EXECUTIVE SUMMARY

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR CLUSTER OF TWO QUARRIES UNDER VIOLATION MINOR MINERAL – GREY GRANITE

(As per EIA Notification, 2006 dated 14.09.2006 and its amendments)

Category: B1 (Cluster)

Project Proponent

Name	Extent of Mining Lease Area
M/S. KARUNAI GRANITES PRIVATE LIMITED Jagadevipalayam Village & Post, Bargur Taluk (Formerly Krishnagiri), Krishnagiri District, Tamil Nadu.	3.15.5 Ha & 11.59.0 Ha

Project Details

JAGADEVIPALAYAM GREY GRANITE QUARRY

Cluster Area : 14.745 Ha (Two Quarries)
Village : Jagadevipalayam
Taluk : Bargur
District : Krishnagiri

Terms of Reference issued by SEAC/SEIAA

1. Lr.No.SEIAA-TN/F.No.5292/2016/TOR-1398/2023 dated 21.03.2023 for the lease area 3.15.5 Ha.
2. Lr.No.SEIAA-TN/F.No.5293/2020/Violation/TOR-1394/2023 dated 21.03.2023 for the lease area 11.59.0 Ha.

EIA CONSULTANT

AADHI BOOMI MINING & ENVIRO TECH (P) LTD
(QCI/NABET Accredited EIA Organization)
3/216, K.S.V Nagar, Narasothipatti, Alagapuram (PO),
Salem – 636004, Website: www.abmenvirotec.com
Email: abmenvirotech@gmail.com, suriyakumarsemban@gmail.com
Mob: 9842729655, 9443290855.

Executive Summary

1. INTRODUCTION

The Applicant, **M/s. Karunai Granites Private Limited** has been granted two quarry leases from the State Government for quarrying grey granite over an extent of 3.15.5 Ha and 11.59.0 Ha in S.F.No 299/2 (P) & 301/1 (P) and in S.F.No 294/4, 295/2A, 295/2B, 295/2C, 298/2, 298/1C2, 301/1(P), 301/2 & 301/3A respectively in Jagadevipalayam Village, Bargur Taluk and Krishnagiri District vide G.O. (2D).No: 9 Industries (E2) Dept. dated 18.01.1995 and G.O. (3D).No.87 Industries (E.2) Department dated 2.11.1999 respectively for the period of ten years.

The mining plan for the areas 3.15.5 Ha and 11.59.0 Ha was approved by commissioner of geology and mining, Chennai vide letter No. 14761/B1/1994, dated 22.09.1994 and letter No.2245/MM9/2004 dated 24.08.2004 respectively. For the lease area 3.15.5 Ha, the lease deed was executed on 02.02.1995 and had expired on 01.02.2005 and for the lease area 11.59.0 Ha, the lease deed was executed on 03.02.2000 and had expired on 02.02.2010.

The project proponent had submitted an application on 21.01.2004 and 22.01.2004 for renewal of quarry leases of 3.15.5 Ha and 11.59.0 Ha respectively and the renewal applications are pending. The quarries were worked under the high court order MP.Nos.1 & 1 of 2010 & WP.NOS 3034 & 3035 of 2010.

Accordingly Scheme of mining is prepared under Rule 18 (3) of GCDR, 1999 and Rule 41 of TNMMCR, 1959 for the existing mining lease once in five years for systematic and scientific development of quarry. Now the 3rd and 2nd scheme of mining has been prepared for the lease area 3.15.5 Ha and 11.59.0 Ha respectively and it is waiting for approval from department of geology and mining.

The grey granite quarries of M/s Karunai Granites Private Limited falls under violation case as they started working before grant of EC as per MoEF&CC Notification S.O 804(E) dated 14.03.2017. Therefore, the Proponent, M/s Karunai Granites Private Limited applied for grant of Terms of Reference to SEIAA/SEAC, TN under violation for lease area 3.15.5 Ha and 11.59.0 Ha.

The proposals have been placed in 340th and 357th SEAC meeting and in 585th and 603rd SEIAA meeting and SEIAA granted Terms of Reference for preparation of EIA/EMP report, Ecological Damage Assessment, Remediation Plan, Natural Resource Augmentation and Community Resource Augmentation for obtaining an Environment Clearance from SEIAA/SEAC, Tamil Nadu. The details of Terms of reference are given in below table.

Table No 1.1 Details on Terms of Reference

S.No	Name of Proponent	ToR Application No	SEAC and SEIAA Meeting No	TOR letter No
1	M/s. Karunai Granites Private Limited (3.15.5 Ha)	SIA/TN/MIN/26168/2018 Dated 22.05.2018	340th and 357th SEAC meeting, dated 23.12.2022 and 23.02.2023 respectively 585th and 603rd SEIAA meeting, dated 13.01.2023 and 21.03.2023 respectively	Lr.No.SEIAA TN/F.No.5292/2016/TOR-1398/2023 dated 21.03.2023
2	M/s. Karunai Granites Private Limited (11.59.0 Ha)	SIA/TN/MIN/53603/2016 Dated 10.05.2016	340th and 357th SEAC meeting, dated 23.12.2022 and 23.02.2023 respectively 585th and 603rd SEIAA meeting, dated 13.01.2023 and 21.03.2023 respectively	Lr.No.SEIAA-TN/F.No.5293/2020/Violation/TOR-1394/2023 dated 21.03.2023

In TOR letters, it is mentioned that public hearing needs to be conducted for the existing granite quarries of M/s. Karunai Granites Private Limited for obtaining EC. As per MOEF&CC SO 141 (E) dated 15.01.2016-Appendix XI, there shall be one public consultation for entire cluster after which the final Environmental Impact Assessment Report/Environmental Management Plan report for the cluster shall be prepared.

Based on the notification issued by MOEF & CC, the combined Draft EIA/EMP report has been prepared as per the Terms of Reference including Ecological Damage Assessment, Remediation Plan, Natural Resource Augmentation and Community Resource Augmentation for the two quarries in the cluster of 14.745 Ha for conducting public hearing. The points raised in the public hearing and the commitments of the project proponent will be given detail in the Final EIA Report which will be submitted to SEAC/SEIAA, TN for obtaining environmental clearance.

