

# EXECUTIVE SUMMARY

## FOR OBTAINING

**Environmental Clearance under EIA Notification – 2006**

**Schedule Sl. No. 1 (a) : VIOLATION Category ‘A’**

**EXTENT = 420.25.0 Ha**

**Total Production (ROM) (2023-2028) 12,44,670 Ts**

**Peak production (ROM) proposed (2024-25) 2,60,563 Ts**

(As per MMDR Amendment Act 2015, the validity of lease period shall be deemed to have been extended upto 31.03.2030)

## ALANGULAM LIMESTONE MINES-II

at

Gopalapuram, Lakshmpuram and Vadakarai Villages, Sivakasi & Rajapalayam Taluk,

Virudhunagar District, Tamil Nadu

G.O No & Date	Village and Taluk	Total Extent (Ha)	MoEFCC ToR obtained
G.O.No 871/MMD-2, 20.08.1990	Gopalapuram, Lakshmpuram & Vadakarai Village, Sivakasi & Rajapalayam Taluk	420.25.0 Ha	F.No.23-170/2018-1A.III (V) dated 26 <sup>th</sup> July 2021

## PROPONENT



## M/S TAMIL NADU CEMENTS CORPORATION LTD.

(A GOVERNMENT OF TAMIL NADU UNDERTAKING)

5th Floor, Aavin Illam, No.3A 5th Floor, Aavin Illam, No.3A, Pasumpon Muthuramalingam Road, Nandanam, Chennai, Tamilnadu.

## Environmental Consultant

### GEO EXPLORATION AND MINING SOLUTIONS



Old No. 260-B, New No. 17,  
Advaitha Ashram Road, Alagapuram,  
Salem – 636 004, Tamil Nadu, India

Accredited for sector 1 Category ‘A’ & 31,38 Category ‘B’  
Certificate No: NABET/EIA/2225/RA0276



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**AUGUST- 2023**

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**1. INTRODUCTION –**

Alangulam Limestone Mines-II was granted Limestone Mining lease vide Proceeding order No G.O MS.No 871 Industries (MM2) Department, Dated: 20.08.1990 over an extent of 420.25 ha partially patta and Government poramboke land in Gopalapuram and Vadakarai Villages of Rajapalayam Taluk and Lakshmipuram of Sivakasi Taluk Virudhunagar District for the period of twenty years.

The project proponent submitted that the mining lease was granted vide G.O. No 871 dated 20.08.1990 for period of 10 years. The lease was expired on 04.02.1998 and renewal for a period of 20 years is pending with the state government for lease area of 420.25.0 Ha spread over villages Gopalapuram and Vadakarai Villages of Rajapalayam Taluk and Lakshmipuram of Sivakasi Taluk, Virudhunagar District, Tamil Nadu state for a period of 20 Years. As per amendment of MMDR 2015 the lease applied for renewal or extended up to a period ending 31st March 2030.

The proponent for their Alangulam Limestone Mines-II had submitted the Environmental Clearance Applications for ToR to MoEF & CC vide online proposal No. IA/TN/MIN/66248/2017 Dated 17.07.2017.

The above proposal seeking ToR was placed in the EAC observed that PP has gone to enhanced production beyond 1993-94 base year production level without taking prior EC hence violated the provision of the EIA notification under E (P) Act. EAC further noted PP has submitted the letter dated 12.07.2018 of Department of mines and geology wherein it was informed that lease for extension till 31.03.2030 is under consideration under MMDR Act 2015, and corrigendum minutes of EAC in its 44th meeting held during Feb 18th -19th, 2021 grant the ToR for M/s. Tamil Nadu Cements Corporation Limited. observed that the project falls under the Category “A” and Schedule 1(a) of the EIA Notification, 2006. The committee recommended the Terms of Reference for the project for assessment of Ecological Damage, remediation plan and natural & Community resource augmentation plan to be prepared an independent chapter in the Environment Impact Assessment report by Accredited consultant.

Public hearing is mandatory as per the Hon’ble high court of Madras order dated 13.10.2017 in W.P.No 1189 of 2017.

In order to abide the above said Gazette Notification, the proponent applied for grant of Environmental Clearance and carried out Environmental Impact assessment study for Summer season (March-May) 2023.

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**BRIEF DESCRIPTION OF THE PROJECT**

S.No.	Particulars	Details	
<b>A</b>	<b>Nature and Size of the Project</b>	Production capacity <b>12,44,670 Ts</b> of Alangulam Limestone Mines-II (G.O. No. 871) by Tamil Nadu Cement Corporation Limited.	
<b>B.</b>	<b>Location</b>		
	<b>Name of Unit</b>	<b>Survey No</b>	<b>Area in Ha</b>
	<b>Gopalapuram, Vadakarai and Lakshmipuram Limestone mines</b>	27/1,3,4,6-8,10,12,15,118/3, 120/2, 121/7, etc.,	420.25.0 Ha
	IBM registration No	IBM/7446/2011	
	Mine Code	38TMN30034	
<b>a</b>	<b>Village</b>	Gopalapuram, Vadakarai and Lakshmipuram	
<b>b</b>	<b>Taluk</b>	Rajapalayam and Sivakasi	
<b>c</b>	<b>District</b>	Virudhunagar	
<b>d</b>	<b>State</b>	Tamil Nadu	
<b>e</b>	<b>Geographical Coordinates</b>	9°20'43.40"N to 9°22'4.53"N, 77°38'14.70"E to 77°40'36.36"E	
<b>f</b>	<b>Toposheet No</b>	58 G/11	
<b>C</b>	<b>Lease area details</b>		
	Lease Area	420.25.0 Ha	
	Type of Land	Government and Patta Land	
	Depth of mining	37m from RL 117m (max) to RL 80m,	
	Year wise Production (ROM) [2023-2024 to 2027-28],	ROM 12,44,670 Tons Top soil 3,00,61 Tons	
	Water table	70-75m	
<b>D</b>	<b>Machinery Details</b>		
<b>S. No</b>	<b>Name of the machine</b>	<b>Nos.</b>	<b>Capacity</b>
<b>1</b>	Wagon drill (Ingersoll Rand)	1	110mm dia
<b>2</b>	Compressor	2	460cfm,150psi
<b>3</b>	Hydraulic excavator	3	1.2m <sup>3</sup>
<b>4</b>	Dozer	1	D10 dozer
<b>5</b>	Taurus Tipper	22	25 Tons
<b>6</b>	Explosive van	1	7.5 tons
<b>7</b>	Water bouser	1	4000 lts.
<b>8</b>	Pumps	3	540 Hp/25 Hp
<b>9</b>	Jeep	1	-
<b>E</b>	<b>Cost details</b>		
	Cost of the project	Approx. Rs. 36.40 Crores	
	Cost for EMP	Rs. 1.82 Crores	
<b>F</b>	<b>Environmental Settings of the area</b>		
<b>a)</b>	Ecological Sensitive Areas (National Park, Wild Life Sanctuary, Biosphere Reserve, Reserve/ Protected Forest etc.) within 10 Km radius	No such area is located within 10km radius of the mine lease area.	

<b>b)</b>	Inter-state boundary within 5 Km radius	No such area is located within 10km radius of the mine lease area.
<b>c)</b>	Nearest Town/ Major City	Vembakottai -10.0 km-SE
<b>d)</b>	Nearest Railway Station	Rajapalayam 13km-NW
<b>e)</b>	Nearest State Highway/ National Highway	SH-186 Rajapalayam -Vembakottai -0.5km -E NH-744 Madurai- Tenkasi-13.8km -NW
<b>f)</b>	Nearest Airport	Madurai airport - 69km-NE, Seaport Tuticorin 82km-SE
<b>g)</b>	Medical Facilities	Dr. Anantharaj Hospital-Alangulam-E
<b>h)</b>	Education Facilities	ERRSM Government Higher secondary school-Alangulam-E
<b>i)</b>	Seismic Zone	Zone III
<b>j)</b>	Water body	Vaippar River-E, Vembakottai reservoir-E

## 2. PROJECT DESCRIPTION –

- The Mine Lease area over an extent of 420.25.0 Ha is located in S.F.Nos. 27/1,3,4,6-8,10,12,15,118/3, 120/2, 121/7, etc., (Partially patta and Government poramboke land), villages Gopalapuram and Vadakarai Villages of Rajapalayam Taluk and Lakshmipuram of Sivakasi Taluk, Virudhunagar District, Tamil Nadu.
- The Topography of the area is almost flat terrain The Mine is located in various survey numbers in Alangulam, Lakshmipuram, Pernaickenpatti, Edirkottai, Duraisamipuram & Naranapuram Villages, Taluk Sivakasi & District- Virudhunagar, State-Tamil Nadu. Mine falls in the survey of India Toposheet no. 58 G/11 & G15 and lies between East longitude 77°38'14.70"E to 77°40'36.36"E and North latitude, 9°20'43.40"N to 9°22'4.53"N.
- The Review of Mining Plan (2023-24to 2027-28) was prepared and submitted for a quantity of 12,44,670 Ts of ROM, Top soil 3,00,61 Tons the same was approved by Indian Bureau of Mines vide Letter No. TN/VRD/LST/ROMP-1558 MDS dated 29.08.2019.
- Anticipated Quantity of Limestone with 80% recovery is about 12,44,670Tons and anticipated waste is 3,73,401Ts (20% of Mineral rejects and side burden) for the present plan period.
- The mineral rejects and side burden is proposed to be dump on the South Eastern side of the lease area, the waste will be utilized for the backfilling in the mined out pit.
- The mined out quantity of limestone will be transported to needy cement and lime based industries.

- Opencast, category “A” other than fully Mechanized Mining is proposed

∞ Existing pit dimension

S.no.	Block /Pit No.	Length	Width	Area in m <sup>2</sup>	Area In Ha.	Top RL (m)	Bottom RL (m)	No. of Benches
1	Quarry - I	650	65	42250	4.225	99	89	2
2	Quarry - II	370	65	24050	2.405	102	92	2
3	Quarry - III	240	40	9600	0.96	108	99	1
4	Quarry - III-A	300	65	19500	1.95	108	98	3
5	Quarry - IV	550	55	30250	3.025	107	92	3
6	Quarry - V	180	135	24300	2.43	112	102	2

∞ Present proposed depth is 37m (1m topsoil + 36m Limestone)

∞ Ultimate Pit Dimension

Pit	Length in (m)	Wide in (m)	Depth in (m)
Quarry-I	680	190	59
Quarry-II	300	135	46
Quarry-III	940	100	20
Quarry-IV	3500	100	33
Quarry-V	525	260	67
Quarry-VI	570	260	70

○ Proposed Bench Height, 9m Height, 9m Width with 60° Slope

- Short-hole drilling of 32-35 mm diameter by jackhammer drills with Air Compressor.
- Project has provided direct employment opportunities to 38 peoples and indirect employment opportunities within the surrounding region for about 50 peoples in the field of Mineral transport, service sector, garages, shops/canteen, etc.,
- Existing greenbelt area is 5.6 Hectares; Greenbelt area at the end of life of mine is 268.4 Hectares. Proposed green belt 10.0Ha. It is proposed to plant predominant local species like Pungum, casuarian and other regional trees.
- The Project Site is well connected to

Nearest Roadway	SH-186 Rajapalayam Vembakottai 0.5km-East NH-744 Madurai-Tenkasi-13.8km-NW
Nearest Village	Alangulam- 150m-East
Nearest Town	Vembakottai -10.0 km-SE
Nearest Railway Station	Rajapalayam– 13.5 km-NW
Nearest Airport	Madurai airport - 69km-NE
Seaport	Thoothukudi-82km – SE
Interstate Boundary	Tamilnadu-Kerala -29km-NW

- There is No Protected Areas Notified under The Wild Life (Protection) Act, 1972, Critically Polluted Areas as notified by the Central Pollution Control Board constituted,

Notified Eco-Sensitive Areas, Interstate boundaries and International Boundaries, besides there are No National Parks, Reserve Forest, Biosphere Reserves, Elephant Corridors, Mangrove Forest, Archeological Monuments, Heritage Site etc. within 10 Km Radius from Project Site.

