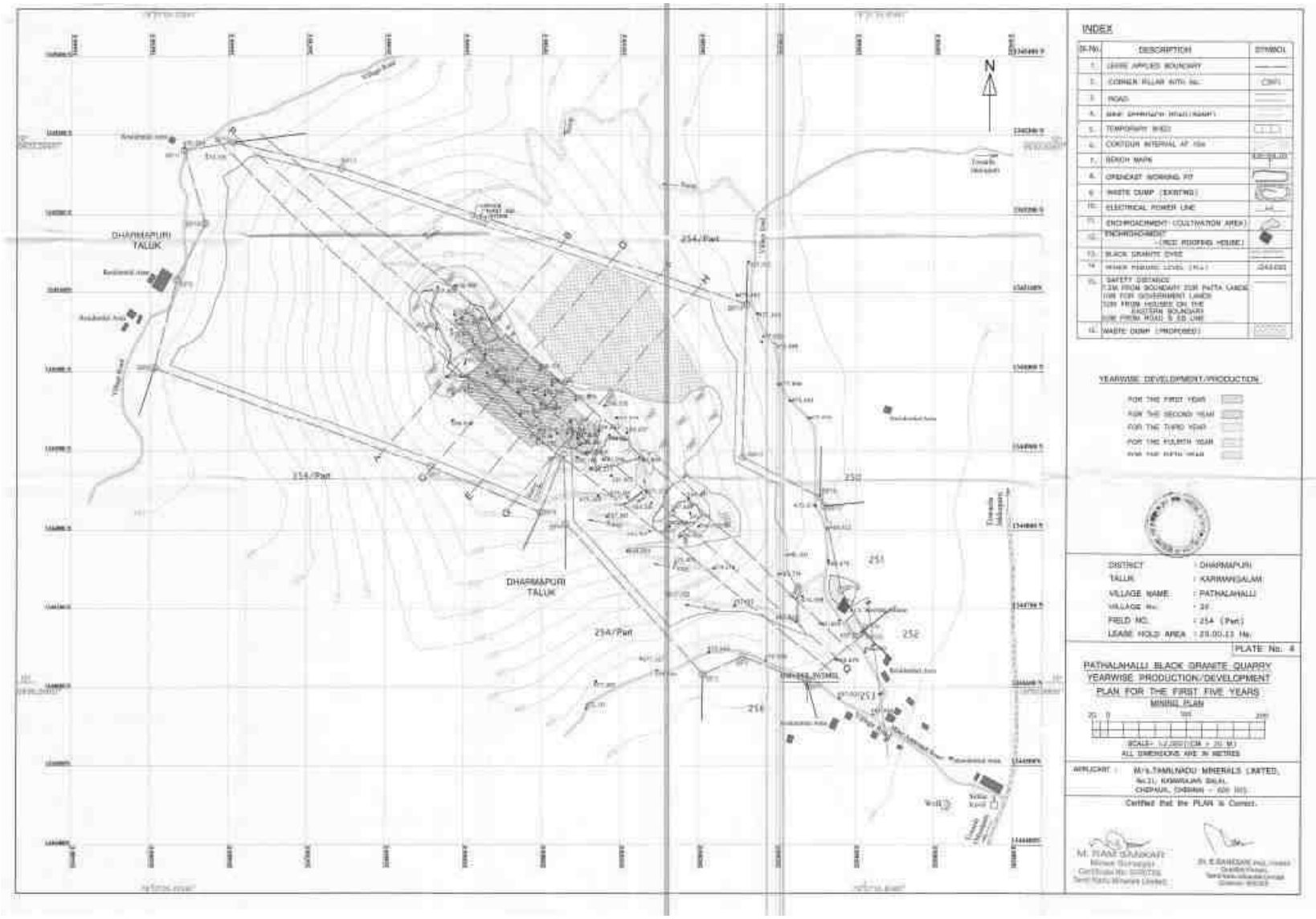


Figure 2-10 Yearwise Production/Development Plan for 5 years

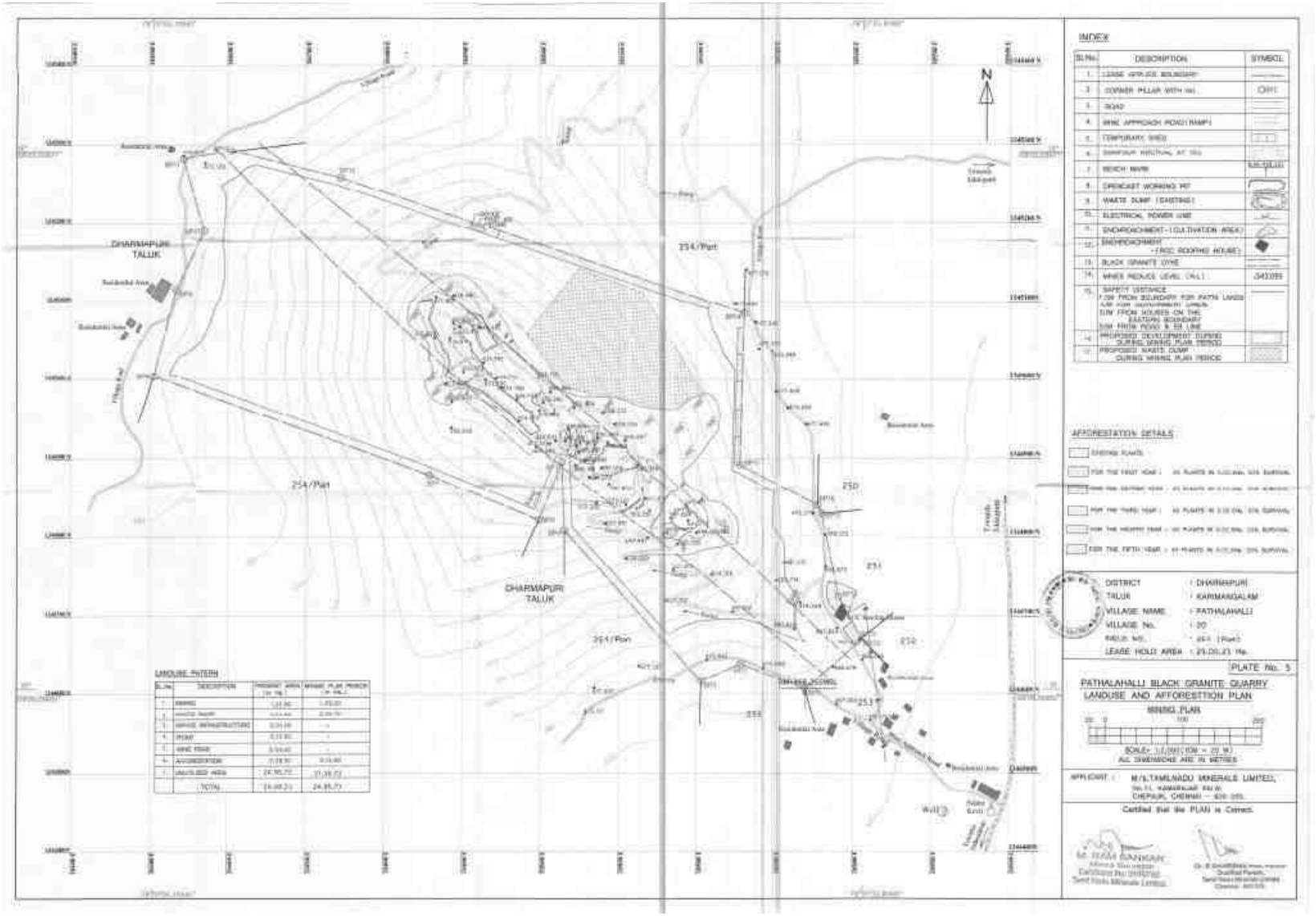


Figure 2-11 Land Use and Afforestation Plan

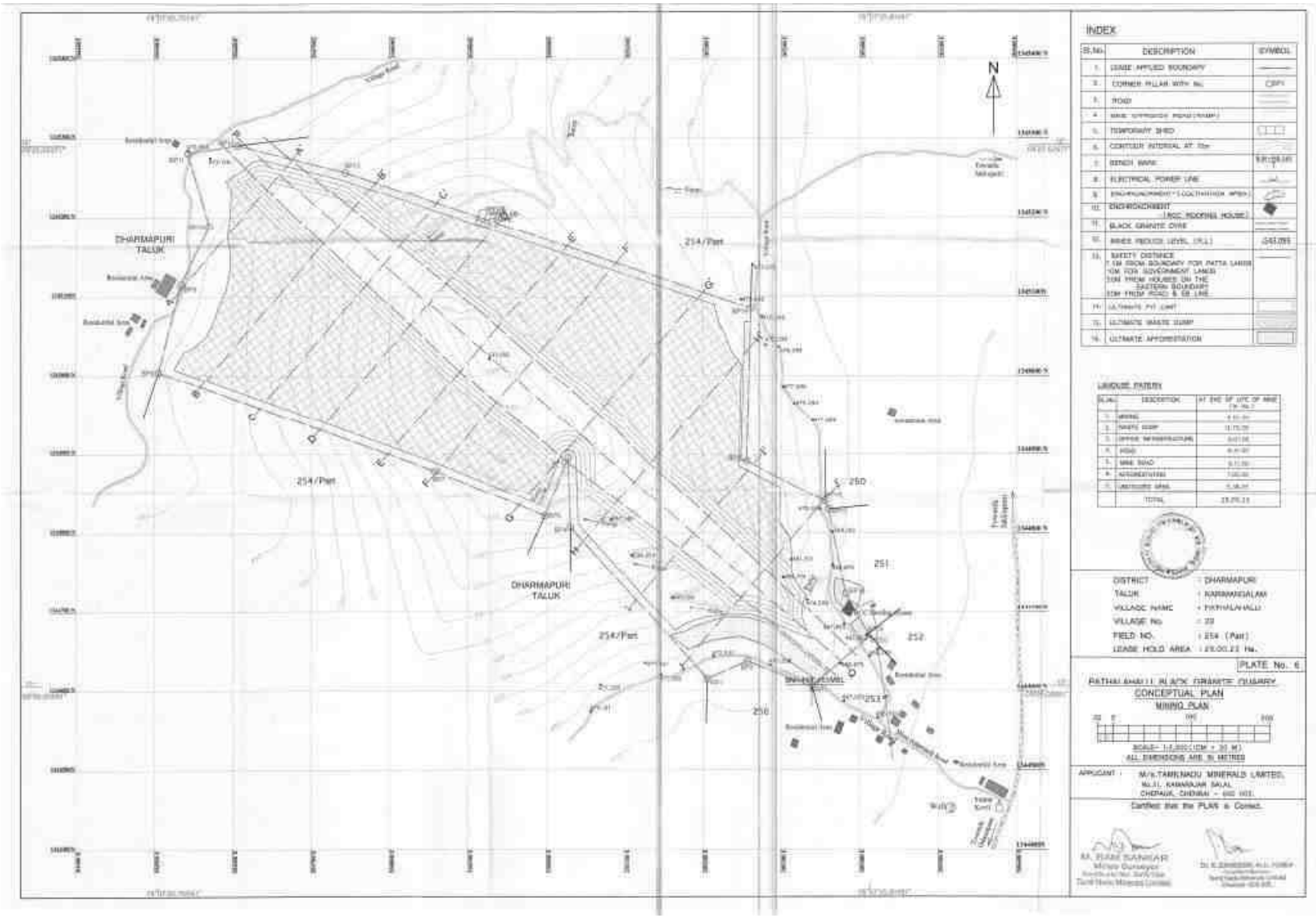


Figure 2-12 Conceptual Plan

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	February -2025
Conduction of Public Hearing	March-2025
Submitting final EIA/EMP	May -2025
Presentation to SEAC and Obtaining EC	June-2025

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.
D. Fixed Cost		
1	Land Cost	Nil. Because Govt. land
2	Labour shed	50,000/-
3	Sanitary facilities	50,000/-
4	Fencing Cost	1,25,000/-
	Total	**2,25,000/-**
E. Operational Cost		
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/-
	Total Operational Cost	**95,67,000/-**
F. EMP Cost		
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/-
	Total EMP Cost	**2,05,000/-**
	Total Cost of the Project (A+B+C)	**99,97,000/- (Say 1 Crore)**

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 2-13.**

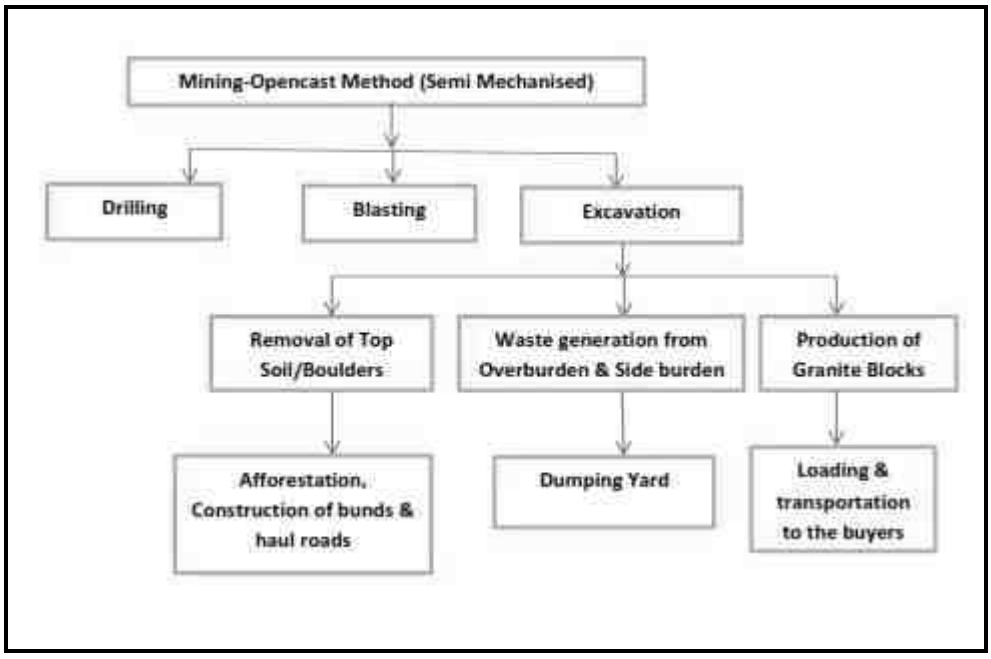


Figure 2-13 Schematic Diagram of Mining Process

2.8.2 Method of mining-Open Cast Mining

In accordance with the 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 has to be maintained. The slope angle of such benches and sides should not exceed 60° from the horizontal. However, observance of these statutory provisions into 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 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 generation of blasting cracks.
- In the exercise of forming the benches with 60° slope within the granite deposit, the

portion confined within the 60° as we as its complimentary 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 now-a-days.
- Formation of too many benches with more height and the width equal to the height may lease 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 sheet and possess high stability on slope 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 stock yard 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 hold 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'.

2) 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' $Ca(OH)_2$.

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 and north west 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 $Ca(OH)_2$.

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 30m 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 160m 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 gorund 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., side burden, granite rejects and the non-recoverable/un sized boulders and rubbles etc is around 1,25,819m^3, will be dumped in the suitable area of around 2.39.00Ha which is already selected. The area of disposal waste rock has been identified in North East and South West 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 by 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
	Total	**3.5**

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^3 /day	Diesel
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
A	**Technical/Mining Personnel**	
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	Workers	
1	Skilled	1
2	Semi- Skilled	9
3	Un-skilled	10
	Total	**30**
	Indirect Manpower	**20**

2.10 Infrastructure facilities

Sanitation facility, office room and rest 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	TNPCB authorized recyclers
	Total	**13.5**	

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 TNPCB 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 30m by observing the statutory provisions of

mine safety rules and regulations. Hence in the proposed mining plan, only 30m 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 30m 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 30m depth. The pit boundaries shall be safely fenced to prevent inherent entry of public and cattle and used for agricultural purpose when the pit is filled with underground seepage water or rain water.

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 "**Proposed black granite quarry"** over an extent of 29.00.23 Ha in S.F. No. 254 (Part) Pathalahalli Village, Karimangalam 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 1.km radius from the boundary. The PIA covers parts of parts of Karimangalam Taluk, Dharmapuri district of Tamil Nadu State. This PIA was subjected to monitor for 3 month duration starting from the month from **March 2024 to May 2024.** The data collected during the monitoring period are considered as primary baseline data. The key points of the PIA are given below:

PIA Area	**:**	10km radius from the project site
Village	**:**	Pathalahalli
Taluk	**:**	Karimangalam
District	**:**	Dharmapuri
State	**:**	Tamil Nadu
Monitoring Duration	**:**	March 2024 to May 2024

3.2 Description of the Study Area

As outlined in Chapter 1, M/s. Tamil Nadu Minerals Limited. Proposed project Proposed Black granite quarry over an extent of 29.00.23 Ha in S.F. No. 254 (Part) Pathalahalli Village, Karimangalam Taluk, Dharmapuri District, Tamil Nadu. The satellite image of the study area with the areeal coverage of 10 km is provided in **Figure 3-1.** The study area is located in the Pathalahalli village of Karimangalam Taluk, Dharmapuri district, Tamil Nadu. The project site is located ~0.96 km away from the state highway SH-60A (Dharmapuri-Morappur-Harur) along SSW direction and ~12.06 away from the NH-44 along WNW direction from the site. The detailed description of the study area with reference to the physical conditions are presented in the following sections for better understanding before proceeding into the section on the prevailing environmental conditions of the study area. Topo Map of the study area is given in **Figure 3-2.** 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.

Meteorology	**:**	**Refer Section 3.5**
Ambient Air Quality	**:**	**Refer Section 3.6**
Ambient Noise Levels	**:**	**Refer Section 3.7**
Water Quality- Surface Water & Groundwater Quality	**:**	**Refer Section 3.8**
Soil Quality	**:**	**Refer Section 3.9**
Ecology	**:**	**Refer Section 3.10**
Socio Economic Status	**:**	**Refer Section 3.11**

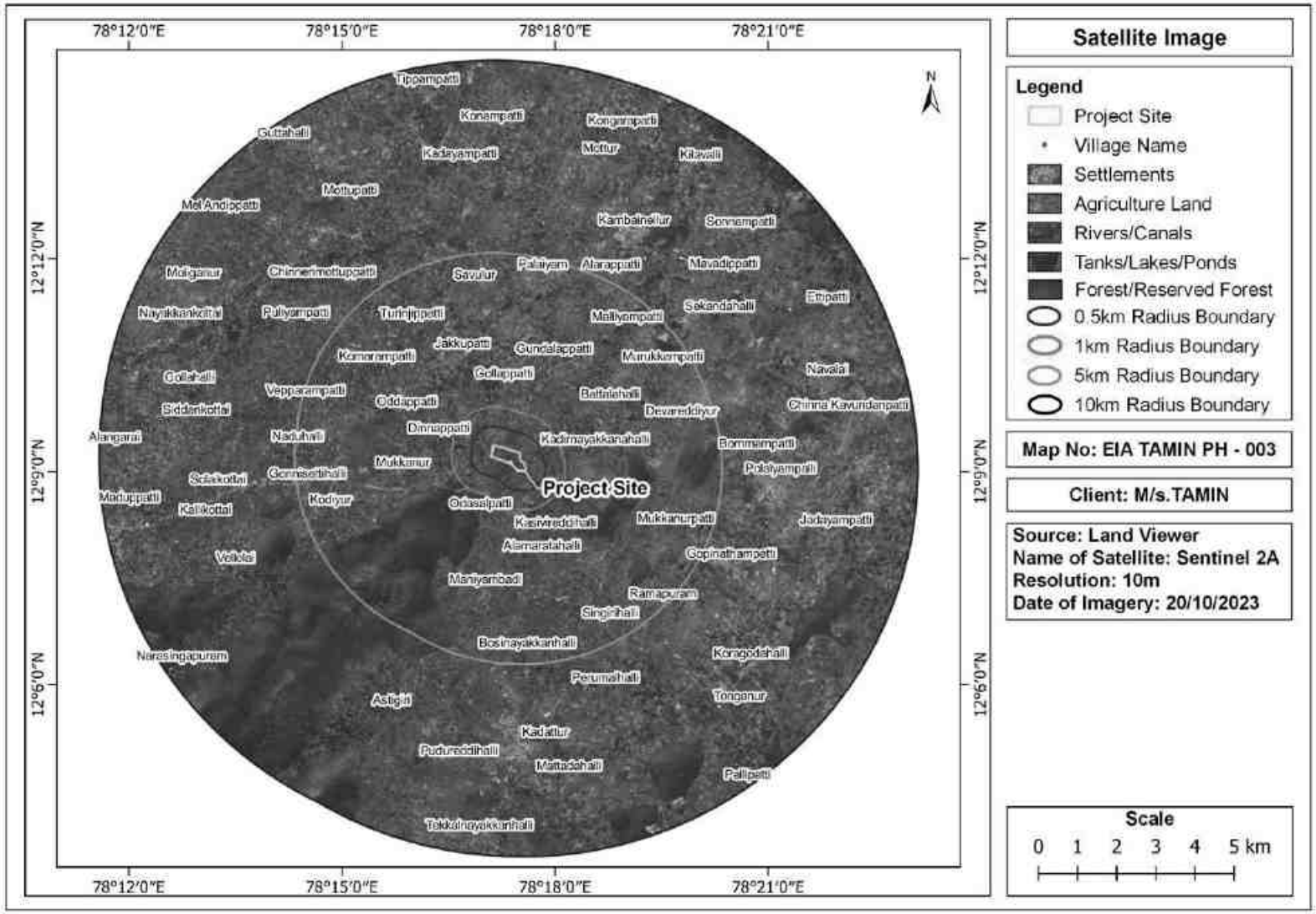


Figure 3-1 Satellite Image of the Study Area

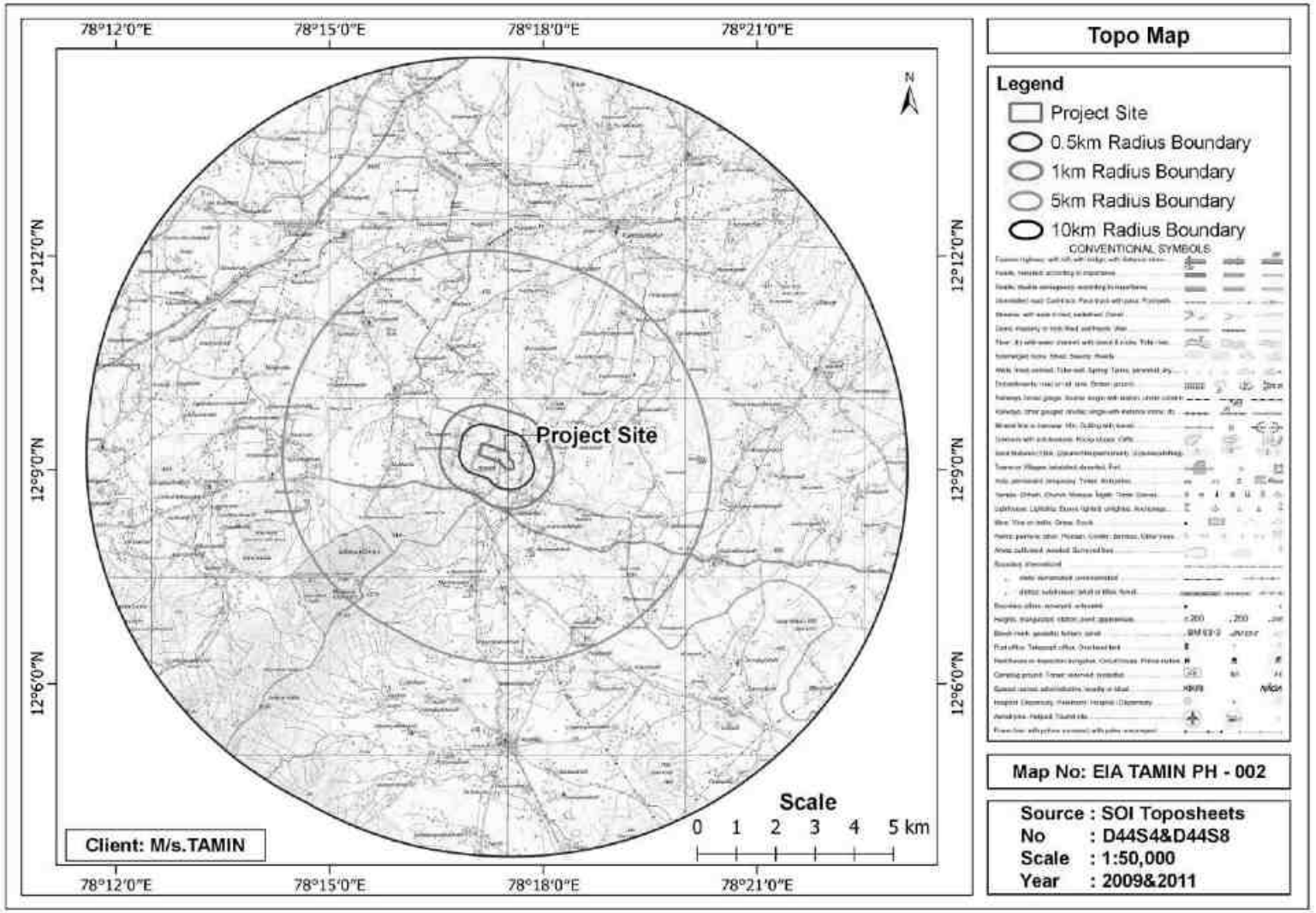


Figure 3-2 Topo Map of the Study Area

3.3 Environmentally/Ecologically Sensitive areas

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 15km from the project boundary is given in **Table 3-1** and **Figure 3-3.**

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

<table>
<tr><th>S.No</th><th>Areas</th><th colspan="4">Distance & Direction from project boundary</th></tr>
<tr><td>1</td><td>Monuments</td><td colspan="4">Nill</td></tr>
<tr><td rowspan="16">2</td><td rowspan="16">Water bodies.</td><td>S.No</td><td>Water bodies</td><td>Distance (~km)</td><td>Direction</td></tr>
<tr><td>1</td><td>Pond near Odasalpatti Pudur</td><td>0.70</td><td>SE</td></tr>
<tr><td>2</td><td>Lake near Gollappatti</td><td>0.99</td><td>N</td></tr>
<tr><td>3</td><td>Lake near Pamandappatti</td><td>4.30</td><td>NE</td></tr>
<tr><td>4</td><td>Semmanda Kuppam Ar</td><td>5.05</td><td>N</td></tr>
<tr><td>5</td><td>Pulappatti R</td><td>5.80</td><td>N</td></tr>
<tr><td>6</td><td>Siriyampatti Lake</td><td>6.15</td><td>NW</td></tr>
<tr><td>7</td><td>Lake near Kadattur</td><td>6.21</td><td>S</td></tr>
<tr><td>8</td><td>Kambainellur Lake</td><td>6.37</td><td>NNE</td></tr>
<tr><td>9</td><td>Chinna Kavundanpatti Lake</td><td>6.64</td><td>E</td></tr>
<tr><td>10</td><td>Lake near Gollahalli</td><td>7.61</td><td>W</td></tr>
<tr><td>11</td><td>Ponnaiyar R</td><td>9.92</td><td>NE</td></tr>
<tr><td>12</td><td>Baisuhalli Lake</td><td>11.07</td><td>WNW</td></tr>
<tr><td>13</td><td>Virupakshipuram Pallam</td><td>11.93</td><td>W</td></tr>
<tr><td>14</td><td>Turinjihalli Ar</td><td>12.26</td><td>SSE</td></tr>
<tr><td>15</td><td>Annasagaram Eri</td><td>12.55</td><td>WSW</td></tr>
</table>

		16 | Ramakkal Eri | 13.10 | W 17 | Vadamangalam Lake | 13.84 | N
3.	Reserve Forest	**S.No | Reserve Forest | Distance (~km) | Direction** 1 | Mukkanur RF | 3.28 | SW 2 | Mukkanur RF | 10.69 | SSW 3 | Morappur RF | 14.00 | ESE 4 | Kavaramalai RF | 14.49 | SSE 5 | Kavaramalai Ext RF | 14.94 | S

4.	Manmade	

S.No	Hospitals	Distance (~km)	Direction
1	D.Thurinchipatti Government PHC	4.29	NW
2	Kambainallur Government Hospital	6.13	NNE
3	Government PHC Solaikottai	6.20	W
4	Kadathur Goverment PHC	6.94	S
5	Goverment PHC Morappur	10.70	ESE

S.No	Government Buildings	Distance (~km)	Direction
1	Malliyampatti VAO Office	4.51	NE
2	Kambainallur Police Station	6.24	NNE
3	Kadathur Sub Registrar Office	6.80	S
4	Register Office Dhamapuri	13.48	WSW
5	Dharmapuri Taluk Office	13.49	WSW
6.	Dharmapuri District Magistrate Court	13.60	WSW

S.No	Religious Places	Distance (~km)	Direction
1	Sri Thannirpanthal Maha Kaliyamman Temple	0.20	N
2	Sri Satguru Tukaram Siddhar Temple	0.27	SE
3	Kattu Mariyamman Temple	0.46	S

4	Masjid he reahamania	1.60	W
5	IPC Church	2.79	WSW
6	Sri Venkataramana Swamy Temple	2.98	SSW
7	Lakshmi Narayana Temple	6.55	NNW
8	Sri Sinivasa Perumal Temple	7.07	S
9	Kollapuri Amman Temple	9.84	N
10	Chelliamman Temple	10.12	NNE
11	Sri Mallikarjuneswarar temple	12.91	W
12	Shri Kottai Perumal Temple Paravasudeva Allayam	13	W

S.No	Schools	Distance (~km)	Direction
1	Odasalpatti Goverment High School	0.91	S
2	M.Oddapatti Government Higher Secondary School	2.30	WNW
3	Chinnamurukkampatti Goverment Middle School	3.91	NE
4	R. Gopinathampatti Government High School	5.96	ESE
5	Settikarai Government Higher Secondary School	8.98	WSW
S.No	**Colleges**	**Distance (~km)**	**Direction**
1	Kadathur Government Polytechnic College	5.3	S

		2	Shri Krishnaa Polytechnic College	5.68	ESE
		3	P.S.A. Arts & Science College	5.74	W
		4	Government College Of Engineering Dharmapuri	9.68	WSW
		5	Morappur Kongu College of Arts and Science	10.49	E
		6	Dharmapuri Government Law College	12.32	WNW
		7	Varuvan Vadivelan Institute Of Technology	12.57	WNW
		8	Dharmapuri Government Polytechnic College	12.88	WNW

S.No	Industries	Distance (~km)	Direction
1	Sivasakthi Impex	1.73	WSW
2	Thirumala Ginning Mills	5.95	NNE
3	Mullai Blue Metals	6.71	ENE
4	Mani Sago Factory	7.89	NNE
5	Shri PKP Spintex Private Limited	12.02	WNW
6	Murgan Granites	12.26	WNW
7	Sri Lakshmi Narayana Fibre Industry	14.05	N
8	Sri Kumaran nuts and coir	14.55	N
9	Asal Food Industries	14.89	N

5	State, National boundaries	Nil

<table>
<tr><td>6</td><td>Nearest Highway/Railway/Town and city</td><td>
<table>
<tr><th>S. No</th><th>Description</th><th>Distance (~km)</th><th>Direction</th></tr>
<tr><td>1</td><td>SH-60A (Dharmapuri-Morappur-Harur)</td><td>0.96</td><td>SSW</td></tr>
<tr><td>2</td><td>NH-44 (Srinagar-Dharmapuri-Kanniyakumari)</td><td>12.06</td><td>WNW</td></tr>
<tr><td>3</td><td>Nearest Railway Station-Thonganur</td><td>10.37</td><td>SE</td></tr>
<tr><td>4</td><td>Nearest Railway Line(Buddireddipatti RS-Thonganur RS)</td><td>10.37</td><td>SE</td></tr>
<tr><td>5</td><td>Nearest Town-Dharmapuri(Pop~68,619)</td><td>13.00</td><td>W</td></tr>
</table>
</td></tr>
<tr><td>7</td><td>Nearest port/ Airport</td><td>➢ Kempegowda International airport Bengalore at a distance of ~ 128.43km towards NNW
➢ Salem Airport (Domestic) at a distance of ~ 46.41km towards SSW</td></tr>
<tr><td>8</td><td>Near by villages and Population</td><td>
<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>Odasalpatti Pudur</td><td>0.04</td><td>E</td><td>700</td></tr>
<tr><td>2</td><td>Kadirnayakkanahalli</td><td>0.36</td><td>E</td><td>500</td></tr>
<tr><td>3</td><td>Dinnappatti</td><td>0.51</td><td>W</td><td>350</td></tr>
<tr><td>4</td><td>Odasalpatti</td><td>0.91</td><td>S</td><td>1000</td></tr>
<tr><td>5</td><td>Gollappatti</td><td>1.42</td><td>N</td><td>250</td></tr>
</table>
</td></tr>
<tr><td>9</td><td>Defence installations</td><td>Nill</td></tr>
</table>

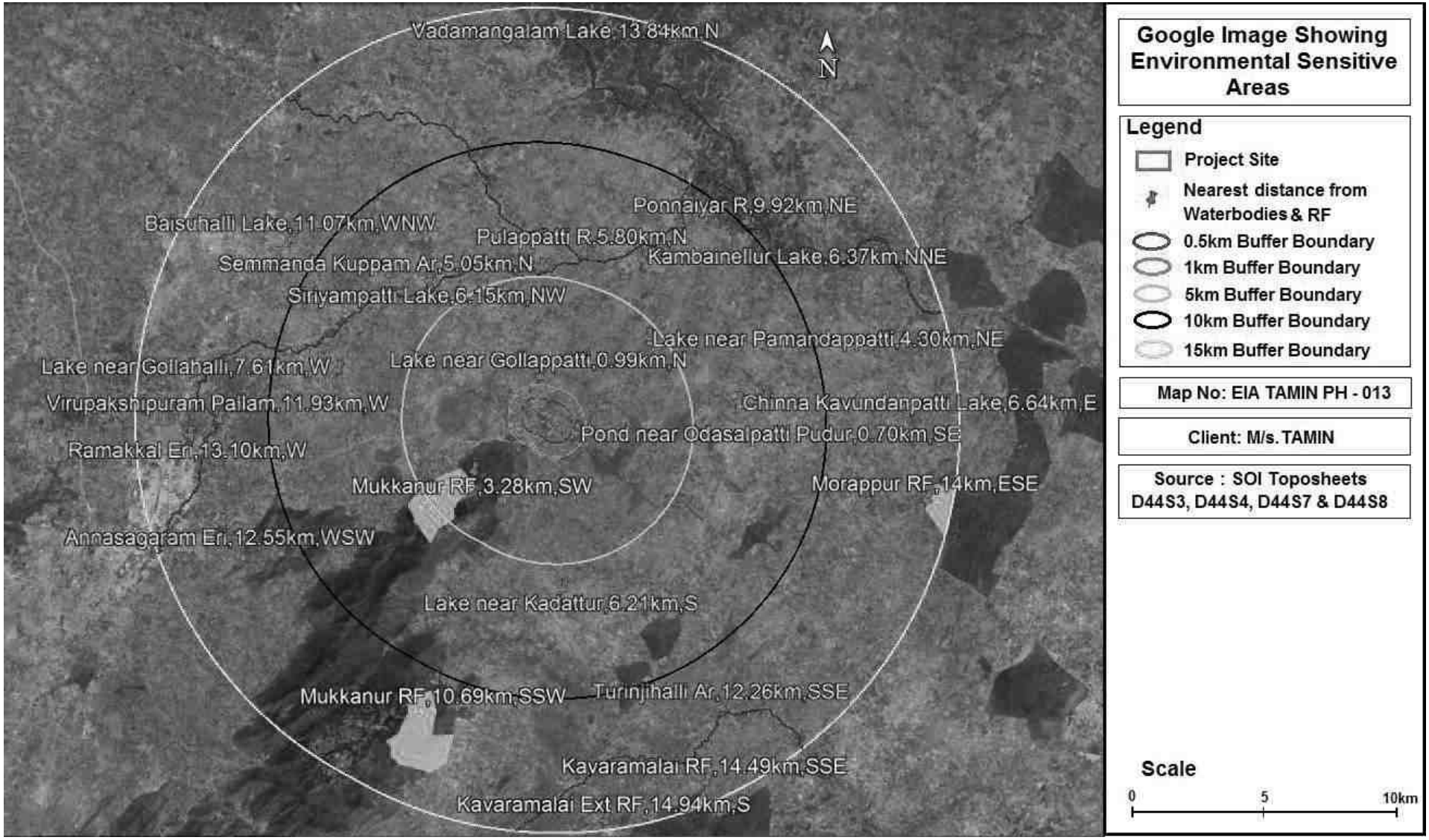


Figure 3-3 Environmental sensitive areas covering within 15 km from project boundary

3.4 Physical Conditions of PIA district

In this section, the physical conditions of PIA district are discussed in general and wherever possible references to the conditions prevailing in the study area in particular are also provided. The physical conditions are discussed as under:

- District profile
- Drainage, land use, geology, Physiographic
- Natural resources

Climatic conditions, seismic zone characteristics and natural hazard

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 and Villupuram districts, on the south by Salem district, and on the west by Karnataka's Chamarajanagar district. The total geographical area of the district is 4497 sq kms, i.e. 3.46% of Tamil Nadu. This district is placed at 14th rank in comparision 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/2011census/dchb/DCHB_A/34/3301_PART_A_DCHB_DHARMAPURI.pdf

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

3.4.2 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/2011census/dchb/DCHB_A/34/3301_PART_A_DCHB_DHARMAPURI.pdf

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

3.4.3 Natural Resources of PIA District

3.4.3.1 Flora & Fauna

Dharmapuri district has various flora and fauna spices which include 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.

Flora and fauna of PIA are discussed in **section 3.11.**

Source: *http://tnenvis.nic.in/files/THIRUVALLUR%20%20.pdf*

3.4.3.2 Forest Resources

Dharmapuri district has tropical forests. Thoppur ghat 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/2011census/dchb/DCHB_A/34/3301_PART_A_DCHB_DHARMAPURI.pdf

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

3.4.3.3 Irrigation

The chief rivers that flow through the district are Cauvery, Chinnar, Markandanathi and Vaniyar. Though river Cauvery flows in the border of the State, as well as in the district, due to topographical condition, possibility of construction of dam is far away in the planning of the State. Krishnagiri dam, which is constructed across Thenpennar, irrigates part of the area. Chinnar, Palar, Thoppiar, Kallar, Varathiar and Pambar are minor rivers, which are almost dry during most part of the year.

Major sources of water supply for irrigation in this district during 2010-11 are given in the following table.

S.No	Irrigation Source	Number	Length in (km)
1.	Canals	85	187
2.	Tube wells & other wells	1,405	-

3.	Open wells	83,970	-
4.	Reservior	7	-
5.	Tanks	1,015	-

Source: Statistical HandBook of TamilNadu, 2011

Chinnar Reservoir, Nagavathi Reservoir,Thoppaiyar Reservoir, Kesargulihalla Reservoir, Thumbalahalli Reservoir and Vaniyar Reservoir are the source of irrigation of this district. By all these water reservoirs, large area of land is irrigated. Lakes like Alapuram and Annasagaram also contributes to the irrigation in the district. The following table gives source wise net area irrigated in this district during 2009-10.

S.No	Irrigation Source	Area in Ha	Percentage
1.	Canals	1016.59	1.69
2.	Wells & Tube wells	56,198.31	93.17
3.	Tanks/Lakes	30,009.75	4.975
4.	Others	94.94	0.16
Total irrigated area		**60,319.59**	**100.00**

Source: Village Records

The different sources of irrigation are canals, wells, tanks, lakes and reservoirs. Tube wells or wells covered 56198.1 hectares which accounted to 93% of the irrigation in the district. Lakes and reservoirs contributed 5% of the irrigation in Dharmapuri district.

Source:https://censusindia.gov.in/2011census/dchb/DCHB_A/34/3301_PART_A_DCHB_DHARMAPURI.pdf

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

3.4.3.4 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/2011census/dchb/DCHB_A/34/3301_PART_A_DCHB_DHARMAPURI.pdf

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

3.4.3.5 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
Total		**3**	**5**	**74**	**19**	**1**

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/2011census/dchb/DCHB_A/34/3301_PART_A_DCHB_DHARMAPURI.pdf

(**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.**

Figure 3-4 Mineral Map of Tamil Nadu

Source: *Maps of India*

3.4.4 Land Use & Land Cover

3.4.4.1 Land use land cover for the study area

The land use pattern of the study area is 340.86 Sq.Km given in **Table 3-2**. Land use pattern and land use map of the study area is given in **Figure 3-5** and **Figure 3-6** respectively.

Table 3-2 Land use/ Land Cover pattern of the Study Area

S.No.	Description	Area (Sq.Km)	Area (Acres)	Area (Hectares)	Percentage (%)
1	Crop Land	272.47	67328.70	27247	79.94
2	Fallow	22.19	5483.26	2219	6.51
3	Scrub Land	21.82	5391.83	2182	6.40
4	Tanks/Lakes/Ponds	8.18	2021.32	818	2.40
5	Rural	6.29	1554.29	629	1.85
6	Deciduous	3.58	884.64	358	1.05
7	Plantation	2.76	682.01	276	0.81
8	River/Stream/Canals	1.37	338.53	137	0.40
9	Barren rocky	1.28	316.29	128	0.38
10	Mining	0.53	130.97	53	0.16
11	Urban	0.39	96.37	39	0.11
Total		**340.86**	**84228.21**	**34086**	**100**

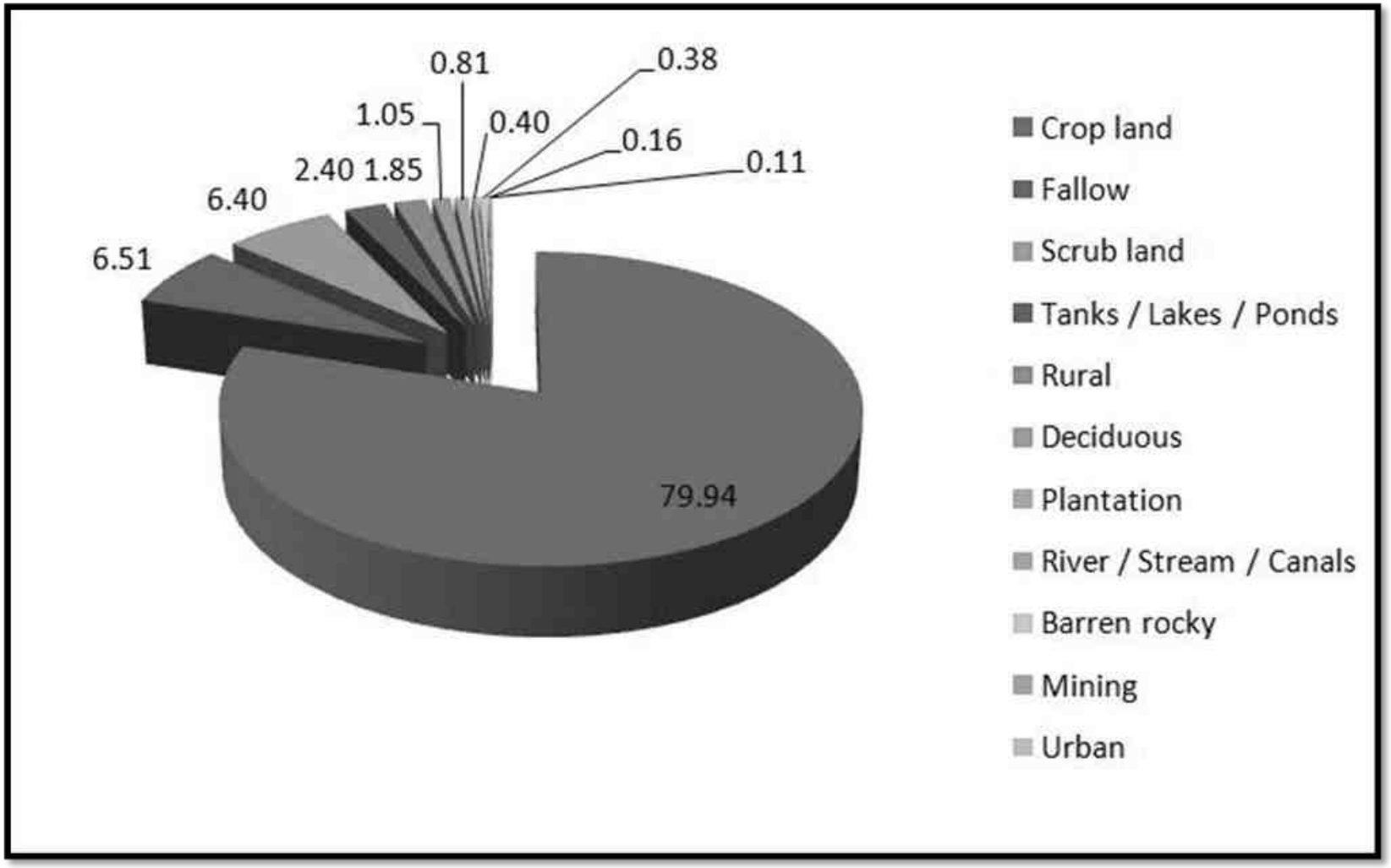


Figure 3-5 Land use/ Land cover pattern of the Study Area

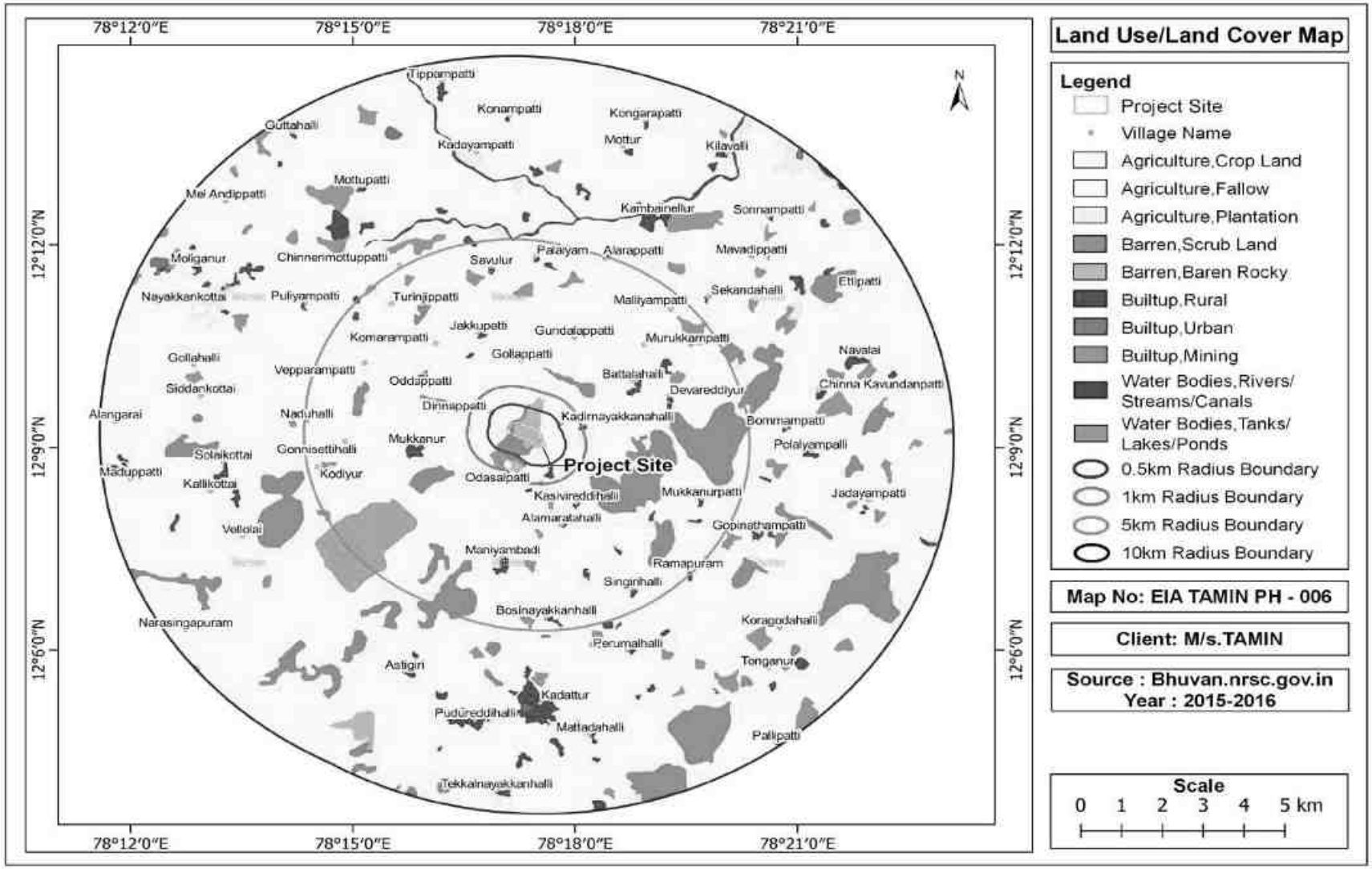


Figure 3-6 Land use/Land cover map of the Study Area

3.4.5 Topography

- 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 north western part of the district has an average elevation of 914 m. above Mean Sea Level.

