

SUMMARY

FOR

ROUGHSTONE AND GRAVEL QUARRY

Extent	2.28.0Ha
Location	Ethirkottai Village, Vembakottai Taluk, Virudhunagar District, Tamil Nadu
S.F.Nos	672/3, 674, 675/2, 676/3
Land Type	Patta Land
Production for 5 years	Roughstone – 1,97,455 m ³ Gravel – 46,896 m ³ Weathered Rock – 31,264 m ³
Depth	20m bgl
Lease Period	5 years

PROJECT PROPONENT

THIRU S. RAMACHANDRAN

1/28, North Street, Ethirkottai, Vembakottai Taluk, Virudhunagar – 626131.

CONSULTANT

CREATIVE ENGINEERS & CONSULTANTS

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Creating Possibilities

NOVEMBER- 2023

ROUGH STONE AND GRAVEL QUARRY OF THIRU S.RAMACHANDRAN AT 672/3, 674, 675/2, 676/3 OVER AN AREA OF 2.28.0HA IN ETHIRKOTTAI VILLAGE, VEMBAKOTTAI TALUK, VIRUDHUNAGAR DISTRICT, TAMIL NADU

SUMMARY

1.1 INTRODUCTION:

Thiru. S.Ramachandran proposes to operate a **Rough Stone and Gravel Quarry** Survey No. at 672/3, 674, 675/2 and 676/3 over an area of 2.28.0 Ha in Ethirkottai Village, Vembakottai Taluk, Virudhunagar District, Tamil Nadu and has initiated action towards obtaining environmental clearance.

It is proposed to mine 1,97,455 m³ of Roughstone and 46,896 m³ of Gravel and 31,264 m³ of Weathered Rock for a period of 5 years upto a depth of 20m as per approved ToR as against the mining plan approved quantity of 2,39,140 m³ of Roughstone and 46,896 m³ of Gravel and 31,264 m³ of Weathered Rock for a period of 5 years upto a depth of 25m.

Although the individual lease area of this project is less than 5 Ha, the other quarries within the 500m radius along with this subject project works out to > 5Ha and as such this proposal is considered under Category – B1 Necessitating preparation of EIA/EMP Report and public hearing .

1.2 STATUTORY APPROVALS:

1.	Precise Area Communication Letter	KV1/664/2021-kaniyamam dated:11.02.2022
2.	Mining Plan Approval	Rc. KV1/664/2021-kaniyamam, dated 11.02.2022.
3.	Terms of Reference	Received from SEIAA, Tamil Nadu vide their Lr No.SEIAA-TN/F.No.9271/SEAC/ToR-1208/2022. Dated:14.07.2022

Based on the conditions of Precise Area Communication letter, a safety distance of 10m for cart track and 7.5m safety distance has been left for the adjoining patta lands. As per TOR Condition, EIA/EMP report is prepared. Salient details of the report is given below.

ROUGH STONE AND GRAVEL QUARRY OF THIRU S.RAMACHANDRAN AT 672/3, 674, 675/2, 676/3 OVER AN AREA OF 2.28.0HA IN ETHIRKOTTAI VILLAGE, VEMBAKOTTAI TALUK, VIRUDHUNAGAR DISTRICT, TAMIL NADU