- The Nearest water bodies are Eri Near Sivalingapuram is about 200m on the South western side and Vaippar River is about 6.8Km on the South side.
- The proponent has been carrying out CSR Activities in various fields for social welfare around the project site and will continue to do. The proponent has spent an amount of Rs 10 Lakhs till date.
- The Seismic Sensitivity of the project area is categorized as Zone III, Moderate Risk Zone as per BMTPC, Vulnerability Atlas of Seismic Zone of India IS: 1893 – 2002

#### LAND USE PATTERN OF THE PROPOSED PROJECT

Sno	Type of land use (in ha)	Area at the beginning of the proposal period	Additional area to be required at this scheme period (ha)	Actual Area utilized in the proposal period
1	Area under mining	15.00	3.28.0	56.71.0
2.	Topsoil dump	0.06	0.37.0	4.05.0
3.	OB/waste dump	8.44	2.99.0	35.09.0
4.	Roads	6.26	Nil	3.00.0
5.	Infrastructures	1.05	Nil	3.00.0
6.	Green belt	5.61.0	10.00.0	50.00.0
7.	Undisturbed Area	383.83	367.19.0	268.40.0
	<b>Total</b>	<b>420.25</b>	<b>383.83.0</b>	<b>420.25.0</b>

Source: ROMP online Report

#### OPERATIONAL DETAILS FOR PROPOSED PROJECT

Year	ROM (Ts)	Over burden (Ts)	Total Topsoil (ts)	Side burden (Ts)
2023-24	259875	74385	5394	253845
2024-25	260563	32130	9401	0
2025-26	241313	188527	6454	356962
2026-27	244688	149063	3828	57713
2027-28	238231	133403	4984	102600
<b>Total</b>	<b>1244670</b>	<b>577508</b>	<b>30061</b>	<b>771120</b>

Source: Approved ROMP Final Report

#### Five Years Proposed Production Details (In Million Tons)

Year	ROM(TS)	Topsoil (Ts)	Ore:Waste ratio
2023-24	259875.00	10788	0.29
2024-25	260563.00	18802	0.12
2025-26	241313.00	12908	0.78

2026-27	244688.00	7656	0.61
2027-28	238231.00	9968	0.56
<b>Total</b>	<b>1244670.00</b>	<b>60122</b>	

Source: Online Report for ROMP. Pg No. 41.

**Table 2.14 Water Requirement**

<b>*Purpose</b>	<b>Fresh water</b>	<b>Waste water</b>	<b>Disposal</b>
Dust Suppression	3.0 KLD	1.6	Rainwater accumulated in Mine Pit
Green Belt development	15.0 KLD	0	Rainwater accumulated in Mine Pit
Domestic purpose	5.0 KLD	0	Rainwater accumulated in Mine Pit
<b>Total</b>	<b>23.0 KLD</b>	<b>1.6 KLD</b>	

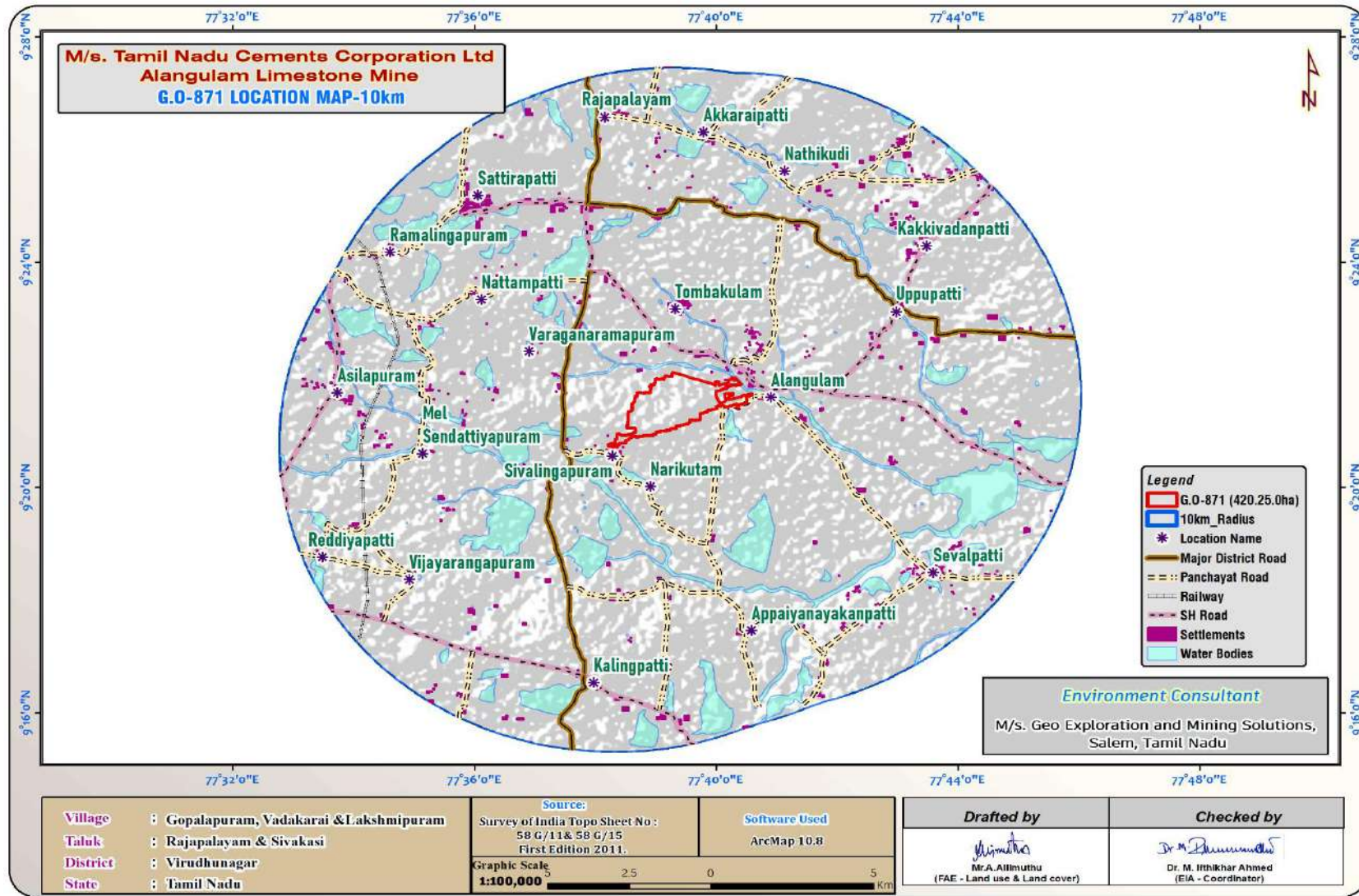
Source: Prefeasibility Report

**PROPOSED MACHINERY DEPLOYMENT**

<b>S. No</b>	<b>Name of the machine</b>	<b>Nos.</b>	<b>Capacity</b>
<b>1</b>	Wagon drill (Ingersoll Rand)	1	110mm dia
<b>2</b>	Compressor	2	460cfm,150psi
<b>3</b>	Hydraulic excavator	3	1.2m <sup>3</sup>
<b>4</b>	Dozer	1	D10 dozer
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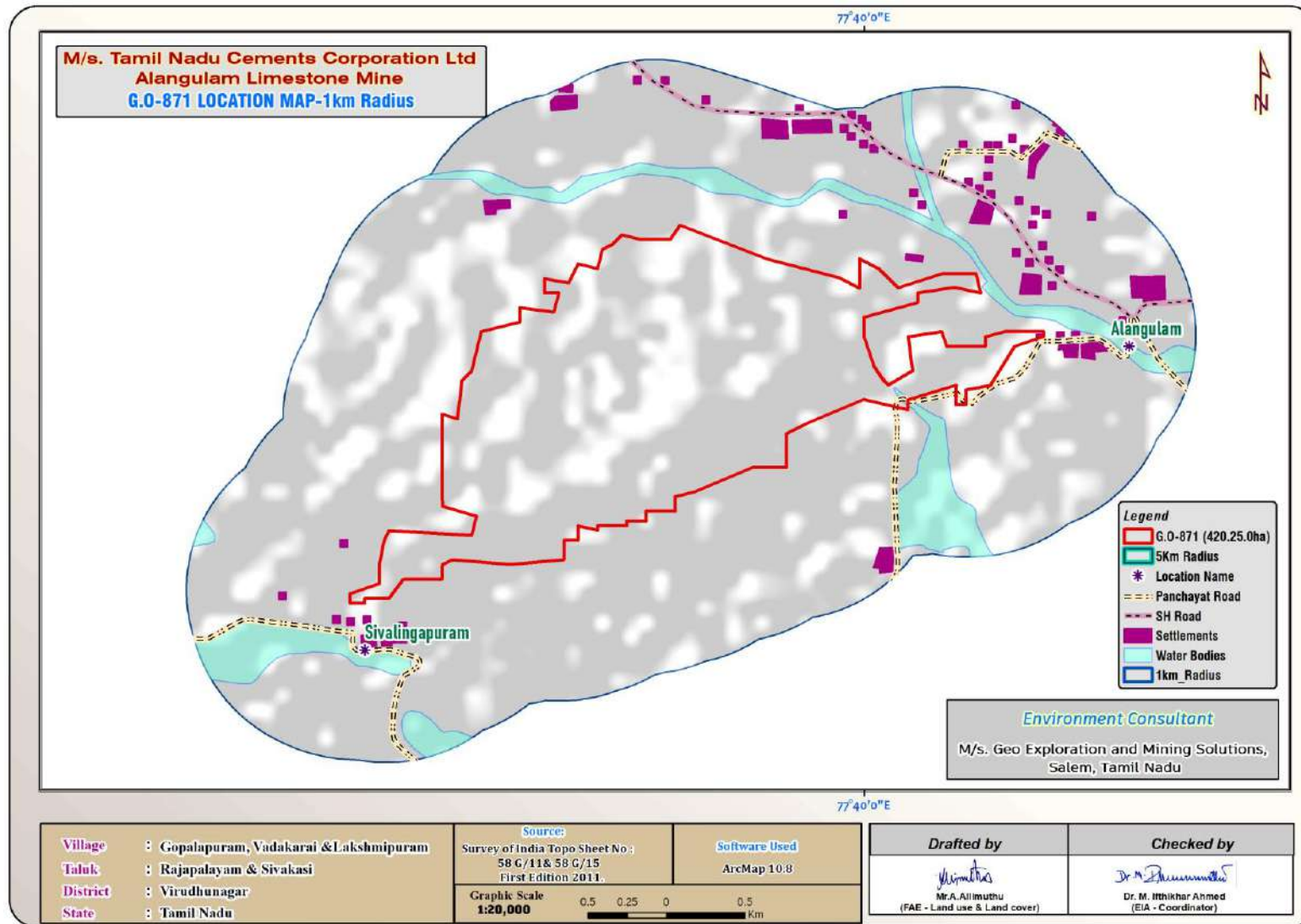


