

Executive Summary
For
Thiru. A. Kumar Rough stone and Gravel Quarry
“B1” Category

S.F.Nos	272/3, 272/4, 273/1, 273/2, 273/3, 277/1 & 1240
Extent	7.41.5 Ha
Village	Kullapuram
Taluk	Periyakulam
District	Theni
Purpose	Prior Environmental Clearance
Total Production for 5 Year Mining Plan Period	Rough Stone = 21, 05,265 m ³ , Weathered Formation = 74,514 m ³ Gravel = 2, 98,056 m ³
Project Cost	Rs. 1.40 Crores /-

PROPONENT ADDRESS

Thiru. A. Kumar,
S/o. Ananthkrishnan,
No.23, New Sriram Nagar,
Allinagaram, Theni - 625 531

PREPARED BY

M/s. Geo Exploration and Mining Solutions,

Accredited for Sector 1, 28 & 38 Category ‘A’
Quality Council of India – National Accreditation Board for Education & Training, New Delhi
Certificate No : NABET/EIA/1821/RA 0123

1. INTRODUCTION –

Thiru. A.Kumar S/o. Ananthkrishnan residing at No.23, New Sriram Nagar, Allinagaram, Theni-625 531 applied for Rough Stone and Gravel quarry lease over an extent of 7.41.5 Ha in S.F.Nos. 272/3, 272/4, 273/1, 273/2, 273/3, 277/1 & 1240 in Kullapuram village, Periyakulam Taluk, Theni District and Tamil Nadu State.

The extent of the individual lease is more than 5 Ha ie 7.41.5 ha, This EIA report is prepared to evaluate the environmental impacts of the project in line with the requirements of EIA notification SO 1533(E) dated 14.9.2006 and amendments made thereof.

The proposed production of Rough stone is 21,05,265 m³ of Rough Stone, 74,514 m³ of Weathered formation and 2,98,056 m³ of Gravel for five year mining plan period.

Project Identification:-

This is the Opencast Mining Project

Statutory details:-

- Precise area communication received from the District Collector vide 5358/MMB.2/2018-1, Dated: 14.05.2018
- Mining plan approved by the Assistant Geologist/Assistant Director (i/c) Theni vide Rc.No 381/Mines/2018 Dated 22.03.2019
- Quarries located within 500m radius details received from the Assistant Geologist/Assistant Director (i/c) 381/Mines/2018 Dated 01.04.2019
- Submitted application for Terms of Reference (ToR) on 08.04.2019
- Terms of Reference (ToR) issued vide Lr No. SEIAA-TN/F.No.6775/SEAC/ToR-627/2019, dated: 11.07.2019

Identification of the project proponent:-

Proponent Address

Thiru. A. Kumar,
S/o. Ananthkrishnan,
No.23, New Sriram Nagar,
Allinagaram, Theni-625 531
Mobile No: +98421 15651
Aadhaar Number: 8925 2292 0967

2. PROJECT DESCRIPTION –		
Project profile and Salient Features		
S.No	Particulars	Details
1	Name of the project	A. Kumar Rough Stone and Gravel Quarry
2	Project proponent	Thiru. A. Kumar
3	Location of the project	S.F.Nos - 272/3, 272/4, 273/1, 273/2, 273/3, 277/1 & 1240 Village - Kullapuram Taluk - Periyakulam District - Theni
4	Co ordinates	Latitude between 12°04'28.11" N to 10°04'42.42" N Longitudes between 77°37'10.91" E to 77°37'22.68" E. Toposheet No 58- E/12
5	Extent and Capacity	Extent 7.41.5 ha Production Capacity 2,98,056m ³ of Gravel 74,514m ³ of Weathered formation 21,05,265m ³ of Rough Stone
6	Topography and MSL	The project area exhibits an elevated topography with highest elevation of 278m on the North west side and lowest elevation of 264m on the south east side h Slope towards South East