1.1 Details of Project and Project Proponent

Table No 1.2 Details on Project and Project Proponent

A. Proposed Projects to Conduct Public Hearing	
1. M/s. KARUNAI GRANITES PRIVATE LIMITED (3.15.5 Ha)	
Particulars	**Details**
Address of the Project Proponent	**M/s. KARUNAI GRANITES PRIVATE LIMITED** Jagadevipalayam Village & Post, Bargur Taluk (Formerly Krishnagiri), Krishnagiri District, Tamil Nadu.
Lease Area	3.15.5 Hectares (Patta Land)
Site Location	S.F.No: 299/2 (P) & 301/1 (P), Jagadevipalayam Village, Bargur Taluk and Krishnagiri District and Tamil Nadu
Geographical Co-ordinates	Latitude: 12°29'14.95"N to 12°29'22.53"N Longitude: 78°20'26.88"E to 78°20'36.60"E
Toposheet No.	57 L/7
Elevation	Elevation of the area is 455-457m above MSL
G.O Letter	G.O. (2D).No: 9 Industries (E2) Dept. dated 18.01.1995.
Period of Lease	10 years (02.02.1995 to 01.02.2005)
Renewal of lease	20 years (Under Deemed Extension as Per GCDR, 1999)
Mining Plan Approval Details	Mining plan approved by Commissioner of Geology and Mining, Guindy, Chennai vide letter No. 14761/B1/1994, dated 22.09.1994. Now the 3rd scheme of mining has been prepared for the period from 2020-2021 to 2024-2025 and submitted for approval.
2. M/s. KARUNAI GRANITES PRIVATE LIMITED (11.59.0 Ha)	
Particulars	**Details**
Address of the Project Proponent	**M/s. KARUNAI GRANITES PRIVATE LIMITED** Jagadevipalayam Village & Post, Bargur Taluk (Formerly Krishnagiri), Krishnagiri District, Tamil Nadu.
Lease Area	11.59.0 Hectares (Patta Land)
Site Location	S.F. No. 294/4, 295/2A, 295/2B, 295/2C, 298/2, 298/1C2, 301/1(P), 301/2 & 301/3A, Jagadevipalayam Village, Bargur Taluk and Krishnagiri District and Tamil Nadu
Geographical Co-ordinates	Latitude: 12°29'9.06"N to 12°29'26.41"N

	Longitude: 78°20'18.72"E to 78°20'38.29"E
Toposheet No.	57 L/7
Elevation	Elevation of the area is 465m above MSL
G.O Letter	G.O. (3D).No.87 Industries (E.2) Department dated 2.11.1999
Period of Lease	10 years (03.02.2000 to 02.02.2010)
Renewal of quarry	20 years (Under Deemed Extension as Per GCDR, 1999)
Mining Plan Approval Details	Mining plan approved by Commissioner of Geology and Mining, Guindy, Chennai vide letter No.2245/MM9/2004 dated 24.08.2004. Now the 2nd scheme of mining has been prepared for the period from 2020-2021 to 2024-2025 and submitted for approval.

1.2 SCOPE OF THEPROJECT

The proposal for Environmental Clearance of two existing granite quarries of **M/s. Karunai Granites Private Limited (3.15.5 Ha and 11.59.0 Ha)** requires EIA/EMP Report as per respective Terms of Reference including Ecological Damage Assessment, Remediation Plan, Natural Resource Augmentation and Community Resource Augmentation.

1.3 ENVIRONMENTAL SETTINGS & MINING DETAILS

Table 1.3 Accessibility

Nearest Village	Jagadevipalayam • For Lease Area of 3.15.5 Ha – 2.0km – SW • For Lease Area of 11.59.0- 1.8km – SW
Nearest Settlement	

Sno	Village Name	Total population as per 2011 census	Distance with Direction
1	Jagadevipalayam	6747	4.7 km-SW
2	Gangavaram	3122	8.6 km-S
3	Orappam	3512	7.4 km-SW
4	Sigaralapalli	7765	6.9km-E
5	Kandikuppam	5734	7.6 km-NW
6	Gandhinagar	9114	4.0km-S

	7	Oppathavadi	9604	7.5km-NE
	8	Batlapalli	3724	6 km-SE
	9	Pasinayanapalli	20749	6.57 km-SE
	10	Kannandahalli	8562	9.53 km-S
Nearest Town	Krishnagiri– 12 km - W			
Nearest Roadway	MDR-860– Kaveripattinam to Pochamapalli – 15km - SW NH -77 – Krishnagiri to Uthangarai – 1.5 km - South SH-131 – Bargur to Tirupatturi – 5.5 km – NE Jagadevi to Bargur Village road – 1.4km - W			
Nearest Railway station	Patchur Railway Station– 18 km –NE			
Nearest Airport	Kampegowda International Airport, Bengaluru –102km – NW			
Table No 1.4 Environmental Sensitiveness				
Interstate Boundary	Tamil Nadu –Andhra Pradesh –16km (NE)			
Coastal Zone	Bay of Bengal – 174km – East			
Reserve Forest	1. Thogarapalli R.F. -2.41km – S 2. Bargur R.F – 6.41km – NE 3. Varatanapalli – 6.6km – NW 4. Nandibanda R.F – 8.6km – NE 5. Neralakotta R.F – 9.7km - NE The proposed projects site does not attract Forest Conservation Act, 1980.			
Wildlife sanctuary	Nil within 10km radius. Cauvery Wildlife Sanctuary – 40km – W The Proposed projects site does not the Wildlife (Protection) Act, 1972.			
Water bodies	1. Mattur Stream – 80m – S 2. A lake – 941m – S 3. A lake near Gettur village – 3.0km – W 4. A lake near Blinayanapalli village – 4.2km – NW 5. A lake near Simanur Village– 3.6km - NW 6. Bargur River – 4.5km - NE			
Defense Installations	Nil within 10km radius			
Critically Polluted area	Nil within 10km radius			
Seismic zone	Zone-III, Moderate damage risk zone as per BMTPC, Vulnerability atlas Seismic zone of India IS: 1893-2002			
Table No 1.5 Mining Details – M/s. Karunai Granites Private Limited (3.15.5 Ha)				

Method of Mining	Open cast Semi -Mechanized method of mining
Geological resources	9,91,353m^3
Mineable reserves	6,16,470m^3
Production (25%)	45,113m^3 for five years or 9022.6 m^3/annum(Avg)
Top soil	25593m^3 for plan period (2020-25)
Reject (75%)	1,35,338 m^3
Ore: Waste ratio	1: 4.07
Depth of Mining	35m bgl
Water Table	50 m bgl
Road design	1: 10 inside the pit and ramp 1:16 for transport
Overall Pit Slope	45°
Period of Lease	10 years (02.02.1995 to 01.02.2005)
Renewal of quarry	20 years (Under Deemed Extension as Per GCDR, 1999)
Existing pit dimension	**Pit** / **Bench** / **L(m)** / **W(m)** / **D(m)** I / I / 123m / 105m / 17m(R.L. 400m – 383m)
Project Cost	Rs 78.0 Lakhs
EMP Cost	Rs 9.50 lakhs
CER Cost	Rs. 1.56 lakhs