Source:https://spc.tn.gov.in/Exe_Summary_DHDR/Dharmapuri.pdf
(Ref: State planning Commission –Tamil Nadu, "District Human Development Report-2017, Dharmapuri District")

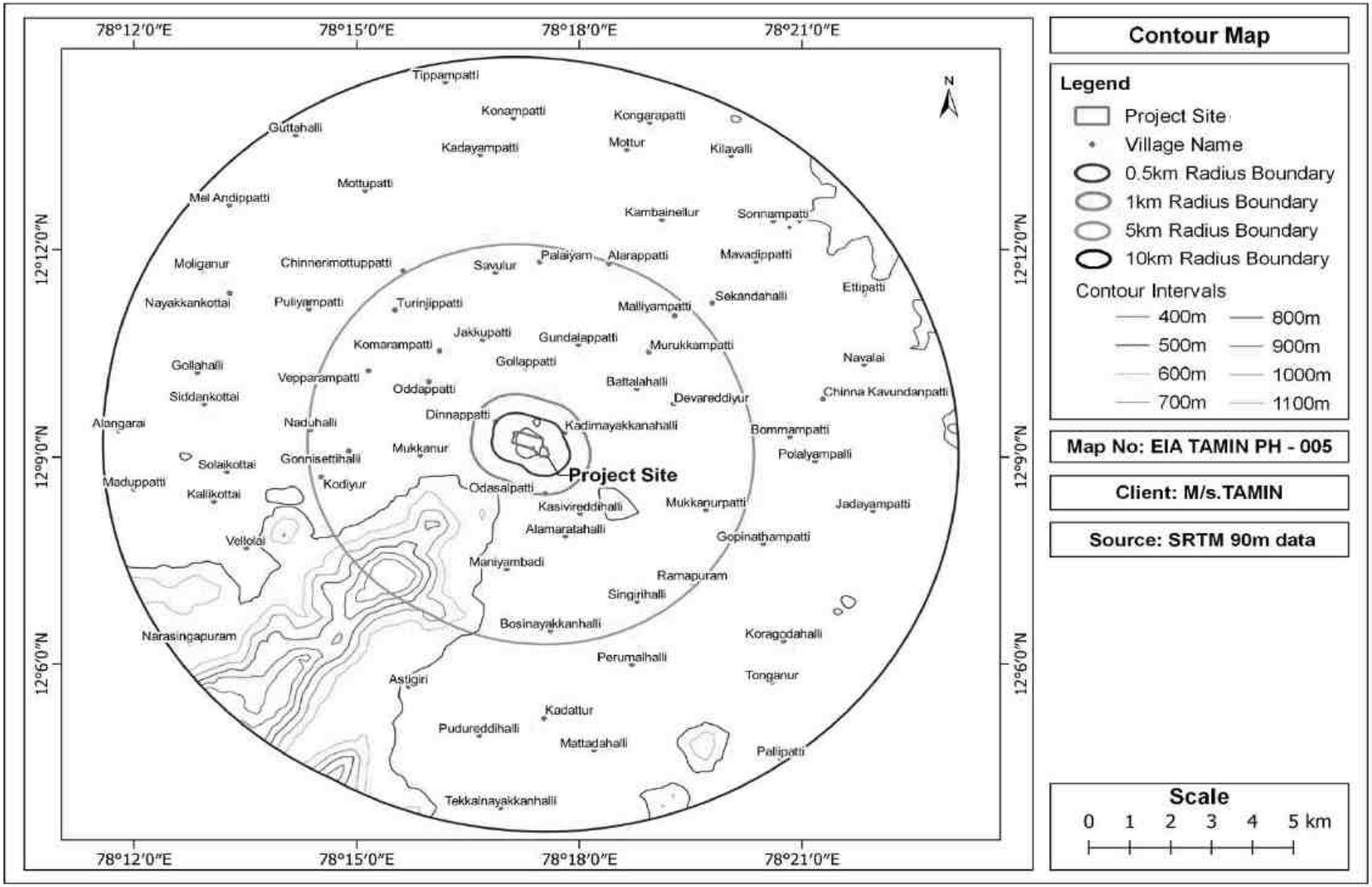


Figure 3-7 Contour map of the Study Area

3.4.6 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: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")

3.4.6.1 Geomorphology of the study area

Total geographical area of the study area is 340.86 Sq.Km. The Geomorphology pattern of the study area is given in **Table 3-3,** Geomorphology pattern of the study area is given in **Figure 3-8.** Geomorphology map of the study area is given in **Figure 3-9.**

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	291.68	72075.5864	29168	85.57
2	Structural Origin-Moderately Dissected Hills and Valleys	30.45	7524.34725	3045	8.93
3	Waterbodies	9.55	2359.85275	955	2.80
4	Denudational Origin-Low Dissected Hills and valleys	5.94	1467.8037	594	1.74
5	Structural Origin-Low Dissected Hills and valleys	3.04	751.1992	304	0.89
6	Denudational Origin-Moderately Dissected Hills and Valleys	0.2	49.421	20	0.06
Total		**340.86**	**84228.2103**	**34086**	**100**

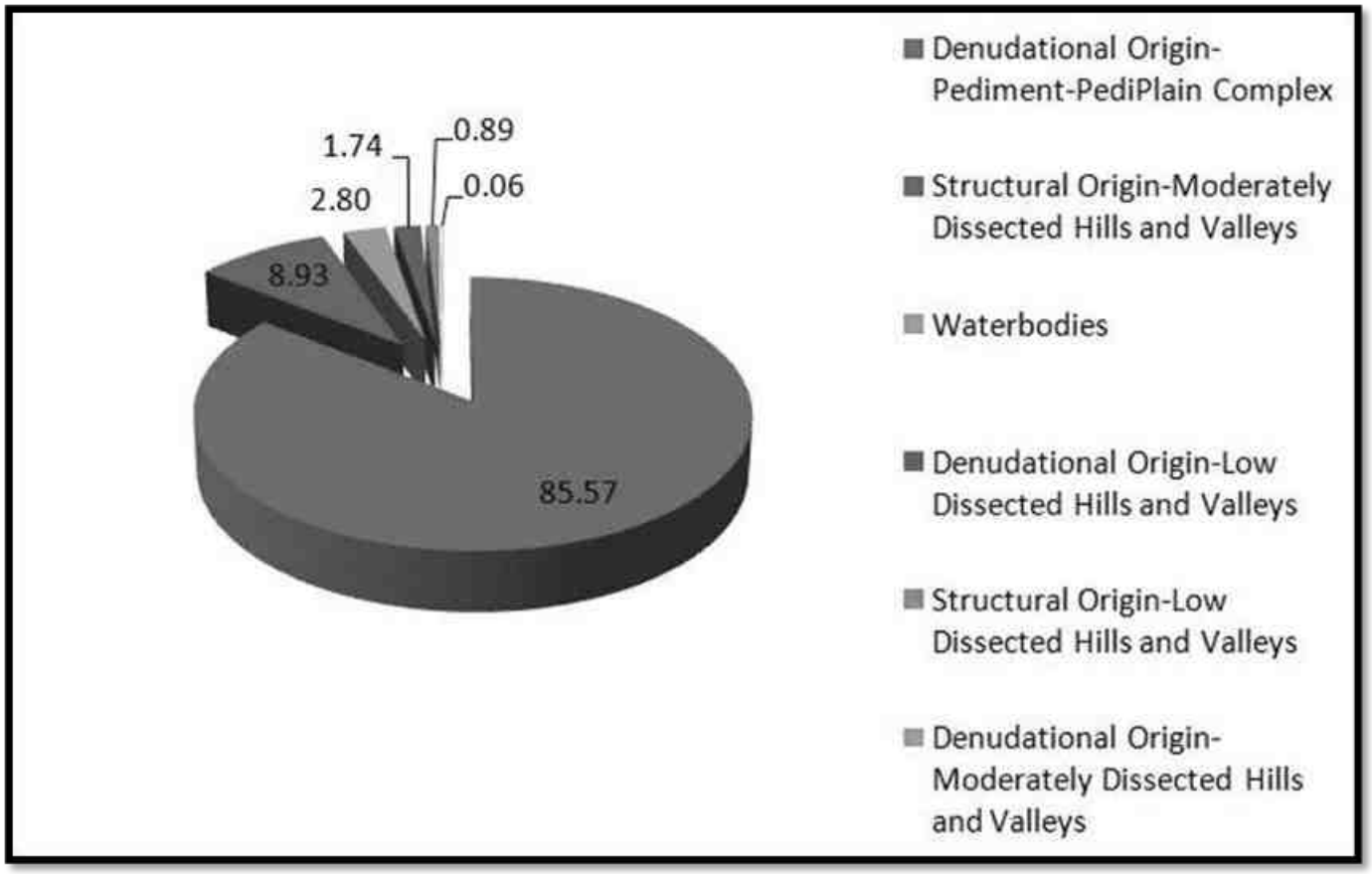


Figure 3-8 Geomorphology pattern of the study area

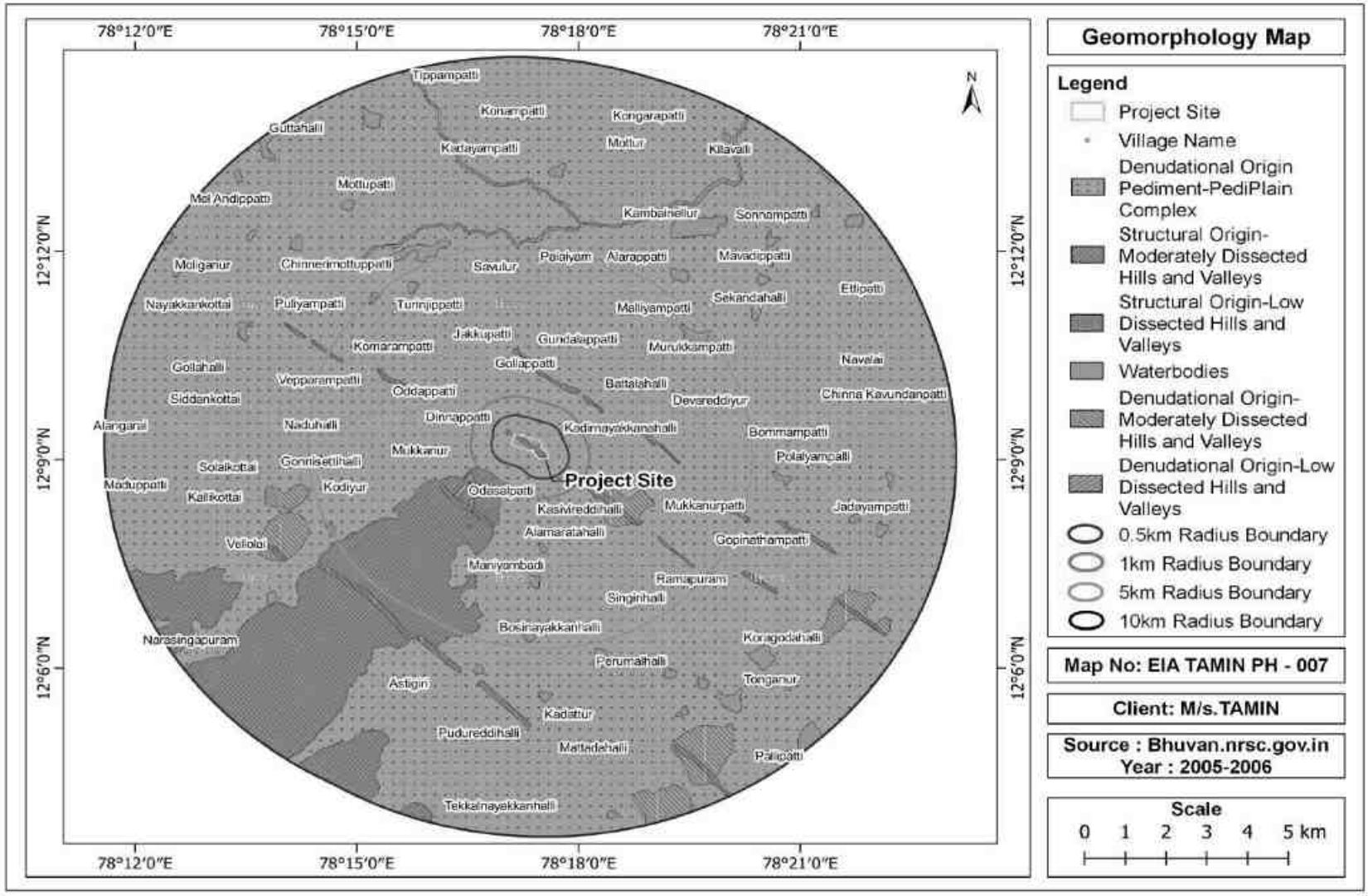


Figure 3-9 Geomorphology Map of Study Area

3.4.7 Hydrogeology of PIA DistrictProfile

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^3/day and are able to sustain pumping for 2 to4 hours per day. The yield of large diameter wells tested in crystalline rocks ranges from 150 to 200 m^3/day for drawdown of 1 to 3 m. The yield characteristics of wells vary considerably depending on the topographic set-up, litho logy and nature of weathering. The transmissivity of weathered formations computed from pumping test data using empirical methods range from 12 to 22m^2/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.

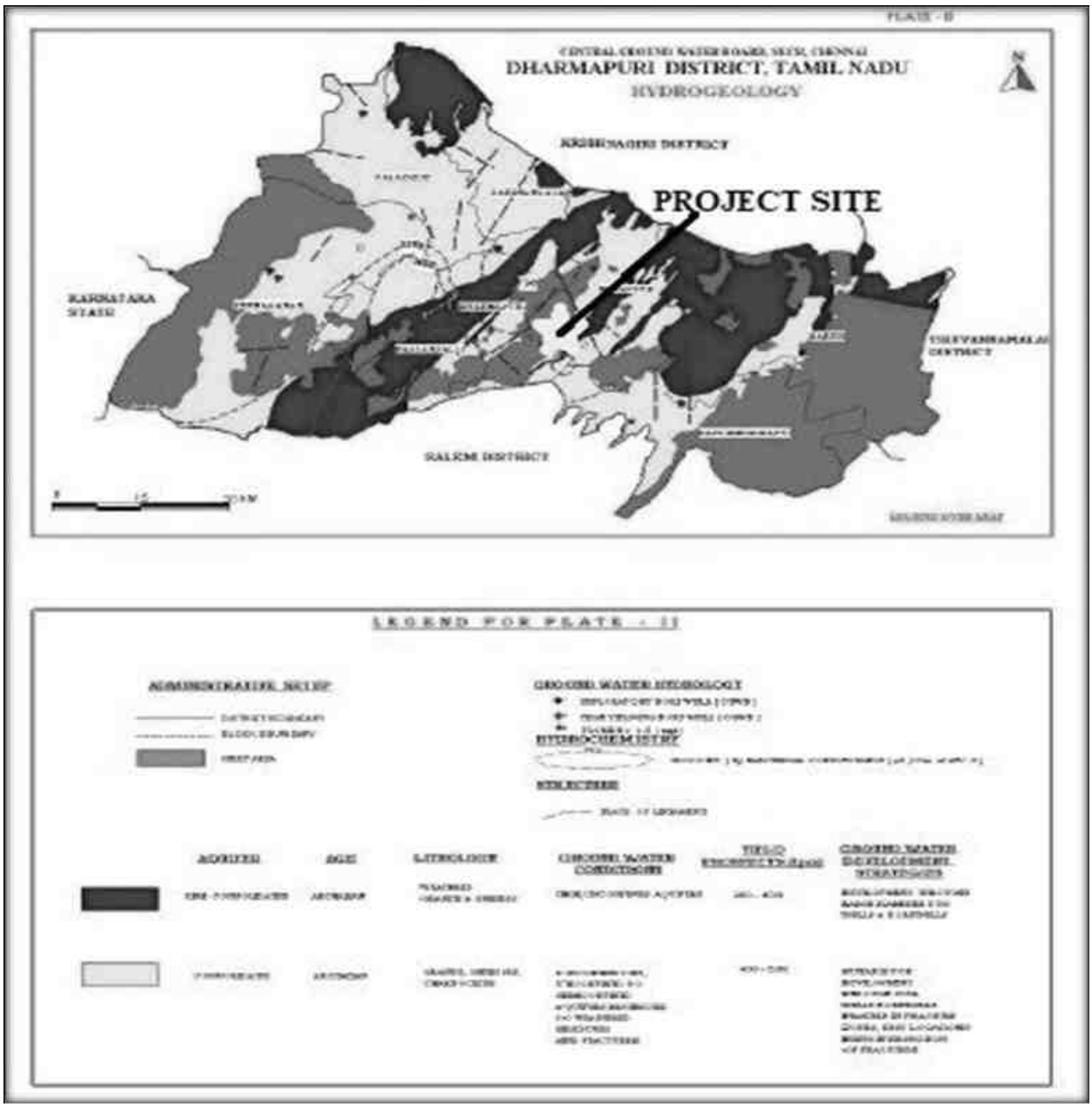
The yield of bore wells drilled down to a depth of 36 to 200 m bgl, by various state agencies mainly for domestic purposes. The discharge ranged from 2 to 33 lps. The yield of successful bore wells drilled down to a depth of 200 m bgl during the groundwater exploration programme of Central Ground Water 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*

Figure 3-10 Hydrogeology Map of Dharmapuri District

3.4.8 Drainage Pattern in 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 R. 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: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")

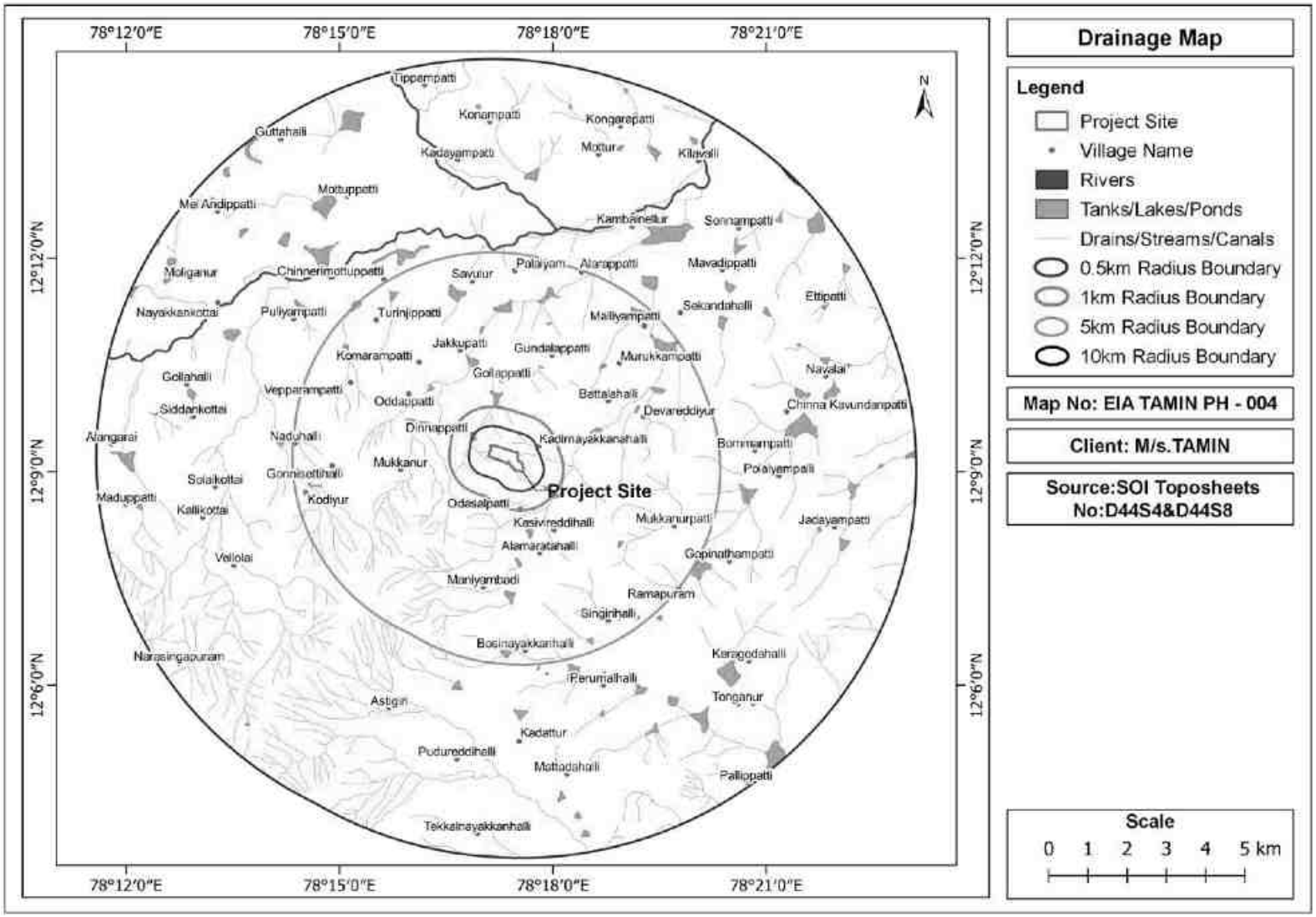


Figure 3-11 Drainage map of the study area

3.4.9 Geology

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 Morappurareas 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 rocks 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 Tamilnadu is given as **Figure 3-12.**

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

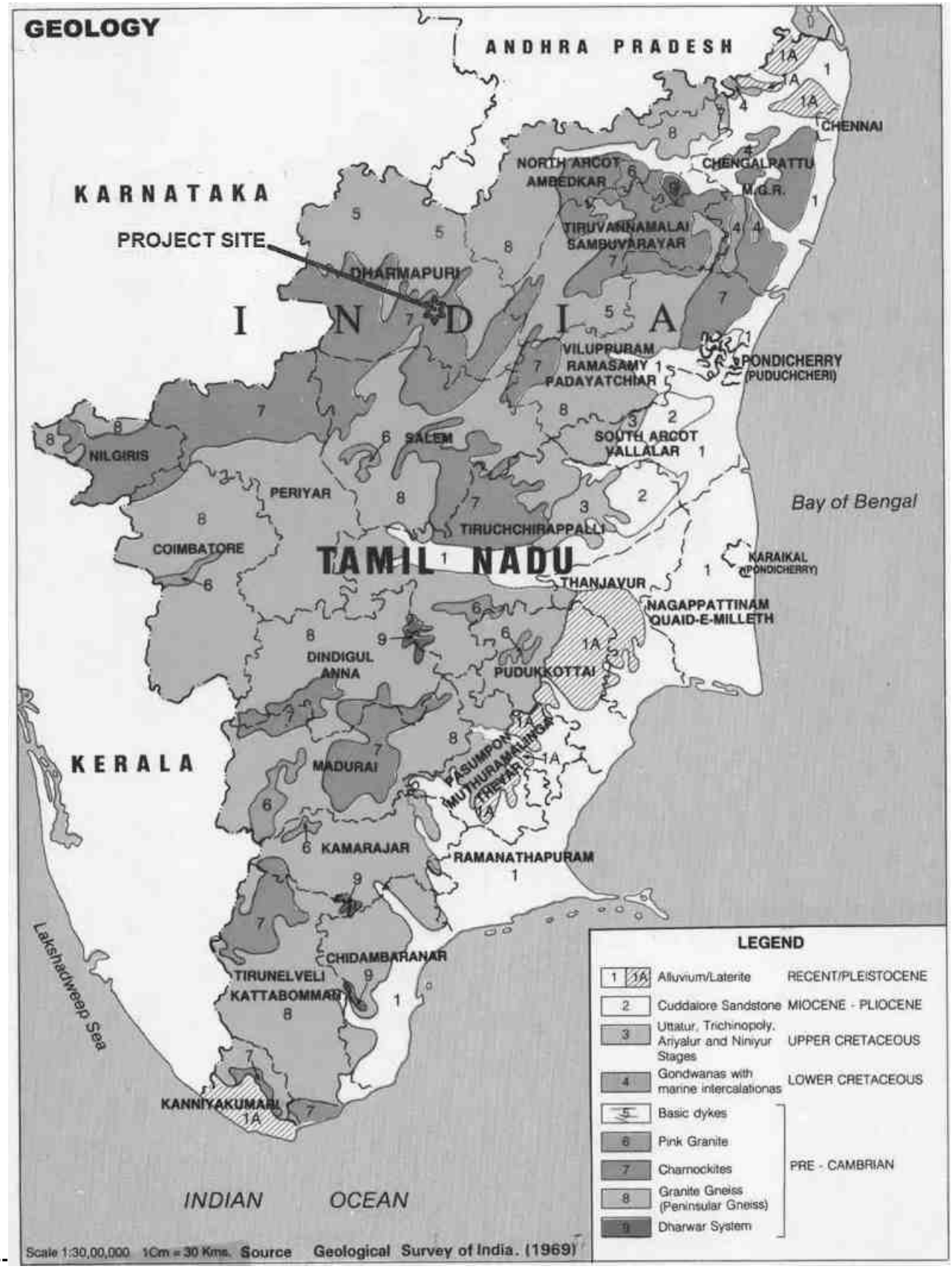


Figure 3-12 Geology Map of Tamil Nadu

3.4.10 Seismicity

As per Earthquake hazard map of Tamil Nadu, The project location/study area falls in Zone III, which is categorized as a Moderate Damage Risk Zone. The Earthquake hazard map of Tamil Nadu is shown in **Figure 3-13.**

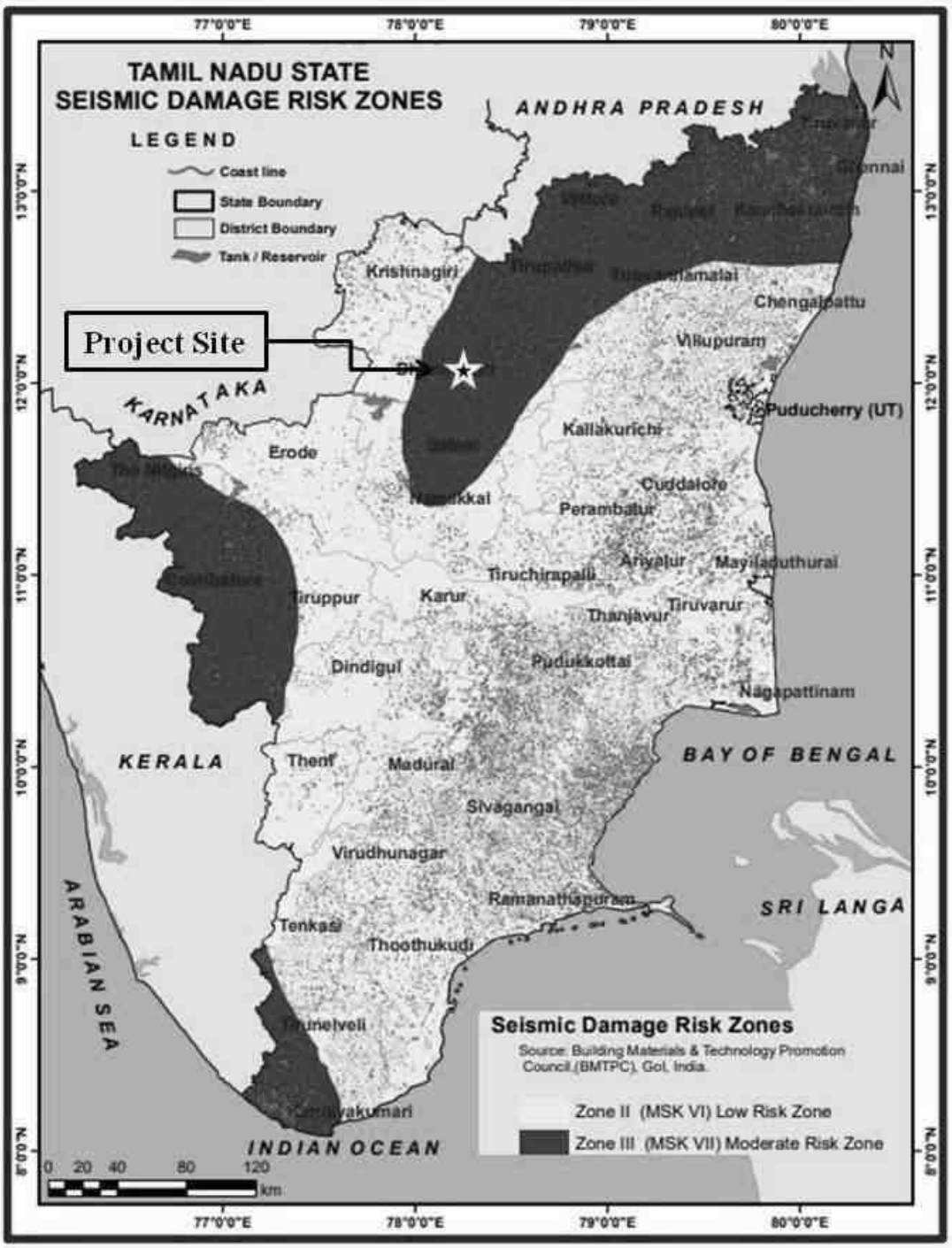


Figure 3-13 Seismicity Map of Tamil Nadu

Source:

https://tnsdma.tn.gov.in/app/webroot/img/document/map/2021/tn_seismic_damage_zones.pdf

3.4.11 Soils in 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 is 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.

S.No	Type of soil	Places in the district
1.	Lateritic Soil	Harur
2.	Black Soil	Dharmapuri,Palacode, Pappireddipatti
3.	Sandy Coastal Alluvium	Dharmapuri, Harur, Palacode
4.	Red Sandy Soil	Pennagaram, Palacode, Harur

***Source**:*
https://censusindia.gov.in/2011census/dchb/DCHB_A/34/3301_PART_A_DCHB_DHARMAPURI.pdf

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

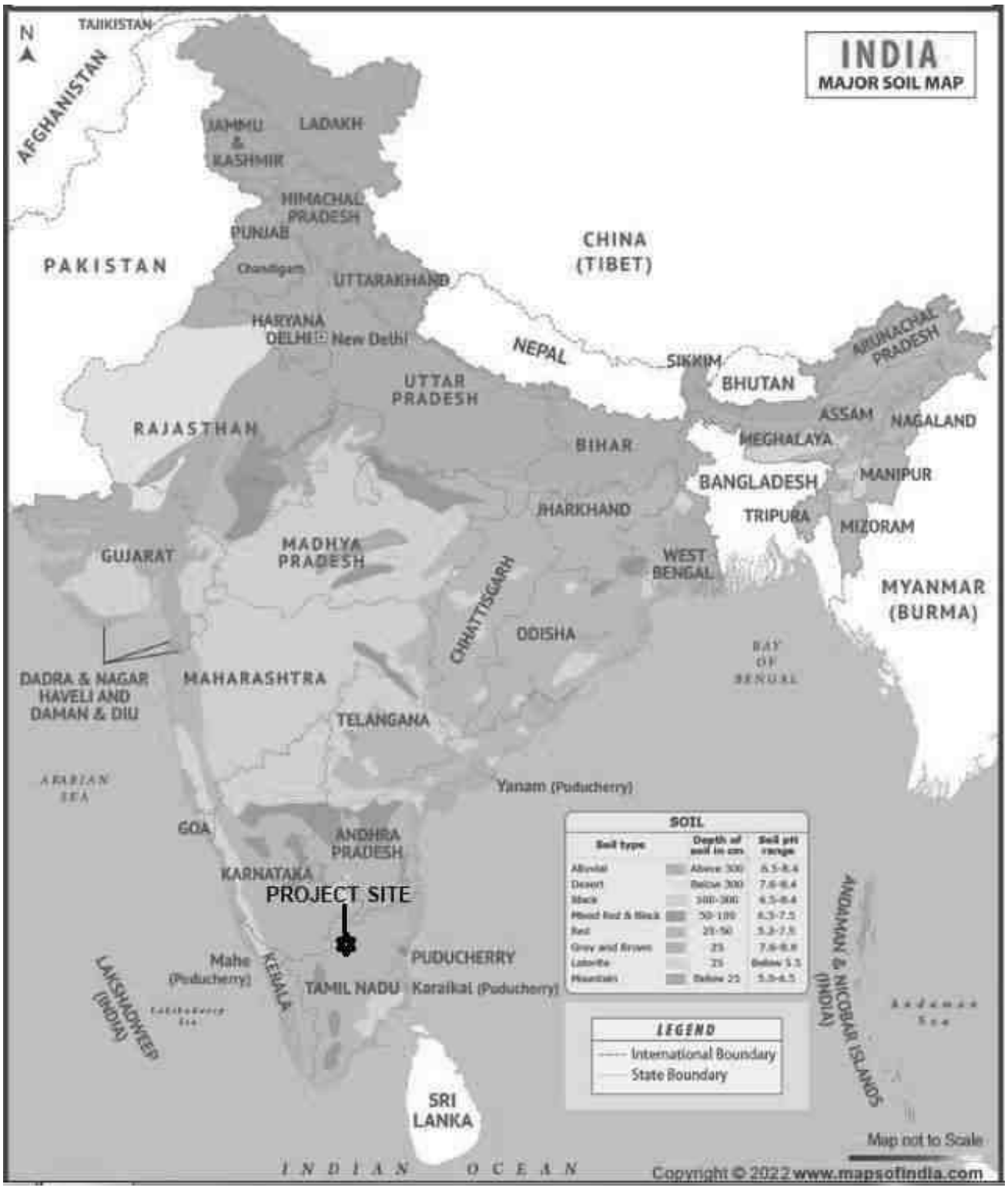


Figure 3-14 Soil map of India

3.4.12 Natural Hazards in PIA District

Dharmapuri District situated in TamilNadu is prone to multi hazards like earthquake, drought, flood, land slide and Road accidents. District Disaster management plan has been developed which aims to improve district's response to disasters while improving its ability to mitigate the disaster risks and increasing community's resilience by implementing the preparedness plan.

According to GSHAP data, the state of Tamil Nadu falls mostly in a region of low seismic hazard with the exception of western border areas that lie in a low to moderate hazard zone. Puducherry lies in a low hazard region. As per the 2002 Bureau of Indian Standards (BIS) map, Tamil Nadu and Puducherry fall in Zones II and III. Historically, parts of this region have experienced seismic activity in the M5.0 range.

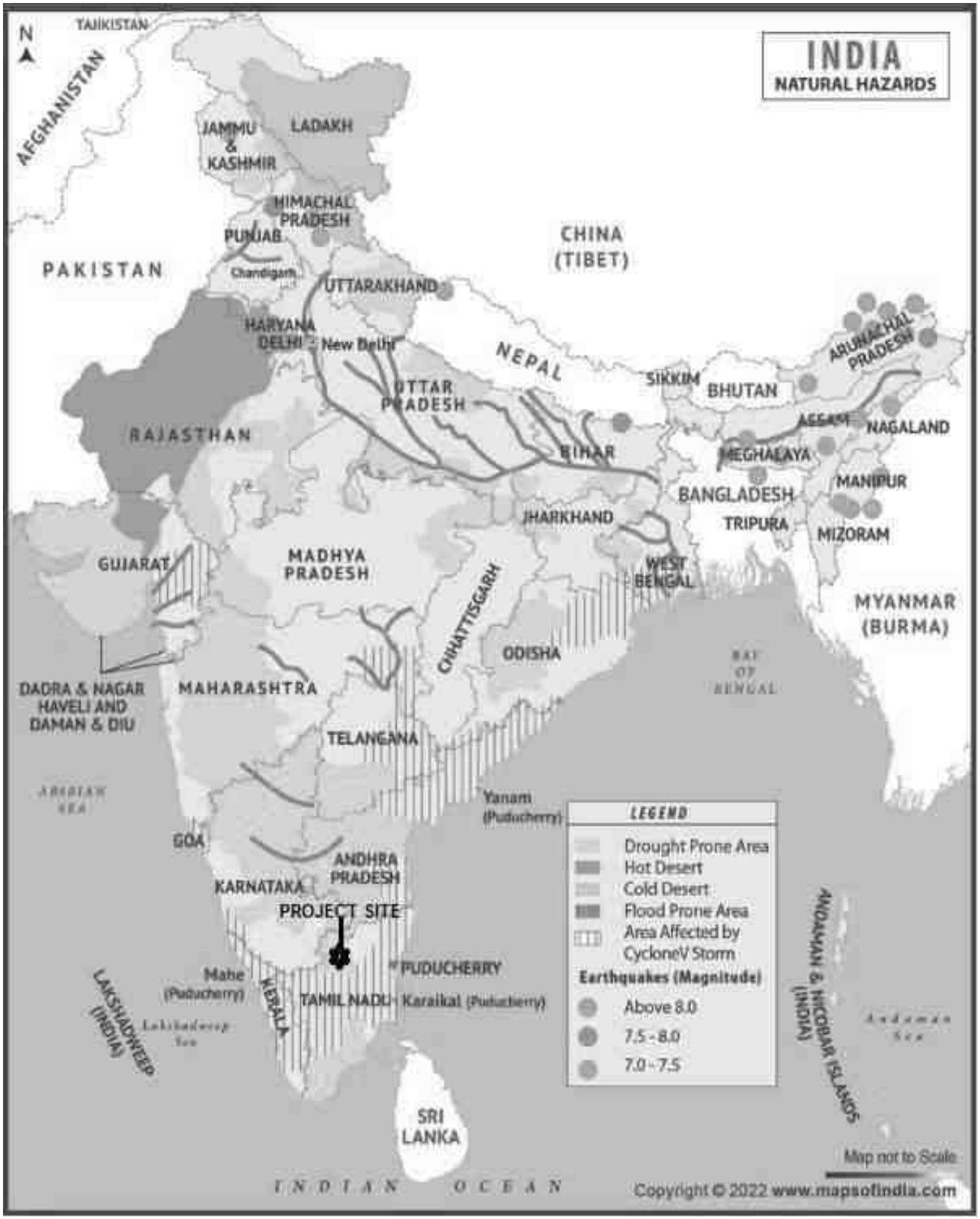


Figure 3-15 Natural Hazards Map of India

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 (**March 2024 to May 2024**). 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 located to project site is Dharmapuri. The Climatological data of Dharmapuri (12° 08' N and 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 3-4 Climatological Summary– Dharmapuri (1991-2020)

Month	Temp (°C)		Rainfall		Relative Humidity (%)		Vapour Pressure hPa		Mean Wind Speed (Kmph)	Predominant Wind Directions (From)*	
	Daily Max.	Daily Min.	Total (mm)	No. of days	08:30	17:30	08:30	17:30		08:30	17:30
Jan	29.7	17.7	2.6	0.3	81	50	20.1	18.1	5.1	NE	E
Feb	32.7	18.9	2.3	0.2	75	41	20.9	17.9	5	NE	E
Mar	35.8	20.8	16.4	0.9	68	33	22.3	17.3	4.6	NE	E
Apr	36.8	23.8	52.9	2.8	68	38	25.5	20	4.3	SW	E
May	36.5	24.5	120.3	6.6	66	48	25.9	23.5	5.3	SW	SW
Jun	34.2	23.9	71.8	3.9	67	52	24.7	23.3	6.7	SW	SW
Jul	33.2	23.4	73.9	4.1	69	56	24.2	23.5	6.8	SW	SW

Month	Temp (°C)		Rainfall		Relative Humidity (%)		Vapour Pressure hPa		Mean Wind Speed (Kmph)	Predominant Wind Directions (From)*	
	Daily Max.	Daily Min.	Total (mm)	No. of days	08:30	17:30	08:30	17:30		08:30	17:30
Aug	32.5	23.1	113.9	6.2	73	58	24.5	24	6.2	SW	W
Sep	32.3	22.6	143.5	7	76	61	25	24.9	4.7	SW	SW
Oct	30.7	21.9	193.2	9.7	82	71	25.6	25.6	3.7	NE	E
Nov	29	20.4	110.9	6.5	83	69	23.7	23.4	4.3	NE	E
Dec	27.9	18.3	40.3	2.7	82	62	20.8	20	4.8	NE	E
Max.	**36.8**	**24.5**	**193.2**	**9.7**	**83**	**71**	**25.9**	**25.6**	**6.8**	**Annual Predominant wind direction is North East**	
Min.	**27.9**	**17.7**	**2.3**	**0.2**	**66**	**33**	**20.1**	**17.3**	**3.7**		
Annual Avg/Total.	**32.7**	**21.6**	**942**	**50.8**	**74**	**53**	**23.6**	**21.8**	**5.1**		

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^{o}C and the lowest daily minimum temperature is 17.7^{o}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 193.2 mm and 2.3 mm was recorded in the months of October & Feburary respectively.
- Maximum and minimum Mean wind speed is 6.8 Km/hr and 3.7 Km/hr was recorded in the months of July and Octoberrespectively. Annual Wind predominant direction is **North East**.

3.5.5 Meteorological data during Study Period

The meteorological scenario in and around the project site is an essential requirement during study period for proper interpretation of baseline air quality status. Meteorological data was collected during the study period mid of **March 2024 to May 2024** and is presented in **Table 3-5**. The wind rose for the study period is given as **Figure 3-16.**

Table 3-5 Meteorology Data for the Study Period (March 2024 to May 2024)

S.No	Parameter	Observation
1	Temperature	Max. Temperature: 37°C Min. Temperature: 22°C Avg. Temperature: 33.17°C
2	Average Relative Humidity	42.14%
3	Average Wind Speed	2.26m/s
4	Predominant Wind Direction	South East

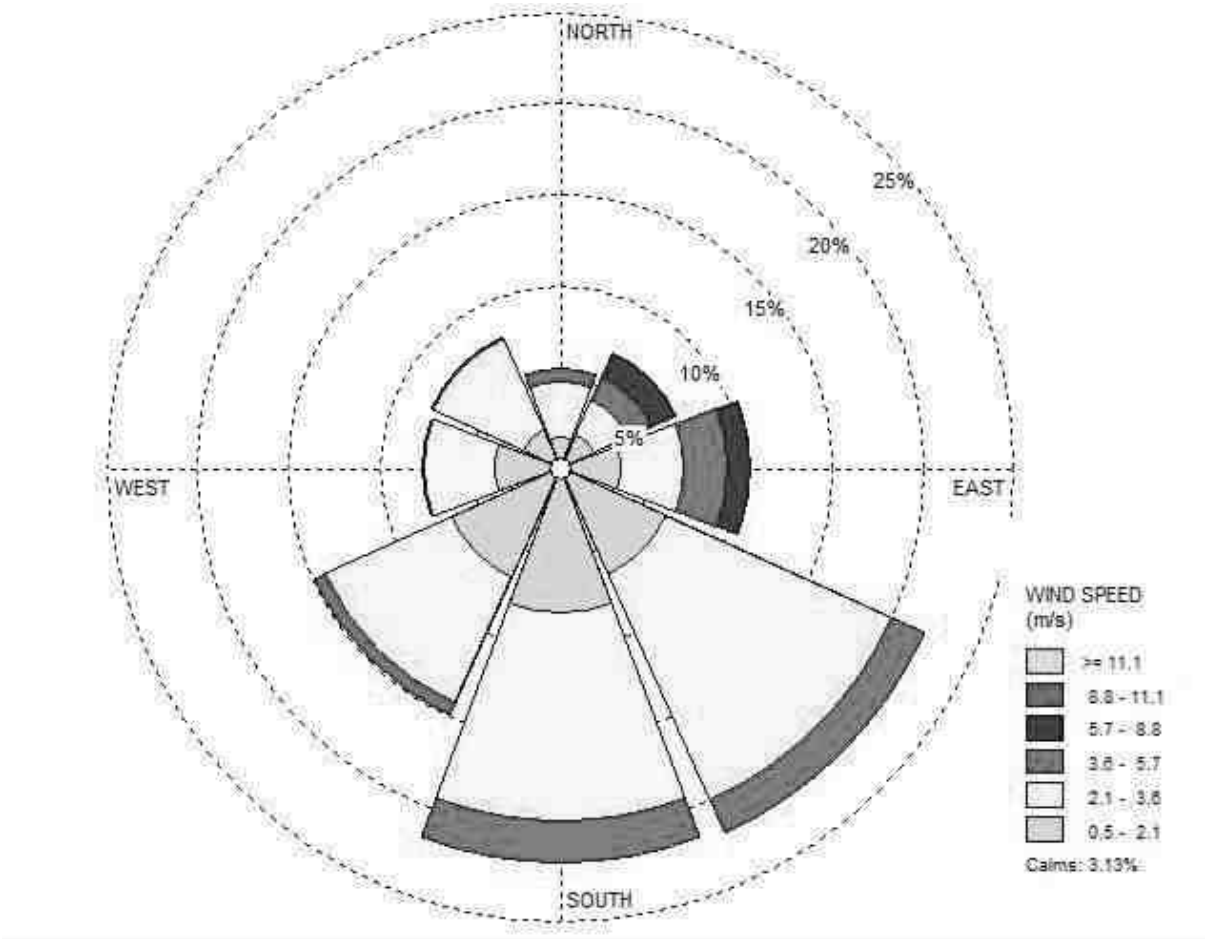


Figure 3-16 Wind Rose during March 2024 to May 2024

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: 33.17°C
- Average Relative humidity:42.14%
- Average Wind speed:2.26m/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 50 to 3994 m during 6 AM to 5 PM, the maximum recorded at 3994 m during May 2024. This is shown in the following **Figure3-21.**

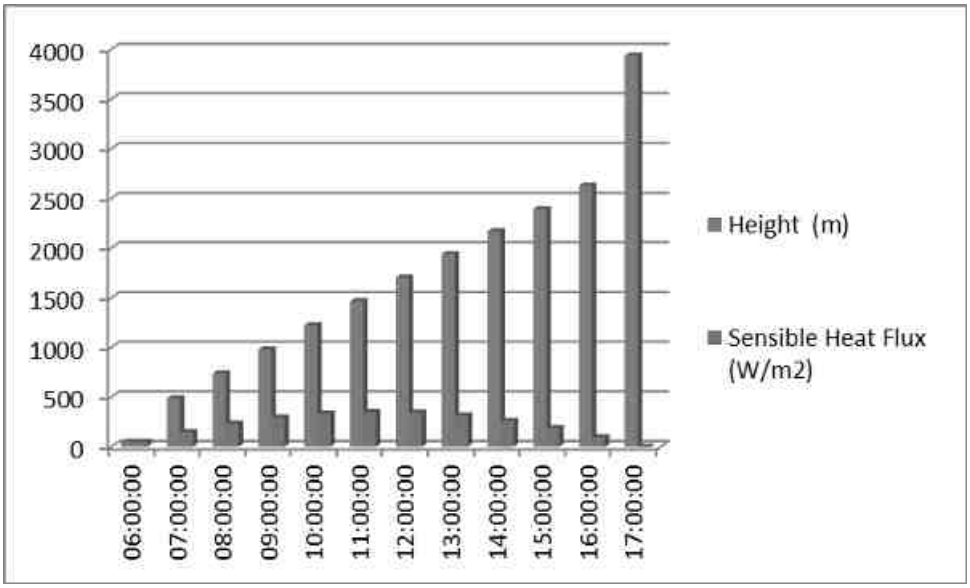


Figure 3-17 Atmospheric inversion level at the project site

3.6 Ambient Air Quality

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

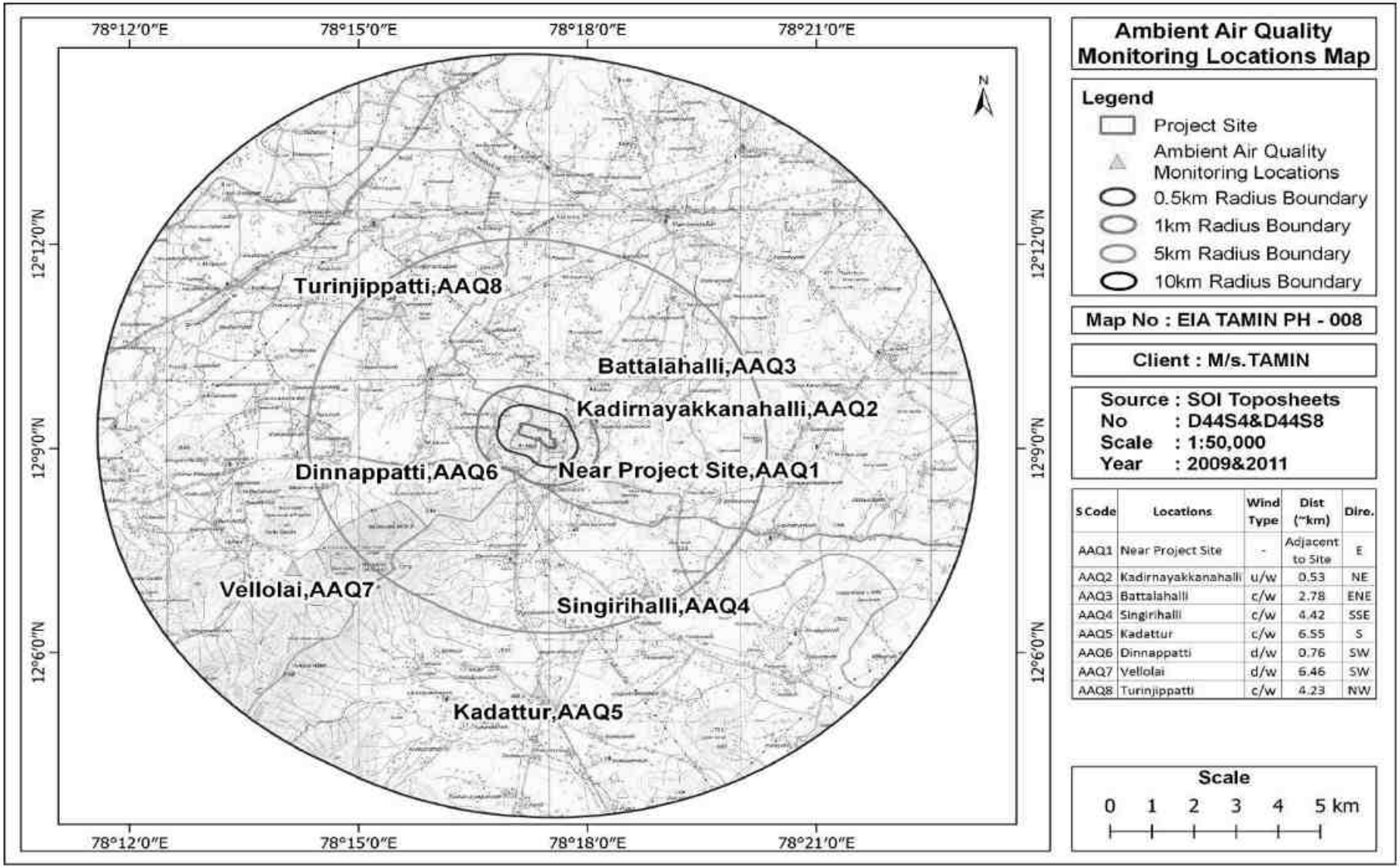
- Topography/Terrain
- Meteorological conditions
- Residential and sensitive areas within the study area
- Representatives of regional background air quality/pollution levels and
- Representation of likely impacted areas

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 (March 2024 to May 2024 is from South and South East). AAQ monitoring locations are selected based on Annual wind predominance, map showing the AAQ monitoring locations is given in **Figure 3-18** and the details of the locations are given in**Table 3-7.**

Table 3-6 Details of Ambient Air Quality Monitoring Locations

Station Code	Location	Type of Wind	Distance (~km)	Azimuth Directions
AAQ1	Near Project Site	-	Adjacent to Site	E
AAQ2	Kadirnayakkanahalli	u/w	0.53	NE
AAQ3	Battalahalli	c/w	2.78	ENE
AAQ4	Singirihalli	c/w	4.42	SSE
AAQ5	Kadattur	c/w	6.55	S
AAQ6	Dinnappatti	d/w	0.76	SW
AAQ7	Vellolai	d/w	6.46	SW
AAQ8	Turinjippatti	c/w	4.23	NW



S Code	Locations	Wind Type	Dist (~km)	Dire.
AAQ1	Near Project Site	-	Adjacent to Site	E
AAQ2	Kadirnayakkanahalli	u/w	0.53	NE
AAQ3	Battalahalli	c/w	2.78	ENE
AAQ4	Singirihalli	c/w	4.42	SSE
AAQ5	Kadattur	c/w	6.55	S
AAQ6	Dinnappatti	d/w	0.76	SW
AAQ7	Vellolai	d/w	6.46	SW
AAQ8	Turinjippatti	c/w	4.23	NW

Figure 3-18 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 (**March 2024 to May 2024**). PM_{10}, $PM_{2.5}$, SO_2, NO_x, CO, Pb, O3, NH_3, C_6H_6, $C_{20}H_{12}$, 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 3-7 Analytical Methods for Analysis of Ambient Air Quality Parameters (NAAQ)

S. No	Parameters	Analytical method	NAAQ standards: 2009		Sampling Time
1	Sulphur Dioxide (SO2), µg/m3	IS:5182(Part-2):2001	50 (Annual)	80(24 Hours)	24 Hours
2	Nitrogen Dioxide (NO2), µg/m3	IS: 5182 (Part – 6): 2006	40 (Annual)	80 (24 Hours)	24 Hours
3	Particulate Matter (PM2.5), µg/m3	IS: 5182 (Part – 23): 2006	40 (Annual)	60 (24 hours)	24 Hours
4	Particulate Matter (PM10), µg/m3	IS:5182 (Part– 23): 2006	60 (Annual)	100 (24 hours)	24 Hours
5	CO, mg/m^3	IS:5182(Part–10):1999	2 (8 hours)	4 (1hour)	8 Hours
6	Pb, µg/m3	IS:5182(Part–22):2004	0.5(Annual)	1(24 hours)	24 Hours
7	O3, µg/m3	IS 5182 Part 9: 1974	100(8hours)	180 (1hour)	8 Hours
8	NH3, µg/m3	IS 5182 Part 25: 2018	100(Annual)	400(24 hours)	8 Hours
9	Benzene, µg/m3	IS 5182 Part 11: 2006	5 (Annual)	5 (Annual)	24 Hours
10	Benzo (a) pyrene, ng/m3	IS 5182 Part 12 : 2004	1 (Annual)	1 (Annual)	24 Hours
11	Arsenic, ng/ m3	HECS/AA/SOP/019,Issue No:01,Issue Date :16.12.:2016: 2016	6 (Annual)	6 (Annual)	24 Hours
12	Nickel, ng/ m3	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

3.6.2.1 Results and Discussions

The variations of the pollutants Particulate matter <10 micron size (PM_{10}),Particulate matter <2.5 micron size ($PM_{2.5}$), Sulphur Dioxide (SO_2), Nitrogen Dioxide (NO_2),Carbon Monoxide (CO), Lead (Pb),Ozone (O_3),Benzene (C_6H_6), Benzo (a) pyrene ($C_{20}H_{12}$), Arsenic (As), Nickel (Ni),Ammonia (NH_3) are compared with National Ambient Air Quality Standards (NAAQS), MoEF&CC Notification, November 2009. Ambient Air Quality Monitoring Data (**March 2024 to May 2024)** for the study area is given in **Table 3-9** and trends of measured ambient concentration in the study area were graphically represented in **Figure 3-20.**

Table 3-8 Summary of the average baseline concentrations of pollutants

S. NO.	Parameters	Units	Conc.	NAAQ Standards	Locations							
					Near Project site	Kadirnayakkanahalli	Battalahalli	Singiirihalli	Kadattur	Dinnappatti	Vellolai	Turinjippatti
					A1	A2	A3	A4	A5	A6	A7	A8
1	PM_{10} Conc.	µg/m³	Min.	100(24 Hours)	29.95	31.60	33.05	31.86	37.46	34.47	34.13	34.89
			Max.		42.69	45.04	47.10	45.40	53.38	49.12	48.64	49.72
			Avg.		**35.92**	**37.90**	**39.63**	**38.20**	**44.92**	**41.34**	**40.93**	**41.84**
			98th 'tile		42.44	44.78	46.83	45.14	53.07	48.84	48.35	49.43
2	$PM_{2.5}$ Conc.	µg/m³	Min.	60(24 Hours)	18.57	18.33	18.18	17.20	20.60	19.99	19.79	20.58
			Max.		26.46	26.12	25.91	24.52	29.36	28.49	28.21	29.33
			Avg.		**22.27**	**21.99**	**21.80**	**20.63**	**24.71**	**23.98**	**23.74**	**24.69**
			98th 'tile		26.31	25.97	25.75	24.37	29.19	28.33	28.04	29.16
3	SO_2 Conc.	µg/m³	Min.	80(24 Hours)	7.07	7.09	7.50	7.62	9.87	7.38	8.29	7.08
			Max.		10.08	10.10	10.69	10.85	14.07	10.52	11.82	10.09
			Avg.		**8.49**	**8.51**	**9.00**	**9.14**	**11.84**	**8.86**	**9.95**	**8.50**
			98th 'tile		10.02	10.04	10.62	10.79	13.98	10.46	11.75	10.03
4	NO_2 Conc.	µg/m³	Min.	80(24 Hours)	14.14	14.18	15.00	15.23	19.74	14.76	16.58	14.16
			Max.		20.16	20.21	21.37	21.71	28.13	21.04	23.63	20.18
			Avg.,		**16.97**	**17.01**	**17.99**	**18.27**	**23.67**	**17.71**	**19.89**	**16.99**
			98th 'tile		20.04	20.09	21.25	21.58	27.97	20.92	23.50	20.07
5	Lead (Pb)	µg/m³	Avg.	1(24 hour)	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)
6	Carbon monoxide (CO)	mg/m³	Avg.	4 (1hour)	BLQ(LOQ0.05)	BLQ(LOQ0.05)	BLQ(LOQ0.05)	0.23	0.32	BLQ(LOQ0.05)	BLQ(LOQ0.05)	0.23
7	Ozone O_3	µg/m³	Avg.	180(1hour)	BLQ(LOQ10)	BLQ(LOQ10)	BLQ(LOQ10)	BLQ(LOQ10)	BLQ(LOQ10)	BLQ(LOQ10)	BLQ(LOQ10)	BLQ(LOQ10)
8	Benzene(	ng/	Avg.	5(Ann	BLQ (LOQ	BLQ (LOQ 1)	BLQ (LOQ	BLQ (LOQ	BLQ (LOQ	BLQ (LOQ 1)	BLQ	BLQ (LOQ 1)

	C6H6)	**m^3**		**ual)**	1)		1)	1)	1)		(LOQ 1)	
9	**Benzo (a) Pyrene (C20H12 (a))**	**ng/ m^3**	**Avg.**	**1(Annual)**	BLQ (LOQ 1)	BLQ (LOQ 1)	BLQ (LOQ 1)	BLQ (LOQ 1)	BLQ (LOQ 1)	BLQ (LOQ 1)	BLQ (LOQ 1)	BLQ (LOQ 1)
10	**Arsenic (As)**	**ng/ 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)
11	**Nickel as Ni**	**ng/ m^3**	**Avg.**	**20(Annual)**	BLQ(LOQ 10)	BLQ(LOQ 10)	BLQ(LOQ 10)	BLQ(LOQ 10)	BLQ(LOQ 10)	BLQ(LOQ 10)	BLQ(LOQ 10)	BLQ(LOQ 10)
12	**Ammonia (NH3)**	**µg/ m^3**	**Avg.**	**400(24 hour)**	BLQ(LOQ5)	BLQ(LOQ5)	BLQ(LOQ5)	BLQ(LOQ5)	BLQ(LOQ5)	BLQ(LOQ5)	BLQ(LOQ5)	BLQ(LOQ5)
13	**Free Silica**	mg/ m^3	**Avg.**	0.05	BLQ(LOQ0.01)	BLQ(LOQ0.01)	BLQ(LOQ0.01)	BLQ(LOQ0.01)	BLQ(LOQ0.01)	BLQ(LOQ0.01)	BLQ(LOQ0.01)	BLQ(LOQ0.01)

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

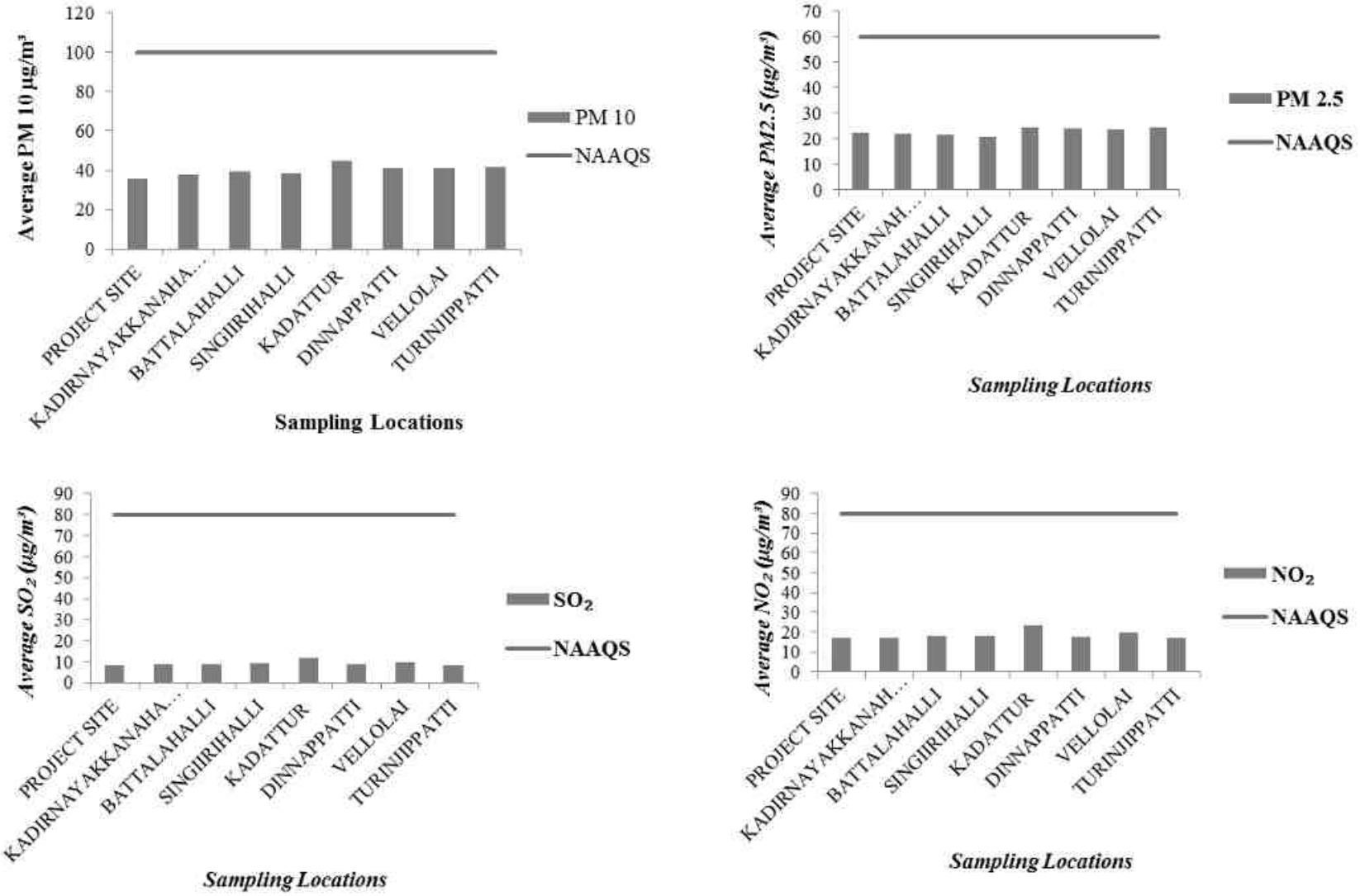


Figure 3-19 Trends of Measured Ambient Concentrations in the Study Area

3.6.2.2 Observations

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_{10} vary from **35.92 µg/m³** to **44.92µg/m³.**
- The average baseline levels of $PM_{2.5}$ vary from **20.63µg/m³** to **24.71µg/m³.**
- The average baseline levels of SO_2 vary from **8.49µg/m³** to **11.84µg/m³.**
- The average baseline levels of NO_2 vary from **16.97µg/m³** to **23.67µg/m³.**

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 3-20**.

