

**SUMMARY**  
**OF**  
**DRAFT EIA / EMP REPORT**  
**FOR**  
**ROUGHSTONE AND GRAVEL**  
**QUARRY**

**EXTENT- 3.65.5Ha**

**FIVE YEAR PRODUCTION OF**

**2,48,356m<sup>3</sup> OF ROUGHSTONE AND**

**1,25,556m<sup>3</sup> OF GRAVEL**

**SURVEY NO - 650, 651/1, 651/2, 652, 653/2, 654/2B2 & 667**

**VILLAGE - EDIRKOTTAI, TALUK- VEMBAKOTTAI,**

**DISTRICT - VIRUDHUNAGAR, STATE - TAMILNADU**

**CATEGORY- B1**

**THIRU T.K.BHARATH**

**3/54, Ettakapatti village,  
Edirkottai Post, Vembakottai Taluk,  
Virudhunagar District, Pin code:626131**

**CREATIVE ENGINEERS & CONSULTANTS**

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**ROUGHSTONE AND GRAVEL QUARRY OF THIRU. T.K BHARATH OVER AN AREA OF 3.65.5 HA IN EDIRKOTTAI VILLAGE, VEMBAKOTTAI TALUK, VIRUDHUNAGAR DISTRICT, TAMILNADU STATE.**

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**SUMMARY**

**1.0 GENERAL:**

**Thiru.T.K.Bharath** proposes to operate a **Rough Stone and Gravel Quarry** at Survey No. 650, 651/1, 651/2, 652, 653/2, 654/2B2 & 667 over an area of 3.65.5 Hectares in Edirkottai Village, Vembakottai Taluk, Virudhunagar District, Tamilnadu, for the TOR approved production capacity of 2,48,356m<sup>3</sup> of Rough Stone and 1,25,556m<sup>3</sup> of gravel formation for the period of Five years.

Precise area communication letter was obtained from the District Collector Virudhanagar Vide NA.KA.KV.1/413/2018, kaniyamam. Dated:16.10.2019. Mine plan for this project was approved by Joint Director / Assistant Director (i/c) Department of Geology & Mining Virudhunagar vide Rc. KV1/418/2018, dated 04.01.2020.

Although the individual lease area of this project is less than 5 Ha, including the other existing quarries within the 500m radius along with this subject project works out to >5 Ha and as such this proposal is considered **under cluster Category – B1** and public hearing is to be conducted.

Proposed Roughstone and Gravel Quarry of Thiru S. Jacob Rajamani at Survey No.648 over an area of 1.03.5Ha. is also falling in this cluster and as such cumulative impact due to projects in the cluster is studied and given in the EIA/EMP report.

ToR for this project has been received from SEIAA, Tamil Nadu vide their letter No. SEIAA-TN/F.No.7723/SEAC/TOR-835/2020 dated 08.02.2021. Based on the ToR granted by SEIAA, Tamil Nadu and in conformance with the MOEF&CC 2006 guidelines, EIA/EMP report has been prepared. Salient details of the EIA/EMP report are as follows:

**2.0 SITE DESCRIPTION:**

The salient features of the project are briefly given below.

<b>S.No</b>	<b>Particulars</b>	<b>Details</b>
1.	Name of the Project	Rough Stone and Gravel Quarry of Thiru T.K.Bharath
2.	Location of the project	Edirkottai Village, Vembakottai Taluk, Virudhunagar District, Tamil Nadu
3.	Mining Lease area (ML area)	3.65.5 Ha
4.	Latitude & Longitude	<b>Latitude:</b> 09 22' 05.95"N to 09° 22' 14.35"N