Table No 1.6 Mining Details – M/s. Karunai Granites Private Limited (11.59 Ha)

Method of Mining	Open cast Semi -Mechanized method of mining
Geological resources	26,62,984m^3
Mineable reserves	20,44,654m^3
Production (25%)	33,115m^3 for five years or 6,623 m^3/annum(Avg)
Top soil	-
Reject (75%)	99345 m^3
Ore: Waste ratio	1: 3
Depth of Mining	35m bgl
Water Table	50 m bgl
Road design	1: 10 inside the pit and ramp 1:16 for transport
Overall Pit Slope	45°
Period of Lease	10 years (03.02.2000 to 02.02.2010)
Renewal of quarry	20 years (Under Deemed Extension as Per GCDR, 1999)
Existing pit dimension	**Pit** / **L(m)** / **W(m)** / **Depth in (m)** I / 356m / 105m / RL455m-RL430m (25m)
Project Cost	Rs 81.50 Lakhs

EMP Cost	Rs 10.5 lakhs
CER Cost	Rs. 1.63 lakhs

1.4 Description of the environment

1.4.1 Base line environmental study

Collection of base line data is an integral part of the preparation of environmental impact assessment reports. The baseline monitoring study has been carried out during December 1st 2022 to February 28th 2023 to assess the existing environmental scenario in the area. For the purpose of EIA studies, mine lease area was considered as the core zone and area outside the mine lease boundary up to 10km radius from the lease boundary was considered as buffer zone.

Table No 1.7 Baseline Data

Particulars	Details	Standards
Meteorology (December 1st 2022 to February 28th 2023)		
Rainfall (Avg.)	31 mm	--
Temperature (Avg.)	22-24°C	--
Wind speed	2.4-2.6m/s	--
Wind Direction	From E, SE NE to W, NW, SW	
Ambient Air Quality (NAAQS)		
PM_{10}	38-52 µg/m^3	100 µg/m^3
$PM_{2.5}$	19-30 µg/m^3	60 µg/m^3
SO_2	3-14µg/m^3	80 µg/m^3
NO_x	7-18 µg /m^3	80 µg/m^3
Noise Level (CPCB Standards)		
Day time (6:00 am - 10:00 pm)	Core zone – 40.3 – 44.6 dB (A) Buffer zone – 44.6 – 49.8 dB (A))	**Industrial Area** Day Time - 75 dB (A) **Residential Area** Day Time – 55 dB (A)
Night time (10:00 pm - 06:00 am)	Core zone – 38.7 – 41.9 dB (A) Buffer zone – 42.5 – 45.4 dB(A)	**Industrial Area** Night Time – 70 dB(A) **Residential Area** Night Time – 45 dB (A)
Water Quality IS 10500:2012 (Desirable limits)		
pH	7.90 – 8.57	6.5 to 8.5
TDS	254 - 654 mg/l	500 mg/l
Electrical conductivity at 25˚C	450 - 1076 micromhos/cm	

Total Hardness as $CaCO_3$	133 - 311 mg/l	200 mg/l
Total suspended solids	0- 2	IS:3025:P.16:1984:R.2012
Chlorides Cl	57 - 362mg/l	250 mg/l
Total iron Fe	0.04 – 0.08mg/l	0.3mg/l
Sulfates SO_4	7 - 16mg/l	200 mg/l
Soil Quality		
pH	7.10 – 8.99	Neutral to slightly alkaline
Bulk density	1.04 – 1.17 g/cc	Favorable physical condition for plant growth.
Hydro Geology		
Water Table	50 m bgl	