3.7.1 Results and Discussions

Based on the recorded hourly noise levels at each monitoring location, the day equivalent (Ld) and night equivalent (Ln) 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

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 given in **Table 3-10.**

Table 3-9 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		65.48	52.86	75	70	Industrial
2.	Kadirnayakkanahalli	N2	0.53	NE	48.52	41.72	55	45	Residential
3.	Battalahalli	N3	2.78	ENE	45.23	40.45	55	45	Residential
4.	Singiirihalli	N4	4.42	SSE	43.56	40.87	55	45	Residential
5.	Kadattur	N5	6.55	S	53.58	43.91	55	45	Residential
6.	Dinnappatti	N6	0.76	SW	51.15	41.98	55	45	Residential
7.	Vellolai	N7	6.46	SW	51.68	42.54	55	45	Residential
8.	Turinjippatti	N8	4.23	NW	49.52	41.72	55	45	Residential

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 Industrial area (Project site), day time noise level was about **65.48 dB (A) and 52.86 dB(A)** during night time, which is within prescribed limit by CPCB for Industrial area (75 dB(A) Day time & 70 dB(A)Night time).
- In Residential area day time noise levels varied from **43.56 dB (A) to 53.58 dB (A)** across the sampling stations and night time noise levels varied from **40.45 dB (A) to 43.91 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).

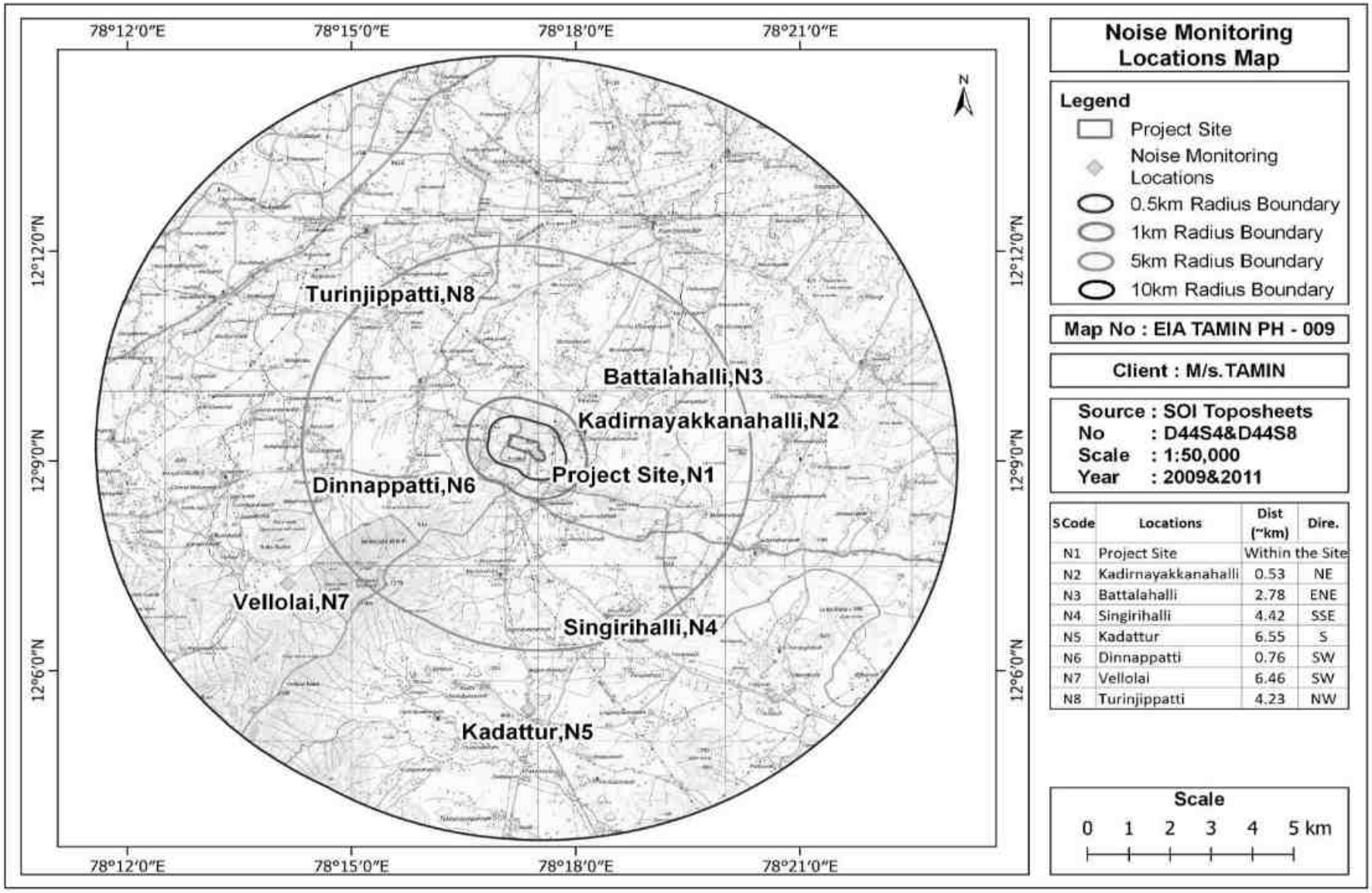


Figure 3-20 Map showing the noise monitoring locations

3.8 Water Environment

The district is part of the composite east flowing river basin "Between Cauvery and Ponnaiyar as per the Irrigation Atlas of India.

3.8.1 Surface Water Resources

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 t he import ant tributaries of Ponnaiyar draining the eastern part of the district whereas the Chinnar and Markandeya Nadhi drain the northern part of the district.

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.**Water sampling and map of sampling location are given in**Table 3-12** and **Figure 3-21**. Physicochemical Parameters of Surface water samples from the study area given in **Table 3-12**.

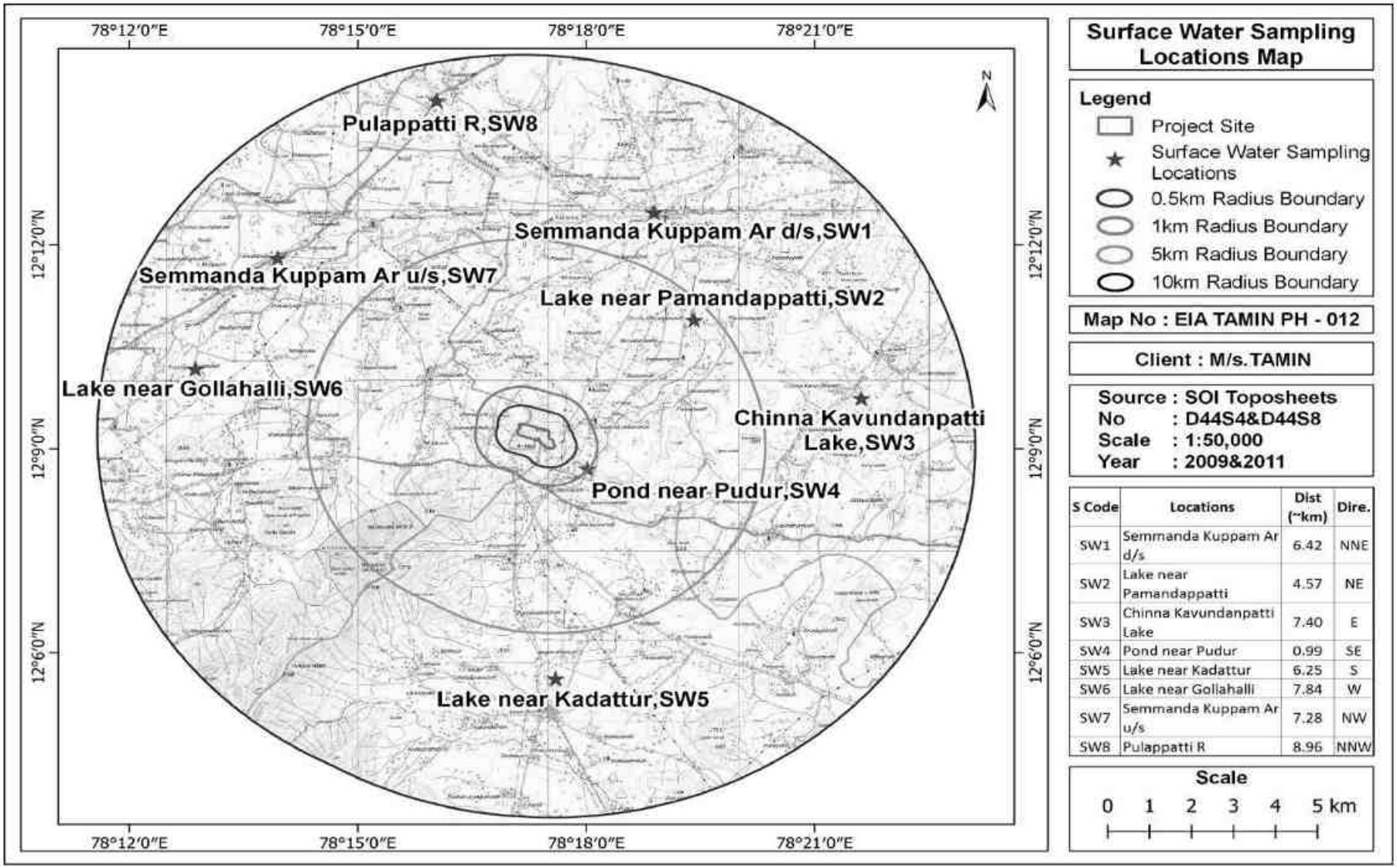
Table 3-10 Test methods used for the analysis of water quality parameters

S.No	Parameter Measured	Test Method
1	Turbidity	IS 3025(Part - 10):1984
2	pH	IS:3025 (Part - 11): 1983 (Reaff: 2006)
3	Electrical Conductivity	IS:3025 (Part - 14): 1983 (Reaff: 2006)
4	Total Dissolve Solids	IS: 3025:1(Part - 16) 1984 (Reaff 2006)
5	Total Suspended Solids	IS 3025 (Part - 17) 1984 (Reaff 1996)
6	Total Alkalinity as CaCO3	IS:3025,1 (Part - 23) 1986 (Reaff 2009)

S.No	Parameter Measured	Test Method
7	Total Hardness as CaCo3	IS:3025 (Part - 21) 1983 (Reaff 2006)
8	Sodium as Na	IS:3025,5(Part - 45) 1993 (Reaff 2006)
9	Potassium as K	IS:3025,5(Part - 45) 1993 (Reaff 2006)
10	Calcium as Ca	IS 3025 (Part - 40):1991
11	Magnesium as Mg	IS 3025 (Part - 46) 1994
12	Chloride as cl	IS 3025 (Part - 32):1988
13	Sulphate as SO4	IS 3025(Part - 24):1986
14	Nitrate as NO3	ASTM (Part - 31)1978
15	Phosphate as PO4	IS 3025 (Pt 45) 1993 (R 2006)
16	Fluorides as F	IS 3025 (Part - 60):2008
17	Cyanide as Cd	IS 3025 (Part-27):1986
18	Arsenic as As	IS 3025:(Part-37):1988(Reaff 2009)
19	Cadmium as Cd	IS 3025 (Part - 41)1991
20	Chromium, Total	IS:3025 (Part - 52) 2003 (Reaff 2009)
21	Lead as Pb	IS:3025 (Part - 47) 1994 (Reaff 2009)
22	Manganese as Mn	IS 3025:(Part - 59):2006
23	Mercury as Hg	IS 3025 (Part48):1994 RA 1999
24	Nickel as Ni	IS 3025:(Part-54):2003(Reaff 2009)
25	Selenium as Se	IS 3025 Part (56)2003
26	Zinc as Zn	IS:3025 (Part - 49) 1994 (Reaff 2009)
27	Dissolved Oxygen (DO)	IS:3025 (Part - 38)1989 (Reaff 2009)
28	BOD, 3 days @ 27°C as O_2	5210B APHA 22nd Edn 2012
29	Chemical Oxygen Demand as O_2	IS:3025 (Part-58)-2006
30	Boron	IS:3025 (Part-57)-2005
31	Copper	IS 3025 (Part-42) 1992

Table 3-11 Details of Surface water sampling locations

S.No	Location Code	Location	Distance in km	Direction
1	SW1	Semmanda kuppam Ar d/s	6.42	NNE
2	SW2	Lake near pamandappatti	4.57	NE
3	SW3	Chinna kavundanpatti Lake	7.40	E
4	SW4	Pond near pudur	0.99	SE
5	SW5	Lake near kadattur	6.25	S
6	SW6	Lake near Gollahalli	7.84	W
7	SW7	Semmanda kuppam Ar U/s	7.28	NW
8	SW8	Pulappatti R	8.96	NNW



S Code	Locations	Dist (~km)	Dire.
SW1	Semmanda Kuppam Ar d/s	6.42	NNE
SW2	Lake near Pamandappatti	4.57	NE
SW3	Chinna Kavundanpatti Lake	7.40	E
SW4	Pond near Pudur	0.99	SE
SW5	Lake near Kadattur	6.25	S
SW6	Lake near Gollahalli	7.84	W
SW7	Semmanda Kuppam Ar u/s	7.28	NW
SW8	Pulappatti R	8.96	NNW

Figure 3-21 Map showing the surface water monitoring locations

Table 3-12 Physicochemical Parameters of Surface water samples from the study area

S. No	Parameter	Unit	Surface water standards (*IS 2296 Class-A)	Semmanda kuppam Ar d/s	Lake near pamandappatti	chinna kavundanpatti Lake	Pond near pudur	Lake near kadattur	Lake near Gollahalli	Semmanda kuppam Ar U/s	Pulappatti R
				SW 1	SW 2	SW 3	SW 4	SW 5	SW 6	SW 7	SW 8
1.	Turbidity	NTU	1	5.2	3.9	6.1	2.6	6.5	3.5	5.7	4.3
2.	pH (at 25°C)	--	6.5-8.5	7.84	7.62	7.21	7.74	7.62	7.15	7.37	7.68
3.	Electrical Conductivity	µS/cm	-	742	804	791	868	808	781	818	886
4.	Total Dissolved Solids	mg/l	500	391	423	416	457	425	411	430	466
5.	Total Suspended Solids	mg/l	-	12	9	14	6	15	8	13	10
6.	Total Alkalinity as CaCO3	mg/l	-	87	84	91	101	95	102	105	107
7.	Total Hardness as CaCO3	mg/l	300	143	146	151	168	158	162	168	172
8.	Sodium as Na	mg/l	-	76	86	82	91	83	77	82	92
9.	Potassium as K	mg/l	-	9	10	10	11	10	9	10	11
10.	Calcium as Ca	mg/l	-	33.24	33.94	35.10	39.05	36.73	37.66	39.05	39.98
11.	Magnesium as Mg	mg/l	-	14.6	14.9	15.4	17.1	16.1	16.5	17.1	17.6
12.	Chloride as Cl	mg/l	250	127	143	137	151	139	128	137	153
13.	Sulphate as SO4	mg/l	400	50.11	56.42	54.05	59.58	54.84	50.50	54.05	60.37
14.	Nitrate as NO3	mg/l	20	0.38	0.46	0.39	0.41	0.48	0.46	0.32	0.47
15.	Phosphate as PO4	mg/l	-	0.25	0.42	0.42	0.37	0.21	0.23	0.21	0.24

S. No	Parameter	Unit	Surface water standards (*IS 2296 Class-A)	Semmanda kuppam Ar d/s	Lake near pamandappatti	chinna kavundanpatti Lake	Pond near pudur	Lake near kadattur	Lake near Gollahalli	Semmanda kuppam Ar U/s	Pulappatti R
				SW 1	SW 2	SW 3	SW 4	SW 5	SW 6	SW 7	SW 8
16.	Fluorides as F	mg/l	1.5	0.39	0.40	0.38	0.31	0.28	0.22	0.41	0.32
17.	Cyanide	mg/l	0.05	BLQ(LOQ 0.01)	BLQ(LOQ 0.01)	BLQ(LOQ0.01)	BLQ(LOQ 0.01)	BLQ(LOQ 0.01)	BLQ(LOQ 0.01)	BLQ(LOQ 0.01)	BLQ(LOQ0.01)
18.	Arsenic	mg/l	0.05	BLQ(LOQ 0.005)	BLQ(LOQ 0.005)	BLQ(LOQ0.005)	BLQ(LOQ 0.005)	BLQ(LOQ 0.005)	BLQ(LOQ 0.005)	BLQ(LOQ 0.005)	BLQ(LOQ0.005)
19.	Boron as B	mg/l	-	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ 0.1)	BLQ(LOQ0.1)
20.	Cadmium as Cd	mg/l	0.01	BLQ(LOQ 0.001)	BLQ(LOQ 0.001)	BLQ(LOQ0.001)	BLQ(LOQ 0.001)	BLQ(LOQ 0.001)	BLQ(LOQ 0.001)	BLQ(LOQ 0.001)	BLQ(LOQ0.001)
21.	Chromium, Total	mg/l	0.05	BLQ(LOQ 0.01)	BLQ(LOQ 0.01)	BLQ(LOQ0.01)	BLQ(LOQ 0.01)	BLQ(LOQ 0.01)	BLQ(LOQ 0.01)	BLQ(LOQ 0.01)	BLQ(LOQ0.01)
22.	Copper as Cu	mg/l	1.5	BLQ(LOQ 0.01)	BLQ(LOQ 0.01)	BLQ(LOQ0.01)	BLQ(LOQ 0.01)	BLQ(LOQ 0.01)	BLQ(LOQ 0.01)	BLQ(LOQ 0.01)	BLQ(LOQ0.01)
23.	Lead as Pb	mg/l	0.1	BLQ(LOQ 0.005)	BLQ(LOQ 0.005)	BLQ(LOQ0.005)	BLQ(LOQ 0.005)	BLQ(LOQ 0.005)	BLQ(LOQ 0.005)	BLQ(LOQ 0.005)	BLQ(LOQ0.005)
24.	Manganese as Mn	mg/l	0.5	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)
25.	Mercury	mg/l	0.001	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)
26.	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)
27.	Selenium as Se	mg/l	0.01	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)
28.	Zinc	mg/l	15	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)
29.	Dissolved Oxygen	mg/l	6	6.7	6.7	6.6	6.6	6.4	6.7	6.6	6.4
30.	Chemical Oxygen Demand as O2	mg/l	-	20	20	16	20	24	20	16	16

S. No	Parameter	Unit	Surface water standards (*IS 2296 Class-A)	Semmanda kuppam Ar d/s	Lake near pamandappatti	chinna kavundanpatti Lake	Pond near pudur	Lake near kadattur	Lake near Gollahalli	Semmanda kuppam Ar U/s	Pulappatti R
				SW 1	SW 2	SW 3	SW 4	SW 5	SW 6	SW 7	SW 8
31.	BOD, 3 days @ 27°C as O2	mg/l	2	2	3	2	3	4	3	2	2

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:

- Water sampling results are compared with Surface water standards IS 2296:1992.
- pH in the collected surface water samples varies between **7.15 to 7.84** which is within the limit of IS 2296:1992.
- The Total Dissolved Solids (TDS) value of collected surface water sample ranges from **391 mg/l to 466 mg/l**.
- The Total hardness value of the collected surface water sample ranges between **143 mg/l to 172 mg/l**.
- BOD value of surface water varies from **2 mg/l to 4 mg/l**
- COD value of surface water varies from **16 to 24 mg/l**
- The concentration of heavy metals like As, Cd, Cr, Pb, Mn, Hg, Ni and Se are within the limits of IS 2296:1992.

Surface water standards (IS 2296:1992) given in**Table 3-13**

Table 3-13 Surface water Standards (IS 2296:1992)

S.No	Parameters	Unit	A	B	C	D	E
1	Turbidity	NTU	---	---	---	---	---
2	pH	--	8.5	8.5	8.5	8.5	8.5
3	Conductivity	µS/cm	---	---	---	1000	2250
4	Total Dissolved Solids	mg/l	500	---	1500	---	2100
5	Alkalinity as $CaCO_3$	mg/l	---	---	---	---	---
6	Total Hardness as $CaCo_3$	mg/l	300	---	---	---	---
7	Calcium as Ca	mg/l	80.10	---	---	---	---
8	Magnesium as Mg.	mg/l	24.28	---	---	---	---
9	Sodium Na	mg/l	---	---	---	---	---
10	Potassium	mg/l	---	---	---	---	---
11	Chloride as Cl	mg/l	250	---	600	---	600
12	Sulphate as SO4	mg/l	400	---	400	---	1000
13	Phosphate	mg/l	---	---	---	---	---
14	Nitrate as NO_3	mg/l	20	---	50	---	---
15	Fluorides as F	mg/l	1.5	1.5	1.5	---	---
16	Cyanide	mg/l	0.05	0.05	0.05	---	---
17	Arsenic	mg/l	0.05	0.2	0.2	---	---
18	Cadmium	mg/l	0.01	---	0.01	---	---

S.No	Parameters	Unit	A	B	C	D	E
19	Chromium, Total	mg/l	0.05	0.05	0.05	---	---
20	Copper	mg/l	1.5	---	1.5	---	---
21	Iron	mg/l	0.3	---	50	---	---
22	Lead	mg/l	0.1	---	0.1	---	---
23	Zinc	mg/l	15	---	15	---	---
24	Manganese	mg/l	0.5	---	---	---	---
25	Selenium	mg/l	0.01	---	0.05	---	---
26	Mercury	mg/l	0.001	---	---	---	---
27	Dissolved Oxygen	mg/l	6	5	4	4	---
28	COD	mg/l	---	---	---	---	---
29	BOD	mg/l	2	3	3	---	---

Class A – Drinking water without conventional treatment but after disinfection.

Class B –Water for outdoor bathing.

Class C – Drinking water with conventional treatment followed by disinfection.

Class D – Water for fish culture and wild life propagation.

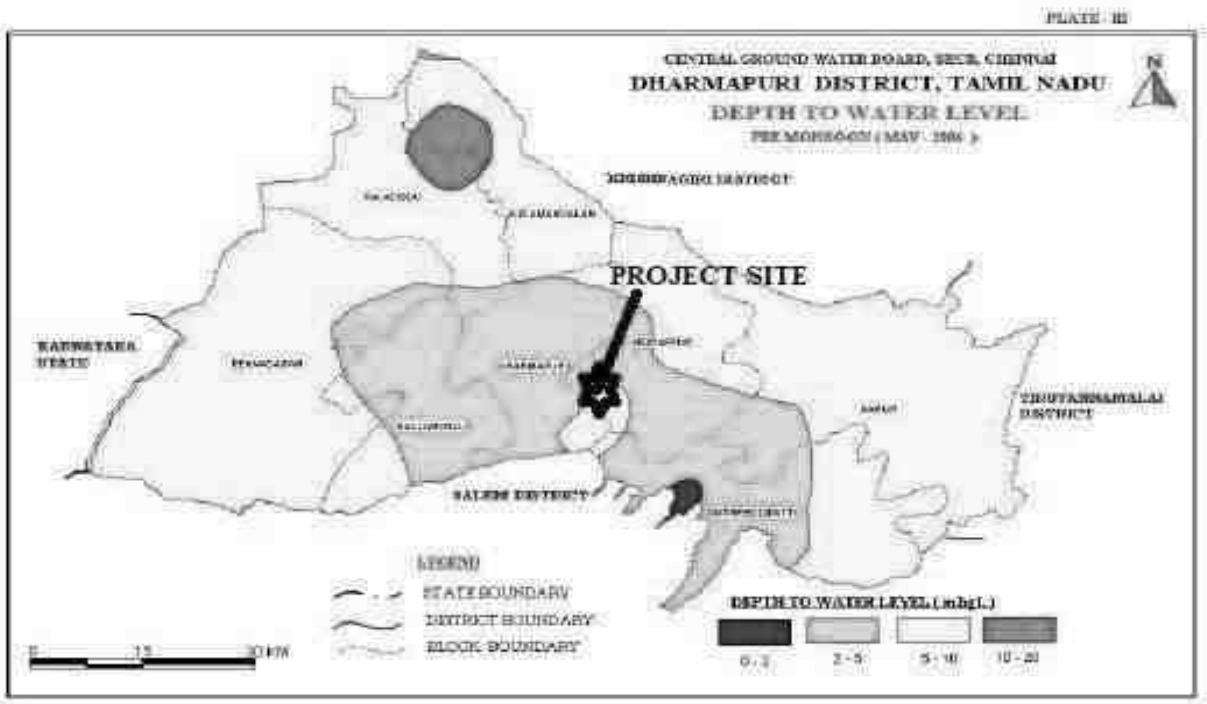
Class E – Water for irrigation, industrial cooling and controlled waste disposal

3.8.3 Groundwater resources

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^3/day in weathered crystalline rocks and 20 to 200 m^3/day in Recent alluvial formations along major drainage courses.

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")



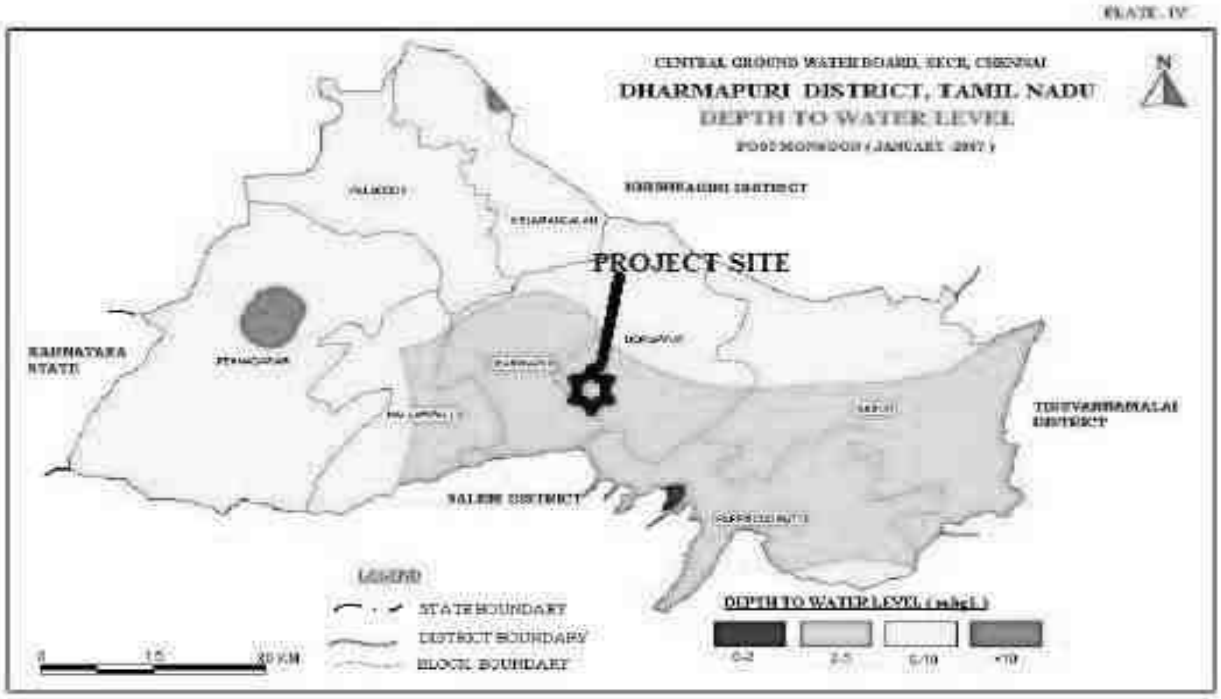


Figure 3-22 Depth to water level during Pre-Monsoon & Post Monsoon in Dharmapuri District

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

The chemical characteristics of ground water in the phreatic zone in Dharmapuri district has been studied using the analytical data of ground water samples collected from Network Hydrograph Stations of Central Ground Water Board. The study of quality of ground water in deeper aquifers in the district has been attempted using the data collected from exploratory bore\ tube wells constructed in the district.

Ground water in phreatic aquifers in Dharmapuri district in general, is colourless, odourless and slightly alkaline in nature. The specific electrical conductance of ground water in phreatic zone (in MicroSeimens at 25ºC) during May 2006 was in the range of 320 to 6010 in the district. It is between 750 and 2250 µS/cm at 25ºC in the major part of the district. Conductance below 750 µS/cm have been observed in ground water in only one sample is Dharmapuri block Whereas Conductance exceeding 2250µS/cm have been observed in parts of Papireddipatti, Pennagaram and Morappur block.

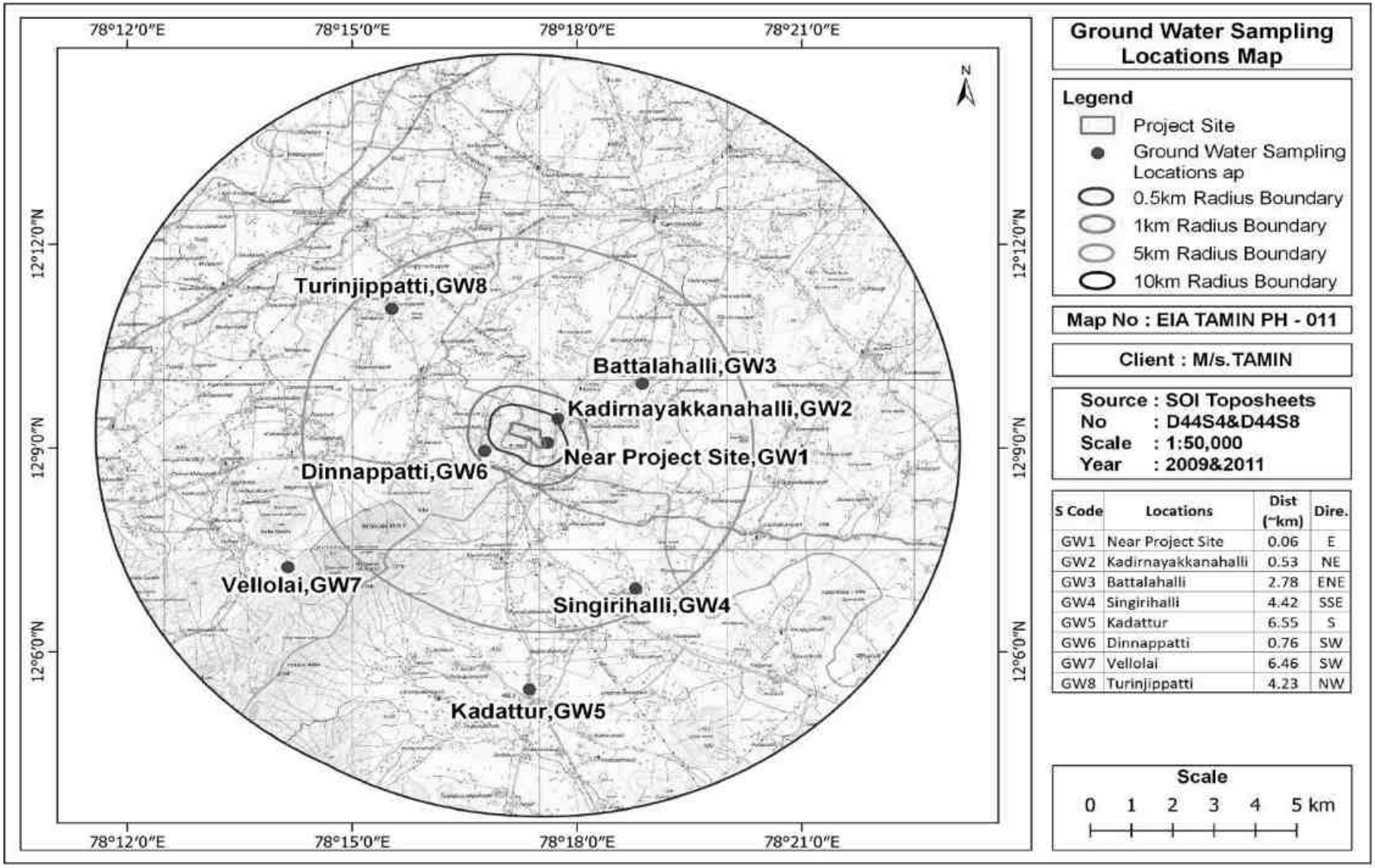
It is observed that the ground water is suitable for drinking and domestic uses in respect of all the constituents except total hardness and Nitrate in more than 90percent of samples analysed. Total Hardness as $CaCO_3$ is observed in all samples have with in the excess of permissible limits in about 40 percent of samples analysed whereas Nitrate is found in excess of 45 mg/l in about 32 percent samples. The incidence of high total hardness is attributed to the composition of litho units constituting the aquifers in the district, whereas the Nitrate pollution is most likely due to the use of pesticides and fertilizers for agriculture.

With regard to irrigation suitability based on specific electrical conductance and Sodium Adsorption Ratio (SAR), it is observed that ground water in the phreatic zone may cause high to very high salinity hazard and medium to high alkali hazard when used for irrigation. Proper soil management strategies are to be adopted in the major part of the district while suing ground water for irrigation.

Map showing the groundwater monitoring locations are given in **Figure 3-23**.

Table 3-14 Details of Groundwater Quality Monitoring Locations

S.No	Location	Location Code	Distance in Km	Direction
1	Near Project site	GW1	0.06	E
2	Kadirnayakkanahalli	GW2	0.53	NE
3	Battalahalli	GW3	2.78	ENE
4	Singiirihalli	GW4	4.42	SSE
5	Kadattur	GW5	6.55	S
6	Dinnappatti	GW6	0.76	SW
7	Vellolai	GW7	6.46	SW
8	Turinjippatti	GW8	4.23	NW



S Code	Locations	Dist (~km)	Dire.
GW1	Near Project Site	0.06	E
GW2	Kadirnayakkanahalli	0.53	NE
GW3	Battalahalli	2.78	ENE
GW4	Singirihalli	4.42	SSE
GW5	Kadattur	6.55	S
GW6	Dinnappatti	0.76	SW
GW7	Vellolai	6.46	SW
GW8	Turinjippatti	4.23	NW

Figure 3-23 Map showing the groundwater monitoring locations

Table 3-15 Physico chemical analysis of Ground water samples from study area

SL NO	Parameters	Unit	Drinking water Standard (IS 10500: 2012)		Near Project site	Kadirnayakkanahalli	Battalahalli	Singiirihalli	Kadattur	Dinnappatti	Vellolai	Turinjippatti
			Permissible Limit	Acceptable Limit	GW1	GW2	GW3	GW4	GW5	GW6	GW7	GW8
1	Colour	Hazen	**15**	**5**	BDQ (LOQ 1.0)	BDQ (LOQ 1.0)	BDQ (LOQ 1.0)	BDQ (LOQ 1.0)	BDQ (LOQ 1.0)	BDQ (LOQ 1.0)	BDQ (LOQ 1.0)	BDQ (LOQ 1.0)
2	Turbidity	NTU	**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)
3	pH	-	**NR**	**6.5-8.5**	7.52	7.12	7.62	7.85	7.32	7.74	7.52	7.35
4	Electrical Conductivity	µS/cm	**-**	**-**	1821	1938	2018	2255	2305	1719	1762	1822
5	Total Dissolve Solids	mg/l	**2000**	**500**	958	1020	1062	1187	1213	905	927	959
6	Total Suspended Solids		**-**	**-**	BLQ(LOQ 1)	BLQ(LOQ 1)	BLQ(LOQ 1)	BLQ(LOQ 1)	BLQ(LOQ 1)	BLQ(LOQ 1)	BLQ(LOQ 1)	BLQ(LOQ 1)
7	Total Alkalinity as $CaCO_3$	mg/l	**600**	**200**	138	159	117	115	92	98	107	148
8	Total Hardness as $CaCO_3$	mg/l	**600**	**200**	298	322	301	324	304	272	261	301
9	Sodium as Na	mg/l	**-**	**-**	217	229	251	285	299	211	217	215
10	Potassium as K	mg/l	**-**	**-**	25.34	26.74	29.26	33.25	34.86	24.64	25.34	25.13
11	Calcium as Ca	mg/l	**200**	**75**	69.27	74.85	69.97	75.32	70.67	63.23	60.67	69.97
12	Magnesium as Mg	mg/l	**100**	**30**	30.4	32.9	30.7	33.1	31.0	27.8	26.6	30.7
13	Chloride	mg/l	**1000**	**250**	362	382	418	475	498	352	362	359
14	Sulphate SO_4	mg/l	**400**	**200**	142.83	150.72	164.92	187.41	196.49	138.88	142.83	141.65
15	Nitrate as NO_3	mg/l	**NR**	**45**	0.45	0.32	0.46	0.51	0.33	0.47	0.67	0.41
16	Phosphate as PO_4	mg/l	**-**	**-**	0.28	0.37	0.32	0.24	0.31	0.43	0.43	0.42
17	Fluorides as F	mg/l	**1.5**	**1**	0.32	0.41	0.52	0.63	0.51	0.58	0.64	0.44
18	Cyanide	mg/l	**NR**	**0.05**	BLQ(LOQ:	BLQ(LOQ:	BLQ(LOQ:	BLQ(LOQ:	BLQ(LOQ:	BLQ(LOQ:	BLQ(LOQ	BLQ(LOQ

SL NO	Parameters	Unit	Drinking water Standard (IS 10500: 2012)		Near Project site	Kadirnayakkanahalli	Battalahalli	Singiirihalli	Kadattur	Dinnappatti	Vellolai	Turinjippatti
			Permissible Limit	Acceptable Limit	GW1	GW2	GW3	GW4	GW5	GW6	GW7	GW8
					0.01)	0.01)	0.01)	0.01)	0.01)	0.01)	: 0.01)	: 0.01)
19	Arsenic as As	mg/l	**0.05**	**0.01**	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)
20	Boron as B	mg/l	**1.0**	**0.5**	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)
21	Cadmium as Cd	mg/l	**NR**	**0.003**	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)
22	Chromium as Cr	mg/l	**NR**	**0.05**	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)
23	Copper as Cu	mg/l	**1.5**	**0.05**	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	Total Iron	mg/l	**NR**	**0.3**	0.21	0.25	0.18	0.17	0.18	0.19	0.22	0.27
25	Lead as Pb	mg/l	**NR**	**0.01**	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)
26	Manganese as Mn	mg/l	**0.3**	**0.1**	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)
27	Mercury	mg/l	**NR**	**0.001**	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)
28	Nickel as Ni	mg/l	**NR**	**0.02**	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	Selenium as Se	mg/l	**NR**	**0.01**	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)
30	Zinc as Zn	mg/l	**15**	**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)
31	Chemical Oxygen Demand as O2	mg/l	**-**	**5**	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)

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:

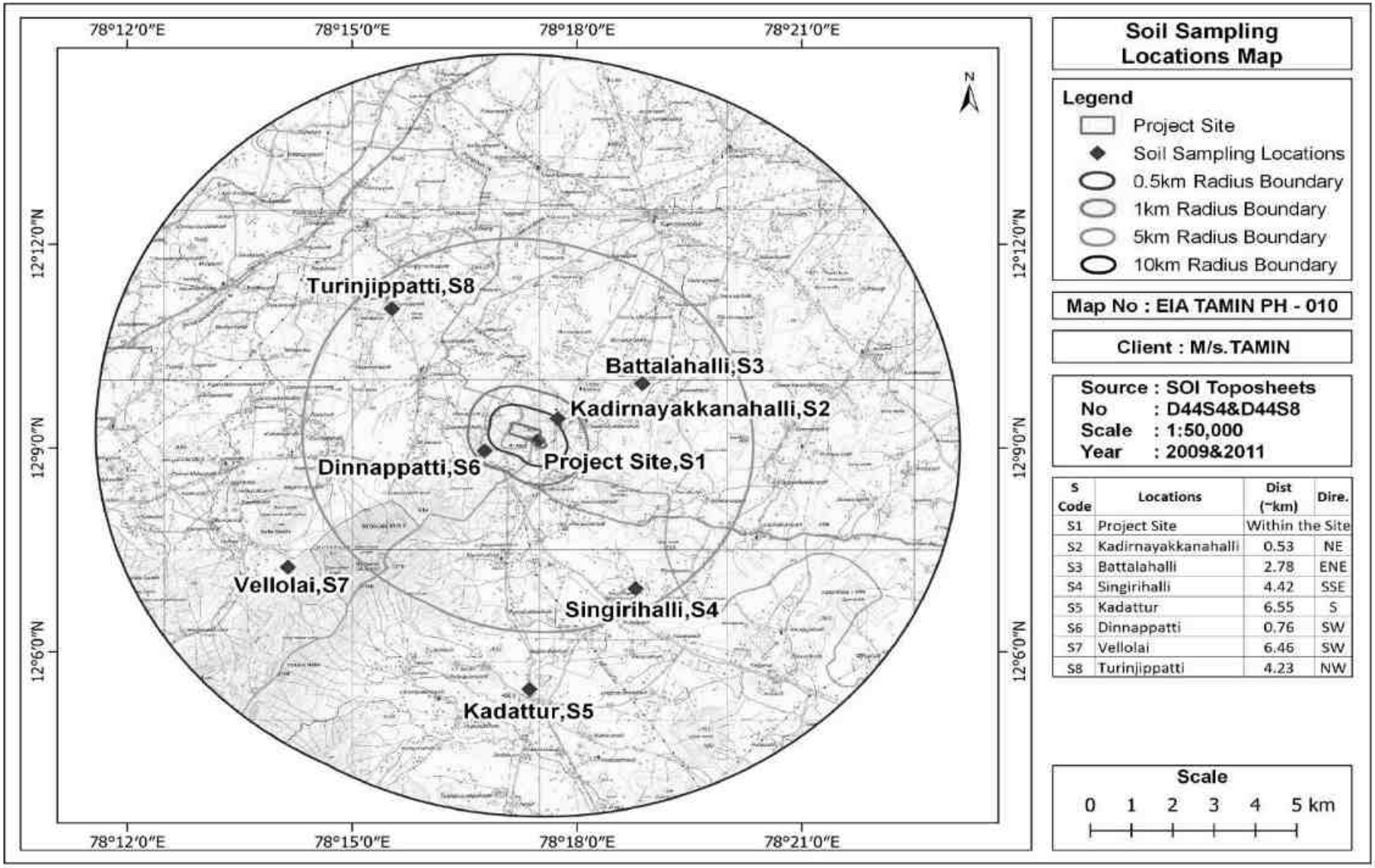
- The pH The ground water results of the study area indicate that the pH range varies between **7.12 and 7.85.** It is observed that the pH range is within the permissible limit of IS 10500:2012.
- The Total Dissolved Solids range of the collected ground water sample is varied between 905 mg/l – 1213 mg/l. All the samples are within the permissible limit of IS 10500: 2012.
- The acceptable limit of the chloride content is 250 mg/l and permissible limit is 1000 mg/l. The chloride content in the collected ground water samples in the study area ranges between 352 mg/l – 498 mg/l. It is observed that all the samples are within the acceptable limit of IS 10500:2012.
- The acceptable limit of the sulphate content is 200 mg/l and permissible limit is 400mg/l. the sulphate content in the collected ground water samples in the study area is varied between 139 mg/l – 196 mg/l. It is observed that all the samples are meeting the acceptable limit of the IS 10500: 2012.
- The Total hardness ranges is between 261 mg/l – 324 mg/l for ground water samples. It is observed that all the samples are within the permissible limit of the IS 10500: 2012.

3.9 Soil Quality

Soil quality monitoring locations & results are given in **Table 3-17** &**Table 3-18.** Map showing the soil monitoring locations are given in **Figure 3-24.**

Table 3-16 Soil Quality Monitoring Locations

S.No	Location	Location Code	Distance in Km	Direction
1	Project site	S1	Within the Site	
2	Kadirnayakkanahalli	S2	0.53	NE
3	Battalahalli	S3	2.78	ENE
4	Singiirihalli	S4	4.42	SSE
5	Kadattur	S5	6.55	S
6	Dinnappatti	S6	0.76	SW
7	Vellolai	S7	6.46	SW
8	Turinjippatti	S8	4.23	NW



S Code	Locations	Dist (~km)	Dire.
S1	Project Site	Within the Site	
S2	Kadirnayakkanahalli	0.53	NE
S3	Battalahalli	2.78	ENE
S4	Singirihalli	4.42	SSE
S5	Kadattur	6.55	S
S6	Dinnappatti	0.76	SW
S7	Vellolai	6.46	SW
S8	Turinjippatti	4.23	NW

Figure 3-24 Map showing the soil monitoring location

Table 3-17 Physico Chemical parameters of soil samples from the study area

S.No	Parameters	Units	Project site	Kadirnayakkanahalli	Battalahalli	Singiirihalli	Kadattur	Dinnappatti	Vellolai	Turinjippatti
			S1	S2	S3	S4	S5	S6	S7	S8
1.	**Soil Texture**	-	Clay loam	Silty clay	Silty clay	Clay	Clay	Silty clay loam	Silty clay loam	Clay loam
2.	**Sand**	%	32.80	12.80	13.40	16.80	17.40	18.70	19.70	23.80
3.	**Silt**	%	31.80	42.10	45.10	38.10	39.80	49.50	50.80	44.50
4.	**Clay**	%	35.40	45.10	41.50	45.10	42.80	31.80	29.50	31.70
5.	**pH**	-	7.68	7.52	8.14	8.32	8.25	7.78	7.91	8.24
6.	**Electrical conductivity**	µS/cm	358	562	497	568	658	478	496	472
7.	**Organic matter**	%	0.63	0.67	0.64	0.78	0.48	0.82	0.89	0.98
8.	**Nitrogen as N**	mg/kg	102.59	124.71	125.97	126.45	115.84	124.63	120.47	128.52
9.	**Potassium**	mg/kg	95.26	115.80	116.97	117.42	107.57	115.73	111.87	119.34
10.	**Phosphorus**	mg/kg	6.87	8.35	8.44	8.47	7.76	8.35	8.07	8.61
11.	**Boron as B**	mg/kg	0.25	0.30	0.31	0.31	0.28	0.30	0.29	0.31
12.	**Cadmium as Cd**	mg/kg	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)
13.	**Chromium as Cr**	mg/kg	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)
14.	**Copper as Cu**	mg/kg	0.37	0.45	0.45	0.45	0.41	0.45	0.43	0.46
15.	**Iron as Fe**	mg/kg	4.35	5.29	5.34	5.36	4.91	5.29	5.11	5.45
16.	**Manganese as Mn**	mg/kg	2.06	2.51	2.53	2.54	2.33	2.50	2.42	2.58
17.	**Zinc as Zn**	mg/kg	0.60	0.72	0.73	0.73	0.67	0.72	0.70	0.75
18.	**Porosity**	-	0.65	0.46	0.44	0.48	0.46	0.47	0.48	0.76
19.	**Water Holding Capacity**	%	18.40	20.50	18.50	19.60	19.50	21.60	20.40	18.20

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 7.52 to 8.32.
- Conductivity of the soil samples ranged from 358 to 658µmho/cm.
- Nitrogen content ranged from 102.59 mg/kg to 128.52 mg/kg.
- Phosphorous ranged from 6.87 mg/kg to 8.61 mg/kg.
- Potassium content ranges from 95.26 mg/kg to 119.34 mg/kg.