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		<b>Longitude: 77° 44' 27.70"E to 77° 44' 34.85"E</b>
5.	Mine site topography	106m - AMSL
6.	Type of land	Private patta land. Applicant has obtained consent from all the pattadhars and got it registered.
7.	Temperature °C (Minimum & Maximum)	Maximum summer temperature rises to 38 <sup>0</sup> to 41 <sup>0</sup> C and during winter period it drops to 20 <sup>0</sup> to 25 <sup>0</sup> C
8.	Average Annual rainfall	829.6mm
9.	Nearest Highway	(SH-187)Sivakasi–Vembakottai- 4.2km –(E) (SH-186) Vembakottai - Rajapalayam 2.2Km -(E)
10.	Nearest Railway station	Sattur – 12.0 km (NE)
11.	Nearest Airport	Madurai – 75.0 Km (NE)
12.	Nearest major water bodies	Odai – south of the lease area for which 50m safety barrier as per condition is left. Kayalkudi River - 2.0 Km (SW), Vaippar River-5.5 Km (S) direction and Marugal Odai - 5.5 km (SW).
13.	Environmental sensitive areas, Protected areas as per Wildlife Protection Act, 1972 (Tiger reserve, Elephant reserve, Biospheres, National parks, Wildlife sanctuaries, community reserves and conservation reserves)	Nil within 10km radius.
14.	Reserved / Protected Forests	Nil within 10km radius
15.	Nearest Town	Sattur – 12.0 km
16.	Nearest villages	Ettakapatti Village – 800 m-(N) Kundayiruppu Village 2.1 Km (SW) Lakshmipuram Village 1.4 Km (SW) Edirkottai Village - 1.5km – (NW)
17.	Other Industries (in Aerial distance)	Other than crushers, Roughstone quarries, fire works factories no other major industries are located in the study area.
18.	Seismic Zone	Area falls in Zone – II (Least Active)

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**2.1 PROJECT DESCRIPTION:**

S.No	Particulars	Details			
1.	Geological resources	Roughstone: 7,51,480cum Gravel: 2,25,444cum			
2.	Mineable reserves	Roughstone: 2,48,356cum Gravel: 1,25,556cum			
3.	Production Capacity for 5 years lease period	<b>YEAR</b>	<b>ROUGHSTONE (m3)</b>	<b>GRAVEL (m3)</b>	
		I	53041	43890	
		II	48840	20100	
		III	48996	20100	
		IV	49491	23004	
		V	47988	18462	
		<b>Total</b>	<b>248356</b>	<b>125556</b>	
4.	Life of the mine	5 years			
5.	Total Waste	There is no waste generation anticipated in this quarry operation since the entire excavated material will be utilized.			
6.	Method of mining	Quarry operations involve shallow jack hammer drilling, blasting, excavation, loading and transportation of Roughstone to needy buyers.			
7.	Bench parameters	Bench height - 5 m, bench widths - 5m			
8.	Ultimate mine depth	24m			
9.	Manpower	14 persons			
10.	Water Requirement & source	The total water requirement for this project will be 3.0KLD. The required water will be procured from outside agencies initially. Later, water collected in the mine pit will be used to meet the needs.			
11.	Power Requirement	All the equipment will be diesel operated. No electricity is needed for mining operation. The minimum power requirement for office, etc will be met from state grid.			
12.	Site services	This is a proposed project. Site services like mine office, first aid room, rest shelters, toilets etc. will be provided as semi-permanent structures.			
13.	Project cost	Total Cost - Rs. 1.68 Crores			

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**3.0 EXISTING ENVIRONMENTAL SCENARIO:**

**3.1 GENERAL:**

The studies and data collection have been carried out systematically and meticulously as per relevant IS codes, CPCB and MoEF&CC guidelines and as per approved ToR during **Winter Season, December 2020 to February 2021**) For the purpose of this study, the area has been divided into two zones, namely, core and buffer zones. Core zone is considered as the total lease area, while buffer zone encompasses an area of 10 km radius distance from the periphery of core zone.

**3.2 SOCIO-ECONOMIC STATUS:**

**i. Core Zone:**

The total mine lease area of 3.65.5Ha. Entire ML area is a private patta land with no forest or agricultural area involved.

**ii. Buffer Zone:**

Based on 2011 census data, in the 10km radius there are 26 Rural villages from Two Taluks namely Sivakasi, and Sattur and 4 urban areas of Sivakasi Taluk namely Naranapuram (CT), Anaiyur (CT), Viswanatham (CT) and Alangulam (CT).