FIGURE.1 DIGITIZED LOCATION MAP ON THE GEO REFERENCED TOPOSHEET (10Km RADIUS)

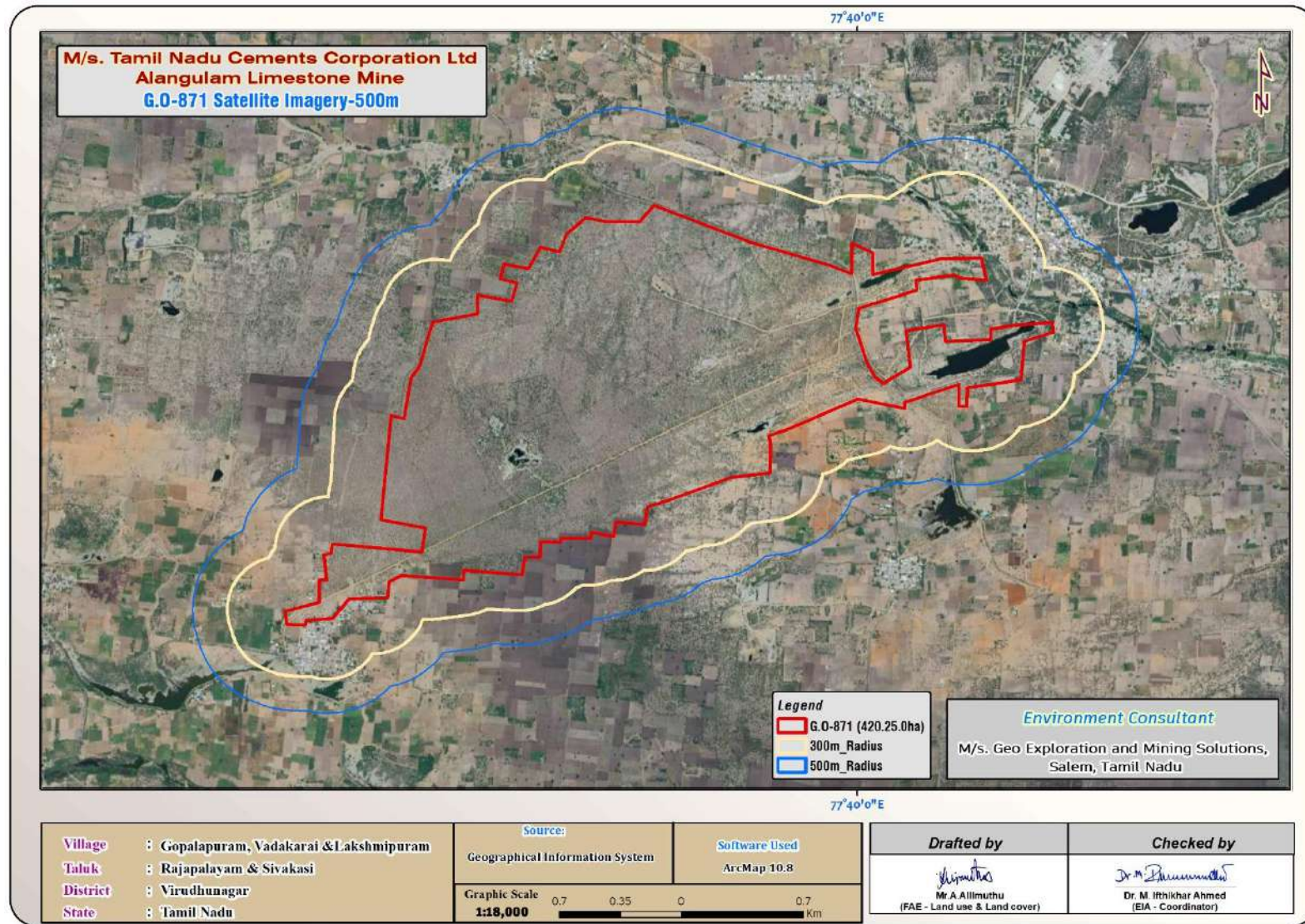




**FIGURE.2 LOCATION MAP COVERING 1KM RADIUS**

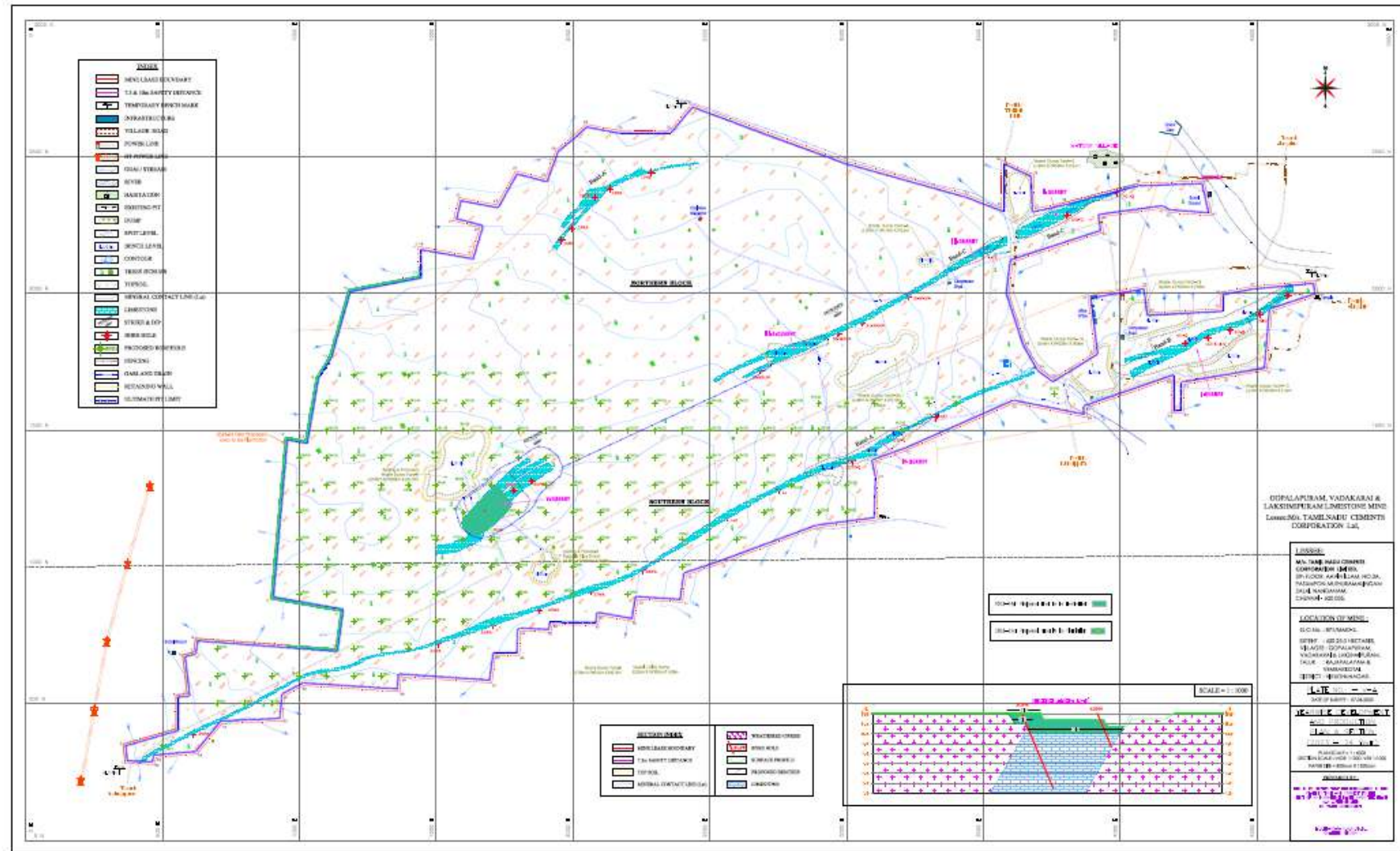


**FIGURE.3 MINE LEASE AREA COVERING WITH 300M AND 500M RADIUS**

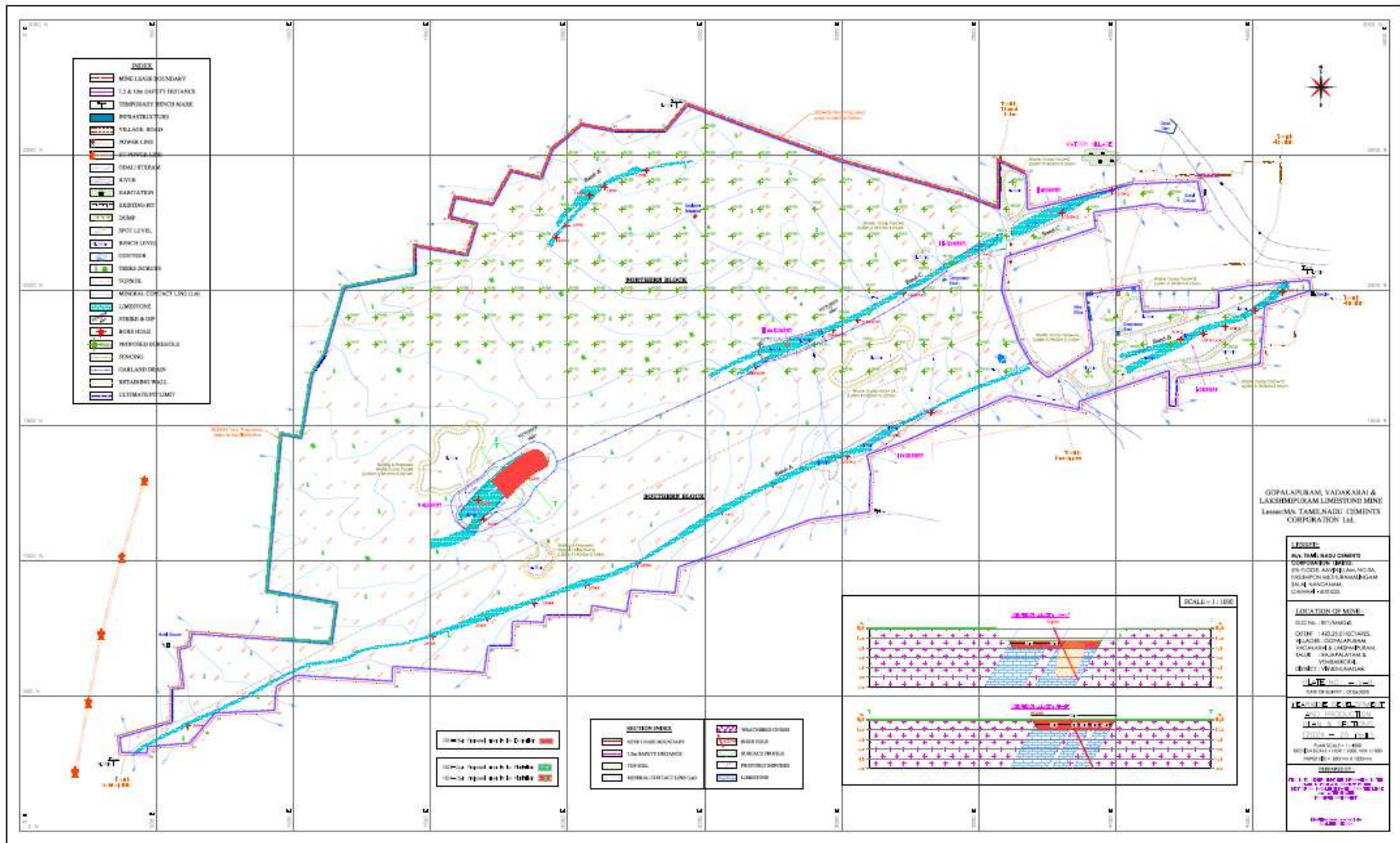




**FIGURE.4: YEAR-WISE DEVELOPMENT PRODUCTION PLAN AND SECTIONS-P1 (2023-2024)**

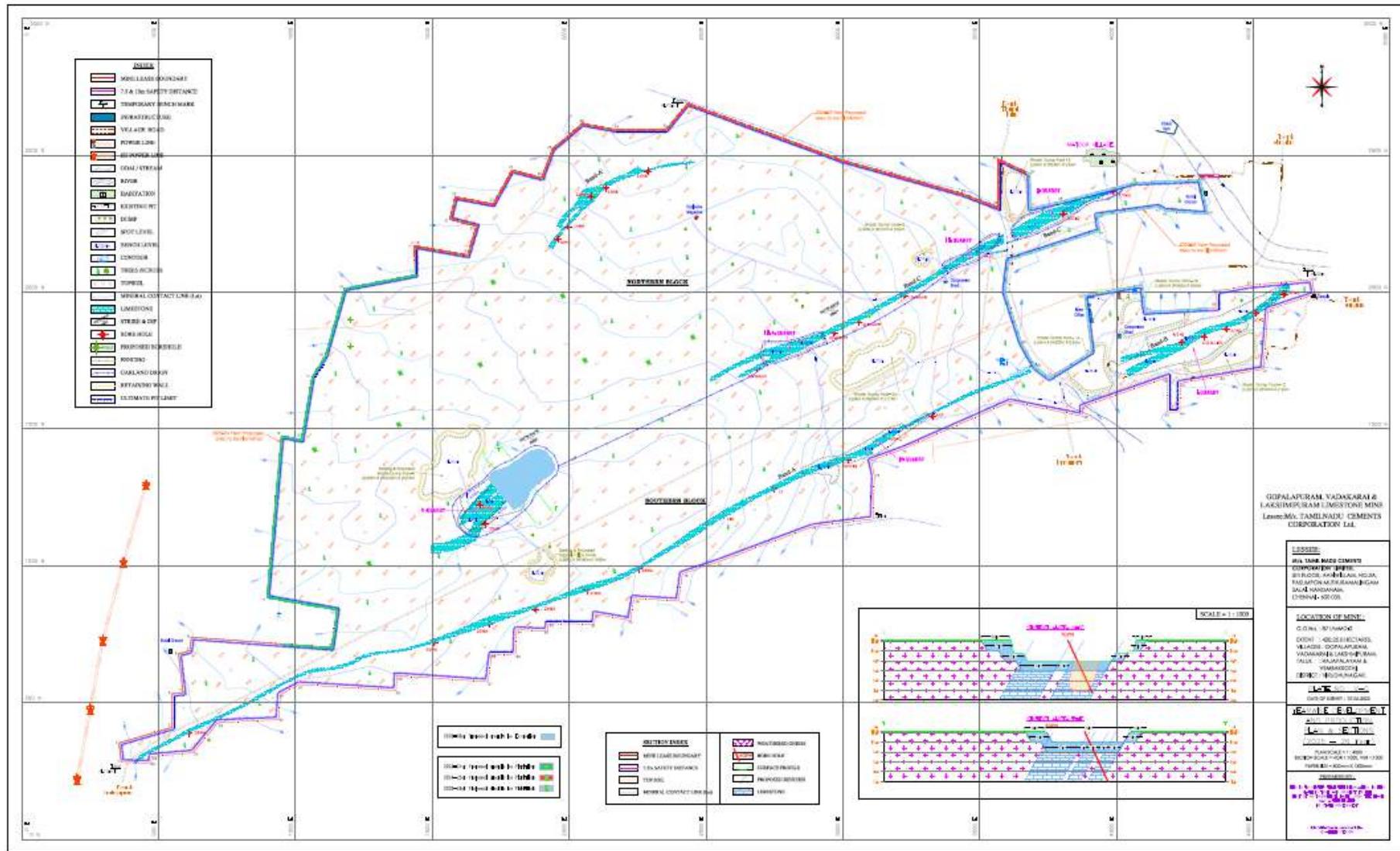


**FIGURE.5 YEAR-WISE DEVELOPMENT PRODUCTION PLAN AND SECTIONS-P1 (2024-2025)**

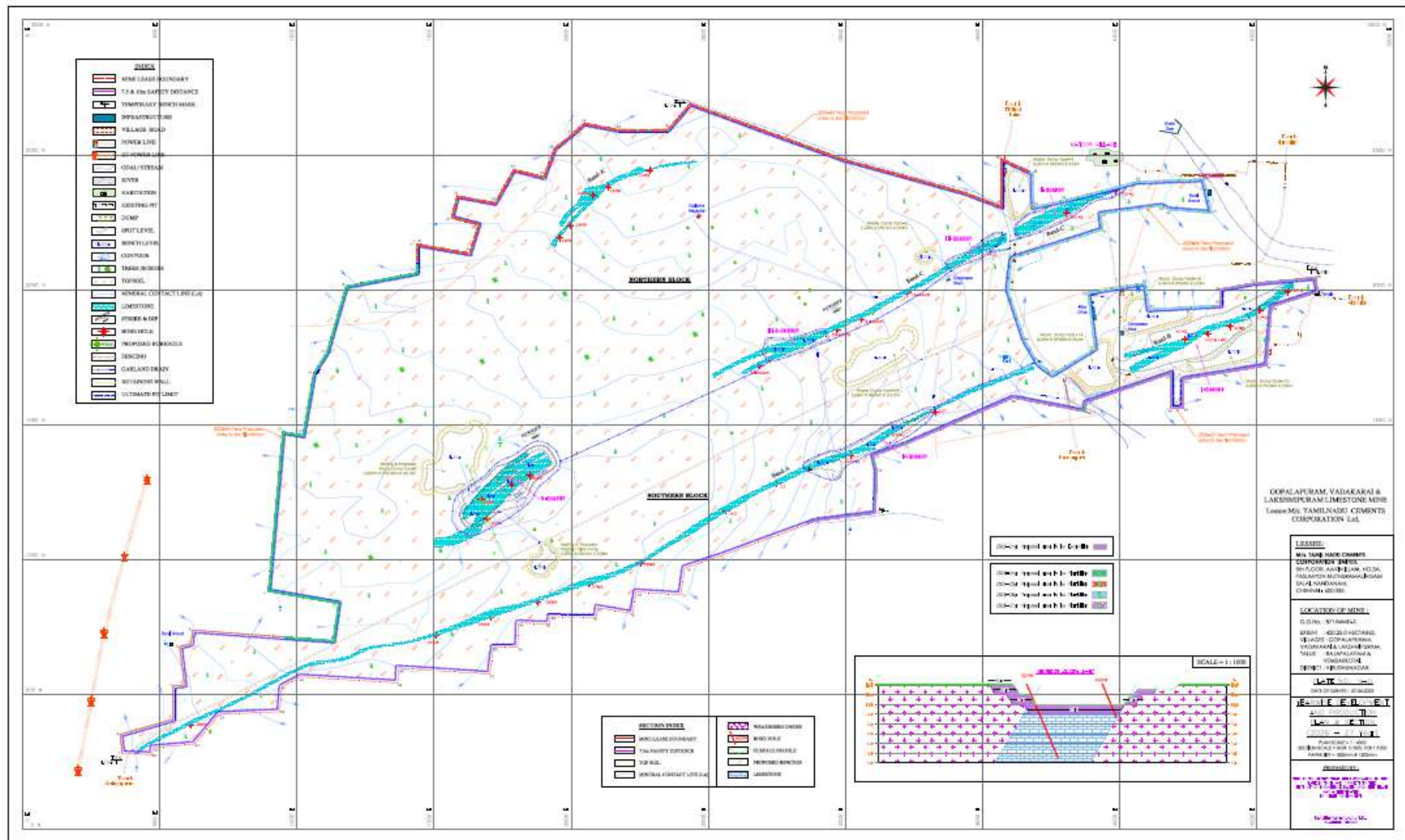




**FIGURE. 6 YEAR-WISE DEVELOPMENT PRODUCTION PLAN AND SECTIONS-P1 (2025-2026)**



**FIGURE.7 YEAR-WISE DEVELOPMENT PRODUCTION PLAN AND SECTIONS-P1 (2026-2027)**





**FIGURE.8 YEAR-WISE DEVELOPMENT PRODUCTION PLAN AND SECTIONS-P1 (2027-2028)**

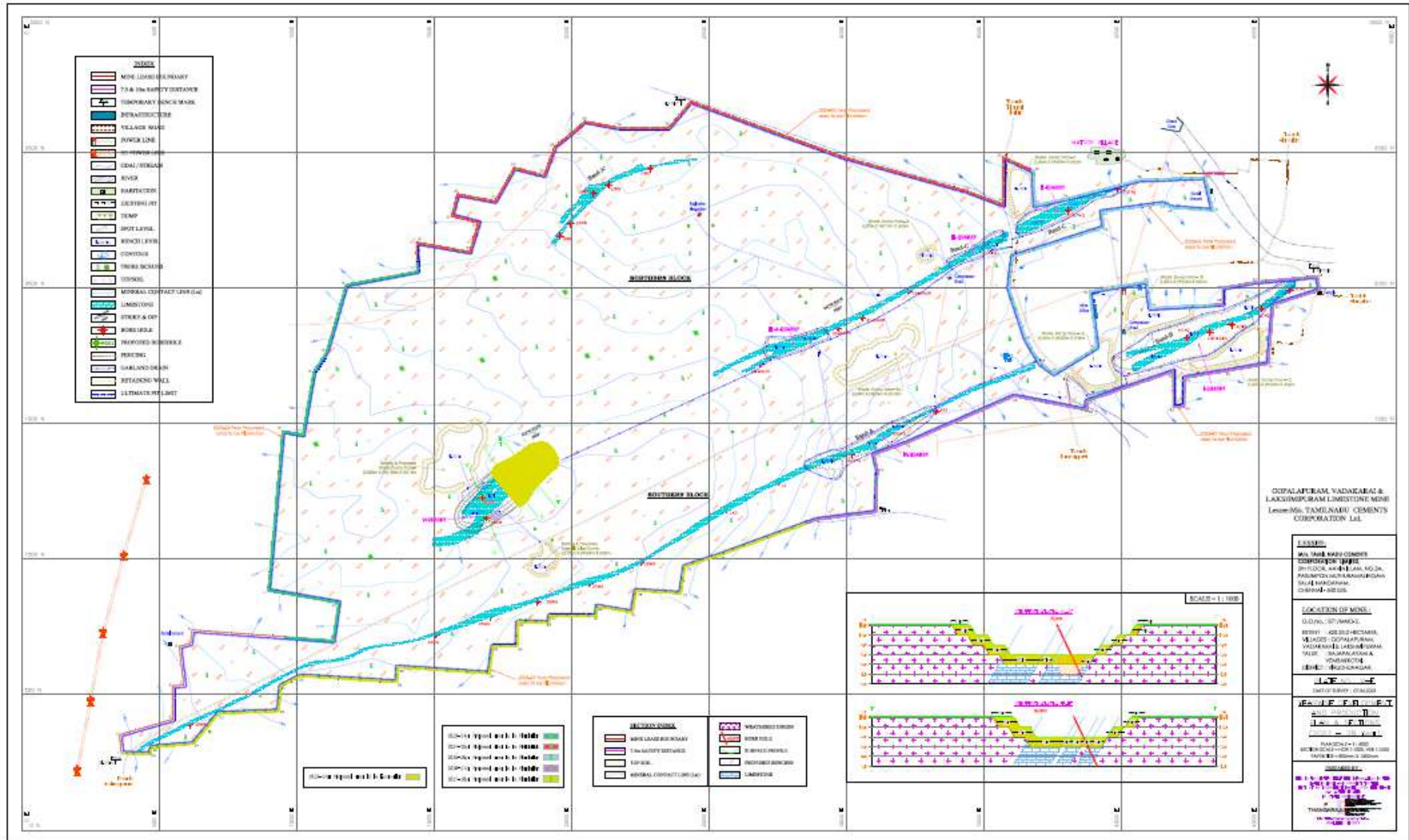
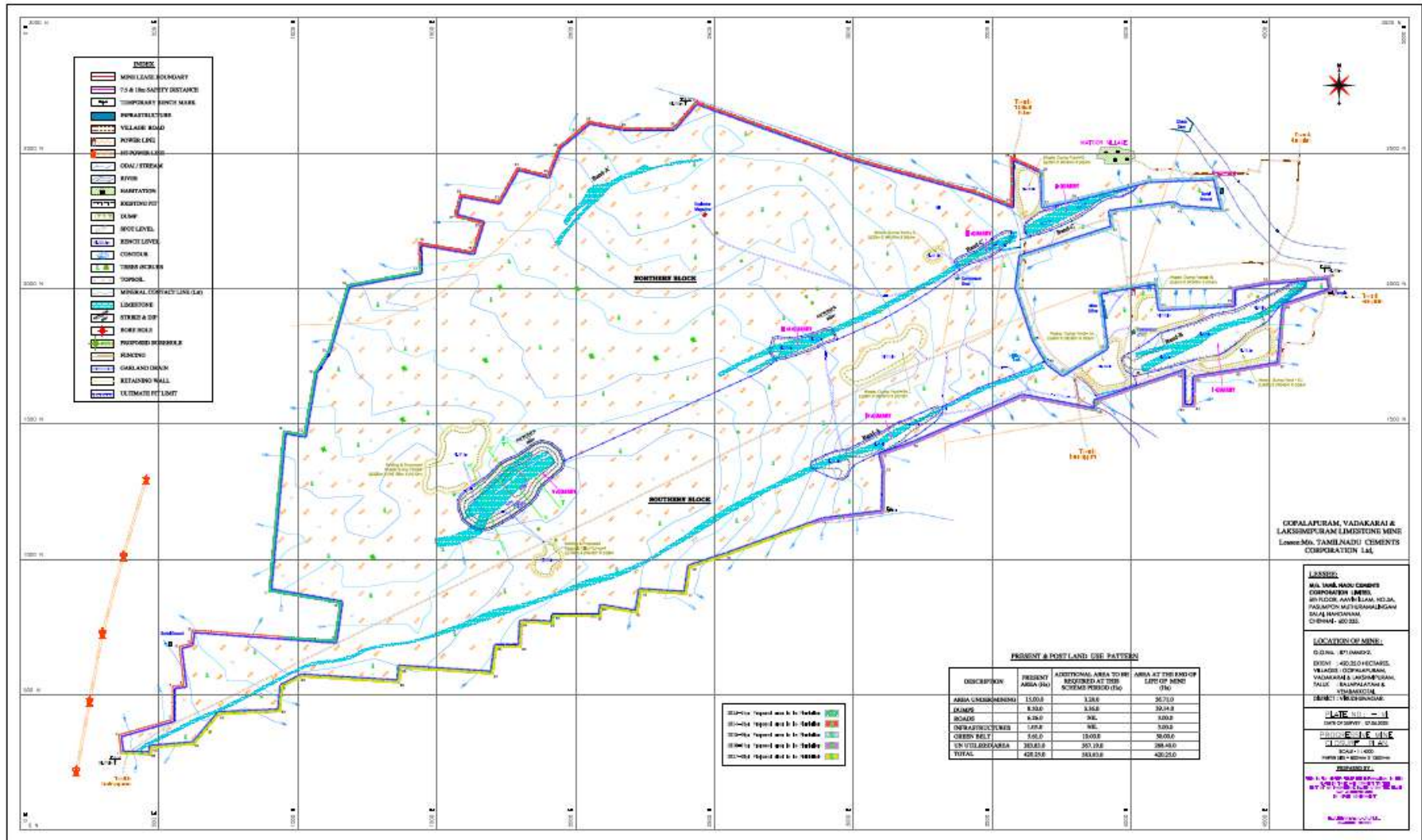
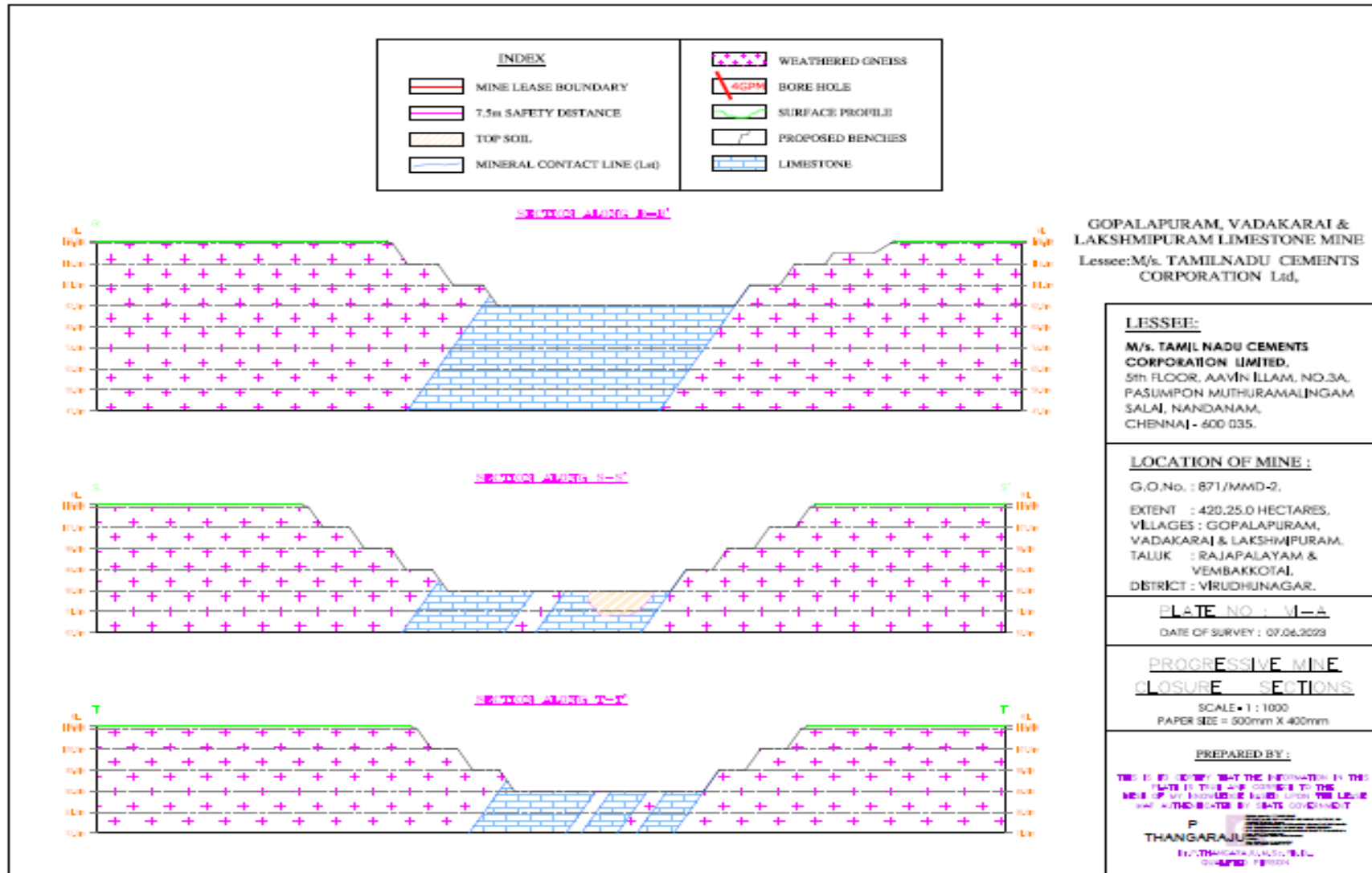


FIGURE.9 : PROGRESSIVE MINE CLOSURE PLAN