2.1 SITE DESCRIPTION:

Table No.1: SITE DETAILS

S.No	Particulars	Details																													
	Name of the Project	Rough Stone and Gravel Quarry of Thiru S.Ramachandran																													
1.	Location of the project	Ethirkottai village, Vembakottai Taluk, Virudhunagar District.																													
2.	Latitude & Longitude	Latitude: 9°21'49.3"N to 9°21'56.8"N Longitude: 77°44'23.1"E TO 77°44'28.0"E																													
3.	Mining Lease area	2.280 Ha																													
4.	Type of land	Private Patta Land																													
5.	Mine site topography	Almost Plain Terrain																													
6.	Accessibility	The lease area can be approached from M.Madathupatti - Reddiyapatti Road on the northern side of the lease area. This connects SH-183(Alangulam – Sivakasi) on the western side of the lease area at a distance of 3.4Km and to SH-187(Vembakottai – Sivakasi) at a distance of 4.25Km on the eastern side. Besides, SH-186 lies at a distance of 1.75Km on the southern side of the lease area.																													
7.	Nearest Highway	SH-186 (Vembakottai – Rajapalayam) – 1.75Km (SW) SH-183 (Alangulam – Sivakasi) – 3.4Km (W) SH-187(Vembakottai – Sivakasi) – 4.25Km (E)																													
8.	Nearest Railway station	Sivakasi – 12km (NE)																													
9.	Nearest Airport	Madurai – 65.0 Km (NE)																													
10.	Nearest major water bodies	<table border="1"> <thead> <tr> <th>Name</th> <th>Distance (Km)</th> <th>Direction</th> </tr> </thead> <tbody> <tr> <td>Odai</td> <td>0.200</td> <td>NW</td> </tr> <tr> <td>Odai</td> <td>0.275</td> <td>NW</td> </tr> <tr> <td>Odai</td> <td>0.255</td> <td>SE</td> </tr> <tr> <td>Kayalkudi River</td> <td>1.5</td> <td>SW</td> </tr> <tr> <td>Marugal Odai</td> <td>3.7</td> <td>SW</td> </tr> <tr> <td>Vaippar River</td> <td>4.1</td> <td>SE</td> </tr> <tr> <td>Uppu Odai</td> <td>7.2</td> <td>SE</td> </tr> <tr> <td>Nedunkulam odai</td> <td>5.6KM</td> <td>W</td> </tr> </tbody> </table>	Name	Distance (Km)	Direction	Odai	0.200	NW	Odai	0.275	NW	Odai	0.255	SE	Kayalkudi River	1.5	SW	Marugal Odai	3.7	SW	Vaippar River	4.1	SE	Uppu Odai	7.2	SE	Nedunkulam odai	5.6KM	W		
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11.	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 10 Km radius																													
12.	Notified Archaeologically important places, Monuments	Vijayakaraisalkulam Archeological Site – 4.96 Km (SW)																													



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S.No	Particulars	Details
13.	Reserved / Protected Forests	Nil within 10 Km radius
14.	Seismic Zone	Zone – II (Least Active)

Table No.2: TECHNICAL DESCRIPTION

S.No	Particulars	Details																																			
1.	Geological reserve	Roughstone – 4,56,160cum , Gravel- 68,424cum Weathered Rock-45616cum																																			
2.	Mineable reserve	Roughstone – 2,39,140cum , Gravel- 46,896cum Weathered Rock-31,264cum																																			
3.	Method of Mining	Open cast mechanized mining method with drilling, blasting, excavation, loading and transportation of Roughstone to needy buyers.																																			
4.	Production	<table border="1"> <thead> <tr> <th>Year</th> <th>Roughstone (m3)</th> <th>Weathered Rock (m3)</th> <th>Gravel(m3)</th> <th>Total(m3)</th> </tr> </thead> <tbody> <tr> <td>I</td> <td>29415</td> <td>14036</td> <td>21054</td> <td>64505</td> </tr> <tr> <td>II</td> <td>52530</td> <td>5612</td> <td>8418</td> <td>66560</td> </tr> <tr> <td>III</td> <td>37740</td> <td>11616</td> <td>17424</td> <td>66780</td> </tr> <tr> <td>IV</td> <td>58205</td> <td></td> <td></td> <td>58205</td> </tr> <tr> <td>V</td> <td>19565</td> <td></td> <td></td> <td>19565</td> </tr> <tr> <td></td> <td>197455</td> <td>31264</td> <td>46896</td> <td>275615</td> </tr> </tbody> </table>	Year	Roughstone (m3)	Weathered Rock (m3)	Gravel(m3)	Total(m3)	I	29415	14036	21054	64505	II	52530	5612	8418	66560	III	37740	11616	17424	66780	IV	58205			58205	V	19565			19565		197455	31264	46896	275615
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5.	Life of the mine	5 Years																																			
6.	Waste Generation and Management	No waste generation anticipated in this quarry operation since the entire excavated material will be utilized.																																			
7.	Ultimate Mine depth	20m																																			
8.	Manpower	Direct – 18, Indirect – 50																																			
9.	Water Requirement & source	Total water – 10 KLD Will be procured from outside agencies initially. Later, water collected in the mine pit will be used to meet the needs.																																			
10.	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.																																			
11.	Site services	Mine office, first aid room, rest shelters, toilets etc. will be provided as semi-permanent structures.																																			