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 Flora

For secondary information based on a total 126 species under 48 family found in the study area. The detailed list of plant species found in each quadrat provided **Table 3-19.**

Table 3-18 Flora/Vegetation in the Study Area

Sl.No.	Species	Family	Common Name	Habit	IUCN
1	*Abrus precatorius*	Fabaceae	Kundumani	Shrub	NA
2	*Abutilon indicum*	Malvaceae	Perun thuthi	Shrub	NA
3	*Acacia nilotica*	Mimosaceae	Karuvelam	Tree	LC
4	*Acacia planifrons*	Mimosaceae	Kodaivelam	Tree	NA
5	*Acalypha indica*	Euphorbiaceae	Kuppaimeni	Herb	NA
6	*Acanthospermum hispidum*	Compositae	--	Herb	NA
7	*Achyranthes aspera*	Amaranthaceae	Nayurivi	Herb	NA
8	*Aegle marmelos*	Rutaceae	Vilvam	Tree	NA
9	*Aerva lanata*	Amaranthaceae	Sirupeelai	Shrub	NA
10	*Aerva persica*	Amaranthaceae	Perumpeelai	Shrub	NA
11	*Aeschynomene americana*	Fabaceae	--	Herb	NA
12	*Aeschynomene aspera*	Fabaceae	Thakkai	Shrub	NA
13	*Ageratum conyzoides*	Compositae	Poom pillu	Herb	NA
14	*Alloteropsis cimicina*	Poaceae	--	Grass	NA
15	*Alternanthera sessilis*	Amaranthaceae	Ponnanganni	Herb	NA
16	*Anisomeles indica*	Labiatae	--	Herb	NA
17	*Annona squamosa*	Annonaceae	Seetha	Tree	NA
18	*Arachis hypogaea*	Fabaceae	Verkadalai	Herb	NA
19	*Argemone mexicana*	Papaveraceae	Braman Thandu	Herb	NA
20	*Aristida adscensionis*	Poaceae	--	Grass	NA
21	*Aristida hystrix*	Poaceae	--	Grass	NA
22	*Aristolochia bracteolata*	Aristolochiaceae	Aduthinnappalai	Herb	NA
23	*Barleria acuminata*	Acanthaceae	Vellai kurinji	Shrub	NA
24	*Barleria longiflora*	Acanthaceae	--	Shrub	NA
25	*Barleria noctiflora*	Acanthaceae	Barleria	Shrub	NA
26	*Boerhavia diffusa*	Nyctaginaceae	Mookarattai	Herb	NA
27	*Boerhavia erecta*	Nyctaginaceae	Seemai mookarattai	Herb	NA
28	*Carica papaya*	Caricaceae	Pappali	Tree	NA
29	*Carissa carandas*	Apocynaceae	Kalaa, Perun kala	Shrub	NA

30	*Cassia fistula*	Caesalpiniaceae	Kondrai	Tree	NA
31	*Celosia argentea*	Amaranthaceae	Pannai keerai	Herb	NA
32	*Cissus quadrangularis*	Vitaceae	Pirandai	Shrub	NA
33	*Citrullus colocynthis*	Cucurbitaceae	Peikkumatti	Herb	NA
34	*Citrus aurantifolia*	Rutaceae	Elumichai	Tree	NA
35	*Cleome viscosa*	Capparidaceae	Nai kadugu	Herb	NA
36	*Coccinia grandis*	Cucurbitaceae	Kovai	Climber	NA
37	*Croton bonplandianum*	Euphorbiaceae	Rail poondu	Herb	NA
38	*Cucumis sativus*	Cucurbitaceae	Vellarikkaai	Climber	NA
39	*Cyperus bulbosus*	Cyperaceae	—	Sedge	NA
40	*Eclipta prostrata*	Compositae	Karisaalai	Herb	NA
41	*Eleocharis acutangula*	Cyperaceae		Sedge	NA
42	*Eragrostis tenella*	Poaceae		Grass	NA
43	*Euphorbia antiquorum*	Euphorbiaceae	Sadura-kalli	Tree	NA
44	*Euphorbia hirta*	Euphorbiaceae	Ammanpacharisi	Herb	NA
45	*Euphorbia indica*	Euphorbiaceae	Ammanpacharisi	Herb	NA
46	*Evolvulus alsinoides*	Convolvulaceae	Vishnukarandi	Herb	NA
47	*Ficus benghalensis*	Moraceae	Aala maram	Tree	NA
48	*Ficus religiosa*	Moraceae	Arasu	Tree	NA
49	*Fimbristylis ovata*	Cyperaceae		Sedge	NA
50	*Glinus lotoides*	Molluginaceae	Siruseruppadai	Herb	NA
51	*Gynandropsis gynandra*	Capparidaceae	Nal vaelai, Vaelai	Herb	NA
52	*Hedyotis aspera*	Rubiaceae		Herb	NA
53	*Heliotropium indicum*	Boraginaceae	Thael kodukku	Herb	NA
54	*Hibiscus surattensis*	Malvaceae		Undershrub	NA
55	*Hybanthus enneaspermus*	Violaceae	Orilai thamarai	Herb	NA
56	*Hygrophila schulli*	Acanthaceae	Neermulli	Herb	NA
57	*Hyptis suaveolens*	Labiatae		Shrub	NA
58	*Indigofera aspalathoides*	Fabaceae	Sivanaar vaembu	Herb	NA
59	*Indigofera linnaei*	Fabaceae		Herb	NA
60	*Indigofera tinctoria*	Fabaceae	Avuri, Neeli	Herb	NA
61	*Ipomoea pes-caprae*	Convolvulaceae	Kudhirai Kulambu	Creeper	NA
62	*Jasminum sambac*	Oleaceae	Peru malli	Climbing Shrub	NA
63	*Jatropha curcas*	Euphorbiaceae	Kaatu-amanakku	Shrub	NA
64	*Jatropha gossypifolia*	Euphorbiaceae	Kaatu-amanakku	Shrub	NA
65	*Justicia adhatoda*	Acanthaceae	Adathodai	Shrub	NA
66	*Justicia simplex*	Acanthaceae		Herb	NA
67	*Kylinga bulbosa*	Cyperaceae		Sedge	NA
68	*Lagenaria siceraria*	Cucurbitaceae	Surakkaai	Climber	NA
69	*Lantana camara*	Verbenaceae	Unnichedi	Shrub	NA
70	*Leucaena leucocephala*	Mimosaceae	Soundil	Tree	NA
71	*Leucas aspera*	Labiatae	Thumbai	Herb	NA
72	*Ludwigia perennis*	Onagraceae		Herb	NA
73	*Martynia annua*	Martyniaceae	Thael Kodukku	Herb	NA
74	*Melia azedarach*	Meliaceae	Malai vaembu	Tree	NA

75	*Merremia hederacea*	Convolvulaceae		Herb	NA
76	*Nyctanthes arbor-tristis*	Nyctanthaceae	Parijaatham	Tree	NA
77	*Ocimum americanum*	Labiatae	Ganjaankorai	Herb	NA
78	*Pavonia odorata*	Malvaceae	Peramutti	Herb	NA
79	*Pedalium murex*	Pedaliaceae	Perunerunji	Herb	NA
80	*Phyllanthus acidus*	Euphorbiaceae	Aranelli	Tree	NA
81	*Phyllanthus amarus*	Euphorbiaceae	Kizha-nelli	Herb	NA
82	*Phyllanthus emblica*	Euphorbiaceae	Muzhu nelli	Tree	NA
83	*Phyllanthus reticulatus*	Euphorbiaceae	Inki pazham	Shrub	NA
84	*Pithecellobium dulce*	Mimosaceae	Kodukkaai puli	Tree	NA
85	*Plumbago zeylanica*	Plumbaginaceae	Chitthiragam	Herb	NA
86	*Polygala javana*	Polygalaceae		Shrub	NA
87	*Pongamia pinnata*	Fabaceae	Punga maram	Tree	NA
88	*Portulaca oleracea*	Portulacaceae	Kari keerai	Herb	NA
89	*Prosopis juliflora*	Mimosaceae	Velikkaathaan	Tree	NA
90	*Psidium guajava*	Myrtaceae	Koyya	Tree	NA
91	*Punica granatum*	Punicaceae	Madhulai	Shrub	NA
92	*Rhynchosia viscosa*	Fabaceae		Climber	NA
93	*Ricinus communis*	Euphorbiaceae	Amanakku	Shrub	NA
94	*Rivea hypocrateriformis*	Convolvulaceae	Boodhikeerai	Climber	NA
95	*Ruellia tuberosa*	Acanthaceae		Herb	NA
96	*Sansevieria roxburghiana*	Dracaenaceae	Mottamamji	Herb	NA
97	*Senna auriculata*	Caesalpiniaceae	Avaram	Shrub	NA
98	*Senna occidentalis*	Caesalpiniaceae	Peiyavarai	Tree	NA
99	*Sesamum indicum*	Pedaliaceae	Ellu	Herb	NA
100	*Sida acuta*	Malvaceae	Malai thangi	Herb	NA
101	*Sida cordata*	Malvaceae	Pazhampaasi	Herb	NA
102	*Sida cordifolia*	Malvaceae	Nilatutthi	Herb	NA
103	*Solanum americanum*	Solanaceae	Manatakkali	Herb	NA
104	*Solanum melongena*	Solanaceae	Kathiri	Herb	NA
105	*Solanum torvum*	Solanaceae	Chundai	Shrub	NA
106	*Solanum trilobatum*	Solanaceae	Thoodhuvalai	Climber	NA
107	*Solanum virginianum*	Solanaceae	Kandankathiri	Herb	NA
108	*Spermacoce hispida*	Rubiaceae	Nathaichoori	Herb	NA
109	*Spermacoce ocymoides*	Rubiaceae	Button Weed	Herb	NA
110	*Tamarindus indica*	Caesalpiniaceae	Puliya maram	Tree	NA
111	*Tectona grandis*	Verbenaceae	Thekku	Tree	NA
112	*Tephrosia purpurea*	Fabaceae	Kozhinji	Undershrub	NA
113	*Terminalia catappa*	Combretaceae	Badam	Tree	NA
114	*Thespesia populnea*	Malvaceae	Poovarasu	Tree	NA
115	*Thevetia peruviana*	Apocynaceae	Thangaarali	Shrub	NA
116	*Tinospora cordifolia*	Menispermaceae	Seenthilkodi	Climber	NA
117	*Toddalia asiatica*	Rutaceae	Mizhakaranai	Shrub	NA
118	*Trachys muricata*	Poaceae	Vennai thiratti pul	Grass	NA
119	*Tridax procumbens*	Asteraceae	Vettukayapoonduthala	Herb	NA

			i		
120	*Tribulus lanuginosis*	Zygophyllaceae	Nerungi	Herb	NA
121	*Tylophora indica*	Asclepiadaceae	Naippalai	Climber	NA
122	*Vernonia cinerea*	Asteraceae	Mookuthipoodu	Herb	NA
123	*Vitex negundo*	Verbenaceae	Nochi	Tree	NA
124	*Waltheria indica*	Sterculiaceae	Chempoodu	Herb	NA
125	*Wrightia tinctoria*	Apocynaceae	Vetpaalai	Tree	NA
126	*Ziziphus mauritiana*	Rhamnaceae	Illandhai	Tree	NA

3.10.3 Fauna

Secondary information for Fauna diversity were collected to cross check with relevant literatures (Smith 1933-43, Ali and Ripley 1983, Daniel 1983, Prater 1993, Murthy and Chandrasekhar 1988).

3.10.4 Mammals

Based on secondary information in the study area the list of mammals are listed in the below **Table 3-20.**

Table 3-19 List of Mammals

S.No	Species name	Common name	IUCN Conservation Status	WPA Schedule
1	Mus musculus	Common Mouse	Not assessed	IV
2	Funambulus pennanti	Palm -Squirrel	Not assessed	II
3	Mus rattus	Indian rat	Not assessed	IV
4	Lepus nigricollis	Indian Hare	Least Concern	II
5	Rattus norvegicus	Brown Rat	Least Concern	IV
6	Felis catus	Cat	Not assessed	II

3.10.5 Reptiles & Amphibians

Based on secondary information in the study area the list of Reptiles and amphibian species were listed in the below **Table 3-21.**

Table 3-20 Reptiles & Amphibians

S.No	Species name	Common name	IUCN Conservation Status	WPA Schedule
1	*Eutropis macularia*	Common skink	Not assessed	IV
2	*Plyas mucosus*	Rat Snake	Not assessed	I
3	*Rana tigrina*	Common yellow frog	Least Concern	IV
4	*Calotes versicolor*	Common Garden Lizard	Not assessed	IV
5	*Hemidactylus sp.*	House lizard	Not assessed	IV
6	*Ophisops leschenaultiix*	Snake-eyed lizard	Not assessed	IV
7	*Rana hexadactyla*	Frog	Least Concern	IV

3.10.6 Butterfly Species

Butterfly can also serve as useful indicators of habitat biodiversity. They are responsible for a large part of the complex interconnections that characterize natural ecosystems. The butterfly communities that are present in forests help to maintain crucial ecological processes and preserve biodiversity as a

whole. They participate in most of the ecological processes that sustain ecosystems. A totally 26 species belonging to five families of butterflies recorded. The Nymphalidae were more dominant family followed by Lycaenidae, Pieridae, Papilionidae and Hesperiidae.

Table 3-21 Occurrence of butterfly species in buffer zone

S.No	Family	Species name	Common name	Status	WPA 72 Shedule
1	Nymphalidae	Danaus chrysippus	Plain Tiger	LC	Sch-IV
2	Nymphalidae	Danaus genutia	Striped Tiger	LC	Sch-IV
3	Nymphalidae	Ariadne merione	Common Caster	LC	Sch-IV
4	Nymphalidae	Neptis hylas	Common Sailor	LC	Sch-IV
5	Nymphalidae	Phalanta phalantha	Common Leopard	LC	Sch-IV
6	Nymphalidae	Melanitis leda	Common Evening Brown	LC	Sch-IV
7	Nymphalidae	Mycalesis perseus	Common Bush Brown	LC	Sch-IV
8	Nymphalidae	Ypthima asterope	Common Three Ring	LC	Sch-IV
9	Nymphalidae	Euthala nais	Baronet	LC	Sch-IV
10	Nymphalidae	Argynnis hyperbius	Indian Fritillary	LC	Sch-IV
11	Nymphalidae	Byblia ilithya	Joker	LC	Sch-IV
12	Pieridae	Colotis danae	Crimson Tip	LC	Sch-IV
13	Pieridae	Colotis etrida	Small Orange Tip	LC	Sch-IV
14	Pieridae	Eurema hecabe	Common Grass Yellow	LC	Sch-IV
15	Pieridae	Catopsillia pomona	Common Emigrant	LC	Sch-IV
16	Pieridae	Cepora nerissa	Common Gull	LC	Sch-IV
17	Pieridae	Leptosia nina	Psyche	LC	Sch-IV
18	Lycaenidae	Castalius rosimon	Common Pierrot	LC	Sch-IV
19	Lycaenidae	Arhopala centaurus	Large Obakblue	LC	Sch-IV
20	Lycaenidae	Euchrysops cnejus	Gram Blue	LC	Sch-IV
21	Lycaenidae	Jamides celeno	Common Cerulin	LC	Sch-IV
22	Lycaenidae	Freyeria trochylus	Grass Jewel	LC	Sch-IV
23	Papilionidae	Papilio polytes	Common Mormon	LC	Sch-IV
24	Papilionidae	Papilio demoleus	Lime Butterflies	LC	Sch-IV
25	Papilionidae	Atrophaneura aristolochiae	Common Rose	LC	Sch-IV
26	Hesperiidae	Borbo cinnara	Rice Swift	LC	Sch-IV

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

3.10.7 Terrestrial Birds

A list of terrestrail birds that were spotted and those that were recorded from the study area is given in **Table 3-23.**

Table 3-22 List of Terrestrial Birds

S.No	Scientific name	Common name	Family	IUCN /

				WPA
1.	*Acridotheres fuscus*	Jungle Myna	Sturnidae	LC / IV
2.	*Acridotheres tristis*	Common Myna	Sturnidae	LC / IV
3.	*Acritillas indica*	Yellowbrowed Bulbul	Pycnonotidae	LC / IV
4.	*Anthus trivialis*	Tree Pipit	Motacillidae	LC / IV
5.	*Apus affinis*	Little Swift	Apodidae	LC / IV
6.	*Athene brama*	Spotted owlet	Strigidae	LC / IV
7.	*Butastur teesa*	White-eyed Buzzard	Accipitridae	LC /IV
8.	*Cacomantis passerinus*	Greybellied Cuckoo	Cuculidae	LC / IV
9.	*Chloropsis jerdoni*	Jerdon's Leafbird	Chloropseida	LC / IV
10.	*Chrysocolaptes lucidus*	Greater Flameback	Picidae	LC / IV
11.	*Chrysomma sinense*	Yelloweyed Babbler	Timaliidae	LC / IV
12.	*Cinnyris asiaticus*	Purple Sunbird	Nectariniidae	LC / IV
13.	*Coracias benghalensis*	Indian Roller	Coraciidae	LC / IV
14.	*Coracina macei*	Large Cuckoo shrike	Campephagidae	LC / IV
15.	*Coracina melanoptera*	Blackheaded Cuckooshrike	Campephagidae	LC / IV
16.	*Corvus culminatus*	Indian Jungle Crow	Corvidae	LC / IV
17.	*Corvus splendens*	House Crow	Corvidae	LC /V
18.	*Cuculus micropterus*	Indian Cuckoo	Cuculidae	LC / IV
19.	*Cyornis tickelliae*	Tickell's Blue Flycatcher	Muscicapidae	LC / IV
20.	*Cypsiurus balasiensis*	Asian Palm Swift	Apodidae	LC / IV
21.	*Dendrocitta vagabunda*	Rufous Treepie	Corvidae	LC / IV
22.	*Dendrocopos mahrattensis*	YellowcrownedWoodpecker	Picidae	LC / IV
23.	*Dendrocopos nanus*	Browncapped Pygmy Woodpecker	Picidae	LC / IV
24.	*Dicrurus macrocercus*	Black Drongo	Cuculidae	LC / IV
25.	*Elanus caeruleus*	Blackwinged Kite	Accipitridae	LC /IV
26.	*Eudynamys scolopaceus*	Asian Koel	Cuculidae	LC / IV
27.	*Glaucidium radiatum*	*Jungle Owlet*	*Strigidae*	*LC / IV*
28.	*Haliastur indus*	*Brahminy Kite*	*Accipitridae*	*LC /IV*
29.	*Harpactes fasciatus*	*Malabar Trogon*	*Trogonidae*	*LC / IV*
30.	*Iduna aedon*	Thickbilled Warbler	Sylviidae	LC / IV
31.	*Irena puella*	Asian Fairybluebird	Irenidae	LC / IV
32.	*Lanius cristatus*	Brown Shrike	Laniidae	LC / IV
33.	*Lonchura malacca*	Tricoloured Munia	Estrildidae	LC / IV
34.	*Lonchura punctulata*	Scaly breasted Munia	Estrildidae	LC / IV
35.	*Lonchura striata*	Whiterumped Munia	Estrildidae	LC / IV
36.	*Loriculus vernalis*	Vernal Hanging Parrot	Psittacidae	LC / IV
37.	*Luscinia svecica*	Blue throat	Muscicapidae	LC / IV
38.	*Megalaima haemacephala*	Coppersmith Barbet	Megalaimidae	LC / IV
39.	*Megalaima malabarica*	Malabar Barbet	Megalaimidae	LC / IV
40.	*Megalaima viridis*	Whitecheeked Barbet	Megalaimidae	LC / IV
41.	*Megalaima zeylanica*	Brownheaded Barbet	Megalaimidae	LC / IV
42.	*Merops orientalis*	Green Bee-eater	Meropidae	LC / IV
43.	*Merops philippinus*	Bluetailed Bee-eater	Meropidae	LC / IV
44.	*Milvus migrans*	Black Kite	Accipitridae	LC /IV

45.	*Motacilla cinerea*	Grey Wagtail	Muscicapidae	LC / IV
46.	*Muscicapa dauurica*	Asian Brown Flycatcher	Muscicapidae	LC / IV
47.	*Myophonus horsfieldii*	Malabar Whistling Thrush	Turdidae	LC / IV
48.	*Nisaetus cirrhatus*	Crested Hawk Eagle	Accipitridae	LC /IV
49.	*Nyctyornis athertoni*	Bluebearded Bee-eater	Meropidae	LC / IV
50.	*Orthotomus sutorius*	Common Tailorbird	Sylviidae	LC / IV
51.	*Parus aplonotus*	Indian Yellow Tit	Paridae	LC / IV
52.	*Passer domesticus*	House Sparrow	Passeridae	LC / IV
53.	*Pavo cristatus*	Indian Peafowl	Phasianidae	LC / I
54.	*Pellorneum ruficeps*	Puffthroated Babbler	Timaliidae	LC / IV
55.	*Phylloscopus trochiloides*	Greenish Warbler	Sylviidae	LC / IV
56.	*Picumnus innominatus*	Speckled Piculet	Picidae	LC / IV
57.	*Pitta brachyura*	Indian Pitta	Pittidae	LC / IV
58.	*Ploceus manyar*	Streaked Weaver	Ploceidae	LC / IV
59.	*Ploceus philippinus*	Baya Weaver	Ploceidae	LC / IV
60.	*Pomatorhinus horsfieldii*	Indian ScimitarBabbler	Timaliidae	LC / IV
61.	*Prinia hodgsonii*	Greybreasted Prinia	Cisticolidae	LC / IV
62.	*Prinia inornata*	Plain Prinia	Cisticolidae	LC / IV
63.	*Prinia socialis*	Ashy Prinia	Cisticolidae	LC / IV
64.	*Psittacula columboides*	Bluewinged Parakeet	Psittacidae	LC / IV
65.	*Psittacula cyanocephala*	Plumheaded Parakeet	Psittacidae	LC / IV
66.	*Psittacula krameri*	Roseringed Parakeet	Psittacidae	LC / IV
67.	*Ptyonoprogne concolor*	Dusky CragMartin	Hirundinidae	LC / IV
68.	*Pycnonotus cafer*	Redvented Bulbul	Pycnonotidae	LC / IV
69.	*Pycnonotus gularis*	Flame-throated Bulbul	Pycnonotidae	LC / IV
70.	*Pycnonotus jocosus*	Redwhiskered Bulbul	Pycnonotidae	LC / IV
71.	*Pycnonotus luteolus*	Whitebrowed Bulbul	Pycnonotidae	LC / IV
72.	*Rhipidura albogularis*	Whitespotted Fantail	Rhipiduridae	LC / IV
73.	*Rhopocichla atriceps*	Darkfronted Babbler	Timaliidae	LC / IV
74.	*Saxicola caprata*	Pied Bushchat	Muscicapidae	LC / IV
75.	*Saxicoloides fulicatus*	Indian Robin	Muscicapidae	LC / IV
76.	*Sitta frontalis*	Velvet fronted Nuthatch	Sittidae	LC / IV
77.	*Spilopelia chinensis*	Spotted Dove	Columbidae	LC / IV
78.	*Streptopelia decaocto*	Eurasian CollaredDove	Columbidae	LC / IV
79.	*Streptopelia orientalis*	Oriental Turtle Dove	Columbidae	LC / IV
80.	*Tephrodornis gularis*	Large Woodshrike	Tephrodornithidae	LC / IV
81.	*Tephrodornis pondicerianus*	Common Woodshrike	Tephrodornithidae	LC / IV
82.	*Tephrodornis sylvicola*	Malabar Woodshrike	Tephrodornithidae	LC / IV
83.	*Terpsiphone paradisi*	Asian ParadiseFlycatcher	Monarchidae	LC / IV
84.	*Treron bicinctus*	Orange breasted Green pigeon	Columbidae	LC / IV
85.	*Turdoides striata*	Jungle Babbler	Timaliidae	LC / IV
86.	*Turdus simillimus*	Indian Blackbird	Turdidae	LC / IV
87.	*Turnix suscitator*	Barred Buttonquail	Turnicidae	LC / IV
88.	*Turnix tanki*	Yellowlegged Buttonquail	Turnicidae	LC / IV
89.	*Upupa epops*	Hoopoe	Upupidae	LC / IV

90.	*Zoothera citrina*	Orange headed Thrush	Turdidae	LC / IV

3.10.8 Conservation Plan for Indian Peafowl (Peacock)

An Indian Peafowl or Peacock *(Pavo cristatus)* is a large pheasant justifiably declared as the National Bird of India in 1963 due to its flagship value founded on its glorious position in mythology and its widespread distribution and grandeur. In India, it is given the utmost protection by inclusion in Schedule 1 of Indian Wildlife Act, 1972 (2002). Being a wide spread species, apart from the various urban habitats, it is also found in agriculture field, along stream with good vegetation and close to human habitation in semi – feral conditions. In the present study area this species have been confirmed from various habitats located near the village periphery.

3.10.9 Appearance

Male peacock has a spectacular glossy green long tail feathers that may be more than 60% of the total body length. These feathers have blue, golden green and copper colored eyes. The long tail feathers are used for mating rituals like courtship displays. The feathers are arched into a magnificent fan shaped from across the back of the bird and almost touching the found on both sides. Female do not have these graceful tail feathers. They have to fan like crest with whites face and throat, chestnut brown crown and hind neck, metallic green upper breast and mantle, white belly and brown back rump and tail. Their primaries are dark brown.

3.10.10 Study Approach

Since the buffer zone of the proposed Project site unit reported with Schedule 1 Species named as *Pavo cristatus* commonly known as peacock, a systematic study was conducted to assess their status in terms of movement and habitat use of the species. At first, a detailed biological survey of the core & buffer zone was carried out to understand the status distribution of the species in the study area. Also, questionnaire survey was carried out to understand the recent status of peacock sighting and their movements. The conclusion of the survey discussed the potential sighting & habitat use, and movement and food habitats of peacock in the study area.

3.10.11 Sighting and Habitat Use

From the core zone no any peacock was sighted. However, direct sighting of the peacock were located near the human dominated and associated surround habitats like agriculture fields and near water bodies. This species is well adapted to natural village environment setting. According to the villagers (interview), during day time that temporally move towards the surrounding areas like agricultural fields or water bodies for feeding while during night time roosts on the trees present in vicinity of the human settlement and also road side trees. Some villages emphasized that, sometime peacock roosts on the roof of the houses.

3.10.12 Food and Feeding Habitats

Peafowls are omnivores, eating plant parts, flower petals, seed heads, insects, and other arthropods, reptiles and amphibians. In the study area dense tree canopy cover supports good insect diversity which is very common food for peafowls.

3.10.13 Habitat Improvement Action Plan

Habitat improvement program will include plantation of various plant species like *Borassus flabiliber*, *Mangifera Indica, Tamarindus indica* and other grass species reported from the study area should be taken into priority. In order to improve vegetation cover, it is suggested to carry out extensive afforestation program in different phases. These species will help to provide habitat for faunal diversity, and also increases the species diversity and maintain the naturalness of the surrounding area.

3.10.14 Seed Distribution among the Villagers

During this habitat improvement programme the seed of *Borassus flabiliber*, *Mangifera indica, Tamarindus indica* and other grass seeds will be distributed in the various villages of the study area. Compost packets will be also provided at the intervals of every one year by the proponent (in consultation of forest department).

3.10.15 Water Filing in the existing Water Bodies during Summer

Water will be filled in the existing water bodies by water tankers (five numbers in each water body).

3.10.16 Inference – Buffer Zone as Peacock Habitat

Presented survey of the peacock in the buffer zone of the project site shows that, peafowl is well adapted to the existing rural setting of the study area. However, the following points can give an insight on the overall status of peafowl in the study area and thereby plan for better management strategies related to proposed activities.

- Local resident of the study area well aware of the movement pattern of peafowl in their surrounding habitats.
- Peafowl uses agriculture and various rural habitats as a feeding ground during day time while during night time they take shelter on the trees as well as on the roof of the houses. It clearly indicates peafowl normally uses ecosystem or habitats adjacent to village.

From the above said facts, it can be inferred that, some villages of the buffer zone provide roosting and feeding ground for peafowl, while core zone do not have potential habitat for roosting or feeding ground for peafowl. Therefore, it has been visualized that, the proposed project will not have any significant impact on peacock in terms of their normal movements and other activities. However, it is necessity to take some management option like habitat improvement in the villages located in the immediate vicinity of the project site. So, habitat improvement programme (Plantation of

recommended and local plant species) will be under taken in (in consultation of forest department) different villages located in the close vicinity of the project area. Under this programme sampling will be distributed in the nearby villages with the consultation of the local forest department.

In consultation of the forest department, following conservation measures will be adapted for peacock conservation:

- Habitat improvement programme in the different villages will be undertaken in the buffer zone area for shelter and roosting of peacocks. This will be achieved by plantation of local varieties of the tree species near villages in buffer area. Plantation will also be carried in some forest patches identified by local forest department.
- School level awareness programme will be conducted for conservation of peacock by organizing competition during "Wildlife Week" and "Van Mahotsav" celebration.

3.10.17 Conservation Measures

- Community inhibiting in study area should make well aware about the importance of the insects in their daily life especially butterflies and bees which acts a very vital role in pollination which results in high and successful fruiting of crops. This can be achieved by arrangements of village wise awareness campaigns.
- Community awareness for selection of wild ornamental plants in empty spaces, home gardens, and open scrub areas which provide breeding and feeding ground for Common Pierrot and such other butterflies and insects.
- Plant saplings of flowering and fruiting plants can be distributed to local people to promote the plantation of butterfly and bee friendly species which gives breeding and feeding platform to the species.

Table 3-23 Conservation plan for Shedule-1 Specoes for five years

Sr. No	Work or Activity	1 to 5 years	Location
1	Plantation	350 trees per year plant of local plant species for five years in villages.	Villages covered in 10 km study area
2	Water filling	5 number in water hole filing during summer.	Ponds covered in 10 km study area
3	Awareness	In school of nearby villages for peacock conservation as Drawing Competition. (Peacock Picture) & Essay Writing on Peacock.	Villages covered in 5 km study area

***All above activity will be carried out with the consultation of Ecologist*
Plant Species will be suggested by the Ecologist and plant saplings will be distributed in project villages as per the above-mentioned schedule (year wise).

The proponent has proposed a sum of Rs. 4,62,500/-for the "Schedule – I species" conservation plan under the following heads: given in below **Table 3-25.**

Table 3-24 Conservation Activity and Cost

S.No	Work or Activity	Approximate Cost. Rs.				
		Year 1	Year 2	Year 3	Year 4	Year 5
1	Plantation-350 tree plants (@ 150/- per plant)	52,500/-	52,500/-	52,500/-	52,500/-	52,500/-
2	Small water tank –20 in number @ 5000/-per tank	1,00,000/-				
3	One awareness programme	20,000/-	20,000/-	20,000/-	20,000/-	20,000/-
	Total	1,72,500/-	72,500/-	72,500/-	72,500/-	72,500/-

(Not including water supply, grass seed collection and plantation)

As a part of conservation activity the following Plants will be planted on the periphery of Project area& along the Approachable Road.

Table 3-25 Conservation Part- Greenbelt Development

S.No	Botanical name	Common Name	Key future of Tree
1	*Albizia lebbeck*	Vagai	A middle-sized deciduous tree with a spreading crown.
2	*Azadicrta Indica*	Vembu	It is adapted to various climate zones.
3	*Dalbergia latifolia*	Eeitti	It is common on deep loams or clays containing lime.
4	*Ficus benghalensis*	Allamaram	Nesting and food purpose for wildlife
5	*Ficus relegiosa*	Arasamaram	It is tolerant to various climate zones.
6	*Madhuca longifolia*	Illupai	A large deciduous shapely, long-lived tree
7	*Pongamia pinnata*	Pungaimaram	Dust reduces
8	*Pterocarpus marsupium*	Vengai	--
9	*Syzygiumcumini*	Naval	It is tolerant to temprature resistant.
10	*Termanilia arjuna*	Maruthu	It is reducing soil erosion

Source:

1. Gamble, J.S. and C.E.C. Fischer. 1915-1935. Flora of Presidency of Madras, Adlard and Son, London. pp. 1-3.
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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*

(**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 3-27** provides the certain important social indicators of Krishnagiri districts in Tamil Nadu.

Table 3-26 Social Indicators of Dharmapuri Districts

S.No	Social Indicators	Dharmapuri District
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
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:*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).

3.11.1.1 Population and Household Size

Dharmapuri district having a population of 1506843 consists of 774303 male populations and 732540 female populations.

Source:*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)

3.11.1.2 Sex Ratio

As per 2011 Census the sex ratio was 946 for every 1,000 males, lower when compared to the State Sex Ratio of 996 in Dharmapuri district.

Source:*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)

3.11.1.3 Scheduled Caste (SC) and Scheduled Tribes (ST)

Dharmapuri has a population of 245392 persons belonging to Scheduled Castes which represents 16.30% of the total population of the district. The rural-urban SCs population share was 16.6 % and 14.6 % in 2011census respectively.

Source:*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)

3.11.1.4 Education & Literacy

The study of the education and literacy profile in the region is relevant in order to have an understanding whether the proposed project can utilize skilled human resources available within the area. According to 2011 census data, the literacy rate in the Dharmapuri district is 68.50%.The literacy rate has been the major determinant of the rise or fall of the other indicators. The accessibility of Primary and Upper Primary education has increased the literacy rate as well as reducing the dropout rate. **Table 3-28** Show the details of education infrastructures in Dharmapuri District.

Table 3-27 Education Infrastructures in Dharmapuri District

Type of school	Total schools		Rural Schools	
	Government	Private	Government	Private
Primary	829	117	783	90
Primary + Upper Primary	328	13	316	13
P + UP+ Secondary + Higher Secondary	5	48	3	48
UP only	4	1	2	1
UP + Secondary + Higher Secondary	95	10	75	9
P + UP + Secondary	3	24	3	20
UP + Secondary	119	10	115	9

Source:*http://udise.in/Downloads/Publications/Documents/District_Report_Cards-2016-17-Vol-II.pdf)*

3.11.1.5 Health Facilities

Primary Health Centers (PHCs) and Sub-centers (SCs) are providing the preventive, curative and rehabilitative health care services to the rural people. The district has good number of public health systems accessible and affordable apart from the private health facilities. The Health Facilities given in Dharmapuri district is given in **Table3-29.**

Table 3-28 Socio Economic analysis: Health care

Name of the District	Type of Facility	Facilities
Dharmapuri	SC	218
	PHC	43
	CHC	8
	SDH	3
	DH	1

	Total	273

*(**Note:** SC – Sub Center; PHC – Primary Health Center; CHC – Community Health Center; SDH – Sub District Hospital; DH – District Hospital)*

*(**Source:** National Health Mission)*

3.11.1.6 Economic Activity & Livelihood Pattern

In Dharmapuri district, as per the Census 2011, there were a total of 751170 workers, comprising 201328 cultivators, 267345 agricultural labourers, 15341 household Industry workers and 267156 other workers.

Source: *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)

3.11.2 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. **Table 3-30.** shows the list of locations which comes under the study area.

Table 3-29 Population profile within the study area

Sl. No	Name	Households	Total Population	Male	Female	Children below 6	Scheduled Caste	Scheduled Tribe
0 -5 km								
Dharmapuri District – Pappireddipatti Taluk								
1.	Singirihalli	410	1500	751	749	174	166	39
2.	Linginaickenhalli	523	2026	1038	988	223	386	26
3.	Bosinaickenhalli	770	3202	1598	1604	346	888	26
4.	Nallagudlahalli	1577	6652	3468	3184	756	234	0
5.	Gedakarahally	303	1219	647	572	149	74	12
6.	Buddireddipatti	918	3816	2008	1808	396	754	343
7.	Unisenahalli	1394	5283	2634	2649	517	1327	5
8.	Battalamalai	170	780	404	376	109	2	775
Dharmapuri District – Dharmapuri Taluk								
9.	Pulidikarai	1000	4021	2142	1879	489	801	0
10.	Kondampatti	1038	4171	2148	2023	423	602	3
11.	Naickanahalli	1762	7458	3866	3592	890	389	0
12.	Akkamanahalli	1000	3912	2045	1867	412	39	1
13.	Mookanur	1347	5736	2947	2789	725	2189	0
14.	Vellolai	814	3294	1717	1577	422	287	0
Dharmapuri District – Harur Taluk								
15.	Pallipatti	424	1633	886	747	160	282	0
16.	Jakkupatti	1118	4678	2469	2209	582	462	0
17.	Battalahalli	642	2622	1285	1337	313	925	273
18.	Palayampalli	1055	4195	2167	2028	528	2882	0
19.	Kosapatty	57	241	127	114	17	2	0
5 -10 km								
Dharmapuri District – Pappireddipatti Taluk								
20.	Kerekodahalli	433	1694	885	809	174	792	1
21.	Chintalpadi	1429	5448	2713	2735	536	2606	167
22.	Madathahally	337	1418	743	675	202	911	0
23.	Basuvapuram	923	3383	1706	1677	343	1542	232
24.	Thalanatham	1350	5476	2815	2661	634	1881	0
25.	Kettureddipatty	1175	4808	2456	2352	525	1312	3

Sl. No	Name	Households	Total Population	Male	Female	Children below 6	Scheduled Caste	Scheduled Tribe
26.	Mottankurichi	1264	4787	2471	2316	550	412	24
27.	Sunkarahalli	500	2064	1109	955	246	949	42
28.	Regadahalli	972	3916	1992	1924	416	971	4
Dharmapuri District – Dharmapuri Taluk								
29.	Nallanahalli	1414	5962	3087	2875	671	412	0
30.	Konanginaickanahalli	1024	4378	2331	2047	471	1362	14
31.	Vellalapatti	1084	4601	2408	2193	560	1322	1
32.	Andihalli	862	3597	1900	1697	417	135	0
33.	Krishnapuram	1245	5106	2646	2460	580	407	0
34.	Kuppur	1335	5453	2855	2598	660	706	0
35.	Settikarai	1475	6009	3056	2953	767	371	12
36.	Annasagaram	925	3489	1785	1704	345	289	0
37.	Ungaranhalli	1486	5730	2992	2738	587	17	0
38.	Noolahalli	1536	6366	3319	3047	702	202	0
39.	Mukkalnaickanahalli	1587	6576	3404	3172	733	278	0
Dharmapuri District – Harur Taluk								
40.	Bannikulam	559	2127	1122	1005	204	65	0
41.	Irumathur	1428	5493	2822	2671	612	640	0
42.	Kelavalli	867	3154	1618	1536	281	249	0
43.	Ichambadi	1214	4570	2377	2193	496	1778	1
44.	Ettipatty	116	421	221	200	44	102	0
45.	Navalai	769	3127	1600	1527	335	2308	0
46.	Chinnakoundampatti	247	946	485	461	82	183	1
47.	Vagurappampatti	1214	4869	2552	2317	551	740	12
48.	Palayampalli	1055	4195	2167	2028	528	2882	0
49.	Andipatty	213	859	437	422	88	62	0
50.	Thoppampatti	108	491	252	239	56	273	0
51.	Sennampatti	249	1036	516	520	97	125	0
52.	Veppasennampatti	10	30	14	16	1	0	0
53.	Dasirihalli	451	1879	975	904	246	497	0
54.	Reddipatti	36	134	67	67	17	8	0
55.	Bodinaickenhalli	60	236	120	116	25	192	0
56.	Kurumbapatty	28	94	50	44	7	0	0

Sl. No	Name	Households	Total Population	Male	Female	Children below 6	Scheduled Caste	Scheduled Tribe
57.	Appiyampatty	117	366	177	189	33	0	0
Dharmapuri District- Palakkodu Taluk								
58.	Bandarahalli	1123	4694	2459	2235	497	799	0
59.	Murukkampatti	1163	4871	2503	2368	641	632	18
60.	Indamangalam	1386	5675	3035	2640	709	393	0
61.	Baisuhalli	1890	8181	4293	3888	1042	1204	0
	Total	**52981**	**214148**	**110882**	**103266**	**24342**	**42700**	**2035**

(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.Summaries of employment and livelihood within the study are given in **Table 3-31.**

Table 3-30 Summaries of Employment and Livelihood within the study area

Sl. 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
0-5 km												
Dharmapuri District – Pappireddipatti Taluk												
➢	Singirihalli	867	685	182	290	12	183	133	8	4	204	33
➢	Linginaickenhalli	1162	1088	74	330	1	487	48	15	0	256	25
➢	Bosinaickenhalli	1691	1291	400	238	17	566	326	24	18	463	39
➢	Nallagudlahalli	3374	2906	468	717	19	1221	191	45	20	923	238
➢	Gedakarahally	693	669	24	284	4	162	16	3	0	220	4
➢	Buddireddipatti	2106	1139	967	223	215	603	493	9	75	304	184
➢	Unisenahalli	3187	2834	353	1412	33	746	223	44	27	632	70
➢	Battalamalai	412	338	74	0	0	323	1	0	3	15	70
Dharmapuri Dt-Dharmapuri Taluk												
➢	Pulidikarai	2272	2189	83	748	8	670	8	19	0	752	67
➢	Kondampatti	1911	1805	106	1010	13	332	52	5	2	458	39
➢	Naickanahalli	3879	3244	635	504	33	1358	84	11	29	1371	489
➢	Akkamanahalli	1981	1610	371	866	35	314	319	7	4	423	13
➢	Mookanur	2750	1837	913	596	20	514	571	4	2	723	320
➢	Vellolai	1577	856	721	388	14	191	567	10	3	267	137
Dharmapuri District – Harur Taluk												
➢	Pallipatti	1030	787	243	144	71	447	104	4	5	192	63
➢	Jakkupatti	2232	1856	376	456	115	961	88	11	18	428	155
➢	Battalahalli	1294	1097	197	294	28	511	77	8	11	284	81
➢	Palayampalli	2342	2312	30	739	4	1150	4	10	0	413	22
➢	Kosapatty	82	81	1	34	0	12	0	1	0	34	1
5-10 km												
Dharmapuri District – Pappireddipatti Taluk												
➢	Kerekodahalli	991	965	26	433	5	312	12	5	2	215	7
➢	Chintalpadi	2955	2796	159	1143	9	827	98	35	8	791	44
➢	Madathahally	745	505	240	73	31	306	104	9	8	117	97
➢	Basuvapuram	1913	1837	76	644	2	933	59	3	0	257	15

Sl. 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
➢	Thalanatham	2828	2437	391	772	23	1229	350	40	2	396	16
➢	Kettureddipatty	2640	1909	731	193	24	1244	634	23	11	449	62
➢	Mottankurichi	2450	2397	53	553	8	1335	35	10	0	499	10
➢	Sunkarahalli	1185	620	565	218	11	197	502	18	10	187	42
➢	Regadahalli	1820	1705	115	562	8	686	79	10	1	447	27
Dharmapuri District – Dharmapuri Taluk												
➢	Nallanahalli	2815	2335	480	401	27	660	282	83	25	1191	146
➢	Konanginaickanahalli	1763	1089	674	223	81	501	424	14	13	351	156
➢	Vellalapatti	2516	1639	877	454	125	768	681	23	16	394	55
➢	Andihalli	1921	1594	327	446	13	438	161	23	16	687	137
➢	Krishnapuram	2639	2267	372	453	3	927	246	138	27	749	96
➢	Kuppur	2838	2682	156	868	22	838	59	57	2	919	73
➢	Settikarai	2811	2389	422	691	40	546	151	52	52	1100	179
➢	Annasagaram	1706	1563	143	120	9	593	64	25	3	825	67
➢	Ungaranhalli	2650	1938	712	483	95	548	214	110	96	797	307
➢	Noolahalli	2963	2466	497	1249	65	582	292	36	21	599	119
➢	Mukkalnaickanahalli	3438	2463	975	1076	30	579	608	24	18	784	319
Dharmapuri District – Harur Taluk												
➢	Bannikulam	1168	1019	149	481	11	232	90	9	1	297	47
➢	Irumathur	2652	2269	383	812	64	832	149	57	4	568	166
➢	Kelavalli	1603	1518	85	608	2	495	14	28	34	387	35
➢	Ichambadi	2459	2204	255	445	34	1131	88	35	21	593	112
➢	Ettipatty	249	249	0	141	0	53	0	3	0	52	0
➢	Navalai	1669	1617	52	129	9	1259	27	9	2	220	14
➢	Chinnakoundampatti	508	434	74	237	4	22	63	12	0	163	7
➢	Vagurappampatti	2695	2127	568	739	16	868	411	32	20	488	121
➢	Palayampalli	2342	2312	30	739	4	1150	4	10	0	413	22
➢	Andipatty	536	519	17	153	0	218	4	11	1	137	12
➢	Thoppampatti	224	220	4	55	0	67	0	5	1	93	3
➢	Sennampatti	490	426	64	114	2	146	61	4	0	162	1

Sl. 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
➢	Veppasennampatti	11	11	0	11	0	0	0	0	0	0	0
➢	Dasirihalli	961	950	11	242	0	258	3	7	0	443	8
➢	Reddipatti	75	74	1	38	0	23	1	1	0	12	0
➢	Bodinaickenhalli	121	119	2	8	0	92	2	0	0	19	0
➢	Kurumbapatty	60	59	1	35	0	21	0	0	0	3	1
➢	Appiyampatty	207	206	1	103	0	71	0	0	0	32	1
Dharmapuri District- Palakkodu Taluk												
➢	Bandarahalli	2559	1930	629	618	139	1093	362	5	18	214	110
➢	Murukkampatti	2802	2611	191	1183	5	645	136	9	0	774	50
➢	Indamangalam	3142	3083	59	1571	6	789	17	19	1	704	35
➢	Baisuhalli	3795	3676	119	991	5	1180	50	22	6	1483	58
	Total	**110757**	**93853**	**16904**	**29781**	**1574**	**35445**	**9842**	**1254**	**661**	**27373**	**4827**

*(**Source:** Census 2011)*

3.11.2.2 Educational Infrastructure within study area

The district has good primary and secondary education infrastructure in urban and rural areas. The people around the study area have well connected to educational infrastructures. The educational facilities in the study area are summarized in **Table 3-32**.

Table 3-31 Details of Education facilities within study area

S. No	Type of School	Numbers
1	Government Pre-Primary school	172
2	Private Pre-Primary school	29
3	Government Primary school	155
4	Private Primary school	17
5	Government Middle school	61
6	Private Middle school	12
7	Government Secondary school	22

S. No	Type of School	Numbers
8	Private Secondary school	18
9	Government Senior Secondary school	11
10	Private Senior Secondary school	8

***(Source:** Census 2011)*

The following **Table 3-33** shows the literates population and the percentage within the study area

Table 3-32 Literates population and the percentage within the study area

S.No	Name	Total Population	Literates Population	Literates Population Male	Literates Population Female	Illiterates Population	Illiterates Population Male	Illiterates Population Female
0-5 Km								
Dharmapuri District – Pappireddipatti Taluk								
1.	Singirihalli	1500	971	546	425	529	205	324
2.	Linginaickenhalli	2026	1207	707	500	819	331	488
3.	Bosinaickenhalli	3202	1933	1117	816	1269	481	788
4.	Nallagudlahalli	6652	3899	2295	1604	2753	1173	1580
5.	Gedakarahally	1219	683	426	257	536	221	315
6.	Buddireddipatti	3816	2590	1510	1080	1226	498	728
7.	Unisenahalli	5283	3360	1888	1472	1923	746	1177
8.	Battalamalai	780	326	204	122	454	200	254
Dharmapuri District – Dharmapuri Taluk								
9.	Pulidikarai	4021	2331	1413	918	1690	729	961
10.	Kondampatti	4171	2363	1381	982	1808	767	1041
11.	Naickanahalli	7458	4111	2383	1728	3347	1483	1864
12.	Akkamanahalli	3912	2352	1391	961	1560	654	906
13.	Mookanur	5736	3541	2070	1471	2195	877	1318
14.	Vellolai	3294	1655	987	668	1639	730	909
Dharmapuri District – Harur Taluk								
15.	Pallipatti	1633	957	603	354	676	283	393
16.	Jakkupatti	4678	2667	1607	1060	2011	862	1149

S.No	Name	Total Population	Literates Population	Literates Population Male	Literates Population Female	Illiterates Population	Illiterates Population Male	Illiterates Population Female
17.	Battalahalli	2622	1566	885	681	1056	400	656
18.	Palayampalli	4195	2552	1514	1038	1643	653	990
19.	Kosapatty	241	189	104	85	52	23	29
5 -10 km								
Dharmapuri District – Pappireddipatti Taluk								
20.	Kerekodahalli	1694	1070	642	428	624	243	381
21.	Chintalpadi	5448	3598	2002	1596	1850	711	1139
22.	Madathahally	1418	905	525	380	513	218	295
23.	Basuvapuram	3383	2069	1206	863	1314	500	814
24.	Thalanatham	5476	3237	1903	1334	2239	912	1327
25.	Kettureddipatty	4808	3098	1808	1290	1710	648	1062
26.	Mottankurichi	4787	2989	1772	1217	1798	699	1099
27.	Sunkarahalli	2064	1324	798	526	740	311	429
28.	Regadahalli	3916	2445	1438	1007	1471	554	917
Dharmapuri District – Dharmapuri Taluk								
29.	Nallanahalli	5962	3711	2190	1521	2251	897	1354
30.	Konanginaickanahalli	4378	2724	1643	1081	1654	688	966
31.	Vellalapatti	4601	2902	1734	1168	1699	674	1025
32.	Andihalli	3597	1997	1211	786	1600	689	911
33.	Krishnapuram	5106	3139	1814	1325	1967	832	1135
34.	Kuppur	5453	3364	2009	1355	2089	846	1243
35.	Settikarai	6009	3565	2021	1544	2444	1035	1409
36.	Annasagaram	3489	2266	1289	977	1223	496	727
37.	Ungaranhalli	5730	3319	1975	1344	2411	1017	1394
38.	Noolahalli	6366	3349	1991	1358	3017	1328	1689
39.	Mukkalnaickanahalli	6576	3381	2075	1306	3195	1329	1866
Dharmapuri District – Harur Taluk								
40.	Bannikulam	2127	1246	751	495	881	371	510
41.	Irumathur	5493	3344	1908	1436	2149	914	1235
42.	Kelavalli	3154	1957	1135	822	1197	483	714
43.	Ichambadi	4570	2799	1672	1127	1771	705	1066

S.No	Name	Total Population	Literates Population	Literates Population Male	Literates Population Female	Illiterates Population	Illiterates Population Male	Illiterates Population Female
44.	Ettipatty	421	297	160	137	124	61	63
45.	Navalai	3127	1983	1138	845	1144	462	682
46.	Chinnakoundampatti	946	681	381	300	265	104	161
47.	Vagurappampatti	4869	2948	1748	1200	1921	804	1117
48.	Palayampalli	4195	2552	1514	1038	1643	653	990
49.	Andipatty	859	524	304	220	335	133	202
50.	Thoppampatti	491	304	177	127	187	75	112
51.	Sennampatti	1036	785	418	367	251	98	153
52.	Veppasennampatti	30	17	9	8	13	5	8
53.	Dasirihalli	1879	1198	685	513	681	290	391
54.	Reddipatti	134	93	52	41	41	15	26
55.	Bodinaickenhalli	236	130	84	46	106	36	70
56.	Kurumbapatty	94	60	38	22	34	12	22
57.	Appiyampatty	366	236	134	102	130	43	87
Dharmapuri District- Palakkodu Taluk								
58.	Bandarahalli	4694	2551	1547	1004	2143	912	1231
59.	Murukkampatti	4871	2538	1486	1052	2333	1017	1316
60.	Indamangalam	5675	3027	1871	1156	2648	1164	1484
61.	Baisuhalli	8181	4946	2947	1999	3235	1346	1889
Total		**127921**	**75236**	**52685**	**86227**	**35646**	**50581**	**127921**

(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. The health facilities within the study area are given in **Table 3-34.**

Table 3-33 Health facility within the study area

Sl.No	Type	Numbers
1	Community health centre	0
2	Primary health centre	0
3	Primary health sub-centre	10
4	Maternity and Child Welfare Centre	0
5	TB hospital/Clinic	0
6	Hospital Allopathic	32
7	Hospital Alternative Medicine	2
8	Dispensary Health Centre	3
9	Veterinary hospital	4
10	Mobile health clinic	12
11	Family Welfare Centre	11
12	Non-Government Medical facilities Out Patient	26

(Source: Census 2011)

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 3-35**.

Table 3-34 Summaries of Socio-economic indicators within the study area

S.No	Particulars	Study area	Unit
1	Number of villages in the Study Area	61	Nos.
2	Total Households	52981	Nos.
3	Total Population	214148	Nos.
4	Children Population (<6 Years Old)	24342	Nos.
5	SC Population	42700	Nos.
6	ST Population	2035	Nos.
7	Total Working Population	110757	Nos.

S.No	Particulars	Study area	Unit
8	Main Workers	93853	Nos.
9	Marginal Workers	16904	Nos.
10	Cultivators	31355	Nos.
11	Agricultural labours	45287	Nos.
12	Household Industries	1915	Nos.
13	Other Workers	32200	Nos.
14	Literates	127921	Nos.

(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 hill lock 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	917	96	30

2	Bottom	869	55	

- The Total waste (Granite waste+ Over Burden + Side Burden) to be generated during the five years of mining plan period will be around 1,25,819m^3. These wastes are proposed to be dumped on the Southern side of lease area.
- Usage of chemicals like Rock Breaking Powder ($Ca(OH)_2$ 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 **March 2024 to May 2024** 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 consideredformodeling is shown below.