**FIGURE.10: PROGRESSIVE MINE CLOSURE PLAN SECTION**



### 3. DESCRIPTION OF THE ENVIRONMENT –

Baseline data generation forms a part of the Environment Impact Assessment Study, which helps to evaluate the predicted impacts on the various environmental attributes and helps in preparing an Environmental Management Plan (EMP) outlining the measures for improving the environmental quality and scope of future expansions for environmentally sustainable development.

Baseline data was generated for various environmental parameters including air, water (surface and ground water), land and soil, ecology and socio-economic status to determine quality of the prevailing environmental settings. The Base Line Study was conducted during Summer season (March-May 2023).

#### 3.1 Land Environment

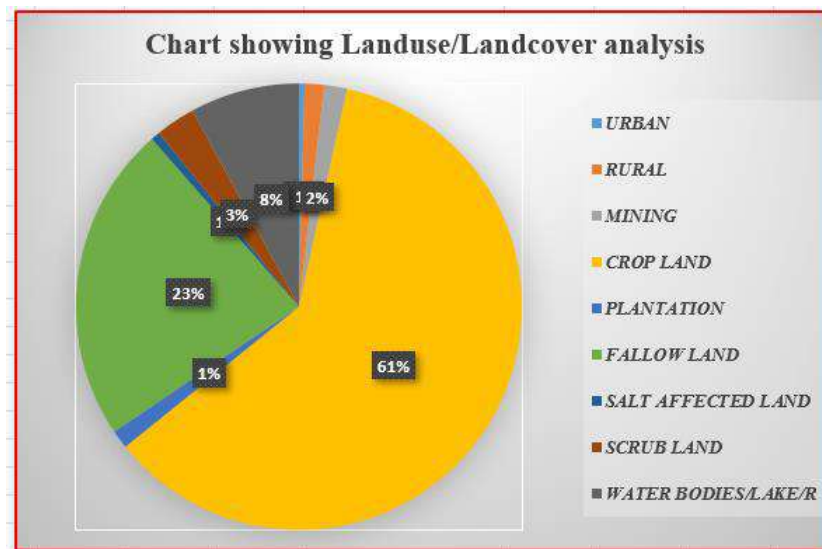
- ∞ The 10 km radius study area mainly comprises of crop land & Agriculture Plantation land accounting of 60.72% & 1.34 % of the total study area. The study area also consists of fallow land of 22.99%.
- ∞ Water Bodies such as ponds/ lakes comprises of 7.92% of the core and buffer area.
- ∞ The Scrub land accounts of 2.87%. As per the primary survey, it was observed the scrub land is mainly occupied by the grass with stony waste and left-over domestic waste generated by the nearby areas.
- ∞ 1.66% of the total study area is occupied by the mine industries of captive mines. The area occupied by Mainly Limestone Mines quarry of the total buffer area. As also observed within the primary survey, the 10 km buffer area.
- ∞ The 10 km study area mostly covers of crop land 60.72%. As per current study 2.87% of the area is occupied by scrub land.
- ∞ Salt affected land covered in an area is 0.68% (284.83 Ha) in buffer zone. 1.82% of the area is covered under the human Settlement. The nearest village within the 3km radius from the project site boundary is observed to be villages like Alangulam. Kongankulam, T.Karisalkulam, Duraisampuram etc