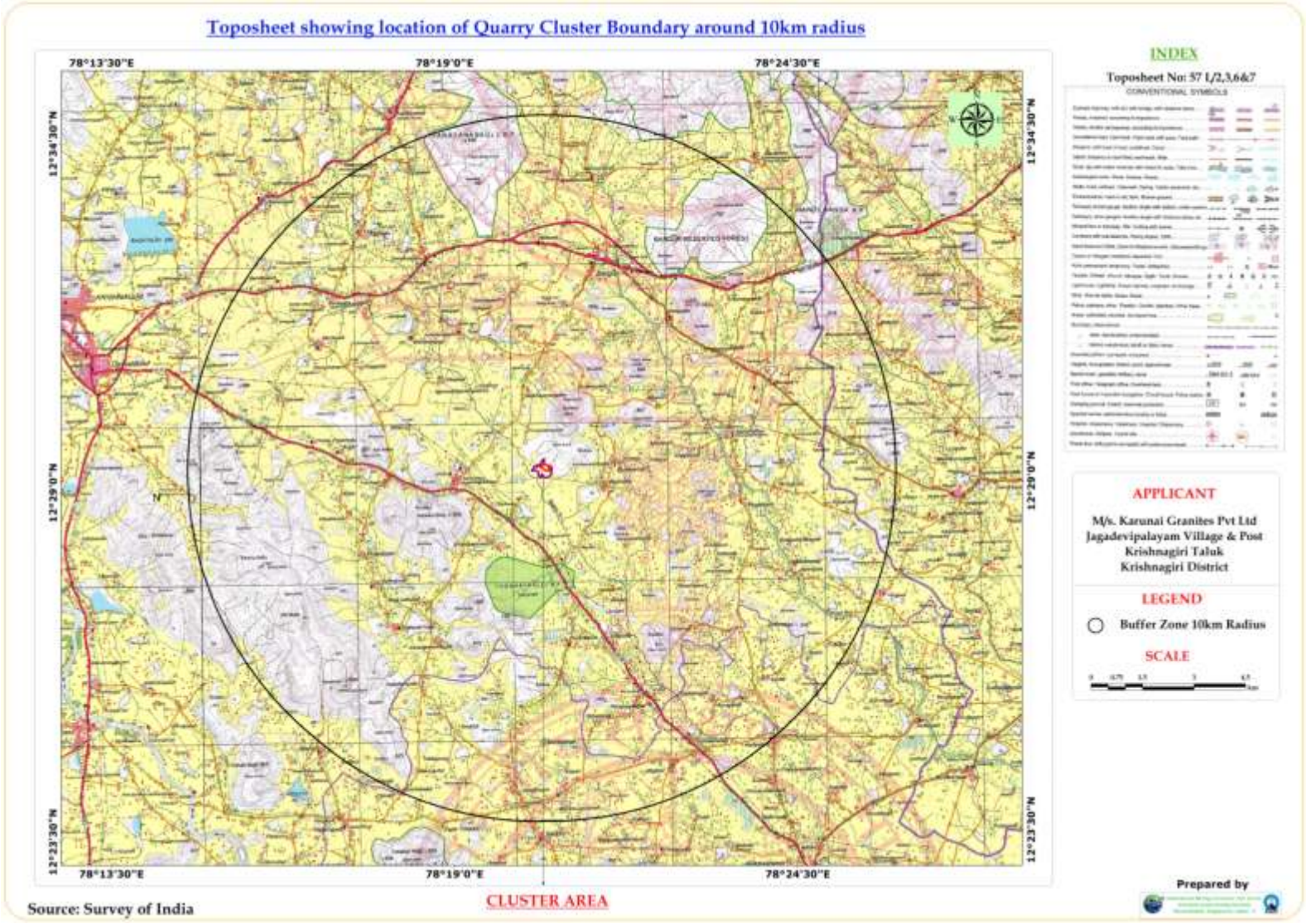

Fig No 1.1 Toposheet showing location of two Quarry Lease Boundary

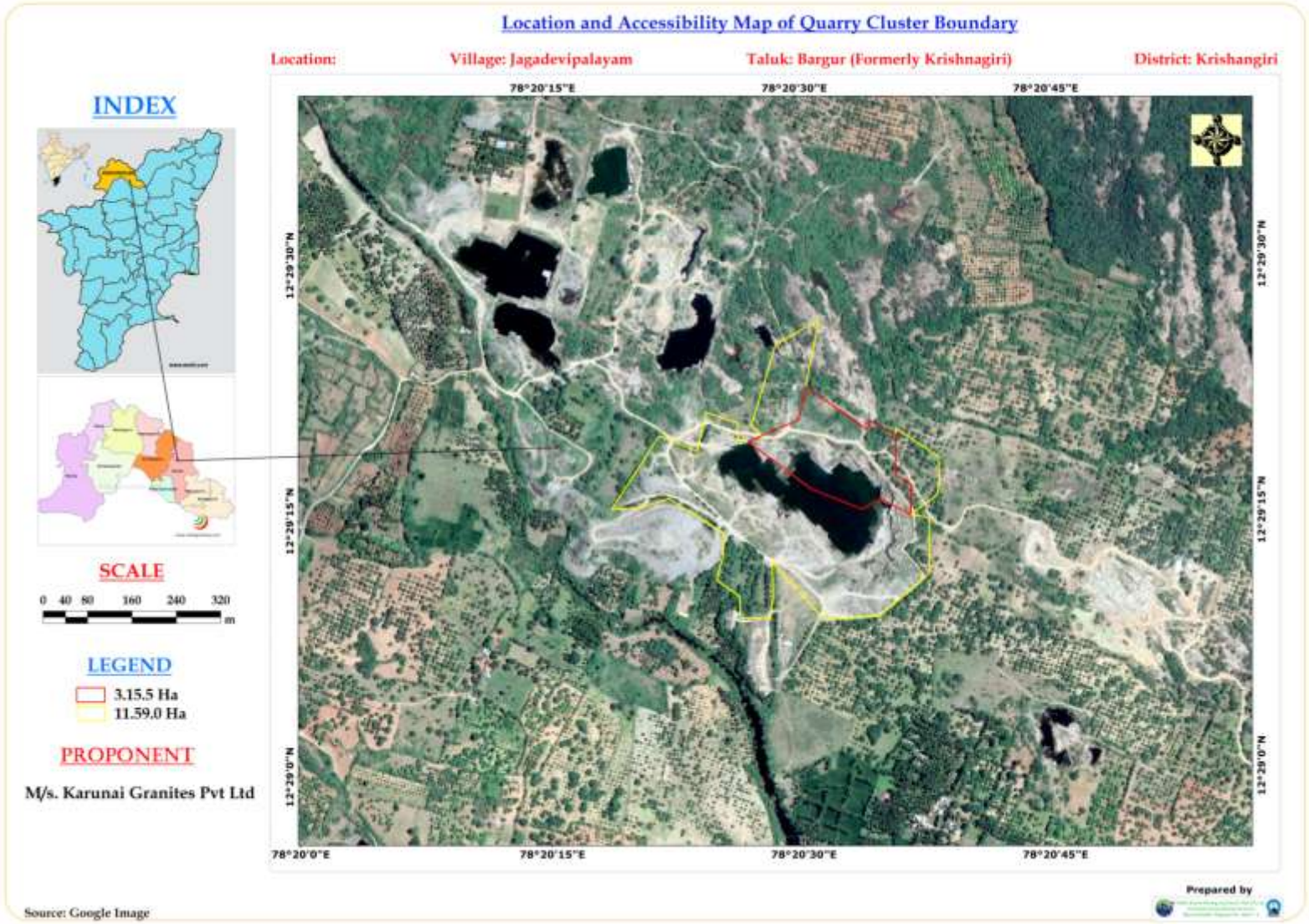

Fig No 1.2 Map Showing the Location and Accessibility of two Quarry Lease Boundary