Environmental Settings around the Project area		
Sl. No.	Particulars	Distance & Direction
I	Wildlife Sanctuary	
1	Kodaikanal Wild Life Sanctuary	7.4 km, North
II	Reserve Forests	
1	Andipatti North Slope Block RF	5.8 km, SE
2	MurugamalaiRF	7.3 km, North
3	Doddapanayakanur RF	10.5 km, SE
III	Water Bodies	
	Varaganadhi	1.5 km, E
	Vaigai Dam	2.5 km, SW
	Vaigai River	2.8 km, South
IV	Nearby Quarries	
	Tvl. Sri Amman MahaliSuyauthavikuzhu Quarry	20 m, West
	S. Lyander Stalin Quarry	130 m, West
	Mariappan Quarry (Abandoned)	210 m, South West
	G. Muthugovindan Quarry	280 m, NE
V	Transport Routes	
	SH 101 (Andipatti-Vaigai-Varusanadu Road)	0.8 km, West
	MDR 732 (Kullapuram Road)	1 km, South
	MDR 763 (Andipatti to Vaigai Dam Road)	4.3 km, SW
	NH 45 (Vathalagundu to Periyakulam Section)	5.8 km, North
	NH 85 (Madurai-Andipatti-Theni Section)	8.3 km, South
	Southern Railway Line (Madurai-Andipatti-Theni Section) (under BG Conversion)	8.8 km, South
	Andipatti Railway Station	8.8 km, South
	Madurai Airport	57 km, Southeast
	Coimbatore Airport	120 km, Northwest
VI	Kerala-Tamil Nadu State Border	40 km, WNW
VII	Nearby Towns & Villages	
	Kanimarpatti	1.3 km, ENE
	Kovilpatti	1.5 km, E
	Jayamangalam	1.5 km, NW
	Varadharaja Nagar	2 km, SW
	Kullapuram	2.2 km, SE
	Andipatti	7.4 km, South
	Taluk Headquarters, Periyakulam	8.6 km, NW
	District Headquarters, Theni	15 km, SW
VIII	Nearby Industries	
	KMC Blue Metals	480 m, SSE
	TATA Coffee Ltd.	880 m, West
	Manure Factory	1.3 km, South
	Rajsree Sugar Factory, Varadharaja Nagar	1.6 km, SW
	Forestry Training College, Duraisamy Puram	4.4 km, SW

Project Detail: -**RESOURCES AND RESERVES**

Description	Rough Stone in m ³	Weathered formation in m ³	Gravel formation in m ³
Geological Resources	36,07,900	74,514	2,98,056
Mineable Reserves	21,05,265	74,514	2,98,056
Proposed Production for five years (Mining plan period)	21,05,265	74,514	2,98,056

Proposed Depth = 60m (20m Above Ground level and 40m below ground level)