**TABLE: 3.3 LAND USE / LAND COVER DETAILS OF STUDY AREA**

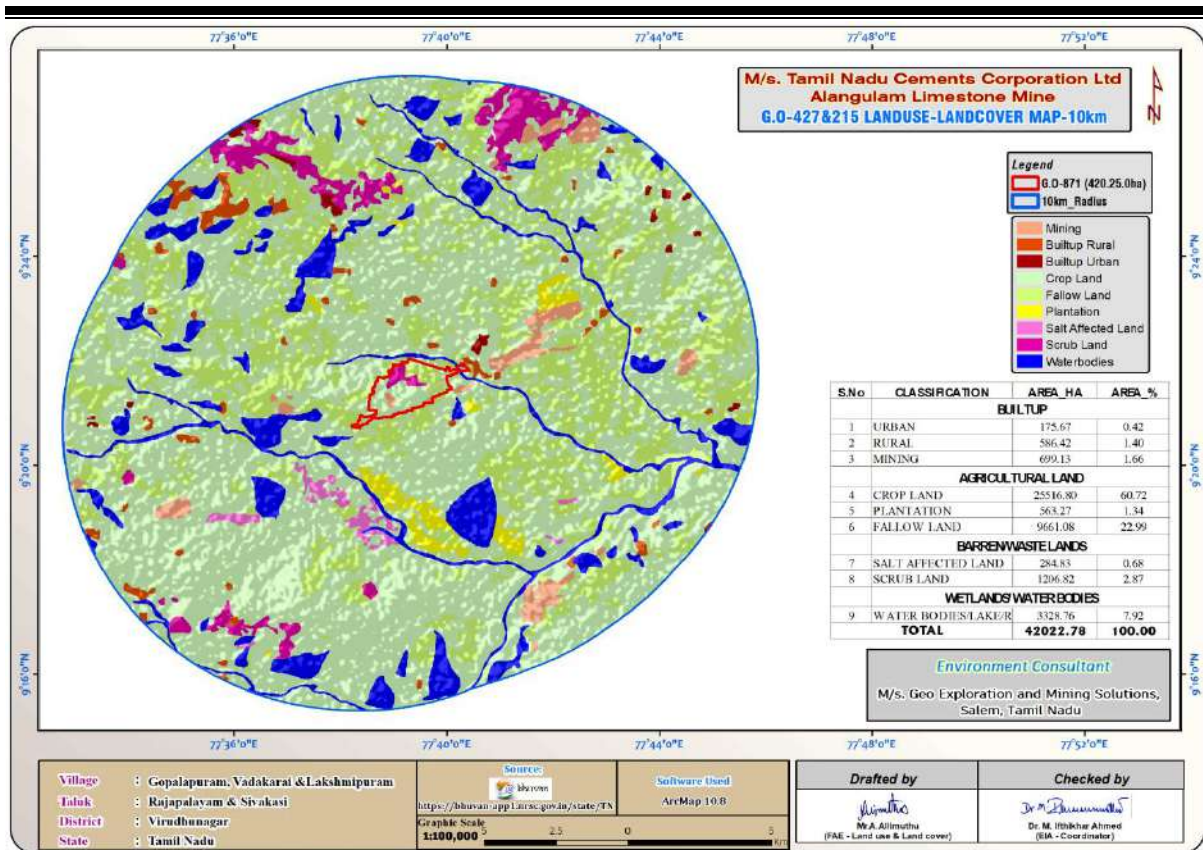
S.No	CLASSIFICATION	AREA_HA	AREA_%
	<b>BUILTUP</b>		
1	URBAN	175.67	0.42
2	RURAL	586.42	1.40
3	MINING	699.13	1.66
	<b>AGRICULTURAL LAND</b>		
4	CROP LAND	25516.80	60.72



5	PLANTATION	563.27	1.34
6	FALLOW LAND	9661.08	22.99
<b>BARREN/WASTE LANDS</b>			
7	SALT AFFECTED LAND	284.83	0.68
8	SCRUB LAND	1206.82	2.87
<b>WETLANDS/ WATER BODIES</b>			
9	WATER BODIES/LAKE/R	3328.76	7.92
<b>TOTAL</b>		42022.78	100.00



**FIGURE.11 LAND USE LAND COVER MAP OF THE STUDY AREA (10KM RADIUS)**



**Soil Environment**

Twenty two (22) soil sampling locations were selected and analysed.

**Physical Characteristics –**

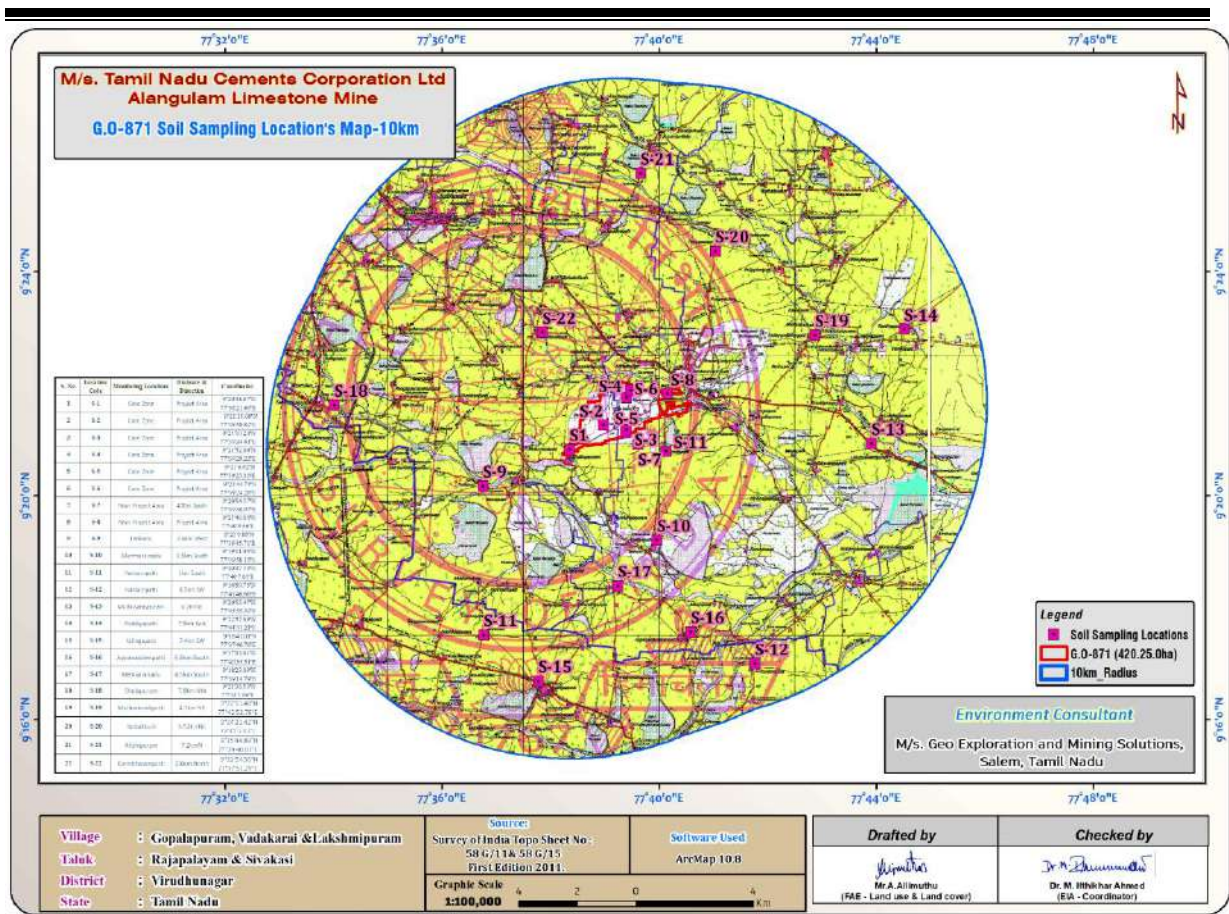
The physical properties of the soil samples were examined for texture, bulk density, porosity and water holding capacity. The soil texture found in the study area is Clay Loam Soil and Bulk Density of Soils in the study area varied between 0.85– 1.56g/cm<sup>3</sup>. The Water Holding Capacity 42.9-48.8% and Porosity of the soil samples is found to be medium i.e. ranging from 20.4– 38.6%.

**Chemical Characteristics –**

- The nature of soil is slightly alkaline to strongly alkaline with pH range 7.54 to 8.56
- The available Nitrogen content range between 173 to 394.3kg/ha
- The available Phosphorus content range between 1.01to 2.64kg/ha
- The available Potassium range between 20.4 to 56mg/kg

**FIGURE.12 SOIL SAMPLES COLLECTION LOCATION MAP**





**3.2 Water Environment –**

Four (4) surface water and twelve (12) ground water samples were collected from the study area and were analysed for physio-chemical, heavy metals and bacteriological parameters in order to assess the effect of mining and other activities on surface and ground water.

**Surface Water**

**Ph:**

The pH 7.25 to 8.01 while turbidity found within the standards (Optimal pH range for sustainable aquatic life is 6.5 to 8.5 pH).

**Total Dissolved Solids:**

Total Dissolved Solid 362-458mg/l, the TDS mainly composed of carbonates, bicarbonates, Chlorides, phosphates and nitrates of calcium, magnesium, sodium and other organic matter.

**Other parameters:**

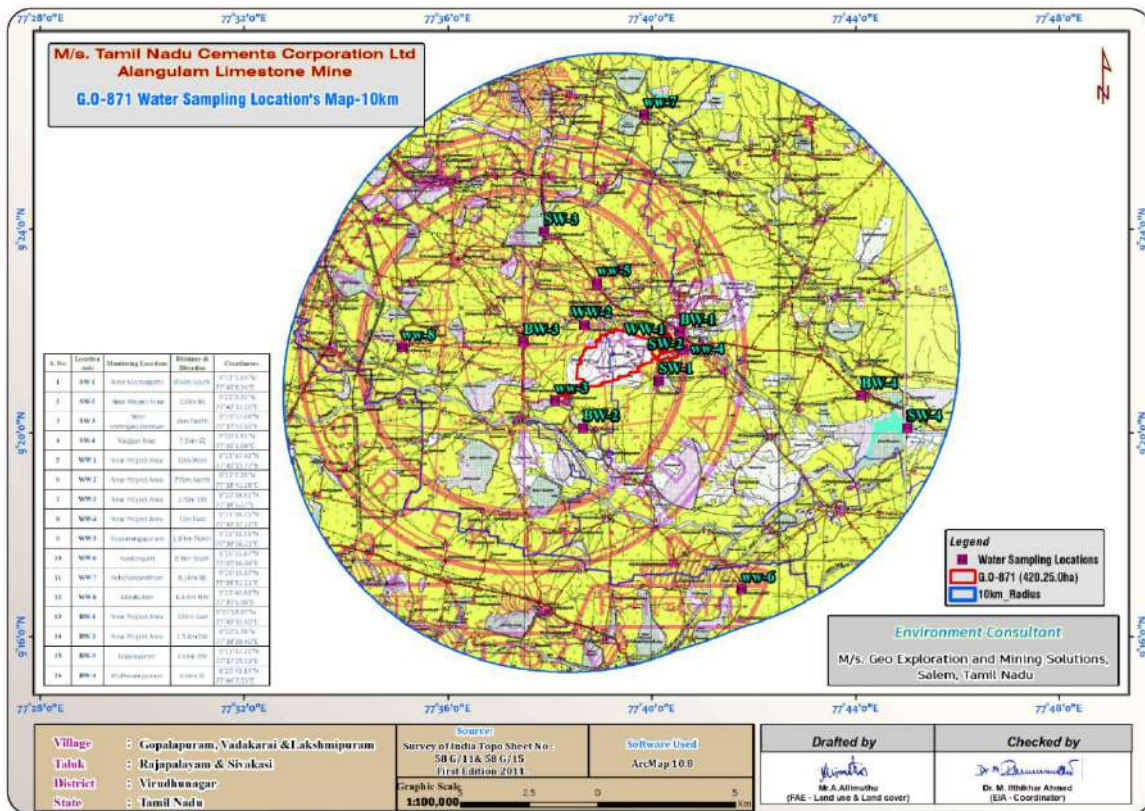
Chloride content is 76.6 to 110mg/l. Nitrates 5.7 – 10.1 mg/l, while sulphate 21.0 – 30.4 mg/l.