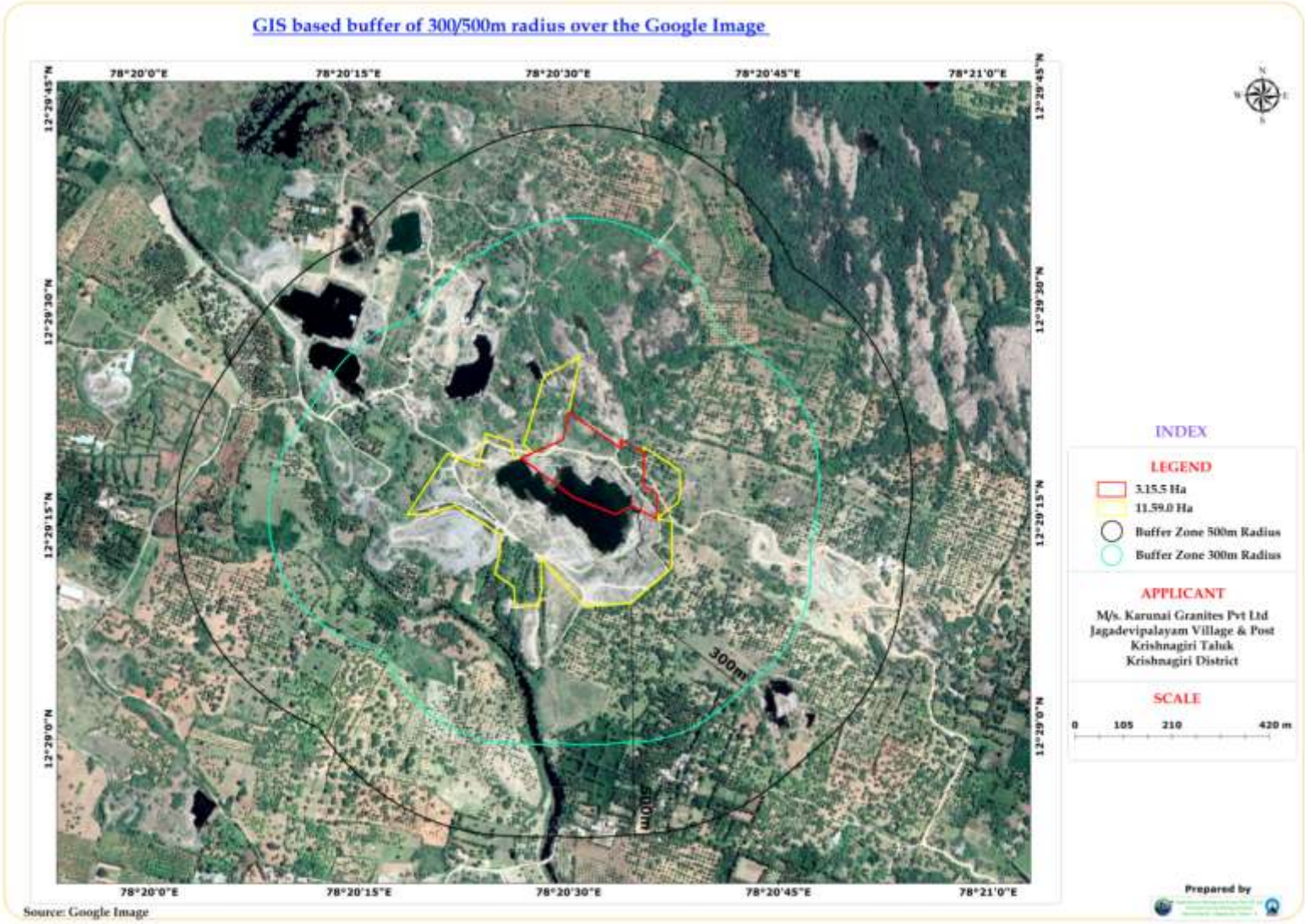

Fig No 1.3 Google Earth Image showing 300m and 500m radius around two quarry lease area