The distribution of population is as below:

- Male - 85087 (49.55%)
- Female - 86618 (50.45%).
- Total - 171705
- Scheduled caste - 21.42%
- Scheduled tribes - 0.09%
- Total literacy rate in the area - 68.38% of the people are literate and 31.62% of the people are illiterate.

The occupational structure of the area is as below:

- Total main workers - 84654 (49.30%)
- Total marginal workers - 5822 (3.40%)
- Total non-workers - 81229 (47.30%)

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**3.3 EXISTING ENVIRONMENTAL QUALITY:**

**3.3.1 Ambient Air Quality:**

The ambient air quality data for PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>2</sub>, CO studied at 5 locations as per prescribed guidelines/ methods. The AAQ monitored data for all locations for above parameters are shown in below.

**Season: (Winter Season, December 2020 to February 2021)**

**Values in µg/m<sup>3</sup>**

S.No	PARAMETERS	Cat.* (R,I,S)	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	NO <sub>2</sub>
1	<b>CORE ZONE</b> (1 Location)	I	52.2 to 69.1	25.5 to 33.9	5.6 to 9.2	8.6 to 13.5
2	<b>BUFFER ZONE</b> (4 Locations)	R	42.2 to 60.8	19.5 to 29.2	3.5 to 8.5	6.4 to 12.2
<b>CPCB LIMITS</b>			<b>PM<sub>10</sub></b>	<b>PM<sub>2.5</sub></b>	<b>SO<sub>2</sub></b>	<b>NO<sub>2</sub></b>
<b>2009 Notification</b>			<b>100</b>	<b>60</b>	<b>80</b>	<b>80</b>
<b>* Note: BDL- Below Detectable Limit, DL- Detectable Limit.</b>						
<b>Conclusion: The existing Ambient Air Quality levels in the monitored locations for PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub>, NO<sub>2</sub> &amp; CO are within the prescribed CPCB limits.</b>						

**3.3.2 Water Environment:**

Parameter	No of Samples – 5 Bore well water samples					Season: Winter Season, December 2020 to February 2021)				
	pH	EC (µmhos/cm)	TDS (mg/L)	Chloride (mg/L)	Total Hardness (mg/L)	Total Alkalinity (mg/L)	Sulphate (mg/L)	Iron (mg/L)	Nitrate (mg/L)	Fluoride (mg/L)
<b>BUFFER ZONE</b> (5 Locations)	6.98 to 7.57	842 to 1079	504 to 652	105 to 218	173 to 490	115 to 586	11.3 to 82.4	0.03 to 0.06	BDL to 2.35	0.42 to 0.56
<b>Limits* Permissible</b>	6.5-8.5	-	2000	1000	600	600	400	0.3	45	1.5
<b>Conclusion: The water quality of the collected ground water samples were found to be within the prescribed permissible limits of IS: 10500:2012 Norms for Drinking in the absence of an alternative source*.</b>										

**3.3.3 Noise Environment:**

No of locations – 5			Season: Winter, December 2020 to February 2021)	
Noise Level In dB(A)	Core Zone dB(A) (1 Location)	*Work zone exposure limit dB(A)	Buffer Zone dB(A) (4 Locations)	MOEF&CC Norms dB(A)
<b>Day Equivalent</b>	46.1	<b>90</b>	46.1 to 48.3	<b>55</b>

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<b>Night Equivalent</b>	38.8		36.6 to 40.2	<b>45</b>
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\*Permissible noise for industrial workers as laid down by CPCB (at 8 hrs Exposure Time)

**Conclusion:** While comparing with the MoEF&CC Norms, the monitored ambient noise levels are within the limit values for Residential areas.

**3.3.4 Soil Quality:**

Parameter	pH	Electrical Conductivity $\mu\text{mhos/cm}$	Soil Type	Organic matter content %	Total Nitrogen mg/kg	Phosphorus mg/kg	Sodium mg/kg	Potassium mg/kg
Core Zone	6.89	60.32	Sandy Clay	0.58	194	2.58	760	520
Buffer Zone	7.05 – 7.28	45.97 – 72.45	Sand clay Silt loam	0.64– 1.21	114 - 185	1.34 - 2.84	690 - 1020	564 - 828

**3.3.5 LAND ENVIRONMENT:**

Landuse pattern carried out through remote sensing satellite data show that 27.09 % of the study area is agriculture land and 26.44 % are fallow land. Land with scrub constitutes 24.42 %.