**Ground Water**

The pH of the water samples collected ranged from 6.69– 8.01 and within the acceptable limit of 6.5 to 8.5. PH, Sulphates and Chlorides of water samples from all the sources are within the limits as per the Standard. On Turbidity, the water samples meet the requirement. Total Dissolved Solids were found in the range of 344-466 mg/l in all samples. Total hardness varied between 112.47-206.01-mg/l for all samples.

On Microbiological parameters, the water samples from all the locations meet the requirement. The parameters thus analyzed were compared with IS 10500:2012 and are well within the prescribed limits.

**FIGURE.13 WATER QUALITY MONITORING LOCATIONS**



**3.3 Air Environment –  
Meteorology (Climate) –**

A temporary meteorological station was installed at project site by covering cluster quarries. The station was installed at a height of 3 m above the ground level in such a way that there are no obstructions facilitating flow of wind, wind speed, wind direction, humidity and temperature are recorded on hourly basis.

**Climate**

- 
- The Virudhunagar lies on 102m above sea level the climate here is considered to be a local steppe climate. The average annual temperature is 28.6 °C | 83.4 °F.
  - The precipitation here is around 829 mm |32.6 inch per year. The driest month is May, with 9 mm |0.4inch. The greatest amount of precipitation occurs in October, with an average of 144 mm | 5.6 inch.
  - The warmest month of the year is October, with an average temperature of 32.2°C | 89.9 °F.
  - The lowest average temperatures in the year occur in December, when it is around 22°C | 71.6°F.
  - The difference in precipitation between the driest month and the wettest month is 107mm | 7inch. The variation in temperatures throughout the year is 3.4°C | 38.1 °F.

Source: <https://en.climate-data.org/asia/india/tamil-nadu/virudhunagar>

### **Air quality Monitoring -**

Ambient Air quality Stations were selected based on the Predominant downwind direction with respect to the project site. Twenty eight Ambient Air Quality Monitoring (AAQM) Stations were selected by considering the wind rose pattern for pre-monsoon season and the accessibility of the selected sites.

∞ Ambient Air Quality Monitoring reveals that the concentrations of PM10 and PM2.5 for all the 28 AAQM stations were found between 39.8 to 52.4 µg/m<sup>3</sup> and 18.2 to 25.4µg/m<sup>3</sup> respectively.

∞ Maximum concentration of particulate pollutant (both PM10 and PM2.5) was found due to presence of mining activities like extraction, loading & unloading, transportation of mineral.

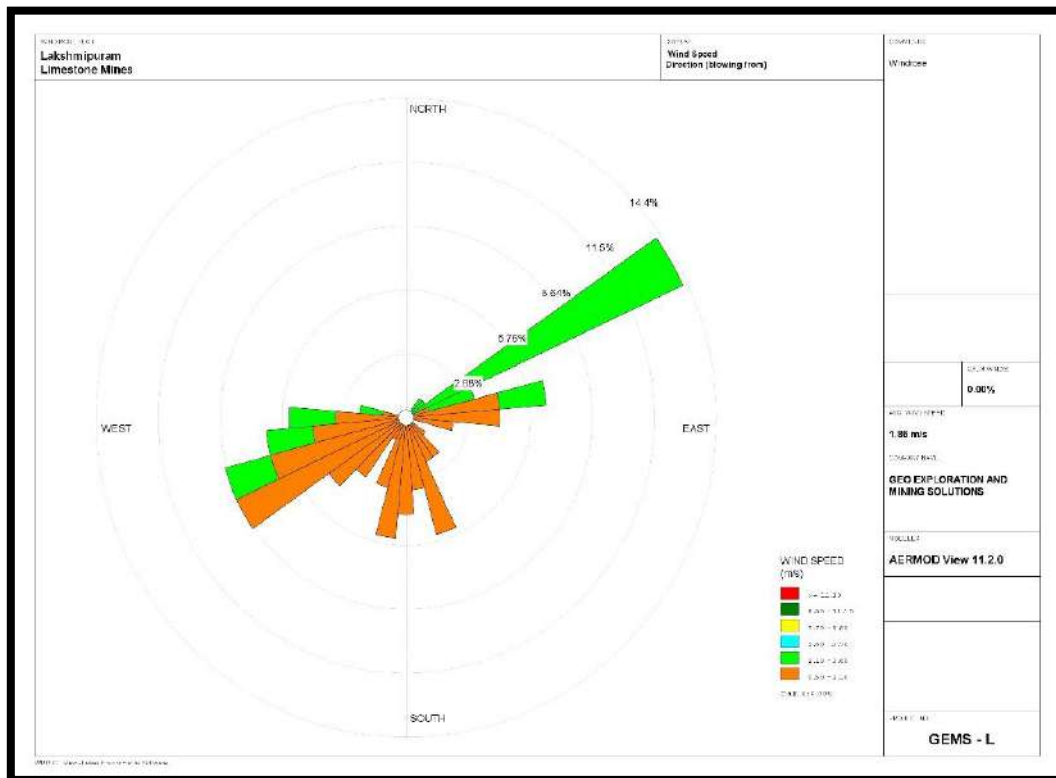
∞ The concentrations of SO<sub>2</sub> and NO<sub>x</sub> were found to be in range of 5.00 to 8.8µg/m<sup>3</sup> and 20.00 to 28.6µg/m<sup>3</sup> respectively.

∞ A suitable green belt is planned along the haul road and at strategic locations inside the mine site which will further reduce the air pollution.

∞ The baseline data of ambient air quality was compared with air quality data of Virudhunagar. The proposed project is mining of Limestone in which particulate pollutant are major contributors to the environment. The baseline status of existing condition suggested that the ambient air quality is well below NAAQS limits.

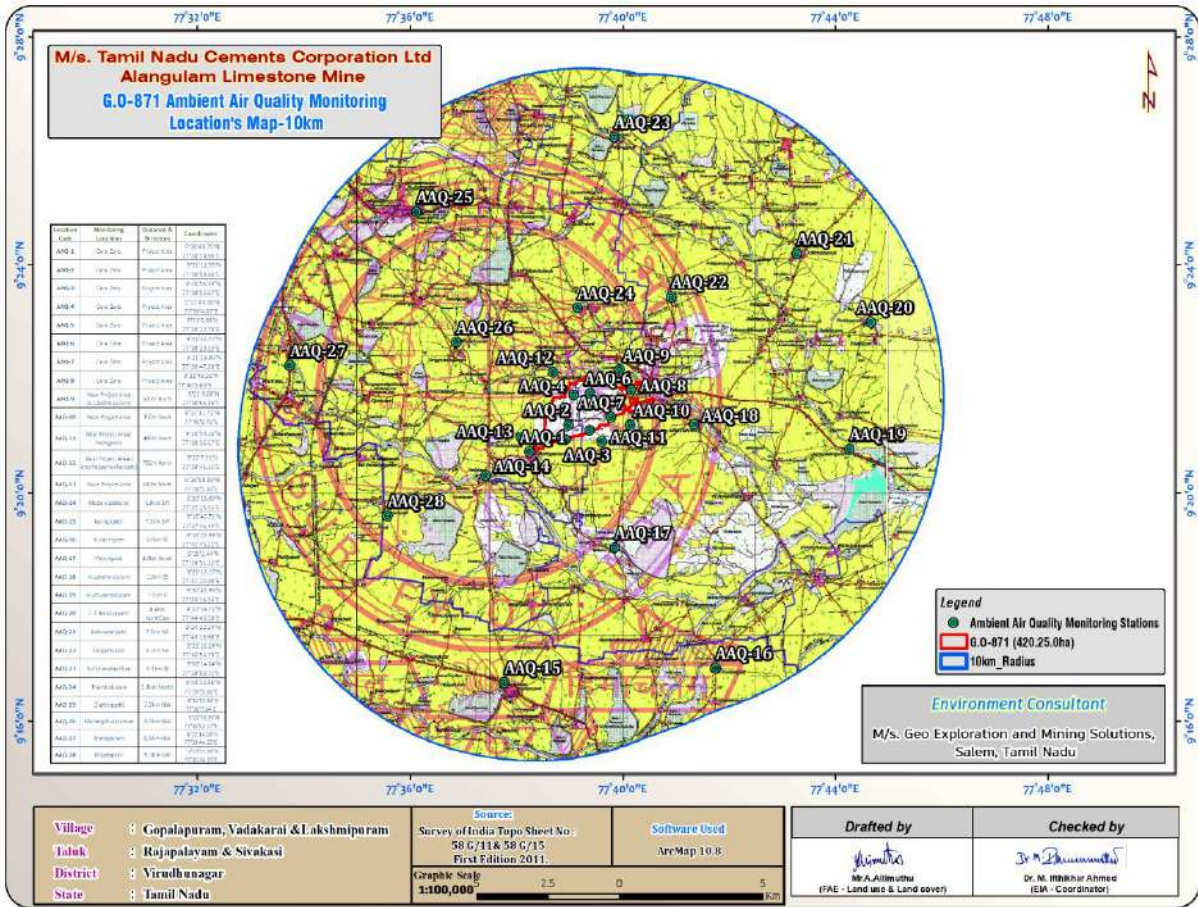
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**FIGURE.14 WIND ROSE MAP**