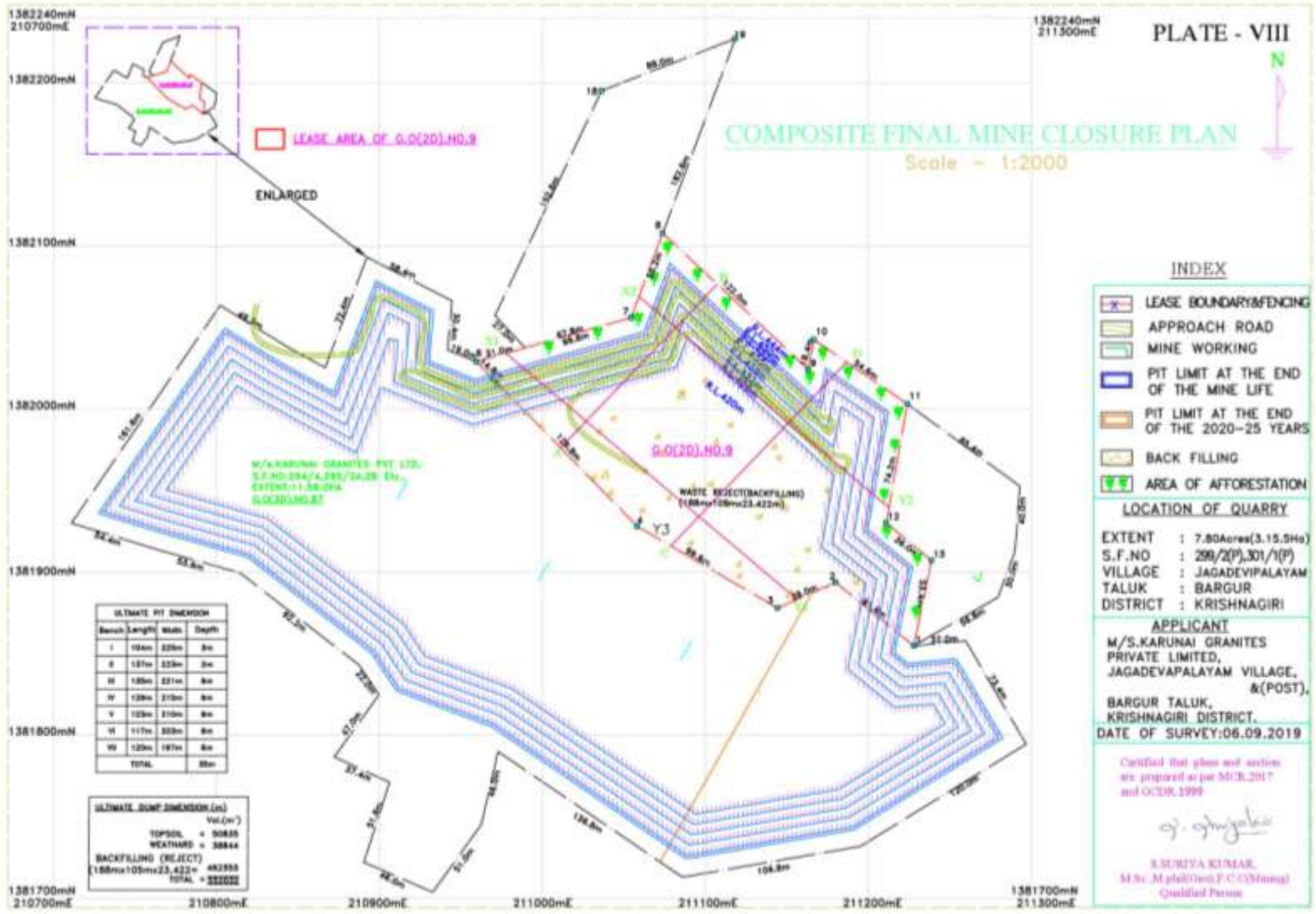

Fig No 1.4 Composite mine closure plan – 3.15.5 Ha

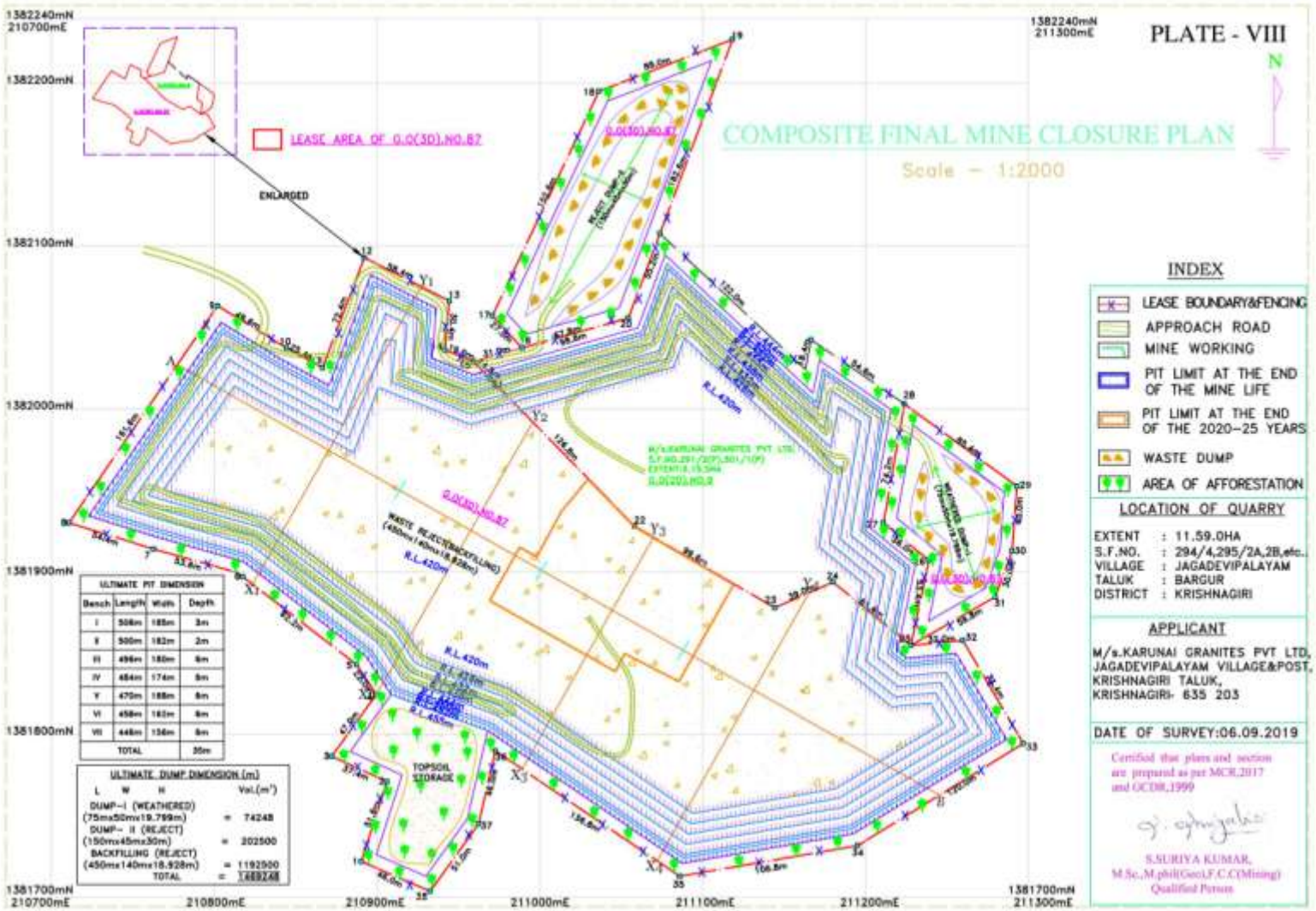

Fig No 1.5 Composite mine closure plan – 11.59.0 Ha

1.5 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

1.5.1 Air Environment

The air borne particulate matter is the main air pollutant by opencast mining. The mining operation will be carried out by adopting semi–mechanized methods which involves Jack Hammer drilling and blasting, excavation, loading and transportation.
AERMOD was used for prediction of impact of PM_{10} during conditions i) Loading/unloading and transportation of granite and weathered rock by trucks on Haul road. Total predicted 24-h maximum GLC of PM_{10} at project site for scenario 1 i.e loading-unloading and transportation was 57.96µg/m^3 occurred at the project site after superposition of base-line value 46 µg/m^3 over the incremental value of 11.96µg/m^3 to combined impact of loading and unloading and transportation over the haul road. Meteorological data under worst case scenario providing 24-h maximum average GLC was discussed above.

1.5.2 Noise Environment

Noise pollution poses a major health risk to the mine workers. The sources of noise in the proposed open cast grey granite quarry are such as Drilling, Blasting, and during movement of vehicles.

The noise generated by the mining activity is dissipated within the core zone. This is because of distance involved and other topographical features adding to the noise attenuation. From the results, it can be seen that the ambient noise levels (day time and night time) at all the locations will remain within permissible limits prescribed by CPCB and 90dB (A) norms of DGMS. At present there is no mining activity carried out. However, the expected noise levels are not likely to have any effect. Precaution will be made to keep down the noise exposure level of 85 dB (A) to the operating personnel for 8 hrs duration.

1.5.3 Ground Vibration

a) M/s. Karunai Granites Private Limited 3.15.5 Ha

The charge per blast of 120kg is well below the Peak Particle Velocity of 5mm/s but the proponent proposes to use only 43kg of explosives per day for the lease area 3.15.5 Ha.

b) M/s. Karunai Granites Private Limited 11.59.0 Ha

The charge per blast of 120kg is well below the Peak Particle Velocity of 5mm/s but the proponent proposes to use only 31kg of explosives per day for the lease area 11.59.0 Ha.

1.5.4 Water Environment

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

The impact due to mining on the water quality is expected to be insignificant because of no use of chemicals or hazardous substances during mining process. The depths of mining of two existing quarries are 35m bgl whereas the depth of ground water table is 50m bgl. So the mining activity will not intersect the ground water table.

The value of TH, TDS and Chlorides of water sample from Jagadevipalayam is beyond the acceptable limits. Water sample from Jitanpalli village has high TDS and water sample from Bagimanoor village has high TH. Based on the Water Quality Index calculated, water qualities from all except Jagadevipalayam village are good. In Jagadevipalayam village, the water quality is found to be poor. For excellent quality, the water should be treated by reverse osmosis to reduce dissolved solids and total hardness to the required rate. Boiling of water will remove the microorganisms effectively from all waters in the above said villages and core zone making the water aseptically fit for drinking purposes.

Prolonged consumption of water containing high TH causes Cardio vascular problems, diabetes, skin diseases, rashes, reproductive failure and renal failure. For the excellent quality of drinking the water must be treated with reverse osmosis process to overcome above mentioned such impacts on human body. Boiling of water will remove the microorganisms effectively from all waters in the above said villages and core zone making the water aseptically fit for drinking purposes.