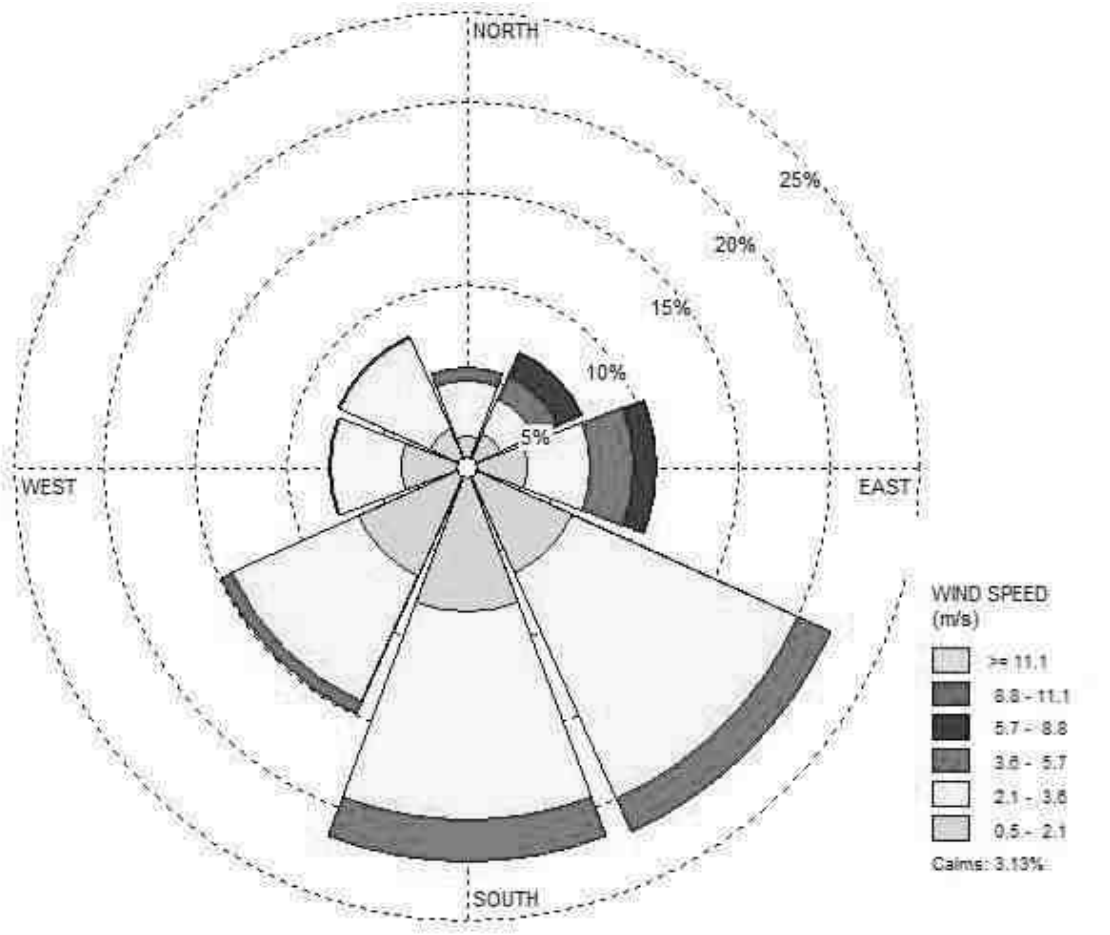

Figure 4-1 Wind rose diagram considered for dispersion modeling

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_2, NO_x 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)		19.25
4	Waste Dumping Area (Sq.Km)	a	0.0239
5	Open Pit Area (Sq.Km)	Aa	0.0109

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, et. 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 $PM_{2.5}$, 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_X	NO_X
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_X
4 Wheeler (1no.)	6.94E-05	6.94E-04
Heavy Duty Vehicles (2 no.)	1.11E-04	1.94E-02
Total	**1.81E-04**	**2.01E-02**

Table 4-6 Emissions considered for mining

Activities	PM Emission rate
Wet Drilling (g/s)	4.04E-07
Haulage (g/s)	4.32E-05
Waste Dumping (g/s)	2.50E-06
Open Pit (g/s.m2)	1.85E-07

Table 4-7 Emission input for modelling

Activities	PM	SO_2	NO_x
Line Source (Haul Road) (g/s)	4.32E-05	-	-

Area Source (Open Pit) (g/s.m^2)	1.85E-07	-	-
Area Source (Waste Dumping) (g/s)	2.50E-06	-	-
Point Source (DG) (g/s)	5.81E-03	5.38E-03	8.16E-02
Point Source (Drilling) (g/s)	4.04E-07	-	-
Line Source (Vehicle)(g/s)	1.81E-04	-	2.01E-02

Note:

a. Since emission factors are available for PM_{10} the following assumptions are made for PM_{10} and $PM_{2.5}$ estimation

1. TSPM is considered as 5 times of PM_{10}
2. 60% of PM_{10} is considered as $PM_{2.5}$

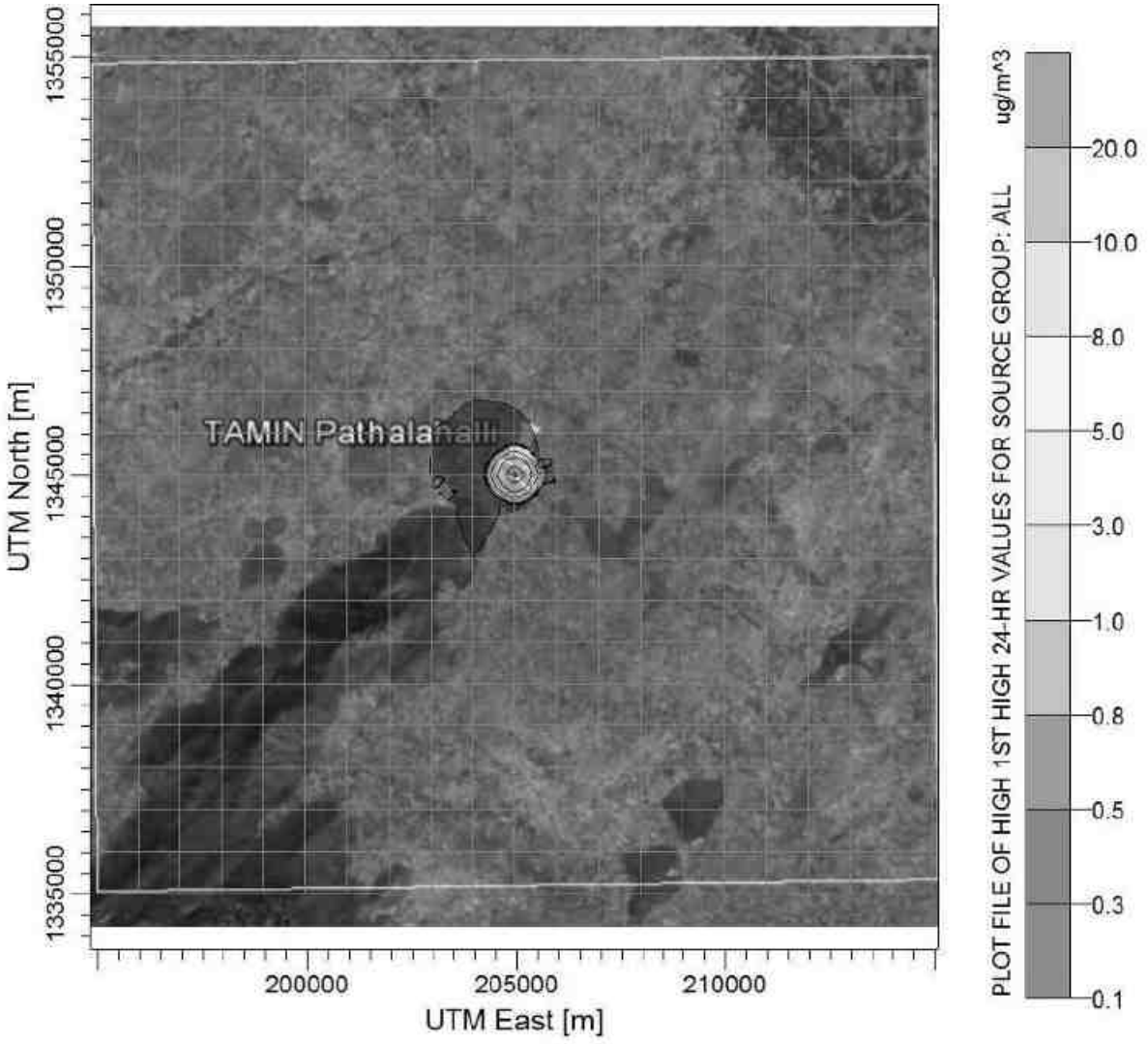

Figure 4-2 Predicted 24 Hrs GLC's of PM_{10} within 10km radius of the study area

Table 4-8 Predicted Top 10 Highest Concentrations Particulate Matter PM_{10}

S.No	UTM coordinates (m)		Conc. (µg/m^3)	Distance from Centre of the	Direction from project
	E	N			

				project (km)	Centre
1.	204952	1345020	10.7317	Project Site	
2.	203952	1346020	0.20618	1.41	NW
3.	204952	1346020	0.15844	1.00	N
4.	203952	1344020	0.14993	1.41	SW
5.	203952	1345020	0.14763	1.00	W
6.	202952	1345020	0.10141	2.00	W
7.	203952	1343020	0.10119	2.23	SSW
8.	202952	1346020	0.09999	2.23	WNW
9.	202952	1348020	0.08279	3.60	NNW
10.	202952	1347020	0.08237	2.82	NW

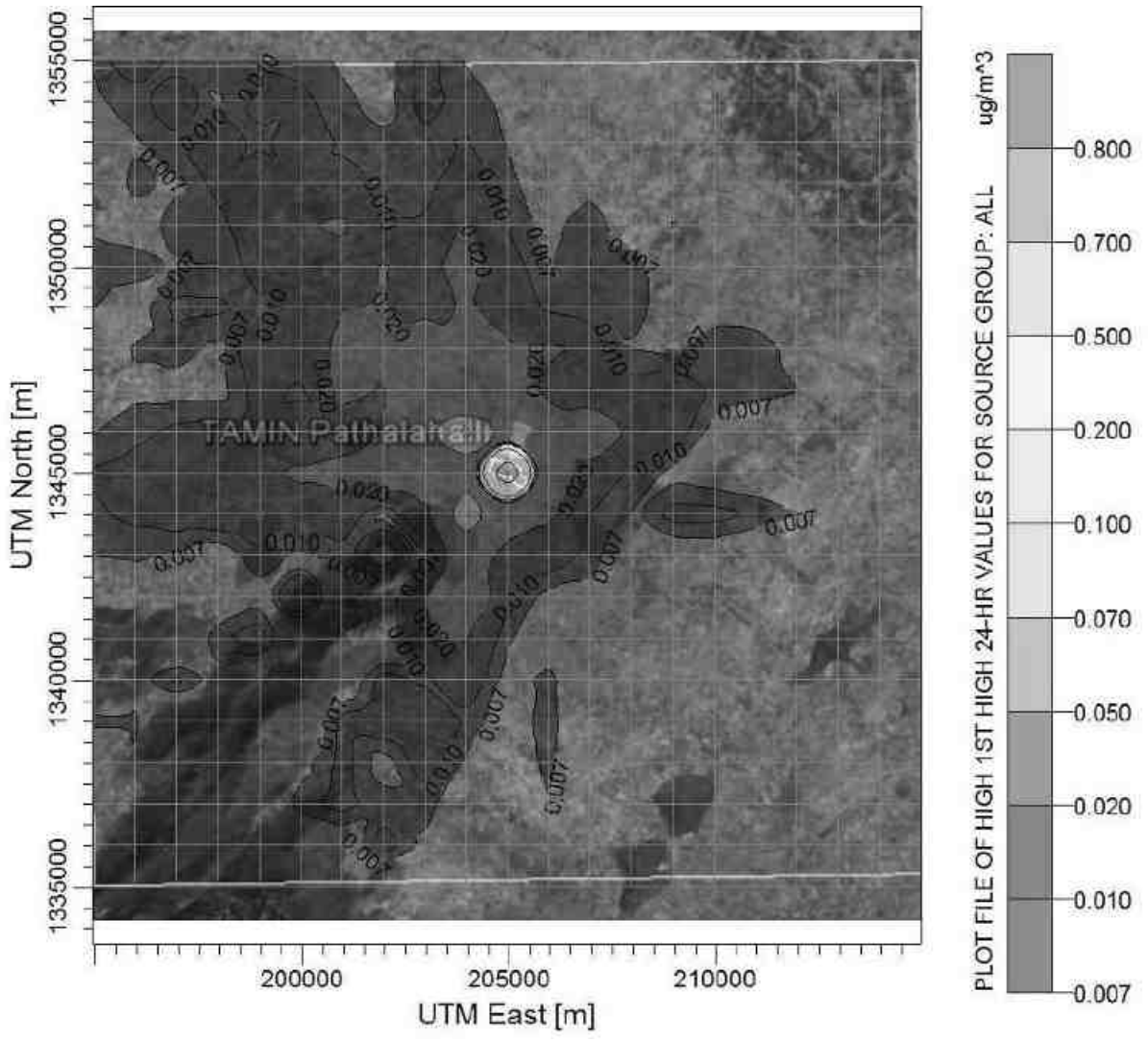

Figure 4-3 Predicted 24-Hrs' GLC's of SO_2within 10 km Radius of the Study Area

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

S.NO	UTM coordinates (m)		Conc. (µg/m³)	Distance from Centre of the project (km)	Direction from project Centre
	E	N			

1.	204952	1345020	0.73214	Project Site	Project Site
2.	203952	1346020	0.07459	1.41	NW
3.	203952	1344020	0.07098	1.41	SW
4.	202952	1346020	0.04861	2.23	WNW
5.	204952	1346020	0.04782	1.00	N
6.	202952	1348020	0.04009	3.60	NNW
7.	203952	1345020	0.03932	1.00	W
8.	203952	1342020	0.03793	3.16	SSW
9.	202952	1347020	0.03555	2.82	NW
10.	206952	1346020	0.03482	2.23	ENE

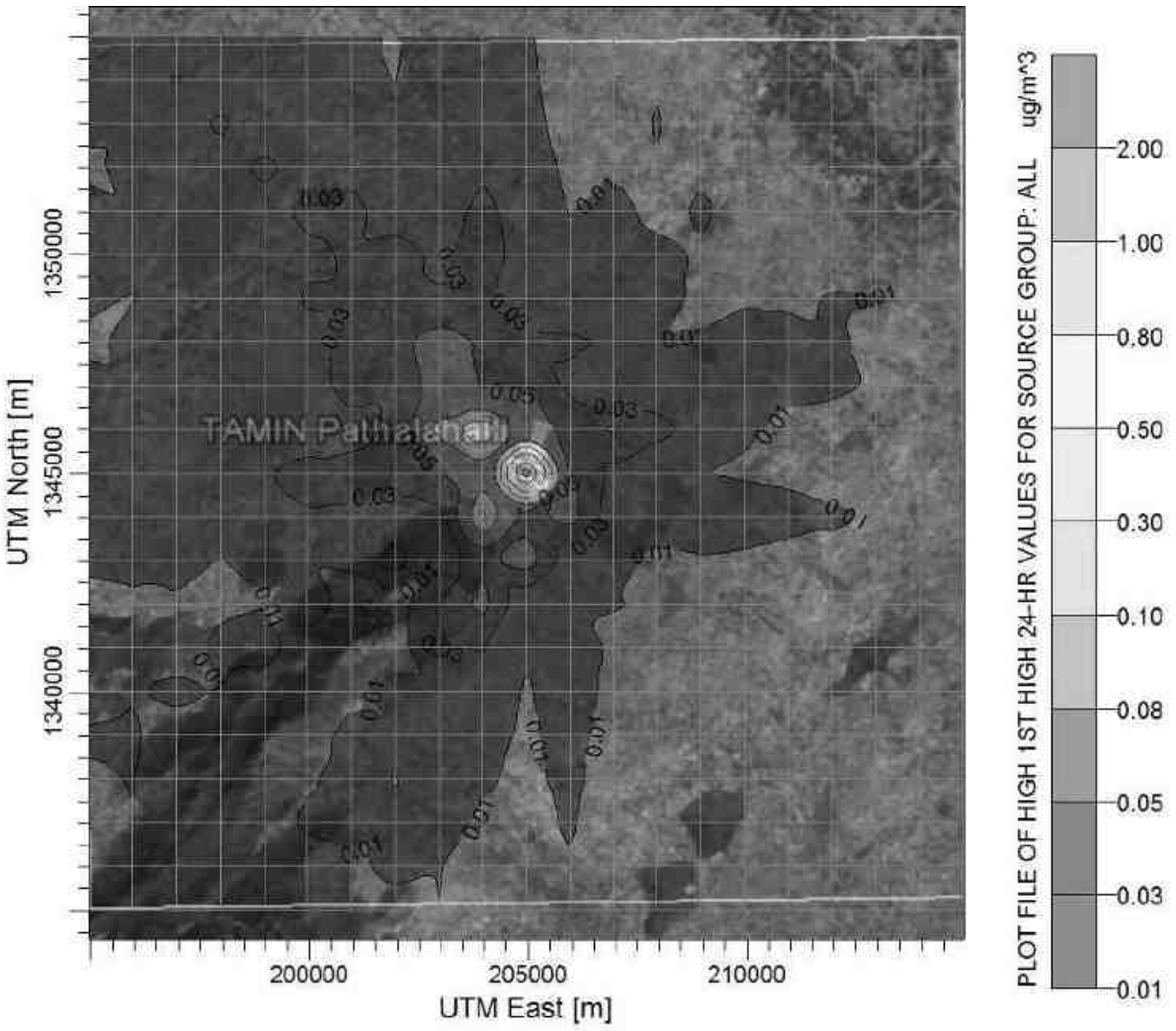

Figure 4-4 Predicted 24-Hrs' GLC's of NO_X within 10 km Radius of the Study Area

Table 4-10 Predicted Top 10 Highest Concentrations Nitrogen Oxide

S.NO	UTM coordinates (m)		Conc. (µg/m³)	Distance from Centre of the project (km)	Direction from project Centre
	E	N			
1.	204952	1345020	1.11046	Project Site	Project Site
2.	203952	1346020	0.11752	1.41	NW
3.	203952	1344020	0.10769	1.41	SW

4.	202952	1346020	0.08811	2.23	WNW
5.	204952	1346020	0.07256	1.00	N
6.	203952	1345020	0.07132	1.00	W
7.	202952	1348020	0.06456	3.60	NNW
8.	204952	1343020	0.06285	2.00	S
9.	202952	1347020	0.0598	2.82	NW
10.	205952	1344020	0.05952	1.41	SE

4.3.2 Conclusion

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

Table 4-11 Total maximum GLCs from emissions

Pollutant	Max. Base Line Conc. (µg/m³)	Estimated Incremental Conc. (µg/m³)	Total Conc. (µg/m³)	NAAQ standard
PM	53.38	10.73	64.11	100
SO_2	14.07	0.73	14.8	80
NO_X	28.13	1.11	29.24	80

4.4 Impact due to Carbon Emission

The proposed Quarry has the potential to generate various GHG emissions, including carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), 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 aboveground 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	The continuous operation	Implementing energy-

	Machinery and Equipment – Direct Emissions	of such machinery results in the direct release of CO2 into the atmosphere, contributing to increased carbon emissions.	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_2 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	Implementing sustainable land management practices, such as minimizing soil disturbance and erosion control measures, can help preserve soil and reduce carbon loss.

		ability to retain carbon, further exacerbating carbon loss.	
5	All Operations-Impacts on Microclimate and Temperature	Quarry operations can alter local microclimates 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	Plantation in and around the quarry area 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

Sl.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_2) and methane (CH_4), contributing to climate change. Carbon emissions.	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. 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 SH-60A connecting Dharmapuri – Morappur-Harur located 0.96km away from the project site in which is located in SSW 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.**

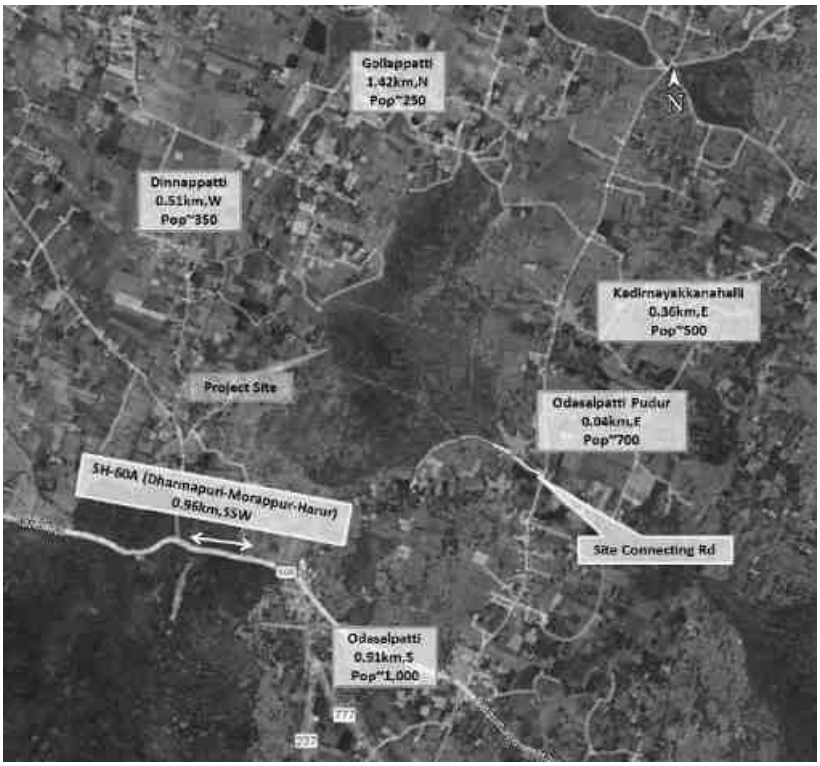

Figure 4-5 Site Connectivity Map of the Study Area

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	1387	1040	7	5	1394	0.75	1046
2	3 wheelers	332	664	0	0	332	2	664
3	4 wheelers/ cars	259	259	2	2	261	1	261
4	truck/Lorry	63	139	11	41	74	2.2	163
5	agricultural tractor	47	188	0	0	47	4	188
6	light emission vehicle	271	542	0	0	271	2.0	542
Total		**2,359**	**2,832**	**20**	**48**	**2,379**	**-**	**2,863**

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	2,359	2,832	15000	0.19	"A"	Free Flow Traffic
After implementation	2,379	2,863	15000	0.19	"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.

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 (potableor 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

- Sorgum
- 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. No chances for any loss of biodiversity as there are no RET or schedule I species.

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., CO2, CH4) 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

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

4.16 Impacts on Social Environment

The entire lease area of the project has no habitations or hutments inthe core zone area, norehabilitation or resettlement problems are involved. By adopting various mitigation measures as explained earlier, the environmental scenario in respect of ambient air quality, water quality, Noise levels, water aspects, biological aspects etc. during the operation of the

project will be maintained within the statutorily prescribed levels. As such, impact due to the projects will be positive on socio-economic aspects. It will be ensured that the buffer zone of the quarry will be properly preserved environmentally in all respects within sustainable limits through necessary monitoring. The project will be operated with care for minimizing environmental impacts with proper EMP measures for pollution control.

4.2 Project Measures for Minimizing and/or offsetting Adverse Impacts Identified

4.2.1 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.

4.17 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

4.18 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

4.19 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.

4.20 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	➢ Adopting wet drilling method ➢ Drilling machine should be provided with dust extractors

2	Blasting	➢ Use of control blasting technique ➢ Water spray before blasting ➢ Usage of Rock breaking powder($Ca(OH)_2$) ➢ Usage of Wire saw cutting method
3	Loading	➢ Water spray on granite material before loading
4	Transportation of material	➢ Covering of the trucks/dumpers to avoid spillage ➢ Water spray on the haul roads before and after transportation ➢ Maintenance of haul road ➢ Speed of vehicles will be limited upto 25km/hr ➢ Development of a green belt of suitable width on both sides of haul road

4.21 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_2) 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.

4.22 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.

4.23 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.

4.24 Water Environment Mitigation Measures

4.24.1 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.

4.24.2 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.

4.24.3 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

4.25 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 ($Ca(OH)_2$) 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.

4.26 Biological Environment Mitigation Measures

- T

o 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.

- G reenbelt development will be done all along the periphery of the mine lease area and haul roads.
- R enovation of ponds
- Construction of check dams and water holes

4.26.1 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	3,650	Neem, Vilvam, Aathi & Panai	80%	2,900

The total area for the proposed green belt is 0.13.0 Ha during 5 years of the proposed quarrying activity TAMIN is proposing to plant 3,650 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.

4.27 Mitigate Measures for Occupational Health and Public Health

The mitigation measures for occupational health are as follows,

Table 4-19 Mitigation for occupational health and safety

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. ➢ 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. ➢ Restricted entry, use of sirens and cordoning of the blasting area are some of the good practices to avoid accidents.
4	Overburden stabilization	➢ Accidents are known to happen due to overburden collapse. ➢ Therefore, slope stabilization and dump stability are critical issues for safety and environment.
5	Workers health surveillance	➢ Health survey programmes for workers and local community. ➢ Regular training and awareness of employees to be conducted to meet health and safety objectives.
6.	Regular Health Camps	➢ By conducting regular health camps to analyse the health condition of the workers as well as the public with in 500m radius.

4.28 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.

4.29 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

4.30 Irreversible and Irretrievable commitments of environmental components

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

4.31 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:

4.32 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.

4.33 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
		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	-2	5	-10	-1	4	-4	-2	6	-12	-	-	0	-26	Development of green belt and plantation
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 2. Regular Water Sprinkling 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 2. Vehicles will be covered by Tarpaulin sheets 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. 2. Granite rejects will be dumped into southwest 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. 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 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 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. 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 black granite quarry is over an extent of 29.00.23 Ha located in S.F.No.254 of Pathalahalli, located at Pathalahalli Village, Karimangalam 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 15,59,462 m^3.

5.3 Site Connectivity

The site connectivity details are given in **Table 5-1.**

Table 5-1 Site Connectivity Details

Nearest State Highway	SH-60A (Dharmapuri-Morappur-Harur), ~ 0.96 km, SSW
Nearest National Highway	NH-44 (Srinagar-Dharmapuri-Kanniyakumari), ~ 12.06 km, WNW
Nearest Railway Station	Thonganur Railway Station, ~ 10.37 km, SE
Nearest City	Dharmapuri, ~ 13 km, W

5.4 Technology Alternatives

The various alternative technologies adopted in quarry operations are given below

Table 5.1 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 Expansive Mortar for secondary	Negligible impact on noise

		breaking	

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 also 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)	Once in a year	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, SO_2, NO_x & 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
Total					**37,300**

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 29.00.23 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. TN/F.No.10401/SEAC/ToR-1599/2023, dated: 06.11.2023. 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 TNSEAC 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 theimpact zones from the accidental scenarios
- Assess the overall suitability of the site from hazard minimization and disaster mitigation point of view
- Furnish specific recommendationson the minimization of the worst accidentpossibilities.
- 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'scertificate 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 norml 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

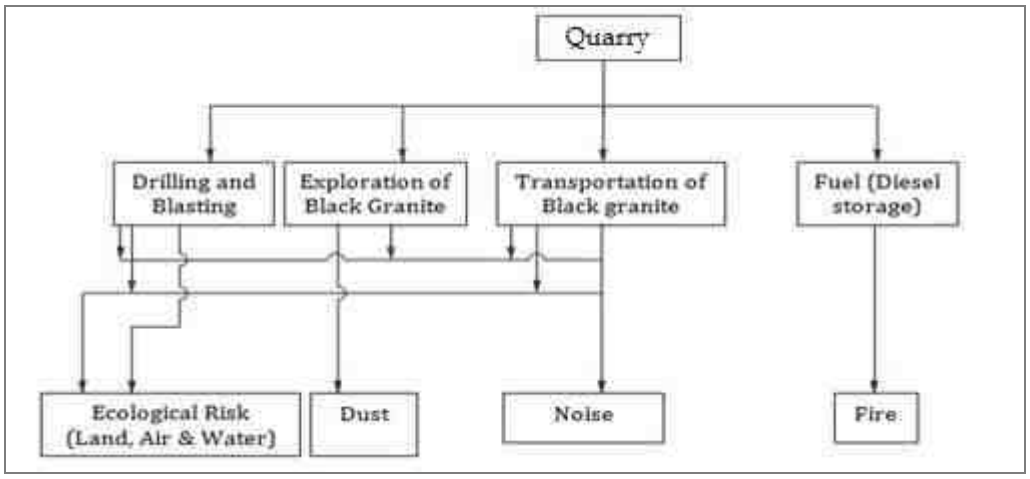

Figure 7-1 Identification of hazards in opencast mine

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 jack hammers 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 to1.5m 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 crack 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, proclaim, 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.
- The quarries will be protected by garland drains around the periphery for storm water drainage.

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 isto make us 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 EmergencyOrganization (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 (**March 2024-May 2024**). PM_{10}, $PM_{2.5}$, SO_2, NOx, Pb, NH_3, C6H6, $C_{20}H_{12}$, 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. The 7.5 m safety distance as well as the defective portion of the deposit may also be used for waste dumping purpose.

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 30m height with slope towards northern and southern sides. Through the area receives scanty rainfall, the ground water level is at 11.3m depth. The Production faces are operated at shallow depths. During the rainy seasons the surface run of water and the gorund 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 south east and north west 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 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 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 complaint 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 PROJECTBENEFITS

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
A	**Technical/Mining Personnel**	
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	**Workers**	
1	Skilled	1
2	Semi- Skilled	9
3	Un-skilled	10
	Total	**30**

8.4 CER activity

Based on O.M F.No. 22-65/2017-IA.III dated: 01.05.2018, 1.0% of the Project cost need to be spent for CER activities i.e., Rs. 1 Lakhs. However, TAMIN is proposing for Rs. 4 Lakhs which is 4.0% of Project cost under CER activities for the Odasalpatti Government High School.

Table 8-2 Proposed CER activity

S.No	CER Activities for Odasalpatti Government School	Amount in Lakhs
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
Total		**4.0**

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 Patthalahalli Black Granite Quarry identifies the principles, procedures and methods that will be used to control and minimize the environmental imapocts for the proposed project.

10.2 EMP structure and organization

10.2.1 Environment Policy of TAMIN

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, Metalliferrous 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.**

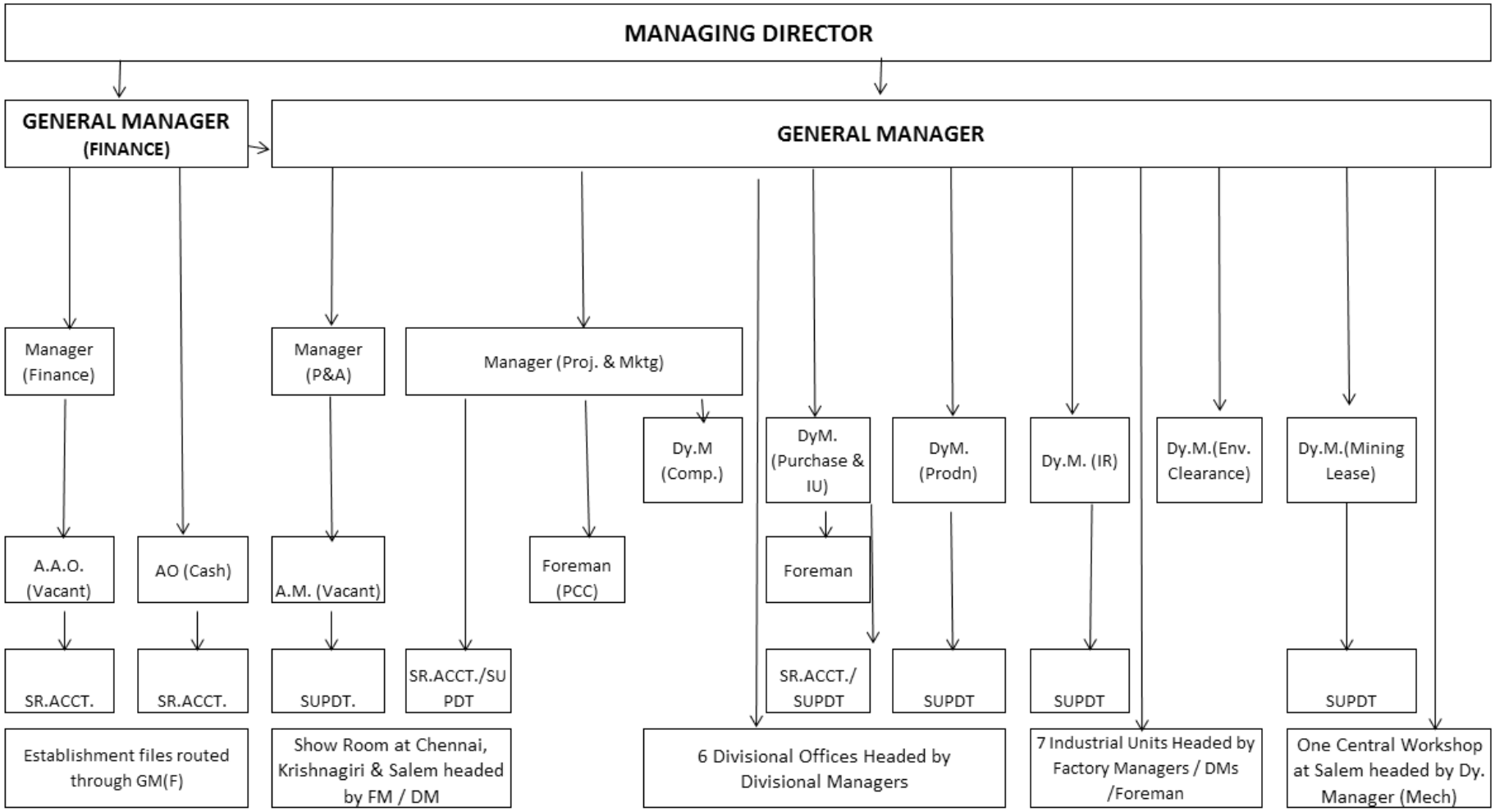

Figure 10-1 Hierarchical System of the TAMIN

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

Control	Responsibility
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 spices 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 1,25,819 m^3. The area of disposal waste rock has been identified in south east and north west 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

Control	Responsibility
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

Control	Responsibility
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

Control	Responsibility
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 access the impact due to the mining activities and the efficacy of the adopted noise control measures. Additional noise control measures will be adopted if required as per the observations during monitoring	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 conductive 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 into the air.

- Provision of First-aid facility at the mine office

10.10 Budget for Environmental Protection

It is necessary to include the environmental cost as a part of the budgetary cost component. Total of Rs. 69,70,437/- allocated for environmental protection activities. Environmental Management cost is given in **Table 10-7.**

Table 10-7 Environmental Management Cost

Parameters	Mitigation Measure	Capital cost (INR)	Recurring Cost
Air Environment	Compaction, gradation and drainage on both sides for Haulage Road	2,90,023	2,90,023
	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	-	10,000
	Stone carrying trucks will be covered by tarpaulin	-	10,000
	Enforcing speed limits of 20 km/hr within ML area	10,000	1,000
	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	-	5,80,046
	Installing wheel wash system near gate of quarry	50,000	20,000
Noise Environment	Source of noise will be during operation of transportation vehicles, HEMM for this proper maintenance will be done at regular intervals.	0	0
	Oiling & greasing of Transport vehicles and HEMM at regular interval will be done	0	0
	Adequate silencers will be provided in all the diesel engines of vehicles.	0	0

	It will be ensured that all transportation vehicles carry a fitness certificate.	0	0
	Safety tools and implements that are required will be kept adequately near blasting site at the time of charging.	0	0
	Line Drilling all along the boundary to reduce the PPV from blasting activity and implementing controlled blasting.	0	0
	Proper warning system before blasting will be adopted and clearance of the area before blasting will be ensured.	0	0
	Provision for Portable blaster shed	50,000	2,000
	NONEL Blasting will be practiced to control Ground vibration and fly rocks	0	65,000
Waste Management	Waste management (Spent Oil, Grease etc.,)	25,000	20,000
	Installation of dust bins	5,000	2,000
Mine Closure	Progressive closure activity-Surface runoff management (Provision for Garland drain)	2,90,023	5,000
	Progressive closure activity barbed wire fencing to quarry area will be provisioned	29,00,230	10,000
	Progressive closure activity greenbelt development 100 trees per one hectare	5,80,046	1,74,014
	Implementation of final mine closure activity as per approved mining plan on last year	0	0
	Contribution towardsm greenfund. As per TNMMCR 1959, Rule 35A	0	0
Implementation of EC, Mining Plan & DGMS Condition	Size 6' X 5' with blue background and white letters as mentioned in MoM Appendix II by the SEAC TN	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	58,005
	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	14,50,115	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
Total		**69,70,437**	**22,30,088**

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.

Follwing mitigation measures are proposed for the project:

- Usage of diamond wire saw cutting method instead of blasting
- Usage of Rock breaking powder (Ca(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:254 (Part) Pathalahalli Village, Karimangalam 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
Total No of Employees	**1170**

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 परिषद
QUALITY COUNCIL OF INDIA
Creating an Ecosystem for Quality

NABET

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

Valid up to
March 31, 2027

Mr. Ajay Kumar Jha
(Sr. Director, NABET)

Certificate No.
NABET/EIA/24-27/RA 0335

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.

Annexure

For

Proposed Black Granite Quarry

over an extent of 29.00.23 Ha

At

Survey No: 254 (Part)
Village: Pathalahalli
Taluk: Karimangalam
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/442957/2023, Dtaed: 11.09.2023

ToR: Lr No.SEIAA-TN/F.No.10401/SEAC/ToR-1599/2023 Dated: 06.11.2023

Baseline Period: March 2023 - May 2023

EIA Consultant & Laboratory

HUBERT ENVIRO CARE SYSTEMS (P) LTD, CHENNAI

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

NABL Certificate No: TC-12310 Dated: 25.09.2023 Valid Till 24.09.2025

February 2025

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Annexure-1

Annexure No - A

Industries, Investment Promotion & Commerce (MME.1) Department, Secretariat, Chennai – 600 009.

Letter No.3774153/MME.1/2022-1, Dated: 14.02.2023

From
Thiru S.Krishnan, I.A.S.,
Additional Chief Secretary to Government.

To
Tvl. Tamil Nadu Minerals Limited,
31, Kamarajar Salai,
TWAD House,
Chepauk, Chennai – 600 005.

Sir,

Sub: Industries, Investment Promotion & Commerce – Mines and Minerals – Minor Mineral – Black Granite – Dharmapuri District – Karimangalam Taluk – Pathalahalli Village – Over an extent of 29.00.23 hectares of Government land in S.F.No.254 (Part) – Quarry Lease Application preferred by Tvl.TAMIN – Precise Area Communicated – Approved mining Plan and Environmental Clearance – Called for.

Ref: 1. Your Quarry Lease Application dated: 19.06.2006.
2. From the District Collector, Dharmapuri, File Roc.No.276/2006(Mines), dated 01.11.2022.
3. From the Commissioner of Geology and Mining, File Rc.No.7377/MM4/2022, dated 18.12.2022.

****

I am directed to refer your quarry lease application first cited and to state that in the references second and third cited, the District Collector, Dharmapuri and the Commissioner of Geology and Mining respectively have recommended the quarry lease application for grant of quarry lease for quarrying Black Granite over an extent of 29.00.23 hectares of Government land in S.F.No.254 (Part) in Pathalahalli Village, Karimangalam Taluk, Dharmapuri District for a period of 20 years under Rule 8-C of the Tamil Nadu Minor Mineral Concession Rules, 1959.

2. The Government, after carefully examined the recommendations of the District Collector, Dharmapuri and the Commissioner of Geology and Mining, have decided to communicate precise area for over an extent of 29.00.23 hectares of Government land in S.F.No.254 (Part) in Pathalahalli Village, Karimangalam Taluk, Dharmapuri District and accordingly, the Government hereby communicate the above said area as Precise Area under sub-rule (3)(b) of Rule 8-C of the Tamil Nadu Minor Mineral Concession Rules, 1959 for grant of quarry lease.

3. I, therefore, request you to furnish the Approved Mining Plan for the above-mentioned Precise Area through the Commissioner of Geology and Mining within a period of 3 months as per sub-rule (3) (b) of Rule 8-C of the Tamil Nadu Minor Mineral Concession Rules, 1959 and to produce Environmental Clearance obtained from the competent authority for the above said area for grant of quarry lease subject to the following conditions:-

1) 50 m safety distance to the houses situated on the Eastern boundary of the applied area.

2) 10 m and 7.5 m safety distance should be provided to the adjoining Government and patta lands respectively. The quarrying operation should be restricted only in the area granted for lease.

3) Barbed wire fencing or compound wall should be erected all along the boundary of the lease granted area.

4) The waste materials generated during the course of quarrying should be dumped only within the lease hold area.

5) A green belt should be created by planting trees along the boundary of the area to control air and noise pollution.

6) As per rule 12 (V) of Mineral (other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016 the applicant firm shall at his own expenses erect, maintain and keep in repair of all boundary pillars.

7) Environment Clearance should be obtained from the competent authority in respect of the subject area as per rule 42 of Tamil Nadu Minor Mineral Concession Rules, 1959 and as per the notification of the Ministry of Environment and Forest and any other clearances if any.

8) The applicant company should submit Mining Due Clearance Certificate for the year 2017-18 before execution of lease deed and for the period from 2018-19 to 2022-23 after March, 2023 as per the G.O.(D).No.43, Industries (MME.1) Department, dated 16.05.2022 in which the Government has given exception to Tvl. TAMIN Limited for remittance of arrear dues to the Government.

9) The applicant company should fence the lease granted area with barbed wire before the execution of lease deed as follows:-

   - The pillar post shall be firmly grounded with concrete foundation of height not less than 2 meters with a distance between two pillars shall not be more than 3 meters.
   - The applicant company shall incorporate the DGPS readings for the entire boundary Pillars of the area and the same should be clearly shown in the mining plan.
   - A soft copy of the digitized map with DGPS readings should be submitted in the CD to the Assistant Director (G&M), Dharmapuri.

10) The conditions mentioned in G.O.(Ms).No.79, Industries (MMC.1) Department, dated 06.04.2015 should be complied with.

11) The applicant company should ensure that all the laborers are registered in the Labor Welfare Board and Insurance Scheme.

12) The applicant company should comply with the additional conditions stipulated in the Government of India, Ministry of Mines, order No.11/02/2020, dated 14.01.2020 issued as per the order of Hon'ble Supreme Court of India, dated 08.01.2020 which states that "The mining lease holders shall after ceasing mining operations, under take re-grassing the mining area and any other area which may have been disturbed due to this mining activities and restore the land to a condition which is fit for growth of fodder, flora and fauna etc."

13) The applicant company should carry out DGPS survey and erection of RCC boundary pillars as per the norms stipulated in the EOI notification in Rc.No.2921/MM4/2019 dated 01.02.2018 and subsequent corrigendum dated 13.08.2019 before execution of quarry lease.

14) Tvl. TAMIN Limited, Chennai - 05 shall produce current mining dues clearance certificate as per the affidavit filed along with this application, on grant of mining lease for this area but, before execution of lease deed.

15) The applicant company should submit latest Board of Directors details before execution of lease deed.

16) The District Collector, Dharmapuri shall obtain a sworn-in-affidavit from the applicant containing the above conditions before execution of lease deed and also ensure that the instructions issued in Government Letter No.12789/MMB.2/2002-7, Industries Department, Dated 09.01.2003 are complied with.

Yours faithfully,

15.2.2023

for Additional Chief Secretary to Government

14/2/2023

Copy to:
The Commissioner of Geology and Mining,
Guindy, Chennai – 600 032.

The District Collector,
Dharmapuri.

Annexure-2

DIRECTORATE OF GEOLOGY AND MINING

From
Thiru.L.Nirmal Raj, I.A.S.,
Director,
Department of Geology and Mining,
Guindy, Chennai - 600 032.

To
The Managing Director,
Tvl. TAMIN Ltd.,
No.31, Kamarajar Salai, TWAD House,
Chepauk, Chennnai -05.

Rc. No.7377/MM4/2022, dated: 28.08.2023

Sir,

Sub: Mines and Minerals – Minor Mineral – Black Granite – Dharmapuri district - Karimangalam taluk – Pathalahalli village - over an extent of 29.00.23 Ha of Government Porampoke land – S.F.Nos.254(Part) – A quarry lease application preferred by Tvl.TAMIN Ltd., Chennai – Precise area communicated by the Government – Mining Plan submitted by Tvl.TAMIN Ltd., Chennai – Recommended and forwarded by the Assistant Director(G&M), Dharmapuri – Approval accorded.

Ref:
1. Commissioner of Geology and Mining original file no. Rc.No.7377/MM4/2022 dated 18.12.2022 forwarded under single file system.
2. Government letter no. 3774153/MME.1/2022-1 dated 14.02.2023.
3. Tvl.TAMIN Ltd., Chennai letter Rc.No.301/ML3/2023 dated 04.05.2023.
4. The Assistant Director of Geology and Mining, Dharmapuri letter Rc.No.276/2006 (Mines), dated 27.06.2023.

****

Kind attention is invited to the above references cited.

2) A quarry lease application preferred by Tvl.TAMIN Ltd., for quarrying black granite over an extent of 29.00.23 ha of Government land in S.F.No.254 (Part) of Pathalahalli village, Karimangalam taluk, Dharmapuri district was forwarded to the Government by the Commissioner of Geology and Mining vide reference 1st cited for grant of quarry lease under rule 8-C of TNMMCR, 1959. Now, the Government letter dated 14.02.2023 have communicated the precise area to an extent of 29.00.23 ha and requested the applicant company to submit the approved mining plan to the Commissioner of Geology and Mining and to produce environmental clearance obtained from the competent authority for the subject area for grant of quarry lease.

3) Accordingly, the mining plan submitted by Tvl.TAMIN Ltd., has been forwarded and recommended by the Assistant Director, (G&M), Dharmapuri vide reference 4th for the subject area for approval.

4) On scrutinizing the mining plan submitted by Tvl.TAMIN Ltd., and the report of the Assistant Director (G&M), Dharmapuri, the following are submitted.

vi. The Assistant Director (G&M), Dharmapuri has reported that the draft mining plan is prepared by the Recognized Qualified Person and the details such as geological, mineable reserves, year wise production and development program have been incorporated in the draft mining plan.

vii. The proposed year wise production:

Year	ROM (cbm)	Production (m^3) @ 10% Recovery	Granite Waste @ 90% cbm
1st year	25000	2500	22500
2nd year	50000	5000	45000
3rd year	10000	1000	9000
4th year	10000	1000	9000
5th year	10000	1000	9000
Total	**1,05,000**	**10,500**	**94,500**

viii. As per the Mining plan submitted by Tvl.TAMIN Ltd., it is mentioned that the total mineable reserves @ 10% recovery is about 1,33,106 cbm for a total depth of 30 m. Production for first 5 years Mining plan period is 10,500 cbm at 10% recovery for a depth of 30 m.

ix. With regard to the dumping of waste during the Mining Plan period, it has been proposed to dump on the North east and south west side of the lease boundary area. The existing pit dimensions excavated under the strength of the earlier grant have been demarcated with the depth contour in the appended sketch enclosed with the mining plan.

x. The Assistant Director (G&M), Dharmapuri has recommended and forwarded the mining plan submitted by Tvl. Tamil Nadu Minerals Limited, Chennai for quarrying Black Granite over an extent of

29.00.23 ha in S.F.Nos.254 (part) of Pathalahalli village, Karimangalam taluk, Dharmapuri district to the Director of Geology and Mining, Chennai for approval.

5) The mining plan submitted by Tvl.TAMIN Ltd, and report of the Assistant Director (G&M), Dharmapuri have been examined with reference to the provisions of Rule 12, 13 and 15 of Granite Conservation and Development Rules, 1999 read with G.O.(Ms). No. 87, Industries (MMC.1), Department dated: 22.02.2001. Based on the recommendation of the Assistant Director (G&M), Dharmapuri the mining plan submitted by Tvl.TAMIN Ltd, is hereby approved subject to the following conditions in addition to the conditions stipulated in the precise area communication issued by the Government.

i. This mining plan is approved without prejudice to any other Law applicable to the quarry lease from time to time whether such Laws are made by the Central Government, State Government or any other authority.

ii. The approval of the mining plan does not in any way imply the approval of the Government in terms of any other provisions of the Mines and Minerals (Development and Regulation) Act 1957, or any other connected laws including Forest (Conservation) Act, 1980, Forest Conservation Rules, 1981, Environment Protection Act, 1980, Indian Explosives Act, 1884 (Central Act IV of 1884) and the rules made there under and the Tamil Nadu Minor Mineral Concession Rules, 1959.

iii. This mining plan including progressive mine closure plan is approved without prejudice to any other order or direction from any court of competent jurisdiction.

iv. Provisions of the Mines Act, 1952 and the Rules and Regulations made there under including submission of notice of opening, appointment of manager and other statutory officials as required under Mines Act, 1952 shall be complied with.

v. Provisions made under Mines and Minerals (Development & Regulation) Act, 1957, MMDR Amendment Act, 2015 and Granite

conservation and Development Rules, 1999 made there under shall be complied with.

vi. Relaxation to be obtained under Rule 106(2)(b) of Metalliferous Mines Regulations, 1961 from the Director of Mines Safety, if necessary.

vii. If anything is found to be concealed as required by the Granite Conservation and Development Rules, 1999 and Tamil Nadu Minor Mineral Concession Rules, 1959 and proposal for rectification has not been made, the approval shall be deemed to have been withdrawn with immediate effect.

viii. No blasting and transportation of materials in vehicles should be carried out from 7.00 PM to 5.00AM.

ix. A green belt should be constructed to prevent sound and air pollution due to the proposed quarrying activity by planting at least 250 seedlings all along the boundary the area.

x. No hindrance shall be caused to the adjacent Patta lands and Government poramboke lands if any while quarrying and transportation of granite.

xi. The applicant company shall strictly adhere to the statutory and safety requirements and the applicant company should ensure the periodical medical checkup to the quarry workers to safeguard them from quarry related diseases.

xii. The waste materials generated during the course of quarrying should be dumped only within the lease hold area that will be earmarked for the purpose in the mining plan as per rule 31 of GCDR, 1999.

xiii. The applicant company shall submit Scheme of Mining, mine closure plan and other statutory requirements within the time stipulated for submission of the above as per rules.

xiv. The applicant company should fence the lease granted area with barbed wire before the execution of lease deed as follows.

- The pillar post shall be firmly grounded with concrete foundation of height not less than 2 m with a distance between two pillars shall not be more than 3mts.

- The applicant company shall incorporate the DGPS readings for the entire boundary pillars of the area and the same should be clearly shown in the mining plan.
- A soft copy of the digitized map with DGPS readings should be submitted in CD to the Assistant Director (G&M), Dharmapuri.

xv. The boundary stone has to be fixed for the subject quarry should be fixed and the district administration / Geology and Mining Department should ensure that the quarrying operation should be restricted only within the area granted for lease.

xvi. Environment Clearance should be obtained from the competent authority in respect of the subject area as per rule 42 of Tamil Nadu Minor Mineral Concession Rules, 1959 and as per the notification of the Ministry of Environment and Forest and any other clearances if any.

xvii. As per rule 12 (v) of Mineral (other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016, the applicant company shall at his own expense, erect, maintain and keep in repair all boundary pillars.

xviii. The conditions mentioned in G.O No. 79 Industries Department dated 06.04.2015 should be complied with.

xix. The applicant company may use mild explosives during quarrying, and storing of explosives if required, by obtaining valid license under explosive Acts and Rules.

xx. If any violation is found during quarrying operation, the penal provisions of Tamil Nadu Minor Mineral Concession Rules 1959 and other rules and act in force will attract.

xxi. Child labour should not be engaged in the quarry works and the quarry workers should be enrolled in the insurance scheme through the Labour Department.

xxii. The applicant company should remit the Stamp Duty as per the approved modified mining plan during the currency of the lease period.

xxiii. The earlier instances of irregular / illegal quarrying, if any, shall not be regularized through the approval of this document.

xxiv. The lessee shall remit the penalty / cost of mineral / other dues if any as arrived by the District Collector / Assistant Director (G&M), Dharmapuri district.

xxv. Non adherence to any condition set-out above, the approval shall be deemed to have been withdrawn with immediate effect.

xxvi. The applicant should comply with the additional conditions stipulated in the Government of India, Ministry of Mines, Order No.11/02/2020, dated.14.01.2020 issued as per the Order of the Hon'ble Supreme Court of India, dated.08.01.2020 states that, "The Mining lease holders shall after ceasing mining operations, undertake re-grassing the mining area and any other area which may have been disturbed due to their mining activities and restore the land to a condition which is fit for growth of fodder, flora, fauna etc".

xxvii. The applicant company should carry out DGPS survey and erection of RCC boundary pillars as per the norms stipulated in the EOI notification in Rc.No.2921/MM4/2019 dated.01.02.2018 and subsequent corrigendum dated 13.08.2019 and using the agencies empanelled by the Commissioner of Geology and Mining on 01.03.2023.

Sd/- L. Nirmal Raj
Director of Geology and Mining

Forwarded/By Order

Additional Director

Copy to:

1. The Additional Chief Secretary
to Government,
Natural Resources Department,
4th Floor, Secretariat, Chennai-9.

MINING PLAN FOR
PATHALAHALLI BLACK GRANITE QUARRY

District	:	Dharmapuri
Taluk	:	Karimangalam
Village	:	Pathalahalli
SF. No.	:	254 (Part)
Extent	:	29.00.23Ha.

(UNDER RULE 12 & 13 OF GCDR, 1999)

APPLICANT:

TAMIN

M/s. TAMIL NADU MINERALS LIMITED,
(An Undertaking of Government of Tamil Nadu)
No.31, KAMARAJAR SALAI,
CHEPAUK, CHENNAI – 600 005.

Name of the RQP	:	Dr. E.GANESAN, Ph.D, PGDELP.
Designation	:	DEPUTY MANAGER, TAMIN
Mobile No	:	94888 55535

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DECLARATION BY NOMINATED OWNER

Certified that the Mining Plan in respect of Pathalahalli Village SF.No.254(Part) over an extent of 29.00.23Ha Black Granite Quarry of Pathalahalli Village, Karimangalam Taluk, Dharmapuri District, Tamil Nadu State has been prepared in full consultation with me and I understood its contents and agree to implement the same in accordance with the law. The Mining plan has been prepared by Dr.E.Ganesan, a Recognized Qualified Person.

I hereby undertake that all the modifications as made in the Mining Plan by the RQP are deemed to have been made with my knowledge and consent and shall be acceptable to me and binding on me in all respects.

I request you to make further correspondences regarding the modifications of the Mining Plan with the said Recognized Qualified Person in the following address:

Dr. E. Ganesan, Ph.D, PGDELP
Deputy Manager (Mining Lease),
Recognized Qualified Person
Tamil Nadu Minerals Limited,
No.31, Kamarajar Salai,
Chepauk, Chennai-600 005.

SUDEEP JAIN, I A S.,
MANAGING DIRECTOR

CERTIFICATE FROM THE RECOGNIZED QUALIFIED PERSON

This is to certify that the provisions of Granite Conservation and Development Rules, 1999 and as amended in Tamil Nadu Minor Mineral Concession Rules, 1959 (Amendment) have been observed in the preparation of Mining Plan for Pathalahalli Black Granite Quarry over an total extent of 29.00.23Ha in SF.No.254 (Part) of Pathalahalli Village, Karimangalam Taluk, Dharmapuri District, Tamil Nadu State has been prepared for

M/s. Tamil Nadu Minerals Limited,
No.31, Kamarajar Salai,
Chepauk, Chennai- 600 005.

Wherever specific permissions/exemptions/relaxations and approvals are required, the applicant will approach concerned authorities of Commissioner of Geology and Mining, Government of Tamil Nadu, Guindy, Chennai for such permissions/exemptions/relaxations and approvals.

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

Place: Chennai
Date:

Dr. E.GANESAN, Ph.D., PGDELP
Qualified Person,
Tamil Nadu Minerals Limited
Chennai - 600 005.

INTRODUCTION:

Tamil Nadu Minerals Limited was established in the year 1978 to carryout systematic mining and development of different minerals all over the State.

The present Mining Plan has been prepared for quarrying Black Granite (Dolerite) over an total extent of 29.00.23Ha in SF.No.254 (Part) of Pathalahalli Village, Karimangalam Taluk, Dharmapuri District Tamil Nadu State for 20 years for which precise area communication has been granted vide Government Industries, Investment Promotion & Commerce (MME.1) Department, Letter No.3774153/MME.1/2022-1, dated:14.02.2023.

PART-I

1.0. MINING PLAN:

Name of Mine:

Pathalahalli SF.No.254 (Part) Black Granite Quarry.

1.2 Particulars of Approval of Mining Plan under GCDR (indicate approval No. and date):

As the subject area is fresh lease, the question of approval of mining does not arise at this stage.

1.3 Date of commencement of Mining Operations:

Will be intimated after execution of the lease deed under rule 8-C(5)(c) of the Tamil Nadu Minor Mineral Concession Rules, 1959.

1.4 (a) Deficiencies, if any that existed in the approved Mining Plan to be taken note of and rectified by incorporating suitable proposal for implementation in the Scheme of Mining:

Not applicable at this stage as it is a fresh lease.

1.4(b) Review of Compliance of salient features of Mining Plan on chapter-wise basis bringing out marked deviations, if any and justifications/ reasons thereof. Items to be covered may include exploration, mine development, exploitation, afforestation programme, reclamation and rehabilitation, control of dust, noise and ground vibration and any other significant feature:

(1) Exploration:

All the parameters required for commercial exploitation of Black Granite such as Occurrence, Geological Reserves, Colour, Textural Factors and Recovery Percentage etc, have already been established through the actual mining in this area past 20years. Therefore, no other exploration study has not been proposed to be undertaken ensuing Mining plan period in respect of Black Granite mining.