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S.No	Particulars	Details
12.	Project cost	Rs. 77,28,230 /-
13.	CER cost	Rs.5.0 Lakhs

3.1 EXISTING ENVIRONMENTAL SCENARIO:

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 2022 to February 2023)** 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. Based on 2011 census data, in the 10km radius there are 26 Rural villages and 4 urban areas from Three Taluks namely Sattur and Sivakasi.

Table No.3: SOCIAL, ECONOMIC AND DEMOGRAPHIC PROFILE OF THE STUDY AREA

Details	Population	Percentage
A. Gender-wise distribution		
Male Population	85087	49.55
Female Population	86618	50.45
Total	171705	100
B. Caste-wise population distribution		
Scheduled Caste	36778	21.42
Scheduled Tribes	158	0.09
Other	134769	78.49
Total	171705	100
C. Literacy Levels		
Total Literate Population	117410	68.38
Others	54295	31.62
Total	171705	100
D. Occupational structure		
Main workers	84654	49.30
Marginal workers	5822	3.40
Total Workers	90476	52.70
Total Non-workers	81229	47.30
Total	171705	100

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3.2.1 EXISTING ENVIRONMENTAL QUALITY:

Table 1: Baseline Data

A) AMBIENT AIR QUALITY		Monitoring Location – 5 locations	
PARAMETER	RESULT (µg/m³)		*LIMIT (µg/m³)
Location	Core Zone	Buffer Zone	
Particulate Matter (Size <10 µm)	51.4 – 68.3	41.4 – 60.2	100
Particulate Matter (Size <2.5 µm)	25.2 – 33.6	19.2 – 28.9	60
Sulphur Dioxide (as SO ₂)	5.4 – 9.0	3.3 – 8.3	80
Nitrogen Dioxide (as NO ₂)	8.2 – 13.1	6.0 – 11.8	80
Conclusion: The existing Ambient Air Quality levels for PM10, PM2.5, SO2 and NO2, are within the NAAQ standards prescribed CPCB limits of 100 µg/m ³ , 60 µg/m ³ , 80 µg/m ³ & 80 µg/m ³ . The CO values in all the locations were found to be below detectable limit. Silica values in the study area are found to be below detectable limit. (Detection limit – 0.05 mg/m ³)			
B) WATER QUALITY		Monitoring Location – 5 locations	
PARAMETER	Result	*LIMIT (µg/m³)	
pH at 25 °C	6.96 – 7.54	6.5-8.5	
Total Dissolved Solids, mg/L	510 – 652	2000	
Chloride as Cl ⁻ , mg/L	106 – 215	1000	
Total Hardness (as CaCO ₃), mg/L	174 – 492	600	
Total Alkalinity (as CaCO ₃), mg/L	112– 582	600	
Sulphates as SO ₄ ²⁻ , mg/L	11.4 – 82.9	400	
Iron as Fe, mg/L	0.04– 0.07	0.3	
Nitrate as NO ₃ , mg/L	BDL(D.L – 1.0)– 2.58	45	
Fluoride as F, mg/L	0.44 – 0.58	1.5	
Conclusion: The water quality of ground water is found to be within the prescribed Permissible limits of IS: 10500 Norms in the absence of an alternative source as per Drinking Water Specifications.			
C) NOISE LEVELS		Monitoring Location – 5 locations	
PARAMETER	RESULT dB(A)		*LIMIT (µg/m³)
	Day Equivalent	Night Equivalent	
Core Zone	45.5	38.4	90
Buffer Zone	45.7 – 47.8	36.2 – 39.8	Day Equivalent - 55dB(A), Night Equivalent - 45dB(A)
*Permissible noise for industrial workers as laid down by CPCB (at 8 hrs Exposure Time). While comparing with the MoEF&CC Norms, the monitored ambient noise levels are generally within the limit values.			