1.5.5 Soil Environment

a) M/s. Karunai Granites Private Limited -3.15.5 Ha

For the plan period 2020-2025, the generation of top soil is estimated as 25593 m^3. It will be dumped along mining lease boundary as earth bund and it will be utilized for green belt development within the lease area. No chemical or toxic elements will be used during mining activity. So the health of soil in and around the quarry will not be affected.

b) M/s. Karunai Granites Private Limited -11.59.0Ha

For the plan period 2020-2025, the generation of top soil is Nil. If top soil found it will be dumped along mining lease boundary as earth bund and it will be utilized for green belt development within the lease area. No chemical or toxic elements will be used during mining activity. So the health of soil in and around the quarry will not be affected.

1.5.6 Waste Dump

a) M/s. Karunai Granites Private Limited -3.15.5 Ha

The production quantity of Grey granite for five years is about 45,113m^3 at the rate of 25% recovery up to permissible depth. The 75% reject of 1,35,338 m^3 shall be dumped in earmarked site as per scheme of mining.

b) M/s. Karunai Granites Private Limited -11.59.0 Ha

The proposed quantity of Grey granite for five years is about 33,115m^3 at the rate of 25% recovery up to permissible depth. The 75% reject of 99,345 m^3 shall be dumped in earmarked site as per scheme of mining.

1.5.7 Biological Environment

There are no notified endangered species in the area, which may be affected due to the quarry activities; therefore the biological environment will not have significant impact due to quarrying activity. The impact on the biological environment due to amount of dust generation is minimized by well-developed green belt in and around the quarry lease area.

1.5.8 Land Environment

Granite quarry project will result in disturbance of the land use pattern of the mine lease area. The land degradation is unavoidable during quarry activities like excavation, overburden dumping, soil extraction etc. So reclamation of mined out land and proper formation of benches will be given due importance as a step for sound land resource management.

The land use analyses show that the area is of predominantly Mango plantation followed by buffer zones of the study area, which clearly indicates that the development of plantation increases over a period of time. At the end of the project, the quarried pit will be act as water storage pond. The stored water will be used for developing mango plantation around the mining lease area. It will improve the

livelihood of village people. The evaporation rate of the water in the pit is given detail in the Chapter 7.

1.5.9 Socio Economic Environment

The quarrying activity will definitely increase the employment opportunity (directly as well as indirectly) in the project area. Some of these impacts would be beneficial. The expectation of the people of area is concerned towards employment, education, road and health facilities. The literacy rate may be increased with the economic benefits which may arise from the quarrying activities.

a) M/s. Karunai Granites Private Limited (3.15.5 Ha)

Direct Employment - 18 persons
Indirect Employment - 20 persons

b) M/s. Karunai Granites Private Limited (11.59.0 Ha)

Direct Employment - 18 persons
Indirect Employment - 20 persons

Indirect employment is that people will keep shops such as tea shops, hotels, spare parts store, mechanic shed, etc. around the quarry depending on the proposed projects. Population rate is increased day by day in India. It is necessary to create employment to all people for their livelihood and country's economic development.

Table 1.8 Environmental Management Plan

S.No	Parameters	Mining Activity	Mitigation measures
1	Air Environment	Drilling	○ Dust extractor or wet drilling to be followed to control dust at source of emission ○ Use of Sharp drill bits for drilling holes and charging the holes by using optimum charge and using time delay detonator
		Blasting	○ Regular water sprinkling on blasted heaps at regular intervals will help in reducing considerable dust pollution
		Loading	○ Water sprinkling be done before loading by making it moist

		Transportation	o Water sprinklers along the sides of haul road shall be fixed to control fly of dust while transporting minerals and waste o Overloading will be prevented o Trucks/Dumpers covered by tarpaulin covers
		DG Sets	o DG sets will be used only during power failure o Adequate stack height for DG sets will be provided as per CPCB norms
		General measures	o Avenue trees along roads around ML boundary shall be planted as per the norms of MoEF to control fly of dust. o Labours engaged in such dust prone areas should be provided with safety devices like ear muff, mask, goggles as per the MMR, 1961 amendments and circulars of DGMS. o Regular health check–up of workers and nearby villagers in the impacted area should be carried out and also regular occupational health assessment of employees should be carried out as per the Factories Act o Ambient Air Quality Monitoring will be conducted on regular basis to assess the quality of ambient air.
2	Water Environment	Surface water	o Wastewater discharge from mine if any will be treated in settling tanks before using for dust suppression and tree plantation purposes.
		Ground water	o The mining activity will not intersect the ground water table o De silting will be carried out before and immediately after the monsoon season o Pit will be used for Storage of rainwater o Rain water will be collected in sump in the mining pit and will be allowed to store and pumped out to surface setting tank of 15 m

			x 10m x 3m to remove suspended solids if any. This collected water will be judiciously used for dust suppression onwards and such sites where dust likely to be generated and for developing green belt.
		Storm water	o The proponent will collect and judicially utilize the rainwater as part of rain water harvesting
		General measures	o Regular monitoring and analyzing the quality of water
3	Noise Environment	Drilling	o Limiting time exposure of workers to excessive noise
		Blasting	o Carrying out blasting only during day time and not on cloudy days o Noise levels will be controlled by using optimum explosive charge, proper delay detonators and proper stemming to prevent blow out of holes. o Providing proper noise proof enclosure for the workers separated from the noise source and noise prone equipment
		Transportation	o Proper and regular maintenance of vehicles, machinery and other equipments. o The noise generated by the machinery will be reduced by proper lubrication of the machinery and other equipments. o Speed of trucks entering or leaving the mine will be limited to moderate speed to prevent undue noise from empty vehicles. o Adequate silencers will be provided in all the diesel engines of vehicles. o Minimum use of horns and speed limit of 10 km/hr in the village area. o It will be ensured that all transportation vehicles carry a valid PUC Certificates
		General measures	o Use of personal protective devices i.e., earmuffs and earplugs by workers, who are