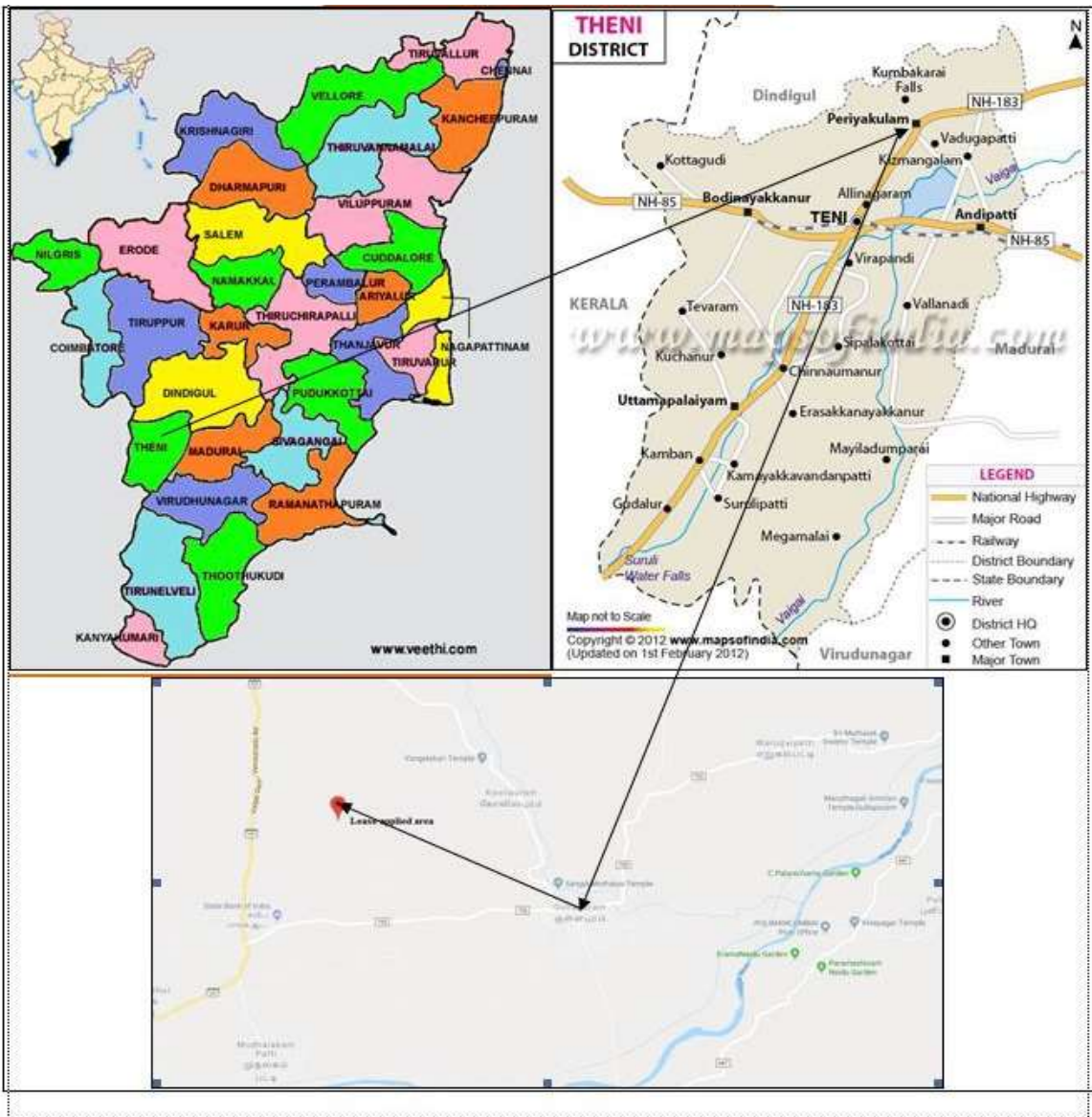
Method of Mining

It is proposed to operate the quarry by opencast mechanized conventional mining method; by deploying Heavy Earth Moving Machineries, Wagon Drill of 110 mm dia. for drilling and Jack hammer for deep hole blasting as permitted by DGMS.

Machineries details:

Sl. No.	Type	Nos.	Capacity	Make	Motive power
I	Drilling Machine				
1	Jack hammer (35 mm dia hole)	4	0.2 - 0.8 m length	Atlas Copco	Compressed air
2.	Tractor mounted Compressor	2	400 psi	Atlas Copco	Diesel
3	Wagon driller (110 mm dia hole)	1	Upto 8 m depth	Atlas Copco	
II	Loading Equipment				
1	Tata Hitachi	2	1.5 cu.m	EX 200LC	Diesel
2	Hyundai 140	1	0.65 cu.m	R140 _{LC-9}	Diesel
III	Haulage within the Mine & Transport Equipment				
1	Taurus	5	20 Tonnes	Ashok Leyland	Diesel

Figure 1.0 Location map of the project area



3. DESCRIPTION OF THE ENVIRONMENT –

Baseline data was generated for various environmental parameters including Air, Water (surface and groundwater), Land and Soil, Ecology and Socio-economic status to determine quality of the prevailing environmental settings. The Base Line Study was conducted during December 2019 – February 2020.

3.1 Land Environment

Core zone:

The entire project area (Extent - 7.41.5ha) is Consent patta land, The entire project area is almost plain topography covered by thick overburden 5m thickness (4m Gravel + 1m Weathered formation). There are no habitations, vegetation's, trees any other infrastructures within project area. Project area exhibits elevated topography having gentle sloping towards South East

It is a dry barren land and agricultural activities are carried out by utilizing well water around the area (lift irrigation-seasonal vegetation is mostly practiced). Out of 7.41.5hec, Mine working covers only 6.19.0Hec and the rest of land for dumps, roads etc.,

Land use pattern (Core zone)

Description	Present area in (ha)	Area at the end of this Quarrying period (ha)
Area under quarrying	Nil	6.19.0
Infrastructure	Nil	0.05.0
Roads	Nil	0.05.0
Green Belt	Nil	0.60.0
Unutilized Area	7.41.5	0.52.5
Total	7.41.5	7.41.5

Buffer zone

10km radius from the periphery of the project area is taken as buffer zone, Land use refers to “mans activity and the various use which are carried on land.” Land Cover refers to “natural vegetation, water bodies, rock/ soil, artificial cover and others resulting due to land transformation.”

The Fallow Land occupies the majority of the study area viz. 28.57%. Agricultural Plantation occupies 20.35%. The Agricultural land occupies about 6.78%. Mines occupy about 0.16% of the Study Area. Water body occupies only 5