**3.3.6 BIOLOGICAL ENVIRONMENT:**

The lease area is a non forest, private land with scrub and thorny bushes. The lease area is dominated with Prosopis juliflora, Abutilon indicum. Calotropis gigantea. The Dominated species in the buffer zone are Albizia lebbeck Murraya koenigii Borassus flabellifer, Sygygium cumuni Prosopis juliflora, Acacia auriculiformis Azadirachta indica Gmelina arborea etc. Patches of coconut farms Sunflower, Banana, Nithiyakalani cultivation, are also observed in the study area. No Wild Life Sanctuary or National Park within the study area of 10 km. Domesticated animals and common birds are observed in the study area.

**3.3.7 HYDROLOGICAL STUDY:**

In the study area, the shallow aquifer is developed through dug wells and deeper aquifer through tube wells. The groundwater has revealed that potential fractures are encountered at deeper levels. From the Geophysical survey, it is found that the subsurface litho units are gravel, weathered layers poorly fractured and terminated with hard and compact massive rocks with fully devoid of fractures. The occurrence of groundwater mainly in the porous soil are



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weathered layers, very negligible amount of groundwater percolated through the poorly fractured layer. Besides, the mining area consists of hard compact rock, no major water seepage within the mine is expected.

#### **4.0 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES:**

This is a proposed project and Semi – Mechanized Open Cast mining will be carried out to quarry out Rough Stone, & Gravel. The identified impacts due to this mine during mining and associated activities have been studied in relation to various environmental components like Air, water, noise, vibration, land, transport etc.

#### **4.1 AIR ENVIRONMENT:**

The proposed mining and allied operations may cause deterioration of air quality due to pollution arising from the project operation if prompt care is not taken. The principal sources of air pollution in general due to mining and allied activities will be:

Dust generation in the mine due to:

- ❖ Excavation of material
- ❖ Movement of HEMM such as Excavators, tippers etc.
- ❖ Loading and unloading operation
- ❖ Transportation

In case of this mine, the following measures will be adopted to control impact on the air quality due to mining operations in the lease area:

- Deployment of mobile water sprinkler for fugitive dust suppression in haul roads.
- Proper maintenance of roads.
- Avoiding crowding of trucks by properly spacing them to avoid the concentration of dust emission at any time.
- Transportation of material by tarpaulin covered trucks
- Proper maintenance of HEMM to minimize gaseous emission
- Imparting sufficient training to operators on safety and environmental parameters
- Development of green belt/ plantation in various areas within the mine lease area etc.

By adoption of all these measures, no adverse impact on air quality is envisaged due to this proposed opencast mining operation.



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The impact on air quality due to the proposed project is estimated using AERMOD View Gaussian Plume Air Dispersion Model developed by Lakes Environmental Software which is based on steady state Gaussian plume dispersion.

The resultant added concentrations with baseline figures even at worst scenario, show that the values of ambient air quality with respect to PM<sub>10</sub> are in the range of 52.4 µg/m<sup>3</sup> to 72.9 µg/m<sup>3</sup> and with respect to PM<sub>2.5</sub> are in the range of 25.3 µg/m<sup>3</sup> to 36.5 µg/m<sup>3</sup> which are well within the statutory norms in each case.

For preservation of environment in this mine strict enforcement of management schemes will be undertaken for taking corrective actions, as needed. By adopting the effective implementation of all the mitigative measures, no adverse impact on Air quality due to the mining operation in this lease area is expected.

#### **4.2 WATER ENVIRONMENT:**

The total water requirement for this project will be 3.0 KLD. The water will be sourced initially from outside agencies. Later the rainwater collected in the mine pit sump will be used for this purpose.

The domestic effluent to be generated from the project will be collected in septic tank with soak pits arrangements. This being a mining project there will not be any process effluent. The rain water falling in the quarry will be harvested in the sump at the lowest level of the quarry. This sump will act as a settling pond to prevent solids escaping along with discharge, before outlet. etc. Towards surface runoff management, garland drain will be constructed around the quarry and will be connected to a settling pond with silt traps. The supernatant clear water from the settling pond will be flow to the downstream users.