			working in high noise generating areas o Provision of Quiet areas, where employees can get relief from workplace noise. o The development of green belts around the periphery of the mine to attenuate noise. o Regular medical check–up and proper training to personnel to create awareness about adverse noise level effects.
4	Vibration	Blasting	o No deep hole blasting envisaged. o Small dia shot holes are used for breaking boulders. o Specific charge pattern has to be designed by proper trial vibration studies with varying charge ratios. o If the vibration still exceeds the limit a long Trench to a depth of 6m may cut in the direction of wave's movement to break longitudinal waves which travel close to surface, preferably near mine buffer zone o In spite of all measures periodical testing of vibration and noise using approved seismograph by DGMS has to be followed as a part of Environmental monitoring
5	Soil Environment	Topsoil	o Humus top soil shall be preserved for reuse in afforestation and agriculture o Top soil should not be mixed with other waste or reject materials. It should be conserved by judicious utilization in the mine premises o Garland drains will be provided around the mine and dumps to arrest any soil from the mine area being carried away by the rain water. This will also avoid the soil erosion and siltation in the mining pits and maintaining the stability of the benches
6	Waste Dump	Stabilization of Dumps	o The rejects\ waste dump shall be properly terraced in to 1.5m benches with proper

			repose angle and then the top soil shall be spread over the dumps and slope to make them humus for some time, after the soil suitable for water retention trees will be planted at the top, slope and toe of the stabilized dumps to form vegetation. o Garland drainage around dump shall prevent under wash of dump by hydrostatic pressure to be developed by surface water and control wash outs and collapse o Dump should be terraced for every 5m height and stabilized
7	Plantation	Mine lease boundary and waste dump	o Provision of green belt all along the periphery of the lease area for control of dust and to attenuate noise o Stabilization of Dump with plantation o It is strongly recommended that the loss of plant in each year will be counted and again planted in subsequent plantation. o The plant should be planted taken from nursery, where the survival rate is high.
8	Land Environment		o The restoration of the degraded land would cover backfilling and terracing with the overburden / wastes and surfacing the same with top soil. o Provision of Garland drainage around the dumps o Fast growing trees and other native shrubs would be planted to stabilize the reclaimed land o Appropriate measures will be taken for Green belt development. o The rain water will be stored in the pit which will recharge the ground water as a part of rain water harvesting scheme for irrigating the nearby agricultural lands.
9	Socio Economic		o Good maintenance practices will be

		adopted for machinery and equipment, which will help to avert potential noise problems. o Green belt will be developed in and around the project site as per Central Pollution Control Board (CPCB) guidelines. o Drilling, blasting etc at specified location will be followed with proper schedule. o Appropriate air pollution control measure will be taken so as to minimize the environmental impact within the core zone. o An emergency preparedness plan will be prepared in advance, to deal with fire fighting, evacuation and local communication. o For the safety of workers, personal protective appliances like hand gloves, helmets, safety shoes, goggles, aprons, nose masks and ear protecting devices has been provided which meet 'BIS' (Bureau of Indian Standards). o As a part of CSR activities, community welfare activities will be undertaken by the proponent which leads to socio economic development
10	Occupational Health	o First-aid facilities as per provisions under Rule (44) of Mines Rules 1955 o Initial and Periodical medical examination shall be conducted for the employees under Rule 29B & 45 (A). o Insurance will be taken in the name of the labourers working in the mines o Workers involved in mining work shall be provided protective equipments such as Thick Gloves, Goggles, ear plugs, safety boot wears, etc…

1.6 Analysis of Alternatives

The quarrying site is dependent on the geology and mineral deposition of the area. Hence, this project is, mineral and site specific and no alternative site considered for this project.

1.7 Environmental Monitoring Program

Success of any environmental management programme depends upon the efficiency of the organizational set up responsible for the implementation of the programme. Regular monitoring of the various environmental parameters is also necessary to evaluate the effectiveness of the management programme. Environmental Monitoring Programme will be conducted for various environmental components as per conditions stipulated in the Environmental Clearance Letter issued by SEIAA & Consent to Operate issued by TNPCB.

Table No: 1.9 Post Project Environmental Monitoring Program

S. No.	Environment Attributes	Location	Monitoring		Remarks
			Duration	Frequency	
1	Meteorology and Air Quality	Continuous monitoring weather station in core zone/ nearest IMD station	24 hours	Monthly Once	Wind speed, direction, Temperature, Relative humidity and Rainfall.
2	Air Pollution Monitoring – $PM_{2.5}$, PM_{10}, SO_2 and NO_x	5 locations (One station in the core zone and at least one in nearby residential, area, one in the upwind, one station on the downwind direction and one in cross wind Direction).	8 hours	Six Month Once	Fine Dust Sampler and Respirable Dust Sampler
3	Water Pollution Monitoring	Mine effluents, Set of grab samples during pre and post monsoon for ground	–	Six Month Once	Physico–chemical, microbiological characteristics

		and surface water in the vicinity.			
4	Hydrogeology	Water level in open wells in buffer zone around 1km at specific wells	-	Once in 6months	Water level monitoring devices may be used
5	Noise	Mine Boundary, High noise generating areas within the lease and at the nearest residential area	24 hours	Monthly Once	Sound level meter
6	Vibration	At the nearest habitation (in case of reporting)	–	Six Month Once	Digital Seismograph
7	Soil	Core Zone and Buffer zone (Grab samples)	–	Six Month Once	Physical and Chemical characteristics

1.8 Project Benefits

The proponent, **M/s. Karunai Granites Private Limited** is very much conscious of his obligations to society at large. Under plantation programme, it is suggested to develop green belt further all along the boundary of the quarry lease area. Apart from the green belts and aesthetic plantation for eliminating fugitive emissions and noise control, all other massive plantation efforts will be executed with the assistance of experts and cooperation of the local community. The quarrying activity will create rural employment. In addition there will be indirect employment to many more people in the form of contractual jobs like construction of infrastructural facilities, transportation of granite and other community services etc. The local population will have preference to get an employment. The proponent will help in socio economic development of the village by providing educational facilities to children, and welfare amenities like drinking water to school; road and medical facilities to villages and employment opportunities to nearby villagers. CSR budget is allocated as 2.5% of the profit.

1.9 Environmental Management Plan

The Environmental Management Plan (EMP) must be integrated into the process of quarry planning so that the ecological balance of the area is well maintained and adverse effects are minimized. EMP includes all preventive as well as mitigation measures to minimize the impacts on the environment. The Quarry Plan is for the production of granite without deep hole drilling and heavy blasting. Only controlled blasting is undertaken. Such limited quarrying activity is not likely to cause any impact adversely on the environment as far as pollution of air, water, land and noise is concerned.

1.10 Conclusion

As discussed, it is safe to mention that the project is not likely to cause significant impacts on the ecology and environment of the area, as adequate preventive measures will be adopted to contain the pollutants within permissible limits. The total operations shall be carried out with ease & minimum risk to the workers. The proposed Environmental Management Plan will keep the area in a safe environment with negligible impact on the environment. Plantation will substantiate the impact due to the quarrying activity. Quarrying activity will help in improving the socio–economic benefits in areas like employment, communication and infrastructure development.