(2) Mine Development:

Sl. No	Year Pertaining to	Proposed generation of waste in the Mining Plan(M^3)		
		Over Burden	Side Burden	Granite Rejects @ 90% (M^3)
1.	First	10647	--	22500
2.	Second	13230	4320	45000
3.	Third	--	--	9000
4.	Fourth	1251	--	9000
5.	Fifth	1871	--	9000
Total		**26999**	**4320**	**94,500**

(3) Exploitation: (Production)

Sl. No	Year pertaining to	ROM Proposed in the Mining Plan (M^3)	Saleable proposed @ 10% (M^3)
1.	First	25000	2500
2.	Second	50000	5000
3.	Third	10000	1000
4.	Fourth	10000	1000
5.	Fifth	10000	1000
	Total	**1,05,000**	**10,500**

(4) Progressive quarry closure Plan:

As a Petrogenetic character, the depth persistence of the Black granite body in the mine area is beyond the workable limits. However, it is very difficult to operate granite dimensional stone mine economically below an average depth of 30m by observing the statutory provisions of Mine Safety Rules and Regulations. Hence in the proposed Mining Plan, only 30m 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 30m 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 30m depth. The pit boundaries shall be safely fenced and used for agricultural purpose when the pit is filled with underground see page or rain waters.

(5) Control of Dust, Noise and Ground Vibrations:

The quarrying operation is being carried out by semi-mechanized method with deployment of HEMM for development and production activities. Dust will be suppressed by adopting wet drilling method and water sprinkling in the haul road. As expansion rock breaking powder is using for splitting rock the noise level will be reduced. As TAMIN is using Milli Second Delay Detonator (MSDD) for blasting, the vibration observed in this quarry is negligible.

Ground Water:

Average ground water table of this area is 11.3m from ground level whereas, TAMIN has proposed to operate the mine up to the depth of 30m from top of the hill. Total height of the hillock is 160m from ground level. Hence, there is no possibility to intersect the ground water table during the course of mining operation.

Significant Features:

TAMIN closely monitored the environmental factors systematically without degrading the land, water and air.

1.4(c) Review of the compliance position of conditions and stipulations imposed, if any, while approving the Mining Plan. In case of non-compliance / partial compliance, detailed justification reasons thereof may be furnished along with proposal for compliance in the ensuing period:

TAMIN always carries out its mining operations in conformity with the above Acts and Rules.

1.4(d) Review of compliance of violations pointed out after inspections made under GCDR, 1999 during last 5 years. The position emerging out of the yearly review of the Mining Plan while checking up implementation of the Mining Plan in the field shall also be taken note of at this stage:

At this stage not applicable

1.4(e) Any other points requiring attention in the interest of proper mine design, development and conservation and environment and ecology of the area:

The proposed mine working is so designed in such a way mainly keeping in view of conservation of mineral, afforestation, environment, and ecology of the mine area.

***

PART – II

2.0. PROPOSAL UNDER MINING PLAN FOR THE 5 YEARS.

2.1 Name and Address of the Lessee:

Name	:	M/s.Tamilnadu Minerals Limited,
Address	:	No. 31, Kamarajar Salai, Chepauk, Chennai - 600 005. Tamil Nadu State.
Phone	:	044-2989 2018
e.Mail	:	tamin@tamingranites.com

2.2 Name and address, registration number of the recognized persons together with validity date / person employed under Rule 13 of GCDR1999 who has prepared the Mining Plan:

RQP Certificate Enclosed.

2.3 Mineral (s) to be mined:

To mine the Dolerite Dyke commercially known as 'Pathalahalli Black'.

2.4 Area and date of expiry of lease:

Details of Lease Area	Date of expiry of lease
Pathalahalli Black Granite Quarry over an extent of 29.08.23Ha in SF.No.254 (Part) of Pathalahalli Village, Karimangalam Taluk, Dharmapuri District, Tamil Nadu State.	Will be informed after execution of lease deed

2.5 Date of expiry of 5 year period for which Mining Plan approved on the last occasion:

Not applicable at this stage

3.0. RESERVES:

3.1 Category-wise (Proved, Probable and Possible) Reserves Estimated in the earlier Mining Plan with grades:

Sl. No	Updated Geological Reserves as on 03.03.2023	Updated Mineable Reserves as on 03.03.2023	Mineable Saleable Reserves @10% Recovery
1.	15,59,462	13,31,059	1,33,106

The above estimations arrived at on the basis of geological cross sections updated as on 03.03.2023.

3.2 Depletion of Reserves:

Nil. At this mining plan state.

3.3 Additional reserves established category wise (with basis and parameters considered):

No additional reserves.

3.4 Category wise updated reserve with grade (indicate and use grade with analysis) as well as marginal grades:

Sl. No	Updated Geological Reserves as on 03.03.2023	Updated Mineable Reserves as on 03.03.2023	Mineable Saleable Reserves @10% Recovery
1.	15,59,462	13,31,059	1,33,106

The above estimations arrived at on the basis of geological cross sections updated as on 03.03.2023.

4.0. CONCEPTUAL MINING PLAN:

a) Anticipated Life of the Quarry:

Updated Mineable Reserves : 13,31,059 M^3

Anticipated Life of the Quarry : 26.62 @ 27 years.

b. Depicted on Mine Geological Plans and sections with necessary statement annexed supported by essential text, covering the basic & long term design features of mine covering exploration, mine development, optimum exploitation & utilization of the mineral, waste & sub-grade mineral management, and environmental aspects. The ensuing five year detailed programme should but be a part of the conceptual overall Mining Plan.

i) Mine Year wise Production:

Year	ROM(M^3)	Recovery @10%(M^3)	Granite Waste @90% (M^3)
First	25000	2500	22500
Second	50000	5000	45000
Third	10000	1000	9000
Fourth	10000	1000	9000
Fifth	10000	1000	9000
Total	**1,05,000**	**10,500**	**94,500**

ii) Optimum exploitation and utilization of the Mineral:

The optimum quantity of mineable reserves as ROM is 13,31,059M^3.

iii) Waste and sub-grade Mineral Management:

The dumps will be maintained not exceeding 5m height and the angle of slope of dumps will be at 45^0 from horizontal. The waste dump has been earmarked in the Plate No. 4.

iv) Environmental Aspects:-
Afforestation Programme:

TAMIN will get Environmental Clearance (EC) from the SEIAA as directed by the Govt after approval of this mining plan and necessary native species of sapling will be planted as per the EC letter.

The quarrying operation is being carried out by semi-mechanized method with deployment of HEMM for development and production activities.

Ultimate Pit dimensions of the Quarry at top and bottom are tabulated below:

Sl. No.	Section line	Ultimate Pit Dimensions at Top (m)		Ultimate Pit Dimensions at Bottom (m)		
		A.Length	A.Width	A.Length	A.Width	A.Depth
1	PQ – A-A',B-B',C-C', D-D,E-E',F-F',G-G', H-H',I-I' & J-J'.	917	96	869	55	30

5.0 MINING:

5.1 Salient Description of the present mining methods:

The Quarrying work being carried out under the direct supervision of our Statutory Mining Personal of TAMIN as approved by the DGMS under MMR,1961.

5.2 Yearly pit-wise development plan proposed for the next five years, depicted on plans and sections (ore and overburden to be shown clearly along with geological formations encountered depicting also the design and layout of the mine benches in case of opencast mining).

It has been discussed in chapter 4.0 b i)

5.3 Yearly pit-wise development plan proposed for next five years along with grade. Blending proposal, if any, may be indicated:

Nil

Details of depth and benches proposed during the Mining Plan Period:

Year	Section	R.L Proposed (m)	Depth Details(m)				No. of Benches
			Present	Proposed	Remaining	Total	
First	PQ&AB	633.813to615.813	0	18.00	12.00	30.00	2
Second	PQ&CD	615.813to603.813	8.20	12.00	9.80	30.00	2
Third	PQ&AB	615.813to609.813	18.00	6.00	6.00	30.00	1
Fourth	PQ&EF	609.813to603.813	5.10	6.00	18.90	30.00	1
Fifth	PQ&GH	610.000to597.300	0	12.70	17.30	30.00	2

5.4 Any change in proposed method of mining and deployment of machinery, together with reasons thereof:

The quarrying operation is being carried out by semi-mechanized method with deployment of HEMM for development and production activities under Regulation 106

6.0. HANDLING OF WASTE /SUB- GRADE MATERIAL:

6.1 Rate of yearly generation of waste and proposals for disposal of waste for next five years. (indicate sequence of dumping with necessary plan and sections)

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 area for disposal of waste rock has been identified in North East and South West side of the lease area. The unsold blocks are kept within the boundary on the country rock area.

6.1.1 Build-up of dumps from year to year to be shown in yearly plans and sections with description of the method & manner of disposal of waste rock, designed capacity & height of individual dumps and precautions envisaged for confinement of the dumps together with design details of the protective works:

The dumps will be maintained not exceeding 5m height and the angle of slope of dumps will be at 45^0 from horizontal. The waste dump has been earmarked in the Plate Nos. 4.

6.2 Rate of yearly generation of sub-grade mineral with reference to threshold values and proposals for stacking for next five years. (Submit necessary plan/sections.) (In case variations from the recommended threshold values of IBM, please give adequate justification and reasons).

There is no sub-grade mineral produced. Commercial and small blocks are also proposed to be sold while handling granite waste.

6.3 Quantity and grade of sub-grade material available at the mine as on date duly supported by plans & sections and descriptive statement inclusive of the precautions adopted for storage.

-Not Applicable-

7.0. USE OF MINERAL:

7.1 Changes proposed in the use of mineral, if any, with reasons:

TAMIN will sell dimensional blocks and waste as per Government approvals in place.

7.2 Changes in the specification, if any, imposed by the user industries and or specifications required in the case of new user industries, if any, to be given:

As mentioned above there is no change in specification imposed by the user industries.

7.3 Efforts made for utilization of the sub-grade mineral including fines:

Commercial blocks and small blocks will also be sold in addition to defect free blocks.

8.0. MINERAL BENEFICIATION:

8.1 Results of any beneficiation investigations conducted and changes made in existing mineral beneficiation plant and tailing disposals, if any, with benefits expected (necessary) flow - sheet and tailing dam designs etc., to be submitted as applicable:

- Not Applicable –

8.2 Beneficiation test done, if any, on sub-grade mineral including fines and proposals for installation of new or additional beneficiation facility, if any (furnish process details in brief along with expected tailings loss):

- Not Applicable –

9.0. ENVIRONMENTAL MANAGEMENT PLAN:

The following observations are made for Environmental Management Plan:

i) Existing land use pattern:

The lease area generally manifests undulating topography with low lying plain agricultural lands. The altitude of the area is 630m (Maximum) above MSL and the area receives normal rainfall of about 985mm.

ii) Land Reclamation & Rehabilitation:-

The mine-pit will be utilized as a water reservoir for agriculture purpose.

iii) Waste Dump management:-

The waste can be dumped on North East and South West side of the lease boundary.

10.0. ANY OTHER INFORMATION:

- NIL -

Date:

Dr. E.GANESAN, Ph.D., PGDELP
Qualified Person,
Tamil Nadu Minerals Limited
Chennai - 600 005.

DIRECTOR
28/8/2023
Department of Geology & Mining
Guindy, Chennai - 600 032.

24/8/2023

This Mining Plan is Approved Subject to the Conditions/ Stipulation indicated in the Approving Plan Approval Letter No/ 7377/mms/2022 Dated

Annexure No - A

Industries, Investment Promotion & Commerce (MME.1) Department, Secretariat, Chennai – 600 009.

Letter No.3774153/MME.1/2022-1, Dated: 14.02.2023

From
Thiru S.Krishnan, I.A.S.,
Additional Chief Secretary to Government.

To
Tvl. Tamil Nadu Minerals Limited,
31, Kamarajar Salai,
TWAD House,
Chepauk, Chennai – 600 005.

Sir,

Sub: Industries, Investment Promotion & Commerce – Mines and Minerals – Minor Mineral – Black Granite – Dharmapuri District – Karimangalam Taluk – Pathalahalli Village – Over an extent of 29.00.23 hectares of Government land in S.F.No.254 (Part) – Quarry Lease Application preferred by Tvl.TAMIN – Precise Area Communicated – Approved mining Plan and Environmental Clearance – Called for.

Ref: 1. Your Quarry Lease Application dated: 19.06.2006.
2. From the District Collector, Dharmapuri, File Roc.No.276/2006(Mines), dated 01.11.2022.
3. From the Commissioner of Geology and Mining, File Rc.No.7377/MM4/2022, dated 18.12.2022.

****

I am directed to refer your quarry lease application first cited and to state that in the references second and third cited, the District Collector, Dharmapuri and the Commissioner of Geology and Mining respectively have recommended the quarry lease application for grant of quarry lease for quarrying Black Granite over an extent of 29.00.23 hectares of Government land in S.F.No.254 (Part) in Pathalahalli Village, Karimangalam Taluk, Dharmapuri District for a period of 20 years under Rule 8-C of the Tamil Nadu Minor Mineral Concession Rules, 1959.

2. The Government, after carefully examined the recommendations of the District Collector, Dharmapuri and the Commissioner of Geology and Mining, have decided to communicate precise area for over an extent of 29.00.23 hectares of Government land in S.F.No.254 (Part) in Pathalahalli Village, Karimangalam Taluk, Dharmapuri District and accordingly, the Government hereby communicate the above said area as Precise Area under sub-rule (3)(b) of Rule 8-C of the Tamil Nadu Minor Mineral Concession Rules, 1959 for grant of quarry lease.

3. I, therefore, request you to furnish the Approved Mining Plan for the above-mentioned Precise Area through the Commissioner of Geology and Mining within a period of 3 months as per sub-rule (3) (b) of Rule 8-C of the Tamil Nadu Minor Mineral Concession Rules, 1959 and to produce Environmental Clearance obtained from the competent authority for the above said area for grant of quarry lease subject to the following conditions:-

1) 50 m safety distance to the houses situated on the Eastern boundary of the applied area.

2) 10 m and 7.5 m safety distance should be provided to the adjoining Government and patta lands respectively. The quarrying operation should be restricted only in the area granted for lease.

3) Barbed wire fencing or compound wall should be erected all along the boundary of the lease granted area.

4) The waste materials generated during the course of quarrying should be dumped only within the lease hold area.

5) A green belt should be created by planting trees along the boundary of the area to control air and noise pollution.

6) As per rule 12 (V) of Mineral (other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016 the applicant firm shall at his own expenses erect, maintain and keep in repair of all boundary pillars.

7) Environment Clearance should be obtained from the competent authority in respect of the subject area as per rule 42 of Tamil Nadu Minor Mineral Concession Rules, 1959 and as per the notification of the Ministry of Environment and Forest and any other clearances if any.

8) The applicant company should submit Mining Due Clearance Certificate for the year 2017-18 before execution of lease deed and for the period from 2018-19 to 2022-23 after March, 2023 as per the G.O.(D).No.43, Industries (MME.1) Department, dated 16.05.2022 in which the Government has given exception to Tvl. TAMIN Limited for remittance of arrear dues to the Government.

9) The applicant company should fence the lease granted area with barbed wire before the execution of lease deed as follows:-

   - The pillar post shall be firmly grounded with concrete foundation of height not less than 2 meters with a distance between two pillars shall not be more than 3 meters.
   - The applicant company shall incorporate the DGPS readings for the entire boundary Pillars of the area and the same should be clearly shown in the mining plan.
   - A soft copy of the digitized map with DGPS readings should be submitted in the CD to the Assistant Director (G&M), Dharmapuri.

10) The conditions mentioned in G.O.(Ms).No.79, Industries (MMC.1) Department, dated 06.04.2015 should be complied with.

11) The applicant company should ensure that all the laborers are registered in the Labor Welfare Board and Insurance Scheme.

12) The applicant company should comply with the additional conditions stipulated in the Government of India, Ministry of Mines order No.11/02/2020, dated 14.01.2020 issued as per the order of Hon'ble Supreme Court of India, dated 08.01.2020 which states that "The mining lease holders shall after ceasing mining operations, under take re-grassing the mining area and any other area which may have been disturbed due to this mining activities and restore the land to a condition which is fit for growth of fodder, flora and fauna etc."

13) The applicant company should carry out DGPS survey and erection of RCC boundary pillars as per the norms stipulated in the EOI notification in Rc.No.2921/MM4/2019 dated 01.02.2018 and subsequent corrigendum dated 13.08.2019 before execution of quarry lease.

14) Tvl. TAMIN Limited, Chennai - 05 shall produce current mining dues clearance certificate as per the affidavit filed along with this application, on grant of mining lease for this area but, before execution of lease deed.

15) The applicant company should submit latest Board of Directors details before execution of lease deed.

16) The District Collector, Dharmapuri shall obtain a sworn-in-affidavit from the applicant containing the above conditions before execution of lease deed and also ensure that the instructions issued in Government Letter No.12789/MMB.2/2002-7, Industries Department, Dated 09.01.2003 are complied with.

Yours faithfully,

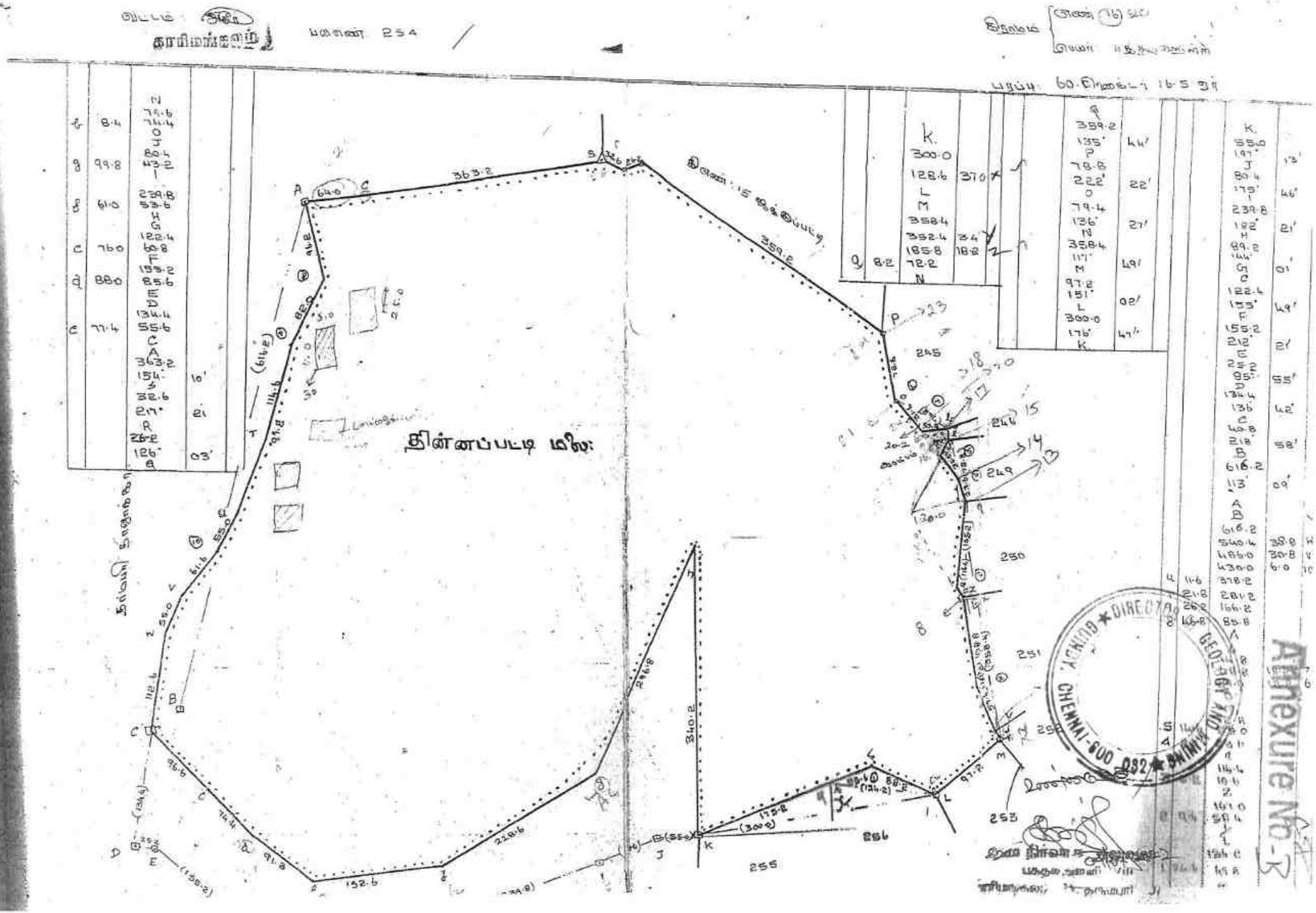
15.2.2023

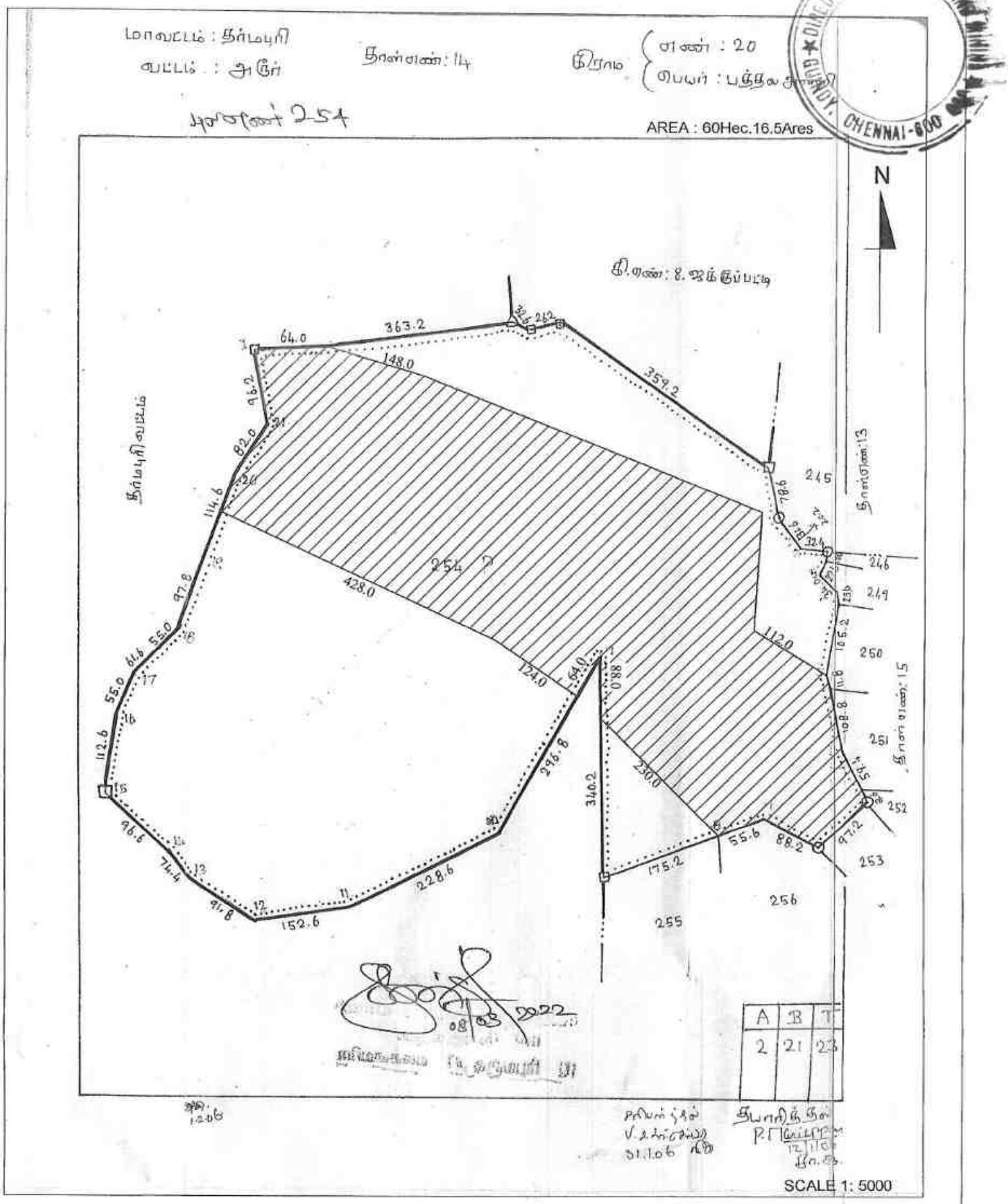
for Additional Chief Secretary to Government

16/2/2023

Copy to:
The Commissioner of Geology and Mining,
Guindy, Chennai – 600 032.

The District Collector,
Dharmapuri.


தின்னப்பட்டி மேல்
Annexure No-2



INDEX

Area to be processed as Fresh lease for 20 years.
SF.No - 254 (Part)
Extent - 29.00.23Ha.

1	2	3	4	5	6	7	8	9	10		
							ஏ. ஹெ. ஏர்ஸ்		ரூ. பை.		
	1A	252-8பா	ச	பு	—	8-2	4	2 77	0 25.5	0 71	374 மு. முக்கப்பன்
	8B	-8பா	ச	பு	—	8-2	4	2 77	0 05.0	0 14	73 மு. காளியப்பன்.
	8C	-8பா	ச	பு	...	8-2	4	2 77	0 01.5	0 06	582 மு. முக்கப்பன் (1) மு. காளியப்பன் (2) கிணறு 1
	8D	-8பா	ச	பு	...	8-2	4	2 77	0 01.5	0 06	374 மு. முக்கப்பன்
	8E	-8பா	ச	பு	—	8-2	4	2 77	0 07.5	0 21	374 மு. முக்கப்பன்
	8F	-8பா	ச	பு	...	8-2	4	3 77	0 09.5	0 26	73 மு. காளியப்பன்
	9	-9	ச	பு	...	8-2	4	2 77	0 51.5	1 42	322 க. பொன்னுசாமி
									3 45.0	9 58	
53		253	அ	தரை	...			—	1 93.5		... கல்லாங்குத்து
54		254	அ	தரை	...				60 16.5		... பாறை
55	1A	255-1பா	ச	பு	...	8-2	4	2 77	0 17.0	0 47	29 மு. ஆதிமூலம்
	1B	-1பா	ச	பு	...	8-2	4	2 77	0 27.5	0 75	323 மு. பொன்னுசாமி
	1C	-1பா	ச	பு	...	8-2	4	2 77	0 07.5	0 21	583 மு. ஆதிமூலம் (1) மு. பொன்னுசாமி (2) கிணறு 1
		-1பா	ச	பு	—	8-2	4	2 77	0 15.5	0 43	29 மு. ஆதிமூலம்
	1E	-1பா	ச	பு	...	8-2	4	2 77	0 05.0	0 14	323 மு. பொன்னுசாமி

ஆம் பசலியில் .... மாவட்டம் .... வட்டம் .... கிராமத்தில் வருடவாரி புலவாரி கைப்பற்று சாகுபடி அடங்கல் கணக்கு

நிலவரித்திட்டத்தின் படி புலன்களின் விபரம்: நில அளவை எண் (1)	உட்பிரிவு எண் (2)	பரப்பு (3)	தீர்வை (4)	ஒரு போகம் அல்லது இரு போகம் (5)	கைப்பற்று தாரருடைய பெயரும் எண்ணும் அல்லது அனுபோக தாரருடைய பெயர் (6)	சாகுபடியாகாத பரப்பு: நிலத்தின் எந்த பகுதியாவது சாகுபடியாகாமல் பயிரிடப்படாதது (7)	முதல்போகம்: எந்த மாதத்தில் பயிர் செய்யப்பட்டது எந்த மாதத்தில் அறுவடை செய்யப்பட்டது (8)	பயிரின் பெயர் (9)	பயிரான/அறுவடையான பரப்பு (10)	உண்மையான பாய்ச்சல் ஆதாரம் (11)	விளைச்சல் அளவு விகிதம் (12)	இரண்டாவது போகம்: எந்த மாதத்தில் பயிர் செய்யப்பட்டது எந்த மாதத்தில் அறுவடை செய்யப்பட்டது (13)	பயிரின் பெயர் (14)	பயிரான/அறுவடையான பரப்பு (15)	உண்மையான பாய்ச்சல் ஆதாரம் (16)	விளைச்சல் அளவு விகிதம் (17)	கிராம அலுவலரின் குறிப்புகள் :(1) புலன்களின் பகுதிகளில் மட்டும் பயிரிடப்பட்ட இனங்களில் எல்லைகள் அளவில் (2) கைப்பற்றில் இல்லாத நிலங்களின் சாகுபடியின் பரப்பு தன்மையும் (3) முந்தைய மாதத்தில் பாய்ச்சல் உதவியின்றி பயிரிடப்பட்டவை என்று பதிவாகியுள்ள நிலங்களுக்கு மாதங்களில் நீர் பாய்ச்சப்பட்ட விவரங்கள் (18)	கீழ்கண்ட வகையில் பயிரிடப்படாது உள்ள நிலத்தின் தன்மை மற்றும் பரப்பின் விவரங்கள் ஒவ்வொரு நிலஅளவை எண் அல்லது அதன் பகுதியில்: (அ)வனம், (ஆ) பயனற்ற பயிர் செய்ய இயலாத நிலம், (இ)விவசாய மற்றும் இதர காரியங்களுக்கு பயன்படுத்தப்படும் நிலம், (ஈ)பயிரிடத் தக்க தரிசு, (உ)நிலையான புல் தரைகளும் மற்றும் இதர மேய்ச்சல் நிலங்களும், (ஊ)விதைக்கப்பட்ட நிகர பரப்பில் சேர்க்கப்படாத மரவகைப் பயிர்களும் தோப்புகளும், (எ)நடப்பு தரிசுகள், (ஏ)இதர தரிசு நிலங்கள் (18அ)	குறிப்பு (19)
238	13	0.00.20										STT					நிலை நக்கம்	[illegible]	[signature]
239 239 240 243	-	0160 0340 0265 0.31.50			2A பெரியசாமி [illegible] 0040								பெரியசாமி		புளி		[illegible]	[illegible]	[signature]
													அகிம்சை		புளி-1		[illegible]	[illegible]	
245	-	[illegible]															ஓடை	ஓடை [illegible]	[signature]
246	-	0.41.50															[illegible]		
247	-	0.31.00															பாறை	பாறை [illegible]	[signature]
248	-	0.22.50										STT	நாகராஜ்		[illegible]-6		[illegible]	[illegible]	[signature]
253 254	- -	[illegible] 6065											"		புளி-4		பாதை	[illegible]	[signature]
262	2	0.61.50			2D அமலம் 0020 நாகலிங்கம் 0040 பழனி 0020 செல்வம் 0020												[illegible] கோவில்		[signature]
263	1	0.01.00															விநாயகர் கோவில்	[illegible]	[signature]
264	3C	0.07.00															பாறை	பாறை [illegible]	[signature]
264	7B2	0.05.50															பாறை	பாறை [illegible]	[signature]
		2.01.70																	

[signature]
கிராம நிர்வாக அலுவலர்
பகுதி அலுவலர்
ஏரியலகாக. [illegible]

Annexure No [illegible]

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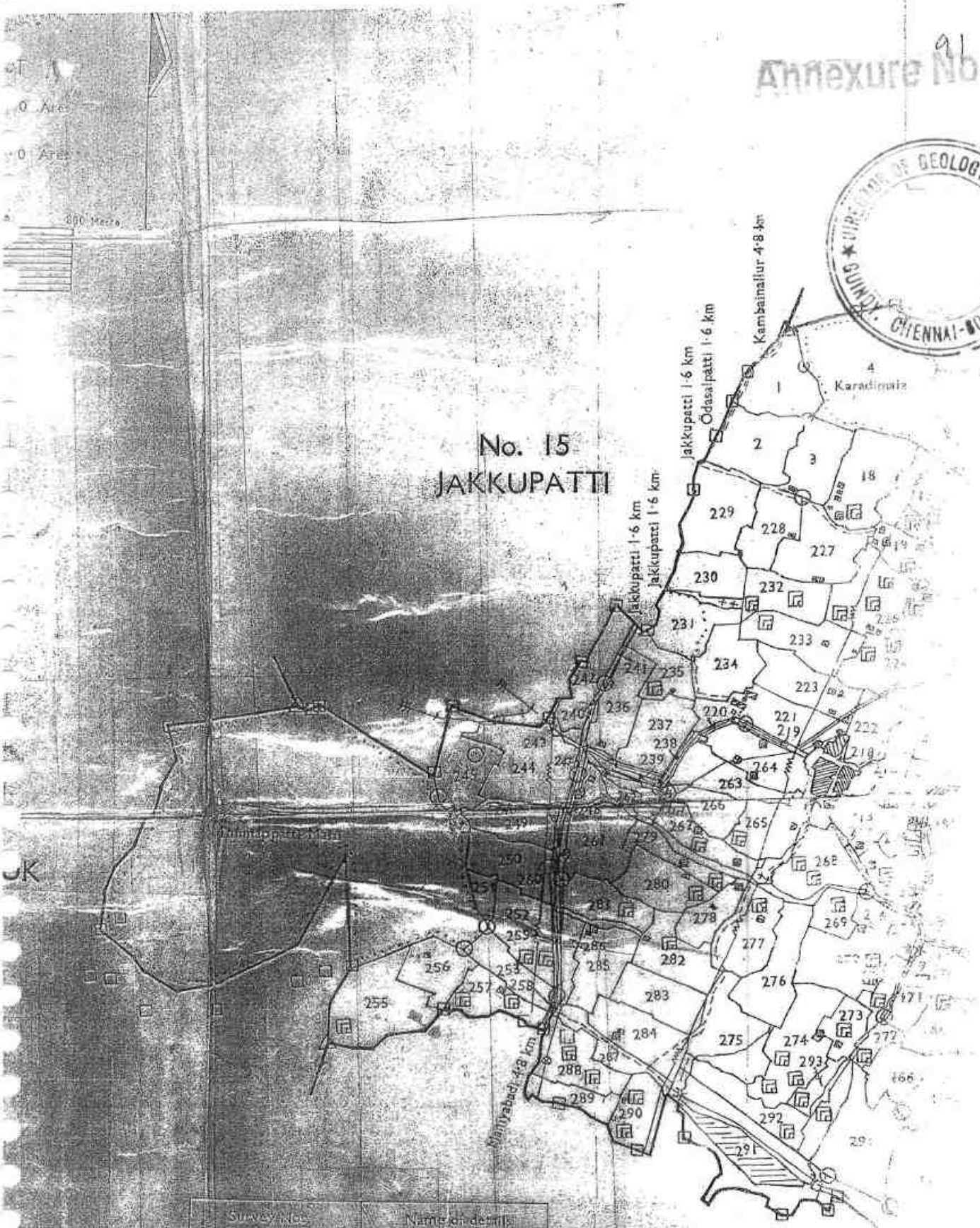
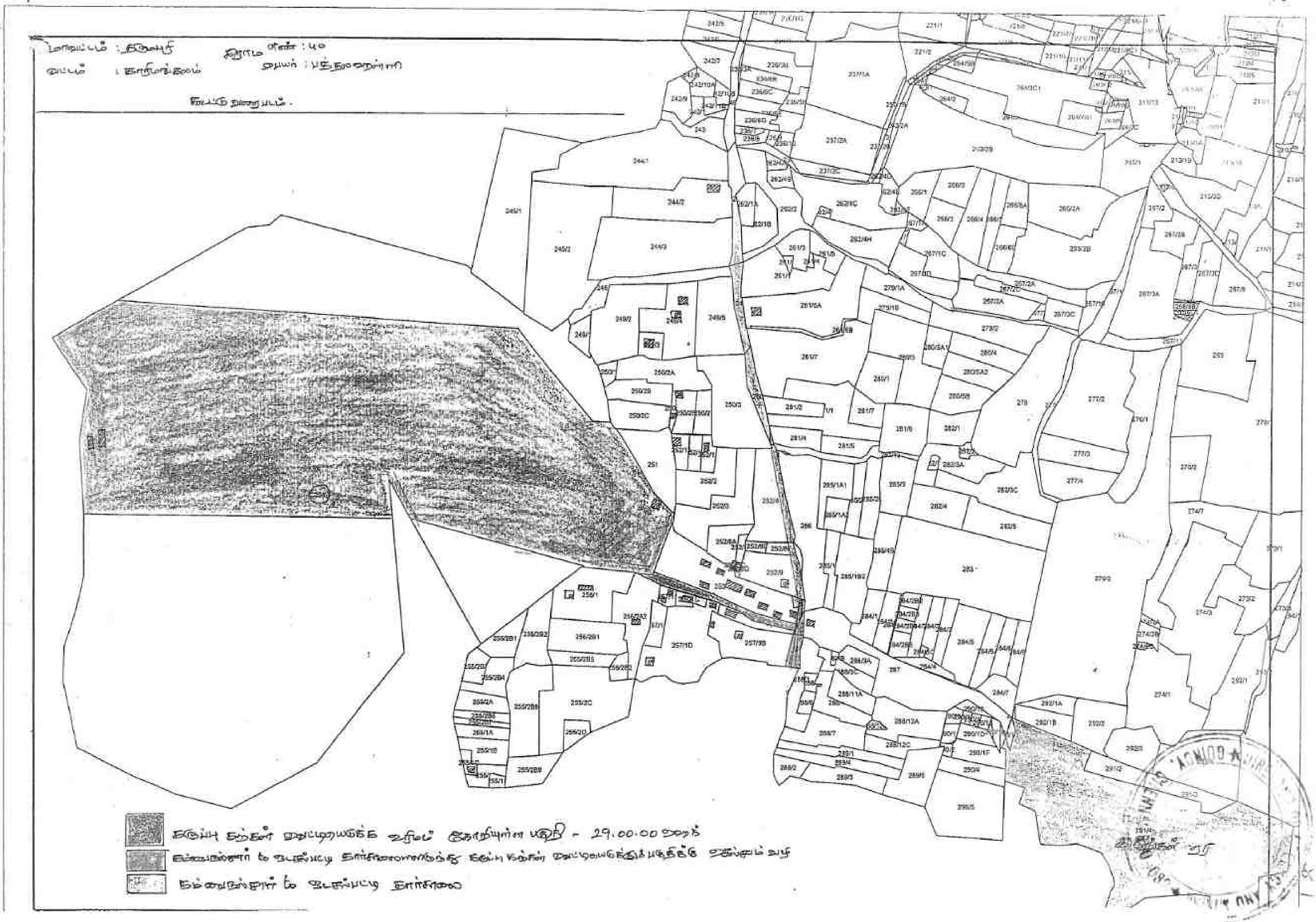
Annexure No-E




எண் : 40
- 29.00.00

Annexure No -F

Tamil Nadu Minerals Limited
(A Government of Tamil Nadu Undertaking)

Tel : 044-29862018 / 28510072
Fax : 91-44-2852 4960
E-mail : tamin@taminggranites.com
GSTIN. : 33AABCT2250P1ZA

Regd. Office : No. 31, Kamarajar Salai, "TWAD House" Chepauk, Post Box No. 2961, Chennai - 600 005.

Rc.No.9456/ML1/2017 **Dated:03.11.2022**

TO WHOM SO EVER IT MAY CONCERN

This is to certify that Shri.E.Ganesan is working as Deputy Manager (Mining Lease) in Tamil Nadu Minerals Limited, Chennai. His qualification and experience in given below.

1. Name : E.Ganesan
2. Qualification : i.M.Sc.(Geology)
   ii.M.B.A
   iii.Second Class Manager
   Certificate of Competency (Restricted)
   Certificate No.SMR/5390, date: 06.05.2014
3. Experience :

Sl. No	Name of the project	Designation	Nature of work	Period	Total period
1.	Sivaganga Graphite Mine	Project Officer (Trainee)	Mining Geologist & over all mining supervision	23.06.1993 to 23.06.1994	Years : 01 Month: 00 Days : 00
2.	- Do -	Project Officer	- Do -	24.06.1994 to 09.07.1997	Years : 03 Month: 00 Days : 15
3.	Lakmana Naicken Patti Quartz& Feldspar Mine	Project Officer	Mining Geologist & over all mining supervision in statutory capacity	03.05.2002 to 23.08.2002	Years : 00 Month: 03 Days : 20
4.	Periyanagalur Limestone Mine	Divisional Manager I/c	- Do -	17.10.2012 to 14.07.2013	Years : 00 Month: 08 Days : 27
	Total Period of experience				**Years : 05 Month: 01 Days : 02**

The Regional Controller of Mines, Indian Bureau of Mines, Chennai Region has already issued the Recognized Qualification Certificate to him vide RQP/MAS/036/88/B dated 21.10.2014.

This certificate is issued only for preparation and Modification of Mining Plan etc., under Rule, 15 of the Minerals (other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016 and under Rule 13 of the Granite Conservation and Development Rules, 1999.

for **Tamil Nadu Minerals Ltd,**

Nominated Owner/Managing Director

RQP CERTIFICATE

GOVERNMENT OF INDIA
MINISTRY OF MINES
INDIAN BUREAU OF MINES

CERTIFICATE OF RECOGNITION AS QUALIFIED PERSON
(Under Rule 22C of Mineral Conservation Rules, 1960)

Name of RQPs

ANNEXURE-I

1. Shri B. Subramanian, Selection Grade Divisional Manager
2. Shri K. Shanmugam, Selection Grade Senior Project Officer
3. Shri P. Girdharan, Selection Grade Divisional Manager
4. Shri E. Ganesan, Selection Grade Project Officer
5. Shri S. Venkatachalapathi, Project Officer
6. Shri A. Ravichandran, Selection Grade Project Officer

Regional Controller of Mines
Indian Bureau of Mines
Chennai Region

DIRECTOR OF GEOLOGY AND MINING ★ GUINDY, CHENNAI-600 032 ★

Annexure No-G.

Tamil Nadu Minerals Limited
(A Government of Tamil Nadu Undertaking)

Tel : 044-29862018 / 28511972
Fax : 91-44-2852 4960
E-mail : tamin@tamingranites.com
GSTIN. : 33AABCT2250P1ZA

Regd. Office : No. 31, Kamarajar Salai, "TWAD House" Chepauk, Post Box No. 2961, Chennai - 600 005.

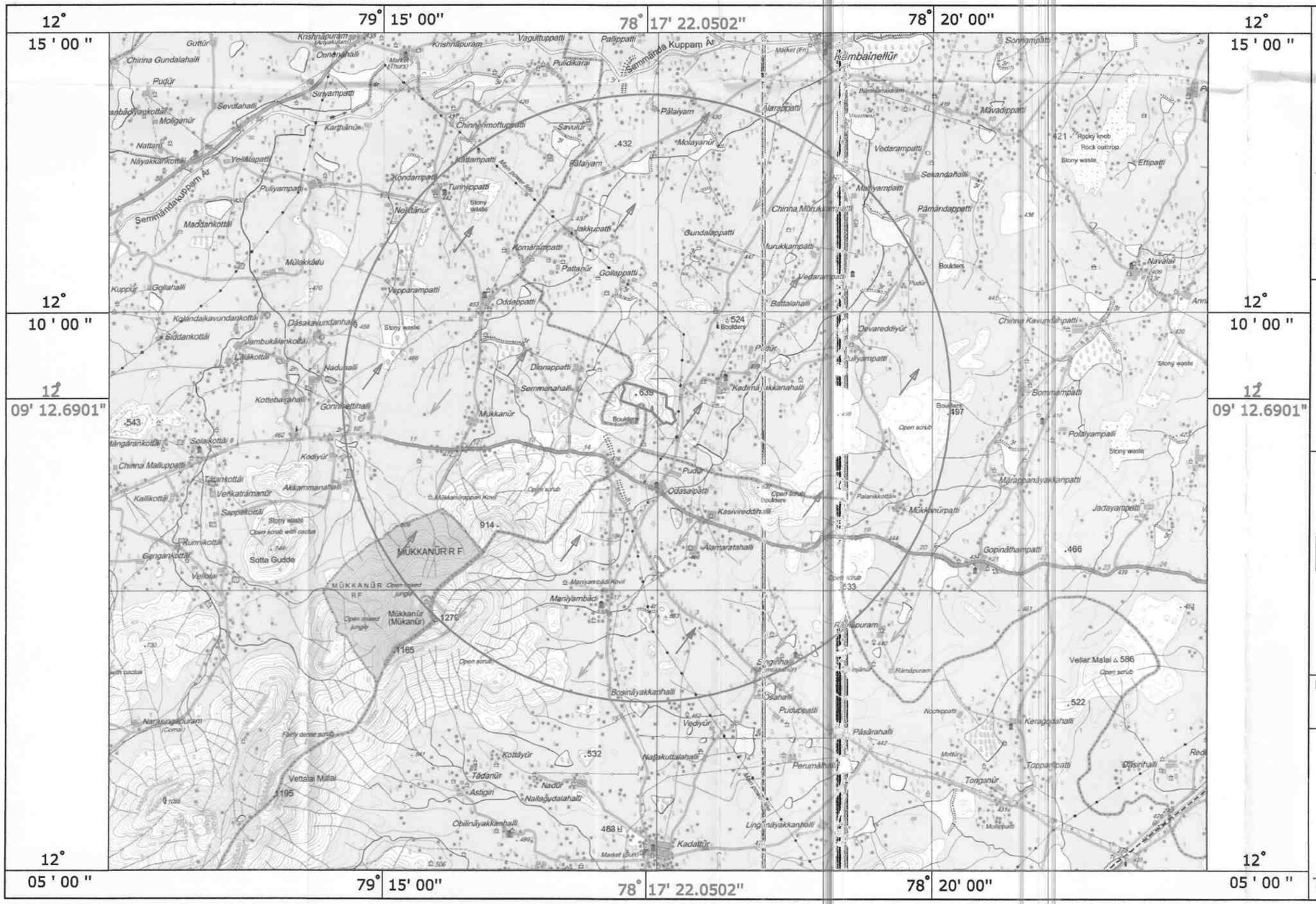
DIRECTOR OF GEOLOGY AND MINING * GUINDY, CHENNAI-600 032

LIST OF BOARD OF DIRECTORS AS ON 10-04-2023

SL.NO	Name of the Director	Designation	Date of Appointment
1	SUDEEP JAIN	Managing Director	11/01/2022
2	SARANYAN KRISHNAN	Nominee Director	06/11/2021
3	NAGARAJAN GOVINDAN	Nominee Director	17/09/2018
4	RENGASAMY PITCHAI MUTHU	Director	02/05/2019
5	PONNUSAMY SANKARA KUMAR	Director	02/05/2019
6	SIGY THOMAS VAIDHYAN	Nominee Director	05/07/2021
7	JAGADEESHWARAN JAYAKANTHAN	Nominee Director	28/06/2022
8	GANESAN KALAIARASI ARUN SUNDAR THAYALAN	Nominee Director	28/06/2021
9	POOJA KULKARNI	Nominee Director	16/02/2023

K. PRIYATHARISINI
Company Secretary
Membership No: A29095

ANNEXURE-4



INDEX

- MINING LEASE APPLIED BOUNDARY
- SAFETY ZONE 5Km. RADIUS
- ROAD
- UNMETALLED ROAD
- RESERVOIR
- STREAM
- CONTOUR

WIND DIRECTION

- WINTER
- SUMMER

DIRECTOR OF GEOLOGY AND MINING * GUINDY, CHENNAI-600 032

DISTRICT	:	DHARMAPURI
TALUK	:	KARIMANGALAM
VILLAGE NAME	:	PATHALAHALLI
VILLAGE No.	:	20
FIELD NO.	:	254 (PART)
LEASE HOLD AREA	:	29.00.23 Ha.

PLATE No. 1

PATHALAHALLI BLACK GRANITE QUARRY

KEY PLAN

PART OF TOPO SHEET No. - 57L/ 8 & 57L/ 4

EASTERN LONGITUDE FROM 78° 17' 05.70541" TO 78° 17' 35.81481"
NORTHEN LATITUDE FROM 12° 09' 00.00051" TO 12° 09' 22.02671"

500 0 2500 5000

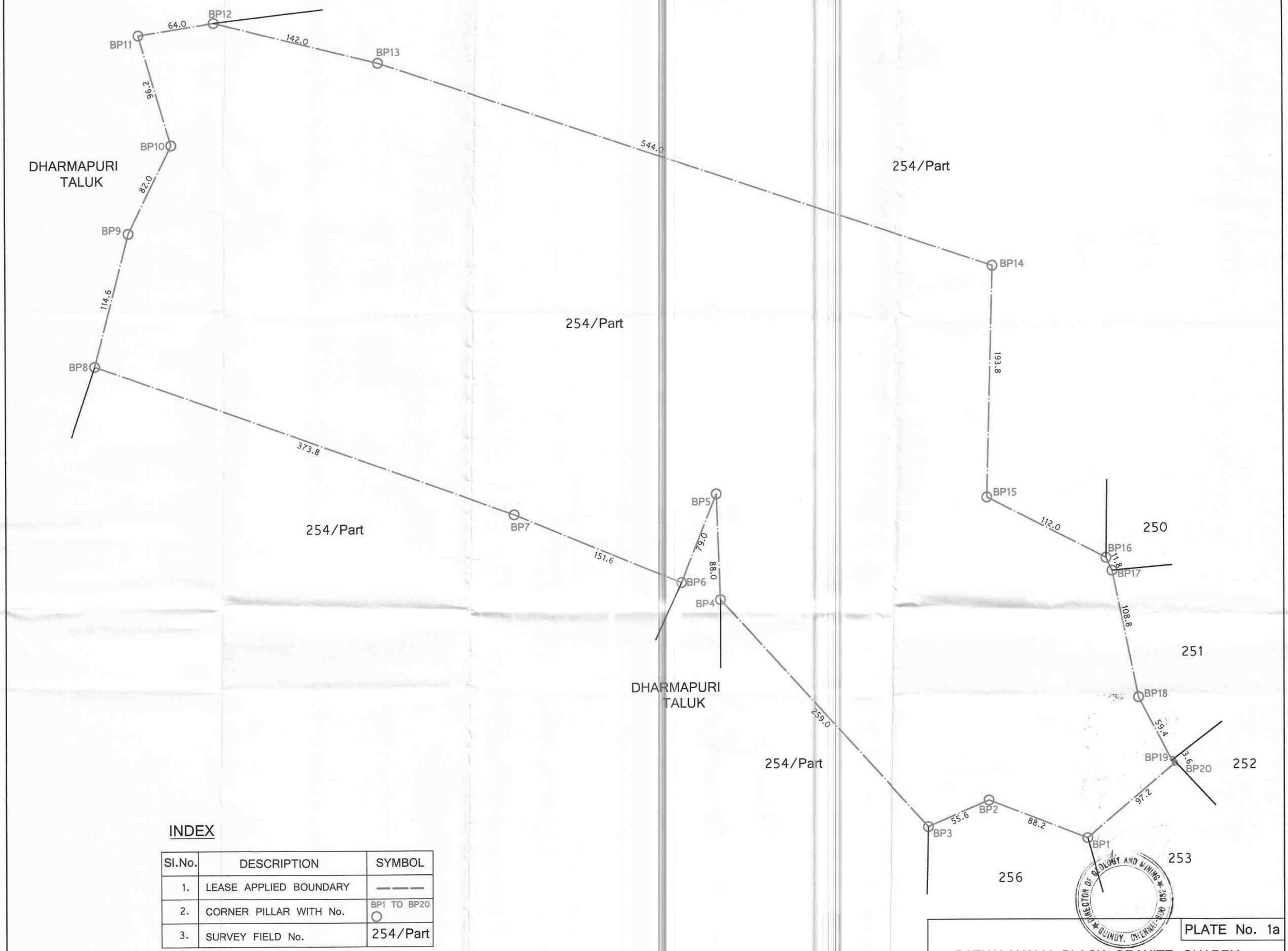
SCALE= 1:50,000(1CM = 500 M)
ALL DIMENSIONS ARE IN METRES

LESSEE : --- M/S.TAMILNADU MINERALS LIMITED,
No.31, KAMARAJAR SALAI,
CHEPAUK, CHENNAI - 600 005.

Certified that the PLAN is Correct.

M. RAM SANKAR
Mines Surveyor
Certificate No: SVR/789.
Tamil Nadu Minerals Limited.

Dr. E.GANESAN, Ph.D., PGDELP
Qualified Person,
Tamil Nadu Minerals Limited
Chennai - 600 005.



INDEX

Sl.No.	DESCRIPTION	SYMBOL
1.	LEASE APPLIED BOUNDARY	———
2.	CORNER PILLAR WITH No.	BP1 TO BP20 ○
3.	SURVEY FIELD No.	254/Part

PLATE No. 1a

PATHALAHALLI BLACK GRANITE QUARRY
LEASE PLAN

20 0 100 200

SCALE= 1:2,000 (1CM = 20 M)

ALL DIMENSIONS ARE IN METRES

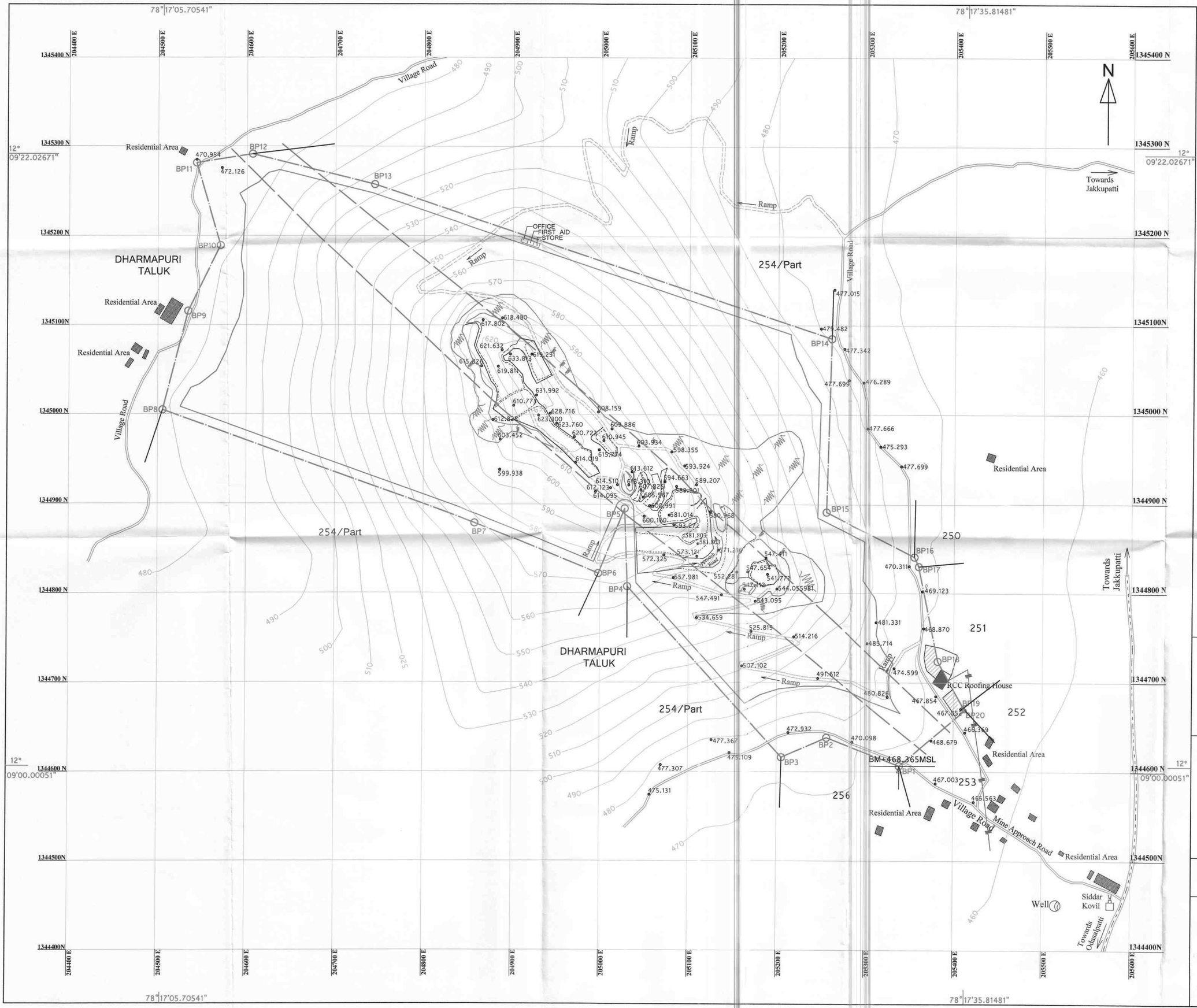
APPLICANT : M/s.TAMILNADU MINERALS LIMITED,
No.31, KAMARAJAR SALAI,
CHEPAUK, CHENNAI - 600 005.