There is a seasonal odai passing on the southern side of the lease area for which a 50m safety distance has been provided as per the conditions of the precise area communication letter. Earthen bund will be formed along the banks of the Odai in proximity to the lease area and good plantation will be carried out in the safety zone area. Either side of the Odai near the lease area will be properly fenced with barbed wire and it will be ensured no impact is caused on this drainage course.

Based on the Central Ground Water Board report of Virudhunagar District.' the stage of groundwater development of Vembakottai where the study area falls is 58% . In view of this, this

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area can be categorized as 'Safe' from ground water development point of view. Thus there is scope for further ground water development.

#### **4.3 NOISE ENVIRONMENT:**

During mining operation there will be noise generation due to working of excavators, movement of vehicles, etc. However, it will be felt near the active working area only and at away from its source it will get reduced. Due to natural attenuation effects, by proper green belt development, design / maintenance of machines, etc., the impact on noise levels will be negligible and are expected to be well within the prescribed limits.

##### **4.3.1 VIBRATION:**

In the proposed mine workings, blasting & vibration effects will be controlled by following measures.

- Carrying out controlled blasting using Nonel milli second delay detonator.
- Optimum design for burden and spacing.
- Reducing explosive charge per delay to minimum.
- Use of suitable initiating sequence and millisecond delay detonators.
- Proper care and supervision during blasting by a competent and experienced person to be carried out.

By adoption of above measures, it will be ensured that ground vibrational levels due to blasting will be maintained within the prescribed DGMS conditions of 10 mm/s for the domestic houses/structures. Standard Operating Procedure (SOP) for blasting will be followed before carrying out blasting to protect the zone.

#### **4.4 IMPACT ON LAND ENVIRONMENT:**

In the post mining stage, entire 2.02.5 Ha of mined out area will be left as water body. 0.02.0 Ha will be left as road, 1.60.0 Ha of safety zone will be covered with vegetation, 0.01.0 will be infrastructure Entire mined out area will be properly fenced to prevent in advertant entry of men and animals. In the post mining stage the rainwater harvested in the mined out void shall be utilized in the area in consultation with the authorities.

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**4.5 BIOLOGICAL ENVIRONMENT:**

No major clearance of vegetation is involved in this project. Necessary mitigative measures like dust suppression, proper maintenance of equipments etc., will be carried out to prevent dust generation & any further impact on the vegetation. About 1.60 ha of lease area comprising safety barrier around the mine periphery, for cart track and odai will be developed with Greenbelt / Plantation to enhance the vegetative growth and aesthetic in the safety zone area.

**4.6 SOCIO ECONOMIC ENVIRONMENT:**

Entire Land is in proponent possession there are no habitations or hutments in the core zone area, no rehabilitation or resettlement problems will arise here. Adequate safety distance inline with the Government order along with concrete wall on the eastern side and bund on the southern side all around fencing will be carried out.

The mining operations in the proposed mine will provide the following socio economic benefits:

- Employment for about 14 persons directly.
- Indirect opportunity to about 50 people through various service related activities connected with the project operations like:
  - ✓ Project related logistical operations for transport of Rough Stone & Gravel, etc,
  - ✓ Various trading services for consumer goods, spare parts, sundry items, etc.
  - ✓ Contractual services connected with the project.
  - ✓ Green belt development
- Improvement in medical care system for the locals.
- Benefit to State and central exchequer by way of royalty, taxes.

Towards the socio economic development of the surrounding area, the proponent has earmarked an amount of Rs.5 Lakhs under Corporate Environmental Responsibility. The activities identified under CER will be implemented in a phased manner in the following areas:

- Provision of RO water facility .
- Smart class facilities for nearby schools.
- Maintenance / Improvement in road facility.
- Desilting of village ponds.

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- Assistance in conducting regular health camp, eye camp.

By carrying out systematic and scientific mining and implementing all the environmental mitigative measures it will be ensured that there will be no adverse impact on this front.