**FIGURE.15 AIR QUALITY MONITORING LOCATION MAP**

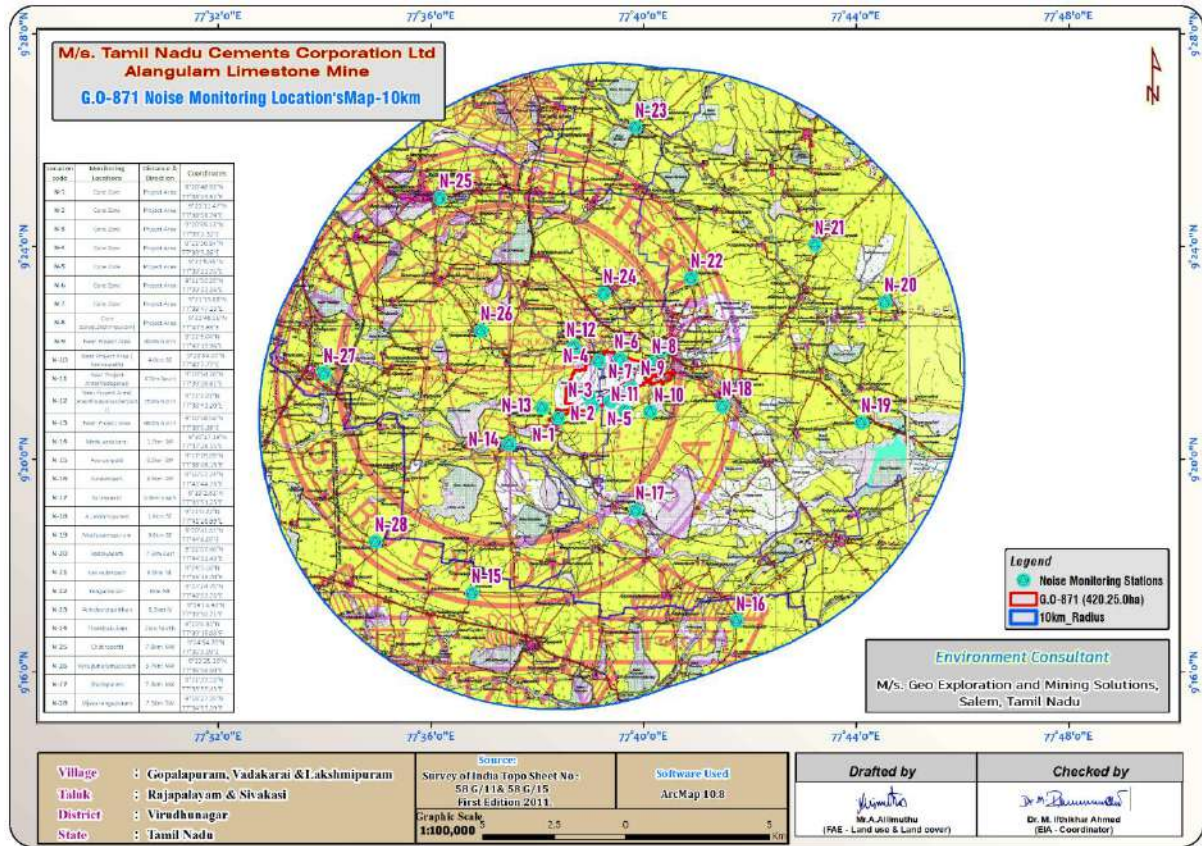


**3.4 Noise Environment –**

In order to assess the ambient noise levels within the study area, noise monitoring was carried out at Twenty eight (28) locations. The noise level monitoring locations were carried out by covering commercial, residential, rural areas within the radius of 10km. A noise monitoring methodology was chosen such that it best suited the purpose and objectives of the study.

Ambient noise levels were measured at 28 (Twenty-eight) locations around the proposed project area. Noise levels recorded in core zone during day time were from 37.4 – 41.9 dB (A) Leq and during night time were is 34.5-35.7dB (A) Leq. Noise levels recorded in buffer zone during day time were from 35.4 – 41.6 dB (A) Leq and during night time were from 33.4 – 37.4 dB (A) Leq. The noise levels at all location are well below the NAAQS standards w.r.t noise. Thus, the noise level for Industrial and Residential area meets the requirements of CPCB

**FIGURE.16 NOISE MONITORING LOCATION MAP**



**3.5 Biological Environment –**

Ecological survey has been carried out to understand baseline ecological status, important floristic elements and fauna structure.

There are No Schedule – I Species listed as per The Indian Wildlife (Protection) Act, 1972 or Threatened Species as per IUCN Red List noticed within the Study Area.

**3.6 Socio Economics –**

Sample survey was carried out to collect qualitative information about the socio-economic environment of the area. The Study area has all basic amenities such as roads, drinking water facilities, township, education institution, temples, medical facilities and electricity facilities and was evident during the site visit.

Though agriculture is the main occupation in the surrounding villages, it has provided employment opportunities to only 50-60% of the families. The remaining population is depended on the other type of employment opportunities mainly as laborers.



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

### **4.1 Land Environment:**

In the Opencast method the major impact is Land Environment, the existing land use pattern of the area is dry barren land, no forest land is involved in this project. Total extent of 420.25 ha about 56.71 ha area is proposed for Mining activity which will have the impact during the mining. After end of the life of mine the mined-out pits will be partially backfilled and partially allowed to store the rain water which act as a temporary reservoir. Total area of 10000 sqm is proposed for green belt development.

There is no vegetation found in the project area at present, after the completion of the mining operation the rate of the green belt development will be increased.

### **4.2 Water Environment**

Water table in the area is 70m in summer and 75m in rainy season. The proposed depth for the mining operation is well above the water table and there is no intersection of surface water (streams, Canal, Odai etc.,) within the study area.

#### **Mitigation Measures –**

- Construction of garland drains to divert surface run – off in to the mining area
- Construction of retaining with weep holes around the Mineral reject dumps to prevent the siltation to the nearby lands.

### **4.3 Air Environment–**

The air borne particulate matter generated by mining operations and transportation is the main air pollutant. The emissions of Sulphur Dioxide (SO<sub>2</sub>), Nitrogen Oxides (NO<sub>x</sub>) contributed by vehicles plying on haul roads will be marginal.

The Predicted maximum Ground level concentration of 24 Hour average of particulate matter concentration is superimposed on the maximum baseline concentration obtained during the study period to estimate the post project scenario, which would prevail at the post operational phase.

The maximum incremental ground level concentration of PM<sub>10</sub> is 47.6 µg/m<sup>3</sup> at Core Zone to 21.73 µg/m<sup>3</sup> at Project Area (Non-Operational). This shows that the adverse impact of mining outside the ML area is marginal and has no adverse effect on health of human and animals and also on the flora of the area.

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**Mitigation Measures –**

- Water spraying on working face to control dust emission due to loading & handling operations
- Water sprinklers along the mine haulage roads to reduce dust generation during plying of HEMM
- Controlled blasting techniques will be implemented
- Periodic water sprinkling on waste dumps and haul roads to minimize dust emissions.
- Practicing wet drilling procedures & Dust mask provision to workers
- Avoiding of overloading of tippers and covering of loaded tippers with tarpaulins during mineral transportation
- Green belt development will be carried out to arrest the dust particles
- Periodical monitoring of air quality to take steps to control the pollutants

**4.4 Noise Environment**

Noise pollution is mainly due to the blasting, Operation of machineries and Occasional plying of tippers in the mines and during transportation of mineral to needy customers.

**Mitigation Measures –**

- Controlled blasting techniques will be implemented, thus Noise due to the blasting from the mine site not going to be significant it will be upto a few seconds in the whole day.
- In the high noise intensity working areas, earmuffs or earplugs or any other suitable personal protective equipment will be provided to the workers.
- Regular noise level monitoring shall be done periodically for taking corrective action.
- Green belt development around the mine sites, office buildings and all along the internal road will be practiced as to create a barrier between the source and the receiver so that the noise is absorbed and the exposure level is minimized.

**4.5 Biological Environment**

The impact on biodiversity is minimal as there is no forest, wild life sanctuaries, and Eco sensitive zone within the radius of 10 Km.

The impact would be due to dust generated from drilling and blasting activities and emission of gaseous pollutant from HEMM and mineral transportation. Adequate dust control measures will be taken to control dust emission. Thick Greenbelt development will be carried out in the mine area and haul roads to control the dust emission. Besides the air quality standards for PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub> and NO<sub>x</sub> and all other values are well within the AAQ standards.

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#### **4.6 Socio Economic Environment.**

Due to the mining activities in the Limestone mines about 38 numbers of skilled and unskilled workers are benefitted through direct employment. About 100 numbers of peoples will be benefitted indirectly. Additional facilities such as medical, educational and infrastructural development will also take place under CSR/CER activities.

Considering the socio – economic and sociological impact it has been noticed that the economic level and living standard of the people will generally increase.

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

#### **Site Alternatives –**

No alternative site has been proposed as Limestone occurrence is site specific in nature and the location of the proposed project is restricted to the geology and mineral deposition of the area.

#### **Mining Technology alternatives –**

Opencast, category “A” opencast Mechanized method and the excavator will be deployed for the formation of benches and loading. Excavator attached with rock breaker will be deployed for breaking and fragmentation to avoid blasting as the strata is medium hard in nature.

The project will follow opencast mining method because of surface mineral deposits and to ensure higher mineral conservation. The mining by opencast method will be highly productive & economical as compared to underground method.

### **6 ENVIRONMENT MONITORING PROGRAM –**

Usually, an impact assessment study is carried over short period of time and the data cannot bring out all variations induced by natural or human activities. Hence regular monitoring program of Environmental parameters is essential to take into account the changes in the Environment. The Objective of Monitoring -

- To check or assess the efficiency of the controlling measures;
- To establish a data base for future impact assessment studies.

### **7 ADDITIONAL STUDIES - RISK ASSESSMENT & HAZARD –**

The components associated with risk and hazard in these mines include jackhammer drilling & blasting, waste dump and explosive storage. Measures to reduce and avoid any incidents occurring from the above-mentioned components shall be planned and implemented as soon as the mine starts commissioning; this includes measures to avoid the above discussed

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risk factors. Proper risk management plan will be proposed to avoid any kind of accident/disaster.

## **8 PROJECT BENEFITS –**

- Improvement in physical infrastructure
- Improvement in Social Infrastructure
- Employment Potential
- Proponents will carry out CSR activities like community awareness program, health camps, Medical aid, family welfare camps etc.,
- A massive plantation will be done in the mine area to mitigate the ill-effects of mining and to improve the vicinity and environment of mine and its surrounding area.

## **9 ENVIRONMENTAL COST BENEFIT ANALYSIS.**

Environmental cost benefit analysis is not recommended.

## **10 ENVIRONMENT MANAGEMENT PLAN –**

The Environmental Management Plan (EMP) is a site-specific plan developed based on the base line environmental status, mining methodology and environmental impact assessment. In each of the areas of impact, measures have to be taken to reduce potentially significant adverse impacts and where these are beneficial in nature, such impacts are to be enhanced/augmented so that the overall adverse impacts are reduced to as low level as possible.

The proponent shall organize an Environment Monitoring Cell in common which is responsible for the management and implementation of the environmental control measures. Basically, this department shall supervise the monitoring of environmental pollution levels like ambient air quality, water quality, soil quality and noise level by appointing approved external agencies.

The working conditions in the mines are governed by the enactments of the Director General of Mines Safety (DGMS). The proponent shall take all necessary precautions regarding health and safety of workers as per the guidelines of the Mines Act, sanitary facilities shall be provided within the lease area; carry out periodic health check-up of workers.

The proponent will carry out CSR activities for overall development of the people in the area. The activities shall include medical camps, water supply, improvement of school infrastructure, etc. The proponents have been carrying out CSR Activities in various fields for social welfare around the project site and spent an amount of Rs 10 Lakhs each till date.

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## 11 CONCLUSION –

It can be concluded from overall assessment of the impacts, in terms of positive and negative effects on various environmental components, that the mining activities will not have any adverse effect on the surrounding environment.

To mitigate any impacts due to the mining activities, a well-planned EMP and a detailed post project monitoring system is provided for continuous monitoring and immediate rectification at site. Due to the mining activities, socio economic conditions in and around the project site will be improved substantially. Hence, the Environmental Clearance shall be granted at the earliest based on the merits of the project.

- Since the mining operation have been stopped for last two years which has caused unemployment and affected the livelihood of the workers who were employed and a major loss to the infrastructure and machinery deployed.
- The livelihood of the proponent is very much dependent upon this mining operation which had been working from several years hence the Environmental Clearance shall be granted at the earliest.

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