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D) SOIL QUALITY	Monitoring Location – 3 locations
PARAMETER	Range of values
pH	6.92 – 7.32
Electrical Conductivity (µmho/cm)	48.96 – 80.57
Organic matter (%)	0.62 – 1.34
Total Nitrogen (mg/kg)	116 - 195
Phosphorus (mg/kg)	1.36 – 2.86
Sodium (mg/kg)	695- 1022
Potassium (mg/kg)	530 -834
Soil is of Sandy Clay type.	

3.2.2 LAND ENVIRONMENT:

Landuse pattern study carried out through remote sensing satellite data around the 10km buffer zone shows that 16.73 % of the study area is agriculture land and 38.10 % are fallow land. Land with scrub constitutes 25.25 %.

3.2.3 BIOLOGICAL ENVIRONMENT:

Flora: The lease area is a non forest, private patta land with thorny bushes and partly minedout area. The lease area is dominated with Acacia nilotica & Prosopis juliflora. The Dominated species in the buffer zone are Azadirachta indica, Albizia lebbeck Murraya koenigii Borassus flabellifer, Sygygium cumuni Prosopis juliflora, Gmelina arborea, Acacia auriculiformis etc. Patches of coconut farms Sunflower, Banana, Nithiyakalani cultivation, are also observed in the study area.

Fauna: There is no Wild Life Sanctuary or National Park within the study area of 10 km. Domesticated animals are commonly found. No wild mammalian species was directly sighted during the field survey. There is no Schedule I species in the core & buffer zone.

3.2.4 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. The occurrence of groundwater mainly in the porous soil are weathered layers, very negligible amount of groundwater percolated through the poorly fractured layer, after that there is no existence of groundwater. Besides, the mining area consists of hard compact rock,



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no major water seepage within the mine is expected. From the nearby working mines, no such seepage is also observed.

4.1 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.

4.1.1 AIR ENVIRONMENT:

The principal sources of air pollution in general due to mining and allied activities will be Excavation, Drilling, Movement of HEMM such as Excavators, tippers etc., Loading and unloading operation and 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:

- Regular wetting of transport road using mobile water tanker.
- Wet drilling / Covering of drill holes with wet clothes
- Proper maintenance of roads.
- Avoiding overloading of tippers & Transportation of material by tarpaulin covered trucks
- Proper maintenance of HEMM to minimize gaseous emission
- Setting up of tyre washing facility in the lease area exit.
- Vehicular emission tests with digital smoke meter.
- Provision green netting around the lease periphery on all sides.
- 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.

The impact on air quality due to the proposed project is estimated using AERMOD View Gaussian Plume Air Dispersion Model.

The resultant added concentrations with baseline figures even at worst scenario, show that the values of ambient air quality with respect to PM₁₀ are in the range of 51.6 µg/m³ to 70.5 µg/m³



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and with respect to PM2.5 are in the range of 25.0 µg/m³ to 34.6 µg/m³ which are within the statutory limits 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.

4.1.2 WATER ENVIRONMENT:

The total water requirement for this project will be 10.0 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 an odai at a distance of 200m (NW), 275m (NW) and at 225m (SE) side of the lease area. There is no proposal to discharge any effluent into these water bodies. No major impact is envisaged on the nearby water bodies due to project operations

4.1.3 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. There will also be attenuation due to vegetation , tin sheet/ green netting to be erected by the proponent all around the lease and as such there will not be any adverse noise propagation outside the lease boundary 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.



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4.1.4 VIBRATION:

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

- Carrying out controlled blasting using Nonel delay detonator.
- Optimum design for burden and spacing.
- Reducing explosive charge per delay to minimum.
- Using rock breaker wherever possible
- Proper care and supervision during blasting by a competent and experienced person to be carried out.
- Besides, different blasting time for both the projects is suggested and the timing is to be mentioned in the display board in the mines entrance.