**4.7 IMPACT ON LOCAL LOGISTICAL SYSTEM DUE TO PROJECT:**

From this proposed quarry the entire output will be transported to the consumers. Since the productivity is less, there will be hardly about 5 trips per hour. The transport route can easily absorb this negligible traffic due to this project. The following mitigative measures are suggested for mitigation of adverse impacts on the logistical aspect of the project:

- ❖ Water sprinkling on transport road and Rough stone in the transport vehicles before transporting, so that no dust nuisance during transport will arise.
- ❖ Proper maintenance of transport roads
- ❖ Proper maintenance of transport vehicles.
- ❖ Avoiding overloading of material
- ❖ Covering of loaded vehicles with tarpaulins sheet if warranted.

**4.8 OCCUPATIONAL HEALTH AND SAFETY ASPECTS:**

In order to ensure minimisation of occupational health and safety problems in the project operation, the following preventive remedial measures will be effectively exercised in the project operations, so as to comply with applicable standards.

- Medical examination of workers at pre-entry level stage of workers, etc., by qualified doctors, with periodical examination of all workers/staff at least once a year, as per DGMS circulars.
- Regular awareness campaigns amongst staff and workers
- Staff will be provided with PPE to guard against excess noise levels, Dust generation and inhalation, etc., as per standards prescribed by DGMS.

**4.9 WASTE MANAGEMENT:**

There is no process effluent generation from this mine. Hence no liquid waste is generated. Single use plastics/ use and throwaway plastics will be banned in the site as directed by the Tamil Nadu Government vide GO(Ms)No.84 regarding ban on use of plastic products. The employees will be encouraged to use compostable material or reusable material.

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**5.0 ENVIRONMENTAL MONITORING PROGRAMME:**

Regular, systematic and sustained programme schedules for implementation and monitoring of various control measures are devised with clear cut guidelines of various concerned plans for keeping a continuous surveillance on the various environmental quality parameters in the area.

The Mines Manager/Mine Incharge will undertake effective monitoring and implementation of various above said environmental control measures promptly and effectively and to oversee various environmental management schemes for air quality control, water quality status, noise level control, plantation programme, social development schemes, etc in the mine. Towards EMP measures, Rs. 12.0 lakhs is allocated under capital cost. Besides, Rs.10.75 lakhs per annum will be spent under recurring cost.

**6.0 CUMULATIVE IMPACT STUDY:**

As already mentioned, since this proposal is considered under cluster Category cumulative impact due to projects in the cluster is studied and given in the respective EIA/EMP reports.

Combined cumulative computer Air Quality Model simulations carried out show that the cumulative peak Ground Level Concentration (GLC) after effective implementation of various mitigative measures for PM<sub>10</sub> and PM<sub>2.5</sub> are 4.82 µg/m<sup>3</sup> & 3.39 µg/m<sup>3</sup> respectively.

It is observed that the peak incremental concentration for PM<sub>10</sub>, PM<sub>2.5</sub> is occurring very near the source. At away from the source the values are getting drastically reduced due to dispersion effects no effect is observed.

The resultant added concentrations with baseline figures even at worst scenario and cumulative impact of all the projects show that the values of ambient air quality with respect to PM<sub>10</sub> are in the range of 52.4 µg/m<sup>3</sup> to 73.9 µg/m<sup>3</sup> and with respect to PM<sub>2.5</sub> are in the range of 25.3 µg/m<sup>3</sup> to 37.3µg/m<sup>3</sup> which are well within the statutory prescribed limits. As such no adverse impact on Ambient air quality is envisaged.

For other environmental attributes also, by implementing the mitigative measures as suggested in the report continuously and rigorously, no adverse impact on the surround environment is expected on the cumulative basis also.

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**7.0 CONCLUSION:**

By systematic and scientific mining adhering to all the statutory norms and enforcing and strictly implementing the above said mitigation measures mentioned in this report, no adverse impact is envisaged.

The proposed mining project will benefit this region in the fields of potential employment opportunities, improved income for local people, improved social welfare facilities in respect of education, medical healthcare systems, etc. in its own way and also revenue to Government through royalty, taxes etc.

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