DISTRICT	: DHARMAPURI
TALUK	: KARIMANGALAM
VILLAGE NAME	: PATHALAHALLI
VILLAGE No.	: 20
FIELD NO.	: 254 (Part)
LEASE HOLD AREA	: 29.00.23 Ha.

Certified that the PLAN is Correct.

M. RAM SANKAR
Mines Surveyor
Certificate No: SVR/789.
Tamil Nadu Minerals Limited.

Dr. E.GANESAN, Ph.D., PGDELP
Qualified Person,
Tamil Nadu Minerals Limited
Chennai - 600 005.



INDEX

Sl.No.	DESCRIPTION	SYMBOL
1.	LEASE APPLIED BOUNDARY	
2.	CORNER PILLAR WITH No.	BP1
3.	ROAD	
4.	MINE APPROACH ROAD (RAMP)	
5.	TEMPORARY SHED	
6.	CONTOUR INTERVAL AT 10m	
7.	BENCH MARK	B.M-468.365
8.	OPENCAST WORKING PIT	
9.	WASTE DUMP	
10.	ELECTRICAL POWER LINE	
11.	ENCHROACHMENT-(CULTIVATION AREA)	
12.	ENCHROACHMENT(RCC ROOFING HOUSE)	
13.	BLACK GRANITE DYKE	
14.	SAFETY DISTANCE 7.5M FROM BOUNDARY FOR PATTA LANDS 10M FOR GOVERNMENT LANDS 50M FROM HOUSES ON THE EASTERN BOUNDARY 50M FROM ROAD & EB LINE	
15.	MINES REDUCE LEVEL (R.L)	543.095

Sl.No.	CORNER PILLAR No.	LATITUDE	LONGITUDE
1	BP1	12° 09'00.00051" N	78° 17'33.38272" E
2	BP2	12° 09'01.00591" N	78° 17'30.64142" E
3	BP3	12° 09'00.27351" N	78° 17'28.96362" E
4	BP4	12° 09'06.43691" N	78° 17'23.13071" E
5	BP5	12° 09'09.29560" N	78° 17'22.99490" E
6	BP6	12° 09'06.90191" N	78° 17'22.04590" E
7	BP7	12° 09'08.71041" N	78° 17'17.38721" E
8	BP8	12° 09'12.67201" N	78° 17'05.70541" E
9	BP9	12° 09'16.29082" N	78° 17'06.61081" E
10	BP10	12° 09'18.69321" N	78° 17'07.78712" E
11	BP11	12° 09'21.68370" N	78° 17'06.85660" E
12	BP12	12° 09'22.02671" N	78° 17'08.94321" E
13	BP13	12° 09'20.96842" N	78° 17'13.51100" E
14	BP14	12° 09'15.54001" N	78° 17'30.62481" E
15	BP15	12° 09'09.23891" N	78° 17'30.52051" E
16	BP16	12° 09'07.61900" N	78° 17'33.83622" E
17	BP17	12° 09'07.27341" N	78° 17'34.00560" E
18	BP18	12° 09'03.83061" N	78° 17'34.76412" E
19	BP19	12° 09'02.13862" N	78° 17'35.74301" E
20	BP20	12° 09'02.06591" N	78° 17'35.81481" E

DISTRICT : DHARMAPURI
TALUK : KARIMANGALAM
VILLAGE NAME : PATHALAHALLI
VILLAGE No. : 20
FIELD NO. : 254 (Part)
LEASE HOLD AREA : 29.00.23 Ha.

DIRECTION OF GEOLOGY AND MINING

PLATE No. 2

PATHALAHALLI BLACK GRANITE QUARRY

SURFACE PLAN

MINING PLAN

20 0 100 200

SCALE= 1:2,000 (1CM = 20 M)
ALL DIMENSIONS ARE IN METRES

APPLICANT : M/s.TAMILNADU MINERALS LIMITED,
No.31, KAMARAJAR SALAI,
CHEPAUK, CHENNAI - 600 005.

Certified that the PLAN is Correct.

M. RAM SANKAR
Mines Surveyor
Certificate No: SVR/789.
Tamil Nadu Minerals Limited.

Dr. E.GANESAN, Ph.D., PGDELP
Qualified Person,
Tamil Nadu Minerals Limited
Chennai - 600 005.

78°17'05.70541" 78°17'35.81481"

12° 09'22.02671" 12° 09'00.00051"

1345400 N 1345300 N 1345200 N 1345100N 1345000 N 1344900 N 1344800 N 1344700 N 1344600 N 1344500N 1344400N

204400 E 204500 E 204600 E 204700 E 204800 E 204900 E 205000 E 205100 E 205200 E 205300 E 205400 E 205500 E 205600 E

N

Village Road

Residential Area

BP1 BP2 BP3 BP4 BP5 BP6 BP7 BP8 BP9 BP10 BP11 BP12 BP13 BP14 BP15 BP16 BP17 BP18 BP19 BP20

470.954 472.126 477.015 479.482 477.342 477.699 476.289 477.666 475.293 477.699 470.314 469.123 468.870 481.331 485.714 474.599 480.826 467.854 467.855 466.369 468.679 467.003 465.563

A A' B B' C C' D D' E E' F F' G G' H H' I I' J J' K K' P Q

75°

Ramp

OFFICE FIRST AID STORE

DHARMAPURI TALUK

254/Part 251 252 253 256 250

RCC Roofing House

Towards Jakkupatti

Towards Odasalpatti

Mine Approach Road

Well

Siddar Kovil

BM-468.365MSL

618.480 617.802 621.632 615.251 633.813 615.826 619.811 631.992 610.773 628.718 623.800 623.760 620.722 612.825 603.452 608.159 609.886 610.945 615.224 603.934 598.355 614.019 613.612 593.924 614.510 612.123 614.095 618.310 617.825 605.267 594.663 589.207 589.801 600.291 600.160 581.014 580.968 593.272 581.803 573.121 572.325 571.216 552.281 547.411 547.654 541.777 547.212 544.055981 543.095 547.491 557.981 534.659 525.815 514.216 507.102 491.612 472.932 470.098 477.367 475.109 477.307 475.131 599.936

Village Road 480 490 500 510 520 530 540 550 560 570 580 590 600 610 620 460 470

INDEX

Sl.No.	DESCRIPTION	SYMBOL
1.	LEASE APPLIED BOUNDARY	
2.	CORNER PILLAR WITH No.	BP1
3.	ROAD	
4.	MINE APPROACH ROAD (RAMP)	
5.	TEMPORARY SHED	
6.	CONTOUR INTERVAL AT 10m	510 600
7.	BENCH MARK	B.M-468.365
8.	OPENCAST WORKING PIT	
9.	WASTE DUMP	
10.	ELECTRICAL POWER LINE	
11.	ENCHROACHMENT-(CULTIVATION AREA)	
12.	ENCHROACHMENT -(RCC ROOFING HOUSE)	
13.	BLACK GRANITE DYKE	
14.	MINES REDUCE LEVEL (R.L)	543.095
15.	SAFETY DISTANCE 7.5M FROM BOUNDARY FOR PATTA LANDS 10M FOR GOVERNMENT LANDS 50M FROM HOUSES ON THE EASTERN BOUNDARY 50M FROM ROAD & EB LINE	
16.	DIP AND STRIKE	75°

DIRECTOR OF GEOLOGY & MINING CHENNAI

DISTRICT	: DHARMAPURI
TALUK	: KARIMANGALAM
VILLAGE NAME	: PATHALAHALLI
VILLAGE No.	: 20
FIELD NO.	: 254 (Part)
LEASE HOLD AREA	: 29.00.23 Ha.

PLATE No. 3

PATHALAHALLI BLACK GRANITE QUARRY

GEOLOGICAL PLAN

MINING PLAN

20 0 100 200

SCALE= 1:2,000 (1CM = 20 M)

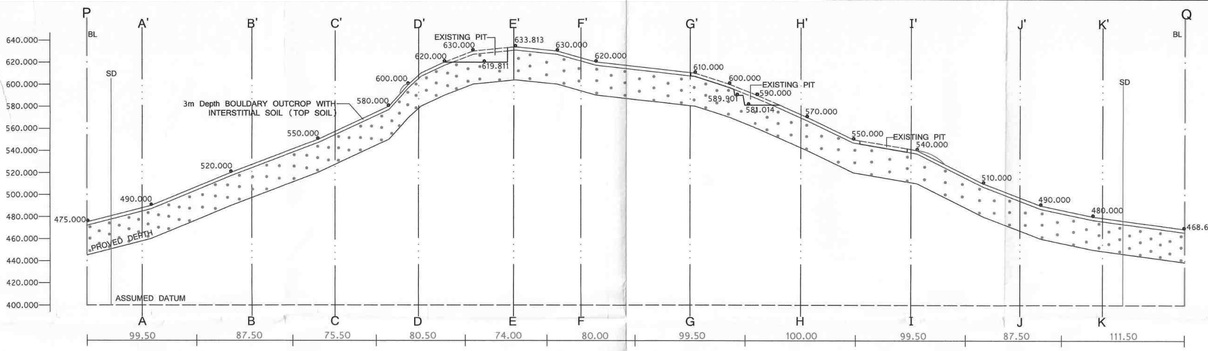
ALL DIMENSIONS ARE IN METRES

APPLICANT : M/s.TAMILNADU MINERALS LIMITED,
No.31, KAMARAJAR SALAI,
CHEPAUK, CHENNAI - 600 005.

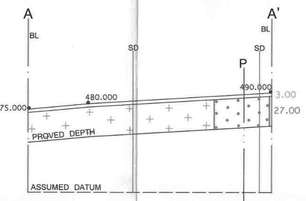
Certified that the PLAN is Correct.

M. RAM SANKAR
Mines Surveyor
Certificate No: SVR/789.
Tamil Nadu Minerals Limited.

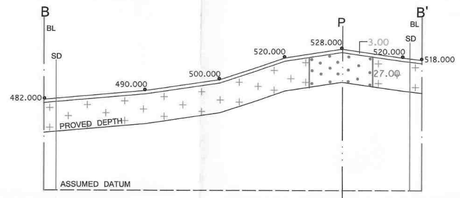
Dr. E.GANESAN, Ph.D., PGDELP
Qualified Person,
Tamil Nadu Minerals Limited
Chennai - 600 005.



LONGITUDINAL SECTION LINE : P-Q



CROSS SECTION LINE : A-A'



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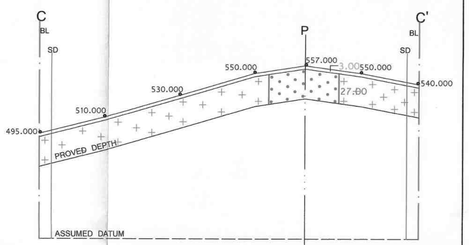

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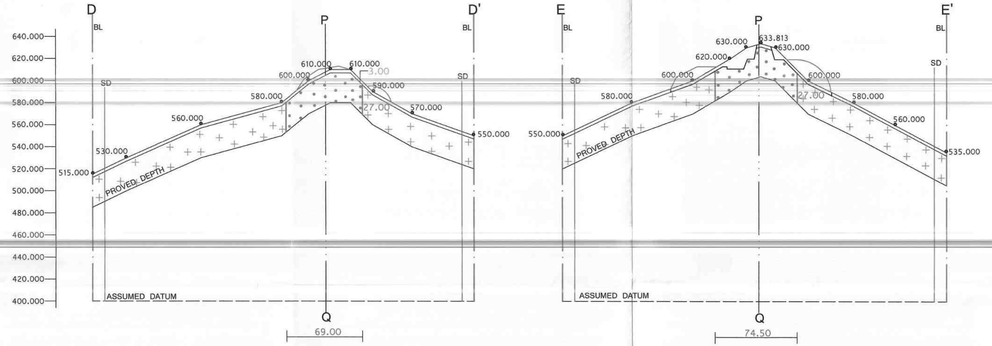
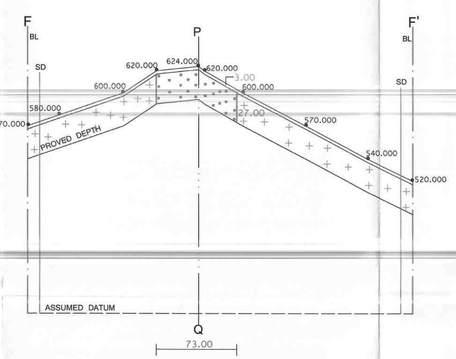


CROSS SECTION LINE : D-D'

CROSS SECTION LINE : E-E'



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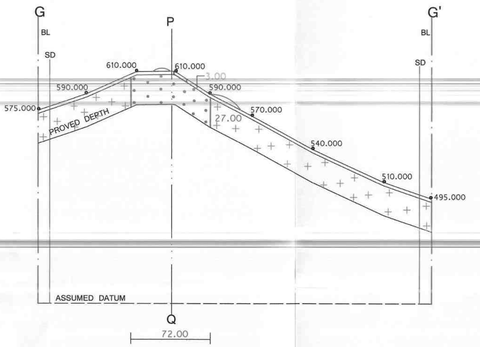

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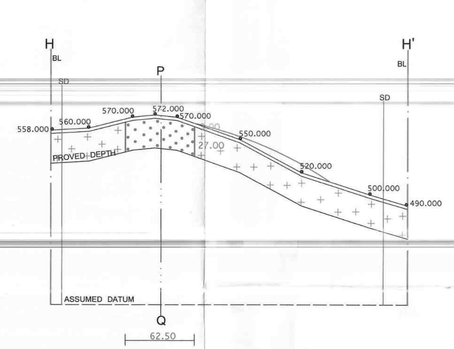

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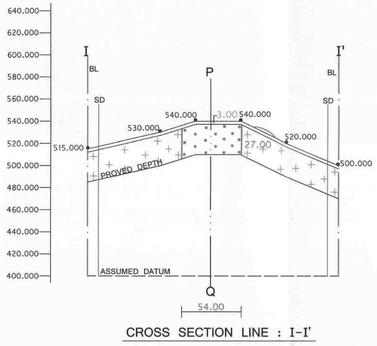
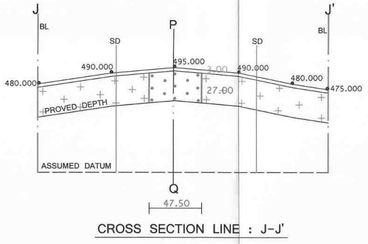
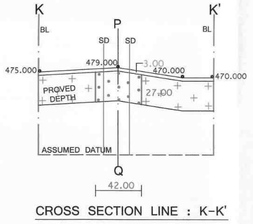


CROSS SECTION LINE : I-I'



CROSS SECTION LINE : J-J'



CROSS SECTION LINE : K-K'

INDEX

Sl.No.	DESCRIPTION	SYMBOL
1.	LEASE APPLIED BOUNDARY	
2.	OPENCAST WORKING PIT	
3.	WASTE DUMP	
4.	3m Depth BOULDARY OUTCROP WITH INTERSTITIAL SOIL (TOP SOIL)	
5.	BLACK GRANITE DYKE	
6.	GRANITIC GNEISS	
7.	SAFETY DISTANCE 7.5M FROM BOUNDARY FOR PATTA LANDS 10M FOR GOVERNMENT LANDS 50M FROM HOUSES ON THE EASTERN BOUNDARY 50M FROM ROAD & EB LINE	

DISTRICT	: DHARMAPURI
TALUK	: KARIMANGALAM
VILLAGE NAME	: PATHALAHALLI
VILLAGE No.	: 20
FIELD NO.	: 254 (Part)
LEASE HOLD AREA	: 29.00.23 Ha.

PLATE No. 3a

PATHALAHALLI BLACK GRANITE QUARRY
GEOLOGICAL SECTIONS
MINING PLAN

20 0 100 200

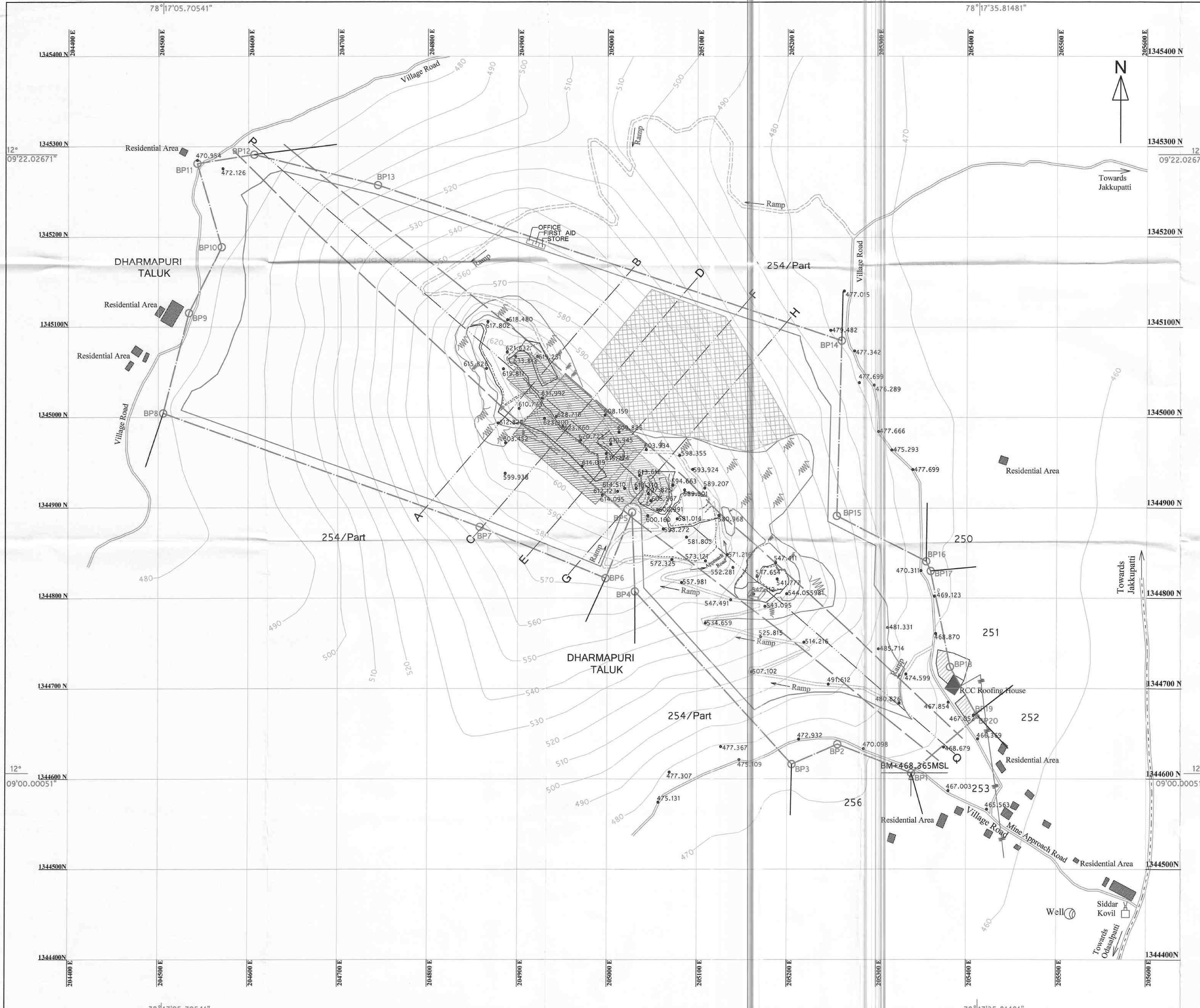
SCALE= 1:2,000(1CM = 20 M)
ALL DIMENSIONS ARE IN METRES

APPLICANT : M/s.TAMILNADU MINERALS LIMITED,
No.31, KAMARAJAR SALAI,
CHEPAUK, CHENNAI - 600 005.

Certified that the PLAN is Correct.

M. RAM SANKAR
Mines Surveyor
Certificate No: SVR/789,
Tamil Nadu Minerals Limited.

Dr. E.GANESAN, Ph.D., PGDELP
Qualified Person,
Tamil Nadu Minerals Limited
Chennai - 600 005.



INDEX

Sl.No.	DESCRIPTION	SYMBOL
1.	LEASE APPLIED BOUNDARY	
2.	CORNER PILLAR WITH No.	BP1
3.	ROAD	
4.	MINE APPROACH ROAD (RAMP)	
5.	TEMPORARY SHED	
6.	CONTOUR INTERVAL AT 10m	610 600
7.	BENCH MARK	B.M-468.365
8.	OPENCAST WORKING PIT	
9.	WASTE DUMP (EXISTING)	
10.	ELECTRICAL POWER LINE	
11.	ENCHROACHMENT-(CULTIVATION AREA)	
12.	ENCHROACHMENT -(RCC ROOFING HOUSE)	
13.	BLACK GRANITE DYKE	
14.	MINES REDUCE LEVEL (R.L)	543.095
15.	SAFETY DISTANCE 7.5M FROM BOUNDARY FOR PATTA LANDS 10M FROM GOVERNMENT LANDS 50M FROM HOUSES ON THE EASTERN BOUNDARY 50M FROM ROAD & EB LINE	
16.	WASTE DUMP (PROPOSED)	

YEARWISE DEVELOPMENT/PRODUCTION

- FOR THE FIRST YEAR
- FOR THE SECOND YEAR
- FOR THE THIRD YEAR
- FOR THE FOURTH YEAR
- FOR THE FIFTH YEAR

DISTRICT	: DHARMAPURI
TALUK	: KARIMANGALAM
VILLAGE NAME	: PATHALAHALLI
VILLAGE No.	: 20
FIELD NO.	: 254 (Part)
LEASE HOLD AREA	: 29.00.23 Ha.

PLATE No. 4

PATHALAHALLI BLACK GRANITE QUARRY YEARWISE PRODUCTION/DEVELOPMENT PLAN FOR THE FIRST FIVE YEARS

MINING PLAN

20 0 100 200

SCALE= 1:2,000 (1CM = 20 M)

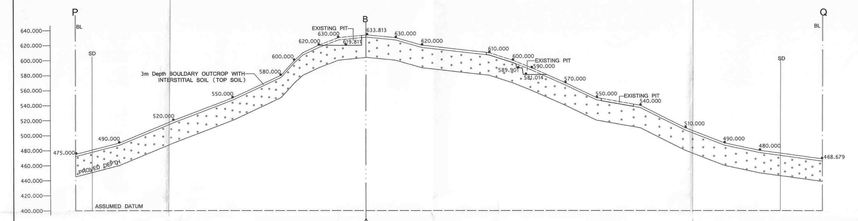
ALL DIMENSIONS ARE IN METRES

APPLICANT : M/s.TAMILNADU MINERALS LIMITED,
No.31, KAMARAJAR SALAI,
CHEPAUK, CHENNAI - 600 005.

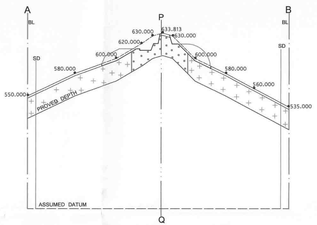
Certified that the PLAN is Correct.

M. RAM SANKAR
Mines Surveyor
Certificate No: SVR/789.
Tamil Nadu Minerals Limited.

Dr. E.GANESAN, Ph.D., PGDELP
Qualified Person,
Tamil Nadu Minerals Limited
Chennai - 600 005.

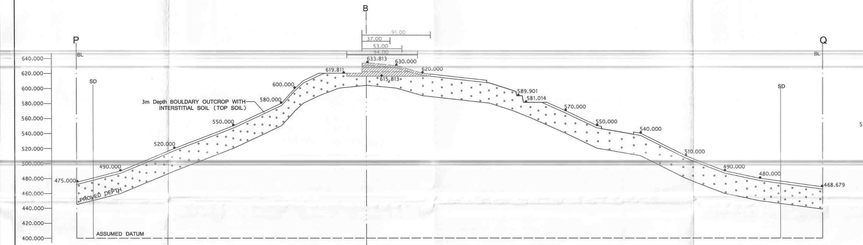


LONGITUDINAL SECTION LINE : PQ



CROSS SECTION LINE : AB

PIT AT THE BEGINING OF THE FIRST YEAR



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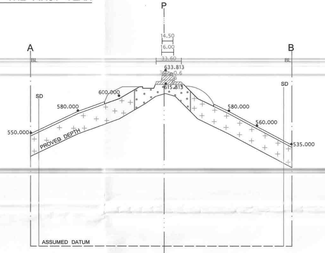

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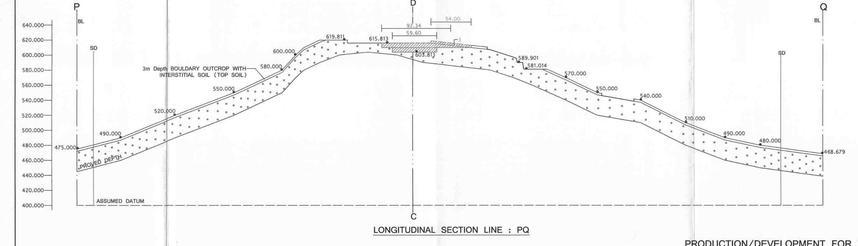
PRODUCTION/DEVELOPMENT FOR THE FIRST YEAR



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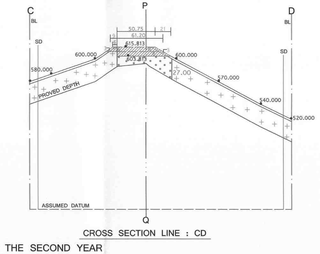
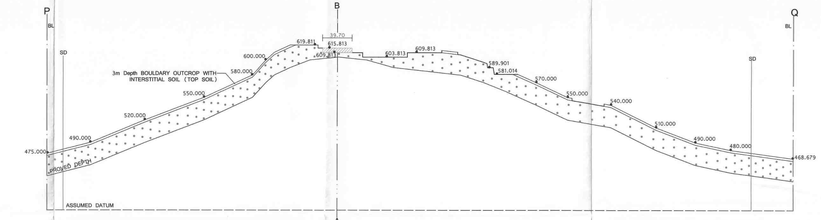


CROSS SECTION LINE : CD

PRODUCTION/DEVELOPMENT FOR THE SECOND YEAR



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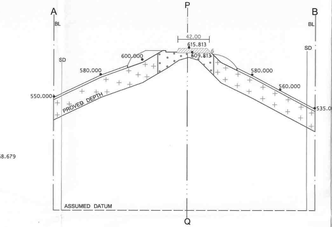
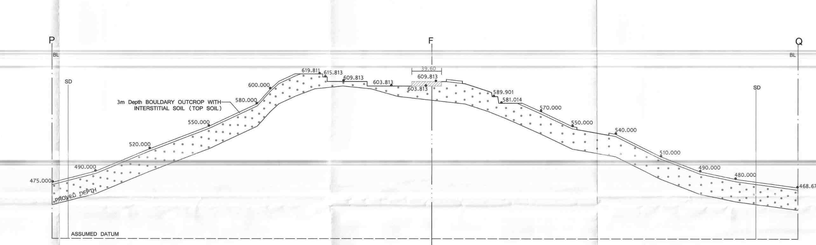


CROSS SECTION LINE : AB

PRODUCTION/DEVELOPMENT FOR THE THIRD YEAR



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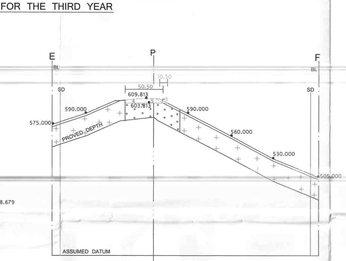
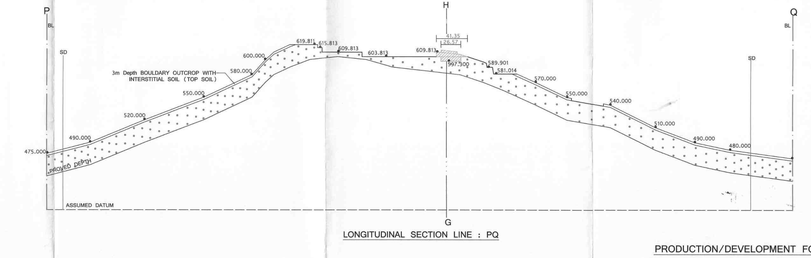


CROSS SECTION LINE : AB

PRODUCTION/DEVELOPMENT FOR THE FOURTH YEAR



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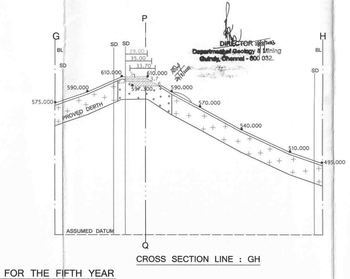

CROSS SECTION LINE : GH

PRODUCTION/DEVELOPMENT FOR THE FIFTH YEAR

DETAILS OF DEPTH, BENCH AND PRODUCTION FOR MINING PLAN PERIOD

Year	Section	RL	Details of Depth (Benches)		Average Measurements in M)		No.Of Benches	Proposed ROM in Cu.M.	Proposed Production @ 50% in Cu.M.
			Present	Proposed	Remaining	Total (Ultimate depth)	Proposed		
I	PQ & AB	633.813 TO 615.813	0	18.00	12.00	**30.000**	2	25,000	2,500
II	PQ & CD	615.813 TO 603.813	8.20	12.00	9.80	**30.00**	2	50,000	5,000
III	PQ & AB	615.813 TO 609.813	18.00	6.00	6.00	**30.00**	1	10,000	1,000
IV	PQ & EF	609.813 TO 603.813	5.10	6.00	18.90	**30.00**	1	10,000	1,000
V	PQ & GH	610.000 TO 597.500	0	12.70	17.30	**30.00**	2	10,000	1,000

INDEX

Sl.No.	DESCRIPTION	SYMBOL
1.	LEASE APPLIED BOUNDARY	
2.	OPENCAST WORKING PIT	
3.	WASTE DUMP	
4.	3m Depth BOULDARY OUTCROP WITH INTERSTITIAL SOIL (TOP SOIL)	
5.	BLACK GRANITE DYKE	
6.	GRANITIC GNEISS	
7.	SAFETY DISTANCE:- 7.5M FROM BOUNDARY FOR PATTA LANDS 10M FOR GOVERNMENT LANDS 50M FROM HOUSES ON THE EASTERN BOUNDARY 50M FROM ROAD & EB LINE	

YEARWISE DEVELOPMENT/PRODUCTION

FOR THE FIRST YEAR
FOR THE SECOND YEAR
FOR THE THIRD YEAR
FOR THE FOURTH YEAR
FOR THE FIFTH YEAR

DISTRICT : DHARMAPURI
TALUK : KARIMANGALAM
VILLAGE NAME : PATHALAHALLI
VILLAGE No. : 20
FIELD NO. : 254 (Part)
LEASE HOLD AREA : 29.00.23 Ha.

PLATE No. 4a

PATHALAHALLI BLACK GRANITE QUARRY
YEARWISE PRODUCTION/DEVELOPMENT SECTIONS FOR THE FIRST FIVE YEARS
MINING PLAN

20 0 100 200

SCALE:- 1:2,000 (1CM = 20 M)
ALL DIMENSIONS ARE IN METRES

APPLICANT : M/s.TAMILNADU MINERALS LIMITED, No.31, KAMARAJAR SALAI, CHEPAUK, CHENNAI - 600 005.

Certified that the PLAN is Correct.

M. RAM SANKAR
Mines Surveyor
Certificate No: SVR/789.
Tamil Nadu Minerals Limited.

Dr. E.GANESAN, Ph.D., PGDELP
Qualified Person,
Tamil Nadu Minerals Limited
Chennai - 600 005.

DIRECTOR (Mines)
Department of Geology & Mining
Guindy, Chennai - 600 032.

78°17'05.70541"

78°17'35.81481"

12° 09'22.02671"

12° 09'00.00051"

N

Towards Jakkupatti

Towards Odasalpatti

DHARMAPURI TALUK

254/Part

250

251

252

253

256

Residential Area

Village Road

Ramp

OFFICE
FIRST AID
STORE

RCC Roofing House

Mine Approach Road

Well

Siddar Kovil

BM=468.365MSL

BP1 BP2 BP3 BP4 BP5 BP6 BP7 BP8 BP9 BP10 BP11 BP12 BP13 BP14 BP15 BP16 BP17 BP18 BP19 BP20

INDEX

Sl.No.	DESCRIPTION	SYMBOL
1.	LEASE APPLIED BOUNDARY	
2.	CORNER PILLAR WITH No.	BP1
3.	ROAD	
4.	MINE APPROACH ROAD(RAMP)	
5.	TEMPORARY SHED	
6.	CONTOUR INTERVAL AT 10m	
7.	BENCH MARK	B.M-468.365
8.	OPENCAST WORKING PIT	
9.	WASTE DUMP (EXISTING)	
10.	ELECTRICAL POWER LINE	
11.	ENCHROACHMENT-(CULTIVATION AREA)	
12.	ENCHROACHMENT -(RCC ROOFING HOUSE)	
13.	BLACK GRANITE DYKE	
14.	MINES REDUCE LEVEL (R.L)	543.095
15.	SAFETY DISTANCE 7.5M FROM BOUNDARY FOR PATTA LANDS 10M FOR GOVERNMENT LANDS 50M FROM HOUSES ON THE EASTERN BOUNDARY 50M FROM ROAD & EB LINE	
16.	PROPOSED DEVELOPMENT DURING DURING MINING PLAN PERIOD	
17.	PROPOSED WASTE DUMP DURING MINING PLAN PERIOD	

AFFORESTATION DETAILS

- EXISTING PLANTS
- FOR THE FIRST YEAR : 40 PLANTS IN 0.02.6Ha. 50% SURVIVAL
- FOR THE SECOND YEAR : 40 PLANTS IN 0.02.6Ha. 50% SURVIVAL
- FOR THE THIRD YEAR : 40 PLANTS IN 0.02.6Ha. 50% SURVIVAL
- FOR THE FOURTH YEAR : 40 PLANTS IN 0.02.6Ha. 50% SURVIVAL
- FOR THE FIFTH YEAR : 40 PLANTS IN 0.02.6Ha. 50% SURVIVAL

LANDUSE PATERN

SL.No.	DESCRIPTION	PRESENT AREA (In Ha.)	MINING PLAN PERIOD (In Ha.)
1.	MINING	1.25.00	1.09.00
2.	WASTE DUMP	1.74.00	2.39.00
3.	OFFICE INFRASTRUCTURE	0.01.00	-
4.	ROAD	0.17.00	-
5.	MINE ROAD	0.59.00	-
6.	AFFORESTATION	0.28.50	0.13.00
7.	UNUTILIZED AREA	24.95.73	21.34.73
	TOTAL	29.00.23	24.95.73

DISTRICT : DHARMAPURI
TALUK : KARIMANGALAM
VILLAGE NAME : PATHALAHALLI
VILLAGE No. : 20
FIELD NO. : 254 (Part)
LEASE HOLD AREA : 29.00.23 Ha.

PLATE No. 5

PATHALAHALLI BLACK GRANITE QUARRY
LANDUSE AND AFFORESTTION PLAN

MINING PLAN

20 0 100 200

SCALE= 1:2,000(1CM = 20 M)
ALL DIMENSIONS ARE IN METRES

APPLICANT : M/s.TAMILNADU MINERALS LIMITED,
No.31, KAMARAJAR SALAI,
CHEPAUK, CHENNAI - 600 005.

Certified that the PLAN is Correct.

M. RAM SANKAR
Mines Surveyor
Certificate No: SVR/789.
Tamil Nadu Minerals Limited.

Dr. E.GANESAN, Ph.D., PGDELP
Qualified Person,
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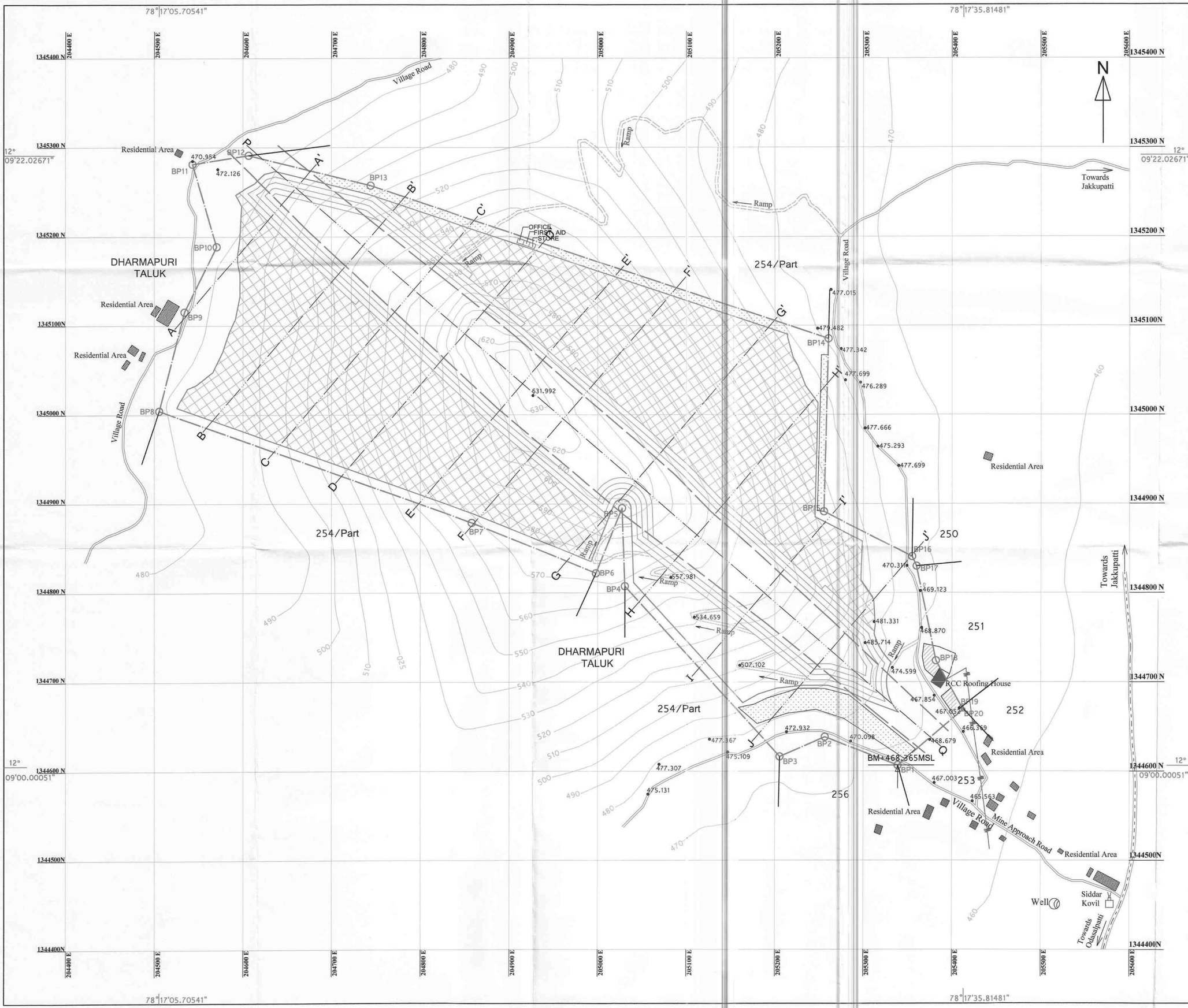
Chennai - 600 005.



INDEX

Sl.No.	DESCRIPTION	SYMBOL
1.	LEASE APPLIED BOUNDARY	
2.	CORNER PILLAR WITH No.	BP1
3.	ROAD	
4.	MINE APPROACH ROAD (RAMP)	
5.	TEMPORARY SHED	
6.	CONTOUR INTERVAL AT 10m	610 600 510 500
7.	BENCH MARK	B.M=468.365
8.	ELECTRICAL POWER LINE	
9.	ENCHROACHMENT-(CULTIVATION AREA)	
10.	ENCHROACHMENT -(RCC ROOFING HOUSE)	
11.	BLACK GRANITE DYKE	
12.	MINES REDUCE LEVEL (R.L)	543.095
13.	SAFETY DISTANCE 7.5M FROM BOUNDARY FOR PATTA LANDS 10M FOR GOVERNMENT LANDS 50M FROM HOUSES ON THE EASTERN BOUNDARY 50M FROM ROAD & EB LINE	
14.	ULTIMATE PIT LIMIT	
15.	ULTIMATE WASTE DUMP	
16.	ULTIMATE AFFORESTATION	

LANDUSE PATERN

SL.No.	DESCRIPTION	AT END OF LIFE OF MINE (In Ha.)
1.	MINING	8.62.00
2.	WASTE DUMP	13.70.50
3.	OFFICE INFRASTRUCTURE	0.01.00
4.	ROAD	0.17.00
5.	MINE ROAD	0.11.50
6.	AFFORESTATION	1.00.00
7.	UNUTILIZED AREA	5.38.23
	TOTAL	29.00.23

DISTRICT : DHARMAPURI
TALUK : KARIMANGALAM
VILLAGE NAME : PATHALAHALLI
VILLAGE No. : 20
FIELD NO. : 254 (Part)
LEASE HOLD AREA : 29.00.23 Ha.

PLATE No. 6

PATHALAHALLI BLACK GRANITE QUARRY
CONCEPTUAL PLAN
MINING PLAN

20 0 100 200

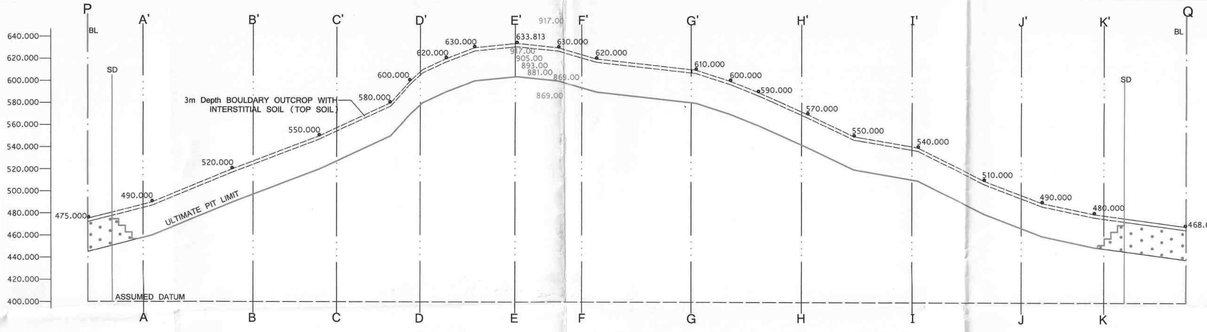
SCALE= 1:2,000 (1CM = 20 M)
ALL DIMENSIONS ARE IN METRES

APPLICANT : M/s.TAMILNADU MINERALS LIMITED,
No.31, KAMARAJAR SALAI,
CHEPAUK, CHENNAI - 600 005.

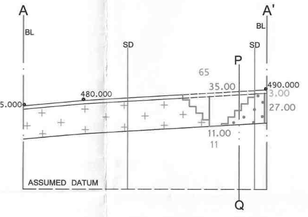
Certified that the PLAN is Correct.

M. RAM SANKAR
Mines Surveyor
Certificate No: SVR/789.
Tamil Nadu Minerals Limited.

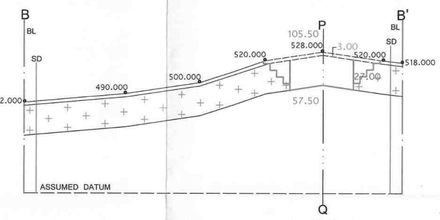
Dr. E.GANESAN, Ph.D., PGDELP
Qualified Person,
Tamil Nadu Minerals Limited
Chennai - 600 005.



LONGITUDINAL SECTION LINE : P-Q



CROSS SECTION LINE : A-A'



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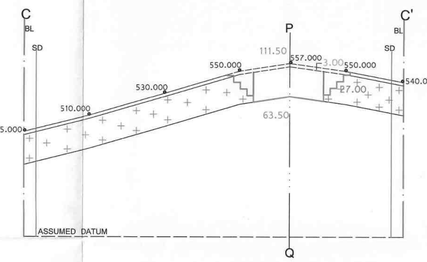

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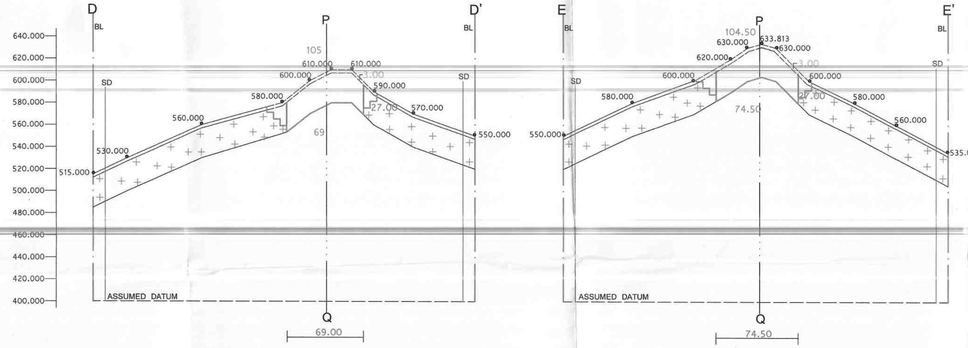
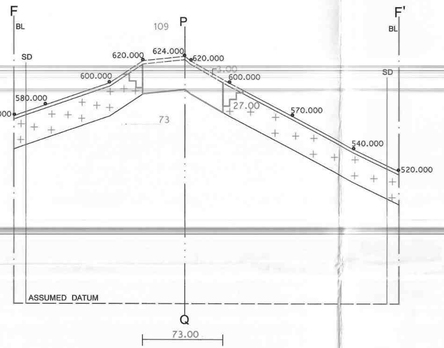


CROSS SECTION LINE : D-D'

CROSS SECTION LINE : E-E'



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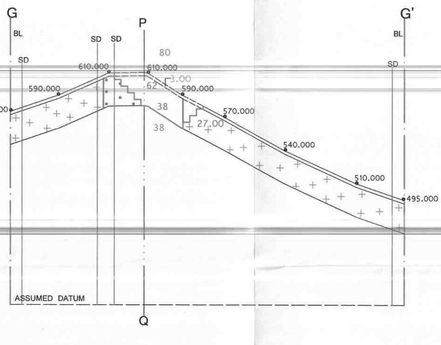

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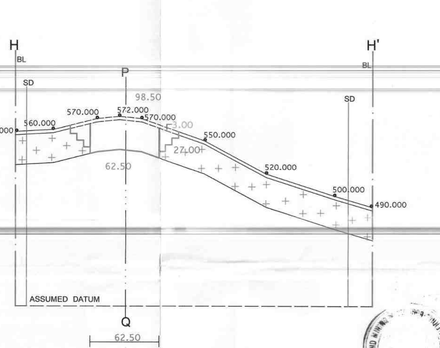
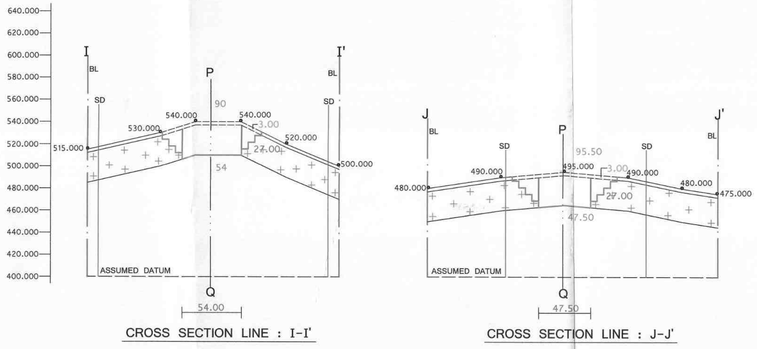


CROSS SECTION LINE : H-H'



CROSS SECTION LINE : I-I'

CROSS SECTION LINE : J-J'

ULTIMATE PIT DIMENSION

Sl.No.	Section on	Detail	Ave.Length in M	Ave.Width in M	Depth in M
1.	P-P' A-A' & J-J'	Top bench	917.00	96.00	30.00
		Bottom bench	869.00	55.00	

INDEX

Sl.No.	DESCRIPTION	SYMBOL
1.	LEASE APPLIED BOUNDARY	
2.	BLACK GRANITE DYKE	
3.	GRANITIC GNEISS	
4.	ULTIMATE PIT LIMIT	
5.	SAFETY DISTANCE 7.5M FROM BOUNDARY FOR PATTA LANDS 10M FOR GOVERNMENT LANDS 50M FROM HOUSES ON THE EASTERN BOUNDARY 50M FROM ROAD & EB LINE	

DISTRICT	: DHARMAPURI
TALUK	: KARIMANGALAM
VILLAGE NAME	: PATHALAHALLI
VILLAGE No.	: 20
FIELD NO.	: 254 (Part)
LEASE HOLD AREA	: 29.00.23 Ha.

PLATE No. 6a

PATHALAHALLI BLACK GRANITE QUARRY
CONCEPTUAL SECTIONS
MINING PLAN

20 0 100 200

SCALE= 1:2,000(1CM = 20 M)
ALL DIMENSIONS ARE IN METRES

APPLICANT : M/s.TAMILNADU MINERALS LIMITED,
No.31, KAMARAJAR SALAI,
CHEPAUK, CHENNAI - 600 005.

Certified that the PLAN is Correct.

M. RAM SANKAR
Mines Surveyor
Certificate No: SVR/789.
Tamil Nadu Minerals Limited.

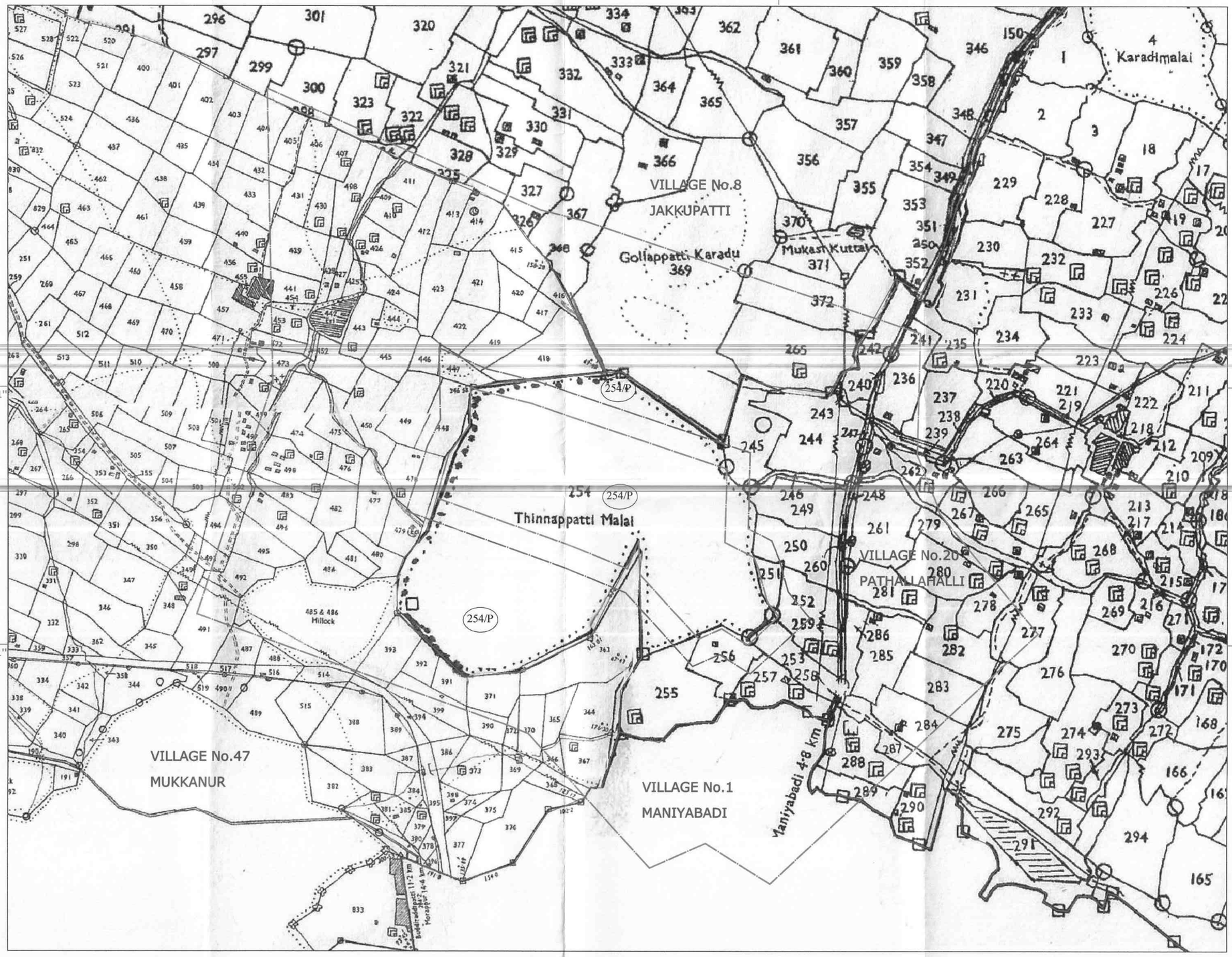
Dr. E.GANESAN, Ph.D., PGDELP
Qualified Person,
Tamil Nadu Minerals Limited
Chennai - 600 005.