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.

4.1.5 IMPACT ON LAND ENVIRONMENT:

Ultimately the entire mined out area of 1.800 Ha will be left as water body. 0.050 Ha will be the mine roads & infrastructure, 0.360 Ha will be covered with vegetation, and 0.070 will be fencing. Entire mined out area will be properly fenced to prevent inadvertent entry of men and animals. In the post mining stage the rainwater harvested in the mined out void shall be utilized.

4.1.6 BIOLOGICAL ENVIRONMENT:

Necessary mitigative measures like dust suppression, proper maintenance of equipment's, greenbelt and plantation etc., will be carried out to prevent dust generation & any further impact on the vegetation or agricultural activity nearby. Greenbelt / Plantation will be carried out to enhance the vegetative growth and aesthetic in the safety zone area

4.1.7 SOCIO ECONOMIC ENVIRONMENT:

The entire lease area is private patta land owned by the applicant. There are no habitations or hutments in the core zone area and no rehabilitation or resettlement problems will arise here.



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

- Direct Employment for about 18 persons.
- Besides through allied opportunities in logistics, trading, repairing works etc. good employment potential will arise in this area, which will provide raising income levels and standards of living in the area through various service-related activities connected with the project operations.
- 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.5.0 Lakhs under Corporate Environmental Responsibility. The activities identified under CER will be implemented in a phased manner in the nearby Government school. In consultation with the locals based on the need & priority it will be implemented.

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.

4.1.8 IMPACT ON LOCAL LOGISTICAL SYSTEM DUE TO PROJECT:

The material mined out from this lease area will be directly transported to the required customers. During the project operations, there will be 3 trips/hr. The transport route will be properly maintained to absorb this 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 mineral in the transport vehicles before transporting, so that no dust nuisance during transport will arise.
- ❖ Plantation on either side of the transport road in consultation with the concerned department.
- ❖ Proper maintenance of transport road.
- ❖ Proper maintenance of transport vehicles.
- ❖ Avoiding overloading of material.
- ❖ Covering of loaded vehicles with tarpaulins sheet.
- ❖ Keeping traffic regulators at vulnerable locations.

ROUGH STONE AND GRAVEL QUARRY OF THIRU S.RAMACHANDRAN AT 672/3, 674, 675/2, 676/3 OVER AN AREA OF 2.28.0HA IN ETHIRKOTTAI VILLAGE, VEMBAKOTTAI TALUK, VIRUDHUNAGAR DISTRICT, TAMIL NADU

- ❖ Limiting of speed
- ❖ Installation of barriers at vulnerable locations

4.1.9 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.

5.1 ENVIRONMENTAL MONITORING PROGRAME:

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 in the mine project site will be directly responsible for various environmental activities in the mine and will undertake effective monitoring and implementation of various 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.20.48 Lakhs is allocated under capital cost. Besides, Rs.17.89 Lakhs per annum is allocated as recurring cost. The baseline monitoring carried out for this project reflects the cumulative impact of this existing quarry.

6.1 CUMULATIVE IMPACT STUDY:

The baseline monitoring carried out for this project reflects the cumulative impact of the existing quarries and other activities. For the proposed quarry of Thiru Jacob Rajamani and the subject project, cumulative impact study has been carried out and salient details are provide below:

Combined cumulative computer Air Quality Model simulations carried out show that the resultant added concentrations with baseline figures with respect to PM₁₀ is in the range of 51.6 µg/m³ to 72.1 µg/m³ and with respect to PM_{2.5} are in the range of 25.0 µg/m³ to 35.6 µg/m³ which are within the statutory stipulations in respective case..It is observed that the peak incremental concentration for PM₁₀, PM_{2.5} 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. As such no adverse impact on Ambient air quality is envisaged.



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Cumulative Noise modeling has been carried out to determine the post project noise levels due to the mining operations of the proposed quarries and it is seen that that the post project concentration in the nearby areas are within the statutory limits of 55dB(A).

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.

7.1 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. Besides, it will meet the raw material requirement of the construction industry also.

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