78° 17'05.70541"

78° 17'35.81481"

12° 09'22.02671"

12° 09'00.00051"



LEGEND

Sl.No.	DESCRIPTION	SYMBOL
1.	LEASE APPLIED BOUNDARY	
2.	VILLAGE ROAD	
3.	CART TRACK	
4.	KULAM / ERI	
5.	KALVAI	
6.	STREAM	
7.	WELL	
8.	VILLAGE BOUNDARY	
9.	BUFFER ZONE 500m RADIUS	
10.	SAFETY ZONE 60.0m RADIUS	
11.	SURVEY FIELD No.	254/P
12.	RESIDENTIAL AREA	

DISTRICT	:	DHARMAPURI
TALUK	:	KARIMANGALAM
VILLAGE NAME	:	PATHALAHALLI
FIELD No.	:	254/Part
VILLAGE No.	:	20
EXTENT OF LEASE	:	29.00.23Ha.

PLATE No.7

PATHALAHALLI BLACK GRANITE QUARRY

MINING PLAN

ENVIRONMENT PLAN

50 0 250 500

SCALE = 1 : 5000 (1Cm=5mts)

ALL DIMENSIONS ARE IN METRES

APPLICANT : M/s.TAMILNADU MINERALS LIMITED,
No.31, KAMARAJAR SALAI,
CHEPAUK, CHENNAI - 600 005.

Certified that the PLAN is Correct

M. RAM SANKAR
Mines Surveyor
Certificate No: SVR/789.
Tamil Nadu Minerals Limited.

Dr. E.GANESAN, Ph.D., PGDELP
Qualified Person,
Tamil Nadu Minerals Limited
Chennai - 600 005.

78°17'05.70541"

78°17'35.81481"

12° 09'22.02671"

12° 09'00.00051"

INDEX

Sl.No.	DESCRIPTION	SYMBOL
1.	LEASE APPLIED BOUNDARY	
2.	CORNER PILLAR WITH No.	BP1
3.	ROAD	
4.	MINE APPROACH ROAD (RAMP)	
5.	TEMPORARY SHED	
6.	CONTOUR INTERVAL AT 10m	610 600
7.	BENCH MARK	B.M-468.365
8.	OPENCAST WORKING PIT	
9.	WASTE DUMP (EXISTING)	
10.	ELECTRICAL POWER LINE	
11.	ENCHROACHMENT-(CULTIVATION AREA)	
12.	ENCHROACHMENT -(RCC ROOFING HOUSE)	
13.	BLACK GRANITE DYKE	
14.	MINES REDUCE LEVEL (R.L)	543.095
15.	SAFETY DISTANCE 7.5M FROM BOUNDARY FOR PATTA LANDS 10M FOR GOVERNMENT LANDS 50M FROM HOUSES ON THE EASTERN BOUNDARY 50M FROM ROAD & EB LINE	
16.	PROPOSED DEVELOPMENT DURING DURING MINING PLAN PERIOD	
17.	PROPOSED WASTE DUMP DURING MINING PLAN PERIOD	
18.	EXISTING AFFORESTATION	
19.	PROPOSED AFFORESTATION DURING MINING PLAN PERIOD	

LANDUSE PATERN

SL.No.	DESCRIPTION	PRESENT AREA (In Ha.)	MINING PLAN PERIOD (In Ha.)
1.	MINING	1.25.00	1.09.00
2.	WASTE DUMP	1.74.00	2.39.00
3.	OFFICE INFRASTRUCTURE	0.01.00	-
4.	ROAD	0.17.00	-
5.	MINE ROAD	0.59.00	-
6.	AFFORESTATION	0.28.50	0.13.00
7.	UNUTILIZED AREA	24.95.73	21.34.73
	TOTAL	29.00.23	24.95.73

DISTRICT : DHARMAPURI
TALUK : KARIMANGALAM
VILLAGE NAME : PATHALAHALLI
VILLAGE No. : 20
FIELD NO. : 254 (Part)
LEASE HOLD AREA : 29.00.23 Ha.

PLATE No. 8

PATHALAHALLI BLACK GRANITE QUARRY
PROGRESSIVE MINE CLOUSURE PLAN
MINING PLAN

20 0 100 200

SCALE= 1:2,000 (1CM = 20 M)
ALL DIMENSIONS ARE IN METRES

APPLICANT : M/s.TAMILNADU MINERALS LIMITED,
No.31, KAMARAJAR SALAI,
CHEPAUK, CHENNAI - 600 005.

Certified that the PLAN is Correct.

M. RAM SANKAR
Mines Surveyor
Certificate No: SVR/789.
Tamil Nadu Minerals Limited.

Dr. E.GANESAN, Ph.D., PGDELP
Qualified Person,
Tamil Nadu Minerals Limited
Chennai - 600 005.

THIRU.DEEPAK S.BILGI, I.F.S.,
MEMBER SECRETARY

STATE LEVEL ENVIRONMENT IMPACT ASSESSMENT AUTHORITY – TAMIL NADU
3rd Floor, Panagal Maaligai,
No.1, Jeenis Road, Saidapet,
Chennai-15.
Phone No. 044-24359973
Fax No. 044-24359975

TERMS OF REFERENCE (ToR)

Lr No.SEIAA-TN/F.No.10401/SEAC/ToR- 1599/2023 Dated:06.11.2023

To

M/s. Tamil Nadu Minerals Limited ,
No: 31, Kamarajar Salai,
Chepauk,
Chennai,
Tamil Nadu-600005.

Sir / Madam,

Sub: SEIAA, Tamil Nadu – **Terms of Reference with Public Hearing** (ToR) for the Proposed Black Granite Quarry over an extent of 29.00.23Ha at S.F. No: 254(part)of Pathalahalli Village, Karimangalam Taluk, Dharmapuri District, Tamil Nadu by M/s. Tamil Nadu Minerals Limited - under project category – "B1" and Schedule S.No. 1(a) – ToR issued along with Public Hearing-preparation of EIA report – Regarding.

Ref:
1. Online proposal No. SIA/TN/MIN/442957/2023, Dated:11.09.2023.
2. Your application submitted for Terms of Reference dated: 15.09.2023.
3. Minutes of the 416th Meeting of SEAC held on 13.10.2023.
4. Minutes of the 670th meeting of Authority held on 06.11.2023.

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

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SEIAA-TN

The proponent, M/s. Tamil Nadu Minerals Limited has submitted application for ToR, in Form-I, Pre- Feasibility report for the Proposed Black Granite Quarry over an extent of 29.00.23Ha at S.F. No: 254(part) of Pathalahalli Village, Karimangalam Taluk, Dharmapuri District, Tamil Nadu.

Discussion by SEAC and the Remarks:-

Proposed Black Granite Quarry over an extent of 29.00.23Ha at S.F.Nos. 254(part) of Pathalahalli Village, Karimangalam Taluk, Dharmapuri District, Tamil Nadu by M/s. Tamil Nadu Minerals Limited -For Terms of Reference. (SIA/TN/MIN/442957/2023, Dated:11.09.2023).

The proposal was placed in the 416th Meeting of SEAC held on 13.10.2023. The details of the project furnished by the proponent are available in the website (parivesh.nic.in).

The SEAC noted the following:

1. The Project Proponent, M/s. Tamil Nadu Minerals Limited has applied for Terms of Reference for the Proposed Black Granite Quarry over an extent of 29.00.23Ha at S.F.Nos. 254(part) of Pathalahalli Village, Karimangalam Taluk, Dharmapuri District, Tamil Nadu.
2. The proposed quarry/activity is covered under Category "B1" of Item 1(a) "Mining Projects" of the Schedule to the EIA Notification, 2006.
3. As per the mining plan the lease period is 20 years. The mining plan is for the period of five years & production should not exceed 1,05,000 m^3 of ROM, 10,500 m^3 of Granite Recovery (@10%) & 94,500 m^3 of Granite Waste (@90%) with ultimate depth of mining 30m.

Based on the presentation and details furnished by the project proponent, **SEAC decided to grant Terms of Reference (TOR) with Public Hearing** subject to the following TORs, in addition to the standard terms of reference for EIA study for non-coal mining projects and details issued by the MOEF & CC to be included in EIA/EMP Report:

1. The structures within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m and (iv) 300 m 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.
2. The PP shall furnish a Copy of 500 m Cluster Certificate from the Competent Authority.

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3. The PP shall furnish VAO certificate regarding the location of habitations within 300m radius from the periphery of the site.
4. The PP shall submit a detailed hydrological report indicating the impact of proposed quarrying operations on the waterbodies like lake, water tanks, etc located within 1 km of the proposed quarry.
5. The Proponent shall develop greenbelt and garland drain around the boundary of the proposed quarry and the photographs indicating the same shall be shown during the EIA appraisal.
6. The PP shall mark the DGPS reference pillars painted with blue & white colour indicating the safety barrier of 7.5 m to be left under the Rule 13 (1) of MCDR, 1988 within the lease boundary and protective bunds.
7. The PP shall develop Green belt/plantation all along the mining lease boundary in a safety barrier.
8. The PP shall furnish the total manpower required for the proposed mining project including Statutory officials, Geologist, Supervisory staff, Skilled, Semi-skilled & Unskilled staff with showing the representation of the local people as per their eligibility and experience.

ANNEXURE-I

1. In the case of existing/operating mines, a letter obtained from the concerned AD (Mines) shall be submitted and it shall include the following:
   (i) Original pit dimension
   (ii) Quantity achieved Vs EC Approved Quantity
   (iii) Balance Quantity as per Mineable Reserve calculated.
   (iv) Mined out Depth as on date Vs EC Permitted depth
   (v) Details of illegal/illicit mining
   (vi) Violation in the quarry during the past working.
   (vii) Quantity of material mined out outside the mine lease area
   (viii) Condition of Safety zone/benches
   (ix) Revised/Modified Mining Plan showing the benches of not exceeding 6 m height and ultimate depth of not exceeding 50m.

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2. Details of habitations around the proposed mining area and latest VAO certificate regarding the location of habitations within 300m radius from the periphery of the site.
3. The proponent is requested to carry out a survey and enumerate on the structures located within the radius of (i) 50 m, (ii) 100 m, (iii) 200 m and (iv) 300 m (v) 500m shall be enumerated with details such as dwelling houses with number of occupants, whether it belongs to the owner (or) not, places of worship, industries, factories, sheds, etc with indicating the owner of the building, nature of construction, age of the building, number of residents, their profession and income, etc.
4. The PP shall submit a detailed hydrological report indicating the impact of proposed quarrying operations on the waterbodies like lake, water tanks, etc are located within 1 km of the proposed quarry.
5. The Proponent shall carry out Bio diversity study through reputed Institution and the same shall be included in EIA Report.
6. The DFO letter stating that the proximity distance of Reserve Forests, Protected Areas, Sanctuaries, Tiger reserve etc., up to a radius of 25 km from the proposed site.
7. In the case of proposed lease in an existing (or old) quarry where the benches are not formed (or) partially formed as per the approved Mining Plan, the Project Proponent (PP) shall the PP shall carry out the scientific studies to assess the slope stability of the working benches to be constructed and existing quarry wall, by involving any one of the reputed Research and Academic Institutions - CSIR-Central Institute of Mining & 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 the fresh/virgin quarries, the Proponent shall submit a conceptual 'Slope Stability Plan' for the proposed quarry during the appraisal while obtaining the EC, when the depth of the working is extended beyond 30 m below ground level.

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9. The PP shall furnish the affidavit stating that the blasting operation in the proposed quarry is carried out by the statutory competent person as per the MMR 1961 such as blaster, mining mate, mine foreman, II/I Class mines manager appointed by the proponent.
10. The PP shall present a conceptual design for carrying out only controlled blasting operation involving line drilling and muffle blasting in the proposed quarry such that the blast-induced ground vibrations are controlled as well as no fly rock travel beyond 30 m from the blast site.
11. The EIA Coordinators shall obtain and furnish the details of quarry/quarries operated by the proponent in the past, either in the same location or elsewhere in the State with video and photographic evidences.
12. If the proponent has already carried out the mining activity in the proposed mining lease area after 15.01.2016, then the proponent shall furnish the following details from AD/DD, mines,
13. What was the period of the operation and stoppage of the earlier mines with last work permit issued by the AD/DD mines?
14. Quantity of minerals mined out.
    - Highest production achieved in any one year
    - Detail of approved depth of mining.
    - Actual depth of the mining achieved earlier.
    - Name of the person already mined in that leases area.
    - If EC and CTO already obtained, the copy of the same shall be submitted.
    - Whether the mining was carried out as per the approved mine plan (or EC if issued) with stipulated benches.
15. All corner coordinates of the mine lease area, superimposed on a High-Resolution Imagery/Topo sheet, topographic sheet, geomorphology, lithology and geology of the mining lease area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).
16. The PP shall carry out Drone video survey covering the cluster, green belt, fencing, etc.,

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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.
18. The Project Proponent shall provide the details of mineral reserves and mineable reserves, planned production capacity, proposed working methodology with justifications, the anticipated impacts of the mining operations on the surrounding environment, and the remedial measures for the same.
19. The Project Proponent shall provide the Organization chart indicating the appointment of various statutory officials and other competent persons to be appointed as per the provisions of the Mines Act'1952 and the MMR, 1961 for carrying out the quarrying operations scientifically and systematically in order to ensure safety and to protect the environment.
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.
21. The proponent shall furnish the baseline data for the environmental and ecological parameters with regard to surface water/ground water quality, air quality, soil quality & flora/fauna including traffic/vehicular movement study.
22. The Proponent shall carry out the Cumulative impact study due to mining operations carried out in the quarry specifically with reference to the specific environment in terms of soil health, biodiversity, air pollution, water pollution, climate change and flood control & health impacts. Accordingly, the Environment Management plan should be prepared keeping the concerned quarry and the surrounding habitations in the mind.
23. Rain water harvesting management with recharging details along with water balance (both monsoon & non-monsoon) be submitted.

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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.
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.
26. Proximity to Areas declared as 'Critically Polluted' (or) the Project areas which attracts the court restrictions for mining operations, should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the TNPCB (or) Dept. of Geology and Mining should be secured and furnished to the effect that the proposed mining activities could be considered.
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.
28. Impact on local transport infrastructure due to the Project should be indicated.
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.
30. A detailed mine closure plan for the proposed project shall be included in EIA/EMP report which should be site-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.
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

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of small/medium/tall trees alternating with shrubs should be planted in a mixed manner.

33. Taller/one year old Saplings raised in appropriate size of bags, preferably 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
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.
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.
36. Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.
37. Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.
38. The Socio-economic studies should be carried out within a 5 km buffer zone from the mining activity. Measures of socio-economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.
39. Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.
40. Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.

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41. If any quarrying operations were carried out in the proposed quarrying site for which now the EC is sought, the Project Proponent shall furnish the detailed compliance to EC conditions given in the previous EC with the site photographs which shall duly be certified by MoEF&CC, Regional Office, Chennai (or) the concerned DEE/TNPCB.

42. 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.

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.

Appendix -I
List of Native Trees Suggested for Planting

No	Scientific Name	Tamil Name	Tamil Name
1	*Aegle marmelos*	Vilvam	
2	*Adenanthera pavonina*	Manjadi	
3	*Albizia lebbeck*	Vaagai	
4	*Albizia amara*	Usil	
5	*Bauhinia purpurea*	Manthari	
6	*Bauhinia racemosa*	Aathi	
7	*Bauhinia tomentosa*	Iruvathi	
8	*Buchanania axillaris*	Katturna	
9	*Bombax Ceiba/ki*	Panai	
10	*Butea monosperma*	Murukkamaram	
11	*Bobax ceiba*	Ilavu, Sevvilavu	
12	*Calophyllum inophyllum*	Punnai	
13	*Cassia fistula*	Saradkondrai	
14	*Cassia roxburghii*	Sengondrai	
15	*Chloroxylon swietenia*	Purasamaram	
16	*Cochlospermum religiosum*	Kongu, Manjalilavu	
17	*Cordia dichotoma*	Naruvili	
18	*Crateva adansonii*	Mavalingam	
19	*Dillenia indica*	Uva, Uzha	
20	*Dillenia pentagyna*	SiruUva, Siruzha	
21	*Diospyros ebenum*	Karungali	
22	*Diospyros ferrea/ylon*	Vagenu	
23	*Ficus amplissima*	Kalltchi	
24	*Hibiscus tiliaceus*	Aatrupoovarasu	
25	*Hardwickia binata*	Aacha	
26	*Holoptelia integrifolia*	Aavili	
27	*Lannea coromandelica*	Odhiam	
28	*Lagerstroemia speciosa*	Poo Maruthu	
29	*Leptanthus tetraphylla*	Nedkottaimaram	
30	*Limonia acidissima*	Vila maram	
31	*Litsea glutinosa*	Pisupattai	
32	*Madhuca longifolia*	Illuppai	
33	*Manilkara hexandra*	UlakkaiPaalai	
34	*Memecylon edule*	Magizhamaram	
35	*Mitragyna parviflora*	Kadambu	
36	*Morinda pubescens*	Nuna	
37	*Morinda citrifolia*	Vellai Nuna	
38	*Phoenix sylvestris*	Eachai	
39	*Pongamia pinnata*	Pungam	

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40	*Premna mollissima*	Murunu	முரன்
41	*Premna serratifolia*	Narumurunu	நரு முரன்
42	*Premna tomentosa*	Malaipoovarasu	மலை பூவரசு
43	*Prosopis cineras*	Vanni maram	வன்னி மரம்
44	*Pterocarpus marsupium*	Vengai	வேங்கை
45	*Pterospermum canescens*	Vennangu, Tada	வெண்னாங்கு
46	*Pterospermum xylocarpum*	Polavu	பலவு
47	*Putranjiva roxburghi*	Karupala	கருப்பாலை
48	*Salvadora persica*	Ugaa Maram	உகா மரம்
49	*Sapindus emarginatus*	Manipungan, Soapukai	மணிபுங்கன் சோப்புக்காய்
50	*Saraca asoca*	Asoca	அசோகா
51	*Streblus asper*	Purai maram	பூரை மரம்
52	*Strychnos nuxvomic*	Yetti	எட்டி
53	*Strychnos potatorum*	Therthang Kottai	தேற்றான் கொட்டை
54	*Syzygium cumini*	Naval	நாவல்
55	*Terminalia bellerc*	Thandri	தான்றி
56	*Terminalia arjuna*	Ven maruthu	வெண் மருது
57	*Toona ciliata*	Sandhana vembu	சந்தன வேம்பு
58	*Thespesia populnea*	Puvarasu	பூவரசு
59	*Walsuratrifoliata*	valsura	வல்சுரா
60	*Wrightia tinctoria*	Veppalai	வெப்பாலை
61	*Pithecellobium dulce*	Kodukkapuli	கொடுக்காப்புளி

Discussion by SEIAA and the Remarks:-

The subject was placed in the 667th Authority meeting held on 06.11.2023. The Authority noted that the subject was appraised in the 416th SEAC meeting held on 13.10.2023. After detailed discussions, the Authority accepts the recommendation of SEAC and decided to grant **Terms of Reference (ToR) along with Public Hearing** under cluster for undertaking the combined Environment Impact Assessment Study and preparation of separate Environment Management Plan subject to the conditions as recommended by SEAC & normal conditions and conditions in **Annexure 'B'** of this minutes.

Annexure 'B'

Cluster Management Committee

1. Cluster Management Committee shall be framed which must include all the proponents in the cluster as members including the existing as well as proposed quarry.
2. The members must coordinate among themselves for the effective implementation of EMP as committed including Green Belt Development, Water sprinkling, tree plantation, blasting etc.,

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3. The List of members of the committee formed shall be submitted to AD/Mines before the execution of mining lease and the same shall be updated every year to the AD/Mines.
4. Detailed Operational Plan must be submitted which must include the blasting frequency with respect to the nearby quarry situated in the cluster, the usage of haul roads by the individual quarry in the form of route map and network.
5. The committee shall deliberate on risk management plan pertaining to the cluster in a holistic manner especially during natural calamities like intense rain and the mitigation measures considering the inundation of the cluster and evacuation plan.
6. The Cluster Management Committee shall form Environmental Policy to practice sustainable mining in a scientific and systematic manner in accordance with the law. The role played by the committee in implementing the environmental policy devised shall be given in detail.
7. The committee shall furnish action plan regarding the restoration strategy with respect to the individual quarry falling under the cluster in a holistic manner.
8. The committee shall furnish the Emergency Management plan within the cluster.
9. The committee shall deliberate on the health of the workers/staff involved in the mining as well as the health of the public.
10. The committee shall furnish an action plan to achieve sustainable development goals with reference to water, sanitation & safety.
11. The committee shall furnish the fire safety and evacuation plan in the case of fire accidents.

Impact study of mining

12. Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area covering the entire mine lease period as per precise area communication order issued from reputed research institutions on the following
    a) Soil health & soil biological, physical land chemical features .
    b) Climate change leading to Droughts, Floods etc.
    c) Pollution leading to release of Greenhouse gases (GHG), rise in Temperature, & Livelihood of the local people.
    d) Possibilities of water contamination and impact on aquatic ecosystem health.

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e) Agriculture, Forestry & Traditional practices.

f) Hydrothermal/Geothermal effect due to destruction in the Environment.

g) Bio-geochemical processes and its foot prints including environmental stress.

h) Sediment geochemistry in the surface streams.

Agriculture &Agro-Biodiversity

13. Impact on surrounding agricultural fields around the proposed mining Area.
14. Impact on soil flora & vegetation around the project site.
15. Details of type of vegetations including no. of trees & shrubs within the proposed mining area and. If so, transplantation of such vegetations all along the boundary of the proposed mining area shall committed mentioned in EMP.
16. The Environmental Impact Assessment should study the biodiversity, the natural ecosystem, the soil micro flora, fauna and soil seed banks and suggest measures to maintain the natural Ecosystem.
17. Action should specifically suggest for sustainable management of the area and restoration of ecosystem for flow of goods and services.
18. The project proponent shall study and furnish the impact of project on plantations in adjoining patta lands, Horticulture, Agriculture and livestock.

Forests

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

Water Environment

23. Hydro-geological study considering the contour map of the water table detailing the number of ground water pumping & open wells, and surface water bodies such as rivers, tanks, canals, ponds etc. within 1 km (radius) so as to assess the impacts on the nearby waterbodies due to mining activity. Based on actual monitored data, it may clearly be

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shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided, covering the entire mine lease period.

24. Erosion Control measures.
25. Detailed study shall be carried out in regard to impact of mining around the proposed mine lease area on the nearby Villages, Water-bodies/ Rivers, & any ecological fragile areas.
26. The project proponent shall study impact on fish habitats and the food WEB/ food chain in the water body and Reservoir.
27. The project proponent shall study and furnish the details on potential fragmentation impact on natural environment, by the activities.
28. The project proponent shall study and furnish the impact on aquatic plants and animals in water bodies and possible scars on the landscape, damages to nearby caves, heritage site, and archaeological sites possible land form changes visual and aesthetic impacts.
29. The Terms of Reference should specifically study impact on soil health, soil erosion, the soil physical, chemical components and microbial components.
30. The Environmental Impact Assessment should study on wetlands, water bodies, rivers streams, lakes and farmer sites.

Energy

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

Climate Change

32. The Environmental Impact Assessment shall study in detail the carbon emission and also suggest the measures to mitigate carbon emission including development of carbon sinks and temperature reduction including control of other emission and climate mitigation activities.
33. The Environmental Impact Assessment should study impact on climate change, temperature rise, pollution and above soil & below soil carbon stock.

Mine Closure Plan

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

EMP

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35. Detailed Environment Management Plan along with adaptation, mitigation & remedial strategies covering the entire mine lease period as per precise area communication order issued.
36. The Environmental Impact Assessment should hold detailed study on EMP with budget for Green belt development and mine closure plan including disaster management plan.

Risk Assessment

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

Disaster Management Plan

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

Others

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

A. STANDARD TERMS OF REFERENCE

1) Year-wise production details since 1994 should be given, clearly stating the highest production achieved in any one year prior to 1994. It may also be categorically informed whether there had been any increase in production after the EIA Notification 1994 came

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into force, w.r.t. the highest production achieved prior to 1994.

2) A copy of the document in support of the fact that the Proponent is the rightful lessee of the mine should be given.

3) All documents including approved mine plan, EIA and Public Hearing should be compatible with one another in terms of the mine lease area, production levels, waste generation and its management, mining technology etc. and should be in the name of the lessee.

4) All corner coordinates of the mine lease area, superimposed on a High Resolution Imagery/ topo sheet, topographic sheet, geomorphology and geology of the area should be provided. Such an Imagery of the proposed area should clearly show the land use and other ecological features of the study area (core and buffer zone).

5) Information should be provided in Survey of India Topo sheet in 1:50,000 scale indicating geological map of the area, geomorphology of land forms of the area, existing minerals and mining history of the area, important water bodies, streams and rivers and soil characteristics.

6) Details about the land proposed for mining activities should be given with information as to whether mining conforms to the land use policy of the State; land diversion for mining should have approval from State land use board or the concerned authority.

7) It should be clearly stated whether the proponent Company has a well laid down Environment Policy approved by its Board of Directors? If so, it may be spelt out in the EIA Report with description of the prescribed operating process/procedures to bring into focus any infringement/deviation/ violation of the environmental or forest norms/ conditions? The hierarchical system or administrative order of the Company to deal with the environmental issues and for ensuring compliance with the EC conditions may also be given. The system of reporting of non-compliances / violations of environmental norms to the Board of Directors of the Company and/or shareholders or stakeholders at large, may also be detailed in the EIA Report.

8) Issues relating to Mine Safety, including subsidence study in case of underground mining and slope study in case of open cast mining, blasting study etc. should be detailed. The proposed safeguard measures in each case should also be provided.

9) The study area will comprise of 10 km zone around the mine lease from lease periphery

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and the data contained in the EIA such as waste generation etc. should be for the life of the mine / lease period.

10) Land use of the study area delineating forest area, agricultural land, grazing land, wildlife sanctuary, national park, migratory routes of fauna, water bodies, human settlements and other ecological features should be indicated. Land use plan of the mine lease area should be prepared to encompass preoperational, operational and post operational phases and submitted. Impact, if any, of change of land use should be given.

11) Details of the land for any Over Burden Dumps outside the mine lease, such as extent of land area, distance from mine lease, its land use, R&R issues, if any, should be given.

12) Certificate from the Competent Authority in the State Forest Department should be provided, confirming the involvement of forest land, if any, in the project area. In the event of any contrary claim by the Project Proponent regarding the status of forests, the site may be inspected by the State Forest Department along with the Regional Office of the Ministry to ascertain the status of forests, based on which, the Certificate in this regard as mentioned above be issued. In all such cases, it would be desirable for representative of the State Forest Department to assist the Expert Appraisal Committees.

13) Status of forestry clearance for the broken up area and virgin forestland involved in the Project including deposition of Net Present Value (NPV) and Compensatory Afforestation (CA) should be indicated. A copy of the forestry clearance should also be furnished.

14) Implementation status of recognition of forest rights under the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 should be indicated.

15) The vegetation in the RF / PF areas in the study area, with necessary details, should be given.

16) A study shall be got done to ascertain the impact of the Mining Project on wildlife of the study area and details furnished. Impact of the project on the wildlife in the surrounding and any other protected area and accordingly, detailed mitigative measures required, should be worked out with cost implications and submitted.

17) Location of National Parks, Sanctuaries, Biosphere Reserves, Wildlife Corridors, Ramsar site Tiger/ Elephant Reserves/(existing as well as proposed), if any, within 10 km of the

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mine lease should be clearly indicated, supported by a location map duly authenticated by Chief Wildlife Warden. Necessary clearance, as may be applicable to such projects due to proximity of the ecologically sensitive areas as mentioned above, should be obtained from the Standing Committee of National Board of Wildlife and copy furnished.

18) A detailed biological study of the study area [core zone and buffer zone (10 km radius of the periphery of the mine lease)] shall be carried out. Details of flora and fauna, endangered, endemic and RET Species duly authenticated, separately for core and buffer zone should be furnished based on such primary field survey, clearly indicating the Schedule of the fauna present. In case of any scheduled-I fauna found in the study area, the necessary plan along with budgetary provisions for their conservation should be prepared in consultation with State Forest and Wildlife Department and details furnished. Necessary allocation of funds for implementing the same should be made as part of the project cost.

19) Proximity to Areas declared as 'Critically Polluted' or the Project areas likely to come under the 'Aravali Range', (attracting court restrictions for mining operations), should also be indicated and where so required, clearance certifications from the prescribed Authorities, such as the SPCB or State Mining Department should be secured and furnished to the effect that the proposed mining activities could be considered.

20) Similarly, for Coastal Projects, a CRZ map duly authenticated by one of the authorized agencies demarcating LTL, HTL, CRZ area, location of the mine lease with respect to CRZ, coastal features such as mangroves, if any, should be furnished. (Note: The Mining Projects falling under CRZ would also need to obtain approval of the concerned Coastal Zone Management Authority).

21) R&R Plan/compensation details for the Project Affected People (PAP) should be furnished. While preparing the R&R Plan, the relevant State/National Rehabilitation & Resettlement Policy should be kept in view. In respect of SCs /STs and other weaker sections of the society in the study area, a need based sample survey, family-wise, should be undertaken to assess their requirements, and action programmes prepared and submitted accordingly, integrating the sectoral programmes of line departments of the State Government. It may be clearly brought out whether the village(s) located in the mine lease area will be shifted or not. The issues relating to shifting of village(s)

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including their R&R and socio-economic aspects should be discussed in the Report.

22) One season (non-monsoon) [i.e. March-May (Summer Season); October-December (post monsoon season) ; December-February (winter season)]primary baseline data on ambient air quality as per CPCB Notification of 2009, water quality, noise level, soil and flora and fauna shall be collected and the AAQ and other data so compiled presented date-wise in the EIA and EMP Report. Site-specific meteorological data should also be collected. The location of the monitoring stations should be such as to represent whole of the study area and justified keeping in view the pre-dominant downwind direction and location of sensitive receptors. There should be at least one monitoring station within 500 m of the mine lease in the pre-dominant downwind direction. The mineralogical composition of PM10, particularly for free silica, should be given.

23) Air quality modeling should be carried out for prediction of impact of the project on the air quality of the area. It should also take into account the impact of movement of Vehicles for transportation of mineral. The details of the model used and input parameters used for modeling should be provided. The air quality contours may be shown on a location map clearly indicating the location of the site, location of sensitive receptors, if any, and the habitation. The wind roses showing pre-dominant wind direction may also be indicated on the map.

24) The water requirement for the Project, its availability and source should be furnished. A detailed water balance should also be provided. Fresh water requirement for the Project should be indicated.

25) Necessary clearance from the Competent Authority for drawl of requisite quantity of water for the Project should be provided.

26) Description of water conservation measures proposed to be adopted in the Project should be given. Details of rainwater harvesting proposed in the Project, if any, should be provided.

27) Impact of the Project on the water quality, both surface and groundwater, should be assessed and necessary safeguard measures, if any required, should be provided.

28) Based on actual monitored data, it may clearly be shown whether working will intersect groundwater. Necessary data and documentation in this regard may be provided. In case the working will intersect groundwater table, a detailed Hydro Geological Study should

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be undertaken and Report furnished. The Report inter-alia, shall include details of the aquifers present and impact of mining activities on these aquifers. Necessary permission from Central Ground Water Authority for working below ground water and for pumping of ground water should also be obtained and copy furnished.

29) Details of any stream, seasonal or otherwise, passing through the lease area and modification / diversion proposed, if any, and the impact of the same on the hydrology should be brought out.

30) Information on site elevation, working depth, groundwater table etc. Should be provided both in AMSL and bgl. A schematic diagram may also be provided for the same.

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

32) Impact on local transport infrastructure due to the Project should be indicated. Projected increase in truck traffic as a result of the Project in the present road network (including those outside the Project area) should be worked out, indicating whether it is capable of handling the incremental load. Arrangement for improving the infrastructure, if contemplated (including action to be taken by other agencies such as State Government) should be covered. Project Proponent shall conduct Impact of Transportation study as per Indian Road Congress Guidelines.

33) Details of the onsite shelter and facilities to be provided to the mine workers should be included in the EIA Report.

34) Conceptual post mining land use and Reclamation and Restoration of mined out areas (with plans and with adequate number of sections) should be given in the EIA report.

35) Occupational Health impacts of the Project should be anticipated and the proposed preventive measures spelt out in detail. Details of pre-placement medical examination

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and periodical medical examination schedules should be incorporated in the EMP. The project specific occupational health mitigation measures with required facilities proposed in the mining area may be detailed.

36) Public health implications of the Project and related activities for the population in the impact zone should be systematically evaluated and the proposed remedial measures should be detailed along with budgetary allocations.

37) Measures of socio economic significance and influence to the local community proposed to be provided by the Project Proponent should be indicated. As far as possible, quantitative dimensions may be given with time frames for implementation.

38) Detailed Environmental Management Plan (EMP) to mitigate the environmental impacts which, should inter-alia include the impacts of change of land use, loss of agricultural and grazing land, if any, occupational health impacts besides other impacts specific to the proposed Project.

39) Public Hearing points raised and commitment of the Project Proponent on the same along with time bound Action Plan with budgetary provisions to implement the same should be provided and also incorporated in the final EIA/EMP Report of the Project.

40) Details of litigation pending against the project, if any, with direction /order passed by any Court of Law against the Project should be given.

41) The cost of the Project (capital cost and recurring cost) as well as the cost towards implementation of EMP should be clearly spelt out.

42) A Disaster management Plan shall be prepared and included in the EIA/EMP Report.

43) Benefits of the Project if the Project is implemented should be spelt out. The benefits of the Project shall clearly indicate environmental, social, economic, employment potential, etc.

44) Besides the above, the below mentioned general points are also to be followed:-

a) Executive Summary of the EIA/EMP Report

b) All documents to be properly referenced with index and continuous page numbering.

c) Where data are presented in the Report especially in Tables, the period in which the data were collected and the sources should be indicated.

d) Project Proponent shall enclose all the analysis/testing reports of water, air, soil,

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noise etc. using the MoEF&CC/NABL accredited laboratories. All the original analysis/testing reports should be available during appraisal of the Project.

e) Where the documents provided are in a language other than English, an English translation should be provided.

f) The Questionnaire for environmental appraisal of mining projects as devised earlier by the Ministry shall also be filled and submitted.

g) While preparing the EIA report, the instructions for the Proponents and instructions for the Consultants issued by MoEF&CC vide O.M. No. J-11013/41/2006-IA.II(I) dated 4th August, 2009, which are available on the website of this Ministry, should be followed.

h) Changes, if any made in the basic scope and project parameters (as submitted in Form-I and the PFR for securing the TOR) should be brought to the attention of MoEF&CC with reasons for such changes and permission should be sought, as the ToR may also have to be altered. Post Public Hearing changes in structure and content of the draft EIA/EMP (other than modifications arising out of the P.H. process) will entail conducting the PH again with the revised documentation.

i) As per the circular no. J-11011/618/2010-IA.II(I) dated 30.5.2012, certified report of the status of compliance of the conditions stipulated in the Environment Clearance for the existing operations of the project, should be obtained from the Regional Office of Ministry of Environment, Forest and Climate Change, as may be applicable.

j) The EIA report should also include (i) surface plan of the area indicating contours of main topographic features, drainage and mining area, (ii) geological maps and sections and (iii) sections of the mine pit and external dumps, if any, clearly showing the land features of the adjoining area.

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

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

1. Project name and location (Village, District, State, Industrial Estate (if applicable).
2. Process description in brief, specifically indicating the gaseous emission, liquid effluent and solid and hazardous wastes.

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3. Measures for mitigating the impact on the environment and mode of discharge or disposal.
4. Capital cost of the project, estimated time of completion.
5. The proponent shall furnish the contour map of the water table detailing the number of wells located around the site and impacts on the wells due to mining activity.
6. A detailed study of the lithology of the mining lease area shall be furnished.
7. Details of village map, "A" register and FMB sketch shall be furnished.
8. Detailed mining closure plan for the proposed project approved by the Geology of Mining department shall be shall be submitted along with EIA report.
9. Obtain a letter /certificate from the Assistant Director of Geology and Mining standing that there is no other Minerals/resources like sand in the quarrying area within the approved depth of mining and below depth of mining and the same shall be furnished in the EIA report.
10. EIA report should strictly follow the Environmental Impact Assessment Guidance Manual for Mining of Minerals published February 2010.
11. Detail plan on rehabilitation and reclamation carried out for the stabilization and restoration of the mined areas.
12. The EIA study report shall include the surrounding mining activity, if any.
13. Modeling study for Air, Water and noise shall be carried out in this field and incremental increase in the above study shall be substantiated with mitigation measures.
14. A study on the geological resources available shall be carried out and reported.
15. A specific study on agriculture & livelihood shall be carried out and reported.
16. Impact of soil erosion, soil physical chemical and biological property changes may be assumed.
17. Site selected for the project - Nature of land - Agricultural (single/double crop), barren, Govt./ private land, status of is acquisition, nearby (in 2-3 km.) water body, population, with in 10km other industries, forest , eco-sensitive zones, accessibility, (note - in case of industrial estate this information may not be necessary)
18. Baseline environmental data - air quality, surface and ground water quality, soil characteristic, flora and fauna, socio-economic condition of the nearby population
19. Identification of hazards in handling, processing and storage of hazardous material and

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safety system provided to mitigate the risk.

20. Likely impact of the project on air, water, land, flora-fauna and nearby population
21. Emergency preparedness plan in case of natural or in plant emergencies
22. Issues raised during public hearing (if applicable) and response given
23. CER plan with proposed expenditure.
24. Occupational Health Measures
25. Post project monitoring plan
26. The project proponent shall carry out detailed hydro geological study through intuitions/NABET Accredited agencies.
27. A detailed report on the green belt development already undertaken is to be furnished and also submit the proposal for green belt activities.
28. The proponent shall propose the suitable control measure to control the fugitive emissions during the operations of the mines.
29. A specific study should include impact on flora & fauna, disturbance to migratory pattern of animals.
30. Reserve funds should be earmarked for proper closure plan.
31. A detailed plan on plastic waste management shall be furnished. Further, the proponent should strictly comply with, Tamil Nadu Government Order (Ms) No.84 Environment and forests (EC.2) Department dated 25.06.2018 regarding ban on one time use and throw away plastics irrespective of thickness with effect from 01.01.2019 under Environment (Protection) Act, 1986. In this connection, the project proponent has to furnish the action plan.

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

a. A note confirming compliance of the TOR, with cross referencing of the relevant sections / pages of the EIA report should be provided.
b. All documents may be properly referenced with index, page numbers and continuous page numbering.
c. Where data are presented in the report especially in tables, the period in which the data were collected and the sources should be indicated.
d. While preparing the EIA report, the instructions for the proponents and instructions for the consultants issued by MoEF& CC vide O.M. No. J-11013/41/2006-IA.II (I) dated

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4th August, 2009, which are available on the website of this Ministry should also be followed.

e. The consultants involved in the preparation of EIA/EMP report after accreditation with Quality Council of India (QCI)/National Accreditation Board of Education and Training (NABET) would need to include a certificate in this regard in the EIA/EMP reports prepared by them and data provided by other organization/Laboratories including their status of approvals etc. In this regard circular no F. No.J -11013/77/2004-IA-II(I) dated 2nd December, 2009, 18th March 2010, 28th May 2010, 28th June 2010, 31st December 2010 & 30th September 2011 posted on the Ministry's website http://www.moef.nic.in/ may be referred.

- After preparing the EIA (as per the generic structure prescribed in Appendix-III of the EIA Notification, 2006) covering the above mentioned points, the proponent willtake further necessary action for obtaining environmental clearance in accordance with the procedure prescribed under the EIA Notification, 2006.
- The final EIA report shall be submitted to the SEIAA, Tamil Nadu for obtaining Environmental Clearance.
- The TORs with public hearing prescribed shall be **valid for a period of three years** from the date of issue, for submission of the EIA/EMP report as per OMNo.J-11013/41/2006-IA-II(I)(part) dated 29th August, 2017.

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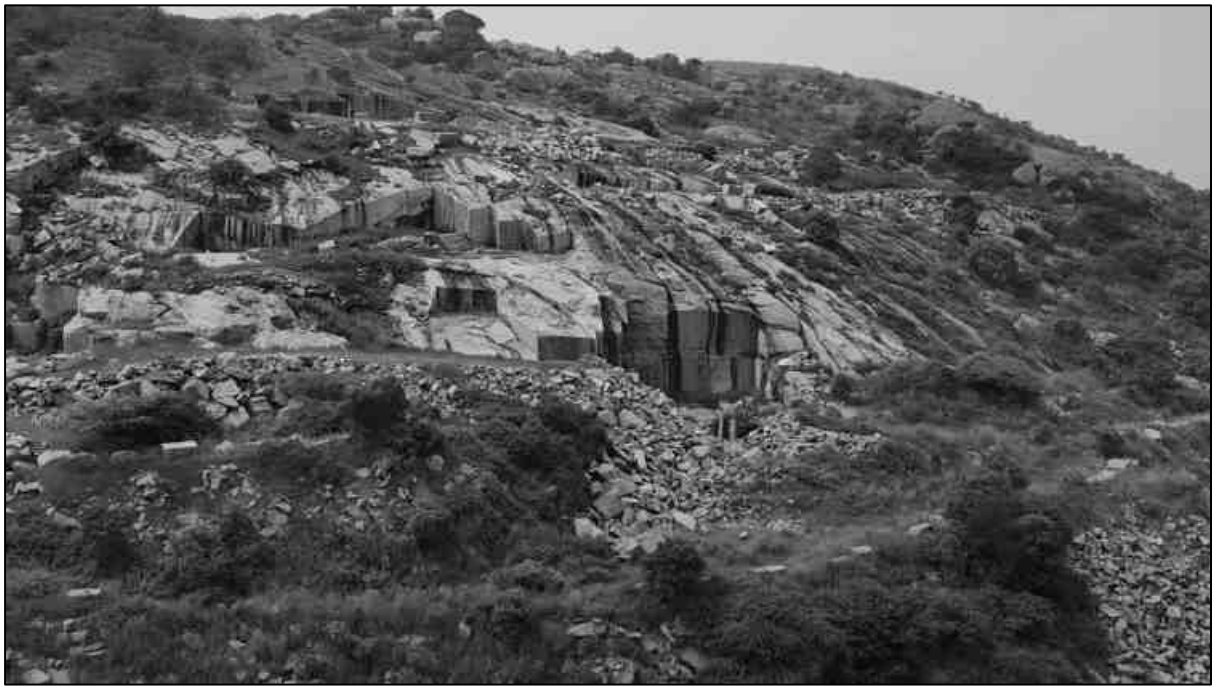
Copy to:

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

Existing Quarry Photographs

Sulamalai Grey Granite Quarry

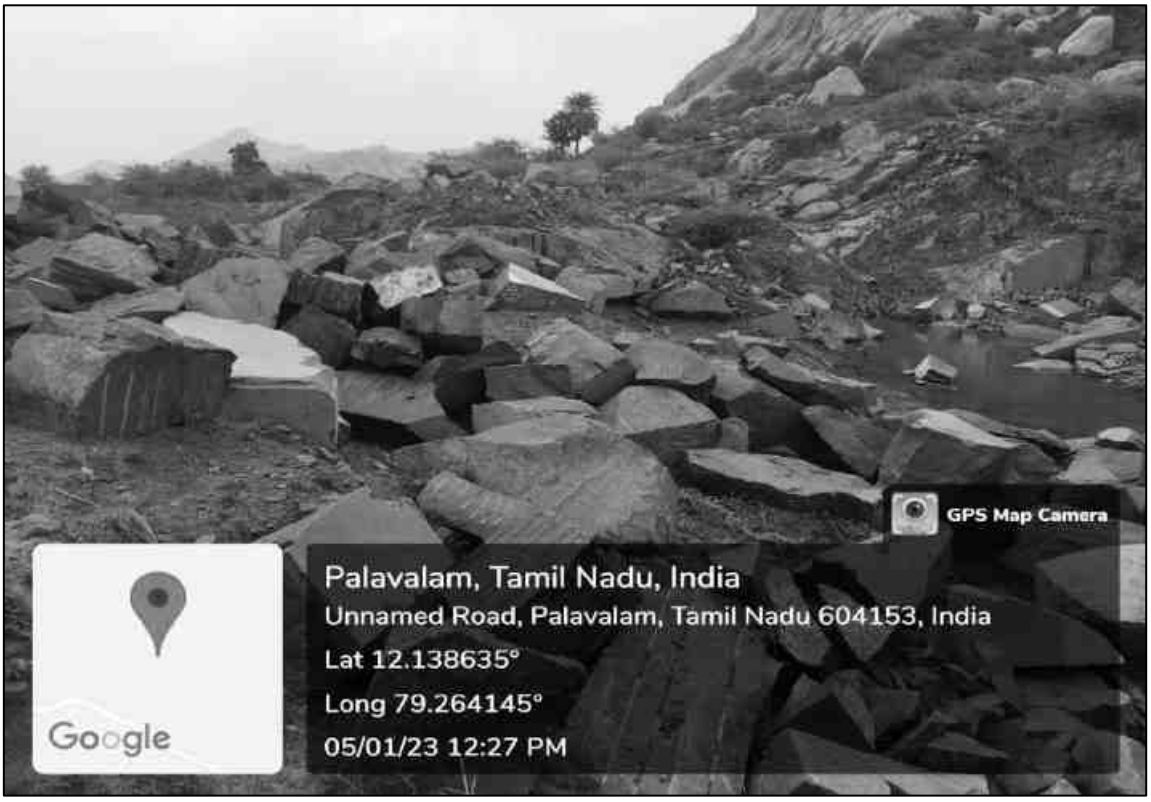


Karandapalli Black Granite Quarry

Pathalahalli Black Granite Quarry

Siruvalai Black Granite Quarry

Pothuvai & Pazhavalam Granite Quarry



Greenbelt and Fencing Photographs

Annexure-8

சான்று [illegible]

தருமபுரி மாவட்டம் காரிமங்கலம் வட்டம் பத்தலஹள்ளி வருவாய் கிராமம் புல எண் 254 -ல் 60.16.5 ஹெக்டேர் பரப்பு 5D. ஏ. தரிசு மானாவாரியாக [illegible]கிராம கணக்கில் தாக்கலாகியுள்ளது. இதில் பரப்பு 29.00.23 ஹெக்டேர் பரப்பளவு [illegible] இங்கு நீர்நிலையும் ஏரி குட்டைகள் உள்ளது. இதில் 300 மீட்டர் தூரத்தில் 7 வீடுகள் உள்ளது என சான்றளிக்கின்றேன்.

கிராம நிர்வாக அலுவலர்
40-பத்தலஹள்ளி 30/8/2023
காரிமங்கலம்-வட்டம்

Annexure-9

From

Dr.G.Panneerselvam,
M.Sc.,M.Phil., Ph.D.,
Assistant Director,
Geology and Mining,
Dharmapuri.

To

Tvl.Tamil Nadu Minerals Limited,
No.31, Kamarajar Salai,
Cheapuk, Chennai.

Roc.No.276/2006 (Mines) Dated.13.07.2023.

Sir,

Sub: Mines and Minerals – Minor Mineral - Black Granite - Dharmapuri District – Karimangalam Taluk – Bathalahalli Village - S.F.No.294 (Part) - over an extent of 29.00.23 Hectares of Govt. poramboke lands – Quarry lease application of Tvl.Tamil Nadu Minerals Ltd., Chennai – Precise area communicated – certain particulars requested – furnished – Reg.

Ref:
1. Quarry lease application preferred by Tvl.Tamilnadu Minerals Ltd., Chennai dated. 19.06.2006.
2. Government letter No. 3774153/ MME.1/2022-1 dated 14.02.2023
3. Tvl.Tamil Nadu Minerals Ltd., Chennai letter Rc.No.301/ML3/2023 dated 07.07.2023.

- - - - -

In the reference 2nd cited, the Government have communicated an extent of 29.00.23 Hects. of Government Poramboke lands in S.F.No.254 (P) in Bathalahalli Village, Karimangalam Taluk, Dharmapuri District as precise area for quarrying Black Granite under sub rule 3(b) of Rule 8-C of Tamil Nadu Minor Mineral Concession Rules, 1959 to Tvl.Tamil Nadu Minerals Ltd., Chennai with a direction to produce the approved mining plan and also to produce Environmental Clearance obtained from the competent authority for the above said area for grant of quarry lease along with various conditions.

2) In the reference 3rd cited, Tvl.Tamil Nadu Minerals Ltd., Chennai have requested to furnish the details of mines/quarries located within 500 mts. radius from the precise area for obtaining Environmental Clearance from SEIAA for carrying quarry operation in the proposed area.

3) As requested, the following are furnished.

Abandoned Quarry

Sl. No.	Name and Address of the lessee	Village & Taluk	S.F.No.	Extent (in Hects.)	Classification of land	Lease period
---Nil----						

Existing Quarry

Sl. No.	Name and Address of the lessee	Village & Taluk	S.F. No.	Extent (in Hects.)	Classification of land	Lease period
---Nil----						

Any other proposed Quarry

Sl. No.	Name and Address of the lessee	Village & Taluk	S.F.No.	Extent (in Hects.)	Classification of land
..... Nil.....					

13.07.2023

Assistant Director,
Geology and Mining,
Dharmapuri.

அனுப்புநர்

திரு.ஞா.புருஷோத்தமன், B.E., M.Plan.,
உதவி இயக்குநர்,
மாவட்ட நகர் ஊரமைப்பு அலுவலகம்,
33, பிடமனேரி ரோடு, அப்பாவு நகர்,
தருமபுரி – 636 701.
மின்னஞ்சல் முகவரி –dpirdd@gmail.com
தொலைபேசி எண்.04342–260399

பெறுநர்

Tamil Nadu Minerals Limited,
(A Government of Tamil Nadu Undertaking),
The Divisional Manager,
No.35, West Link Colony Road,
4th Cross, Co–operative Colony,
Krishnagiri – 635 001.

ந.க.எண்.506/2023/தமா நாள். .05.2023.

பொருள் : நில உபயோக சான்று – மாவட்ட நகர் ஊரமைப்பு அலுவலகம், தருமபுரி – கிருஷ்ணகிரி கோட்டம் – தருமபுரி மாவட்டம் – காரிமங்கலம் வட்டம் – பத்தலஅள்ளி – ச.எண். 254(P)–ல் 29.00.23 ஹெக்டேர் இடத்திற்கு நில உபயோக சான்று கோரியது – தொடர்பாக.

பார்வை : மனுதாரர் Tamil Nadu Minerals Limited, Krishnagiri அவர்கள் கடிதம் Rc.No.4251/A2/2008, Dated: 29.05.2023.

பார்வையில் காணும் மனுதாரர் கடிதம் மற்றும் இணைப்புகள் பரிசீலிக்கப்பட்டதில், தருமபுரி மாவட்டம், காரிமங்கலம் வட்டம், பத்தலஅள்ளி, ச.எண். 254(P)–ல் 29.00.23 ஹெக்டேர் இடத்திற்கு நில உபயோக சான்று கோரப்பட்டுள்ளது.

நகர் ஊரமைப்பு சட்டம் 1971–ன்படி மேற்படி இடத்திற்கு முழுமைத் திட்டம் மற்றும் விரிவு அபிவிருத்தி திட்டம் ஏதும் அறிவிப்பு செய்யப்படவில்லை. எனவே மனையிடம் திட்டமில்லாப் பகுதியில் அமைகிறது என்ற விவரம் தெரிவித்துக் கொள்ளப்படுகிறது.

31/05/23
உதவி இயக்குநர்,
மாவட்ட நகர் ஊரமைப்பு அலுவலகம்,
தருமபுரி மாவட்டம்.

31/5/23

31/5/23

भारतीय गैर न्यायिक

एक सौ रुपये

Rs. 100

रु. 100

ONE HUNDRED RUPEES

सत्यमेव जयते

भारत INDIA

INDIA NON JUDICIAL

தமிழ்நாடு तमिलनाडु TAMILNADU

TAMIN

28 JAN 2025

DF 184264

M.S. CHANDRAMOULI
STAMP VENDOR
LIC No. 9034/86/B1
New No. 133/3, T.H. Road
Triplicane, Chennai-600 005.
Phone : 044-48592446

AFFIDAVIT

I, Dr.E.Ganesan, represents M/s.Tamil Nadu Minerals Limited, as Deputy Manager(ML) and authorized signatory of the project solemnly declare and sincerely affirm that the blasting operation in respect of proposed Pathalahalli Black Granite Quarry over an extent of 29.00.23 Ha of Govt poramboke land in SF No.254(Part) of Pathalahalli Village, Karimangalam Taluk, Dharmapuri District will be carried out by the statutory competent person as per the Metalliferous Mines Regulations, 1961 such as Blaster, Mining Mate, Mine Foreman, Second Class Manager Certificate of Competency appointed by TAMIN.

for Tamil Nadu Minerals Ltd.,

(Dr. E.GANESAN)
Deputy Manger (ML)

NOTARY * GOVT OF TAMILNADU, INDIA * D. DHEENADHAYALAN G.O.Ms.No. 162/2020 CITY OF MADRAS

D. DHEENADHAYALAN M.A., B.L.
ADVOCATE & NOTARY PUBLIC
400, LAW CHAMBER,
MADRAS HIGH COURT, CHENNAI-104
EXPIRE ON 22/10/25
CELL No 9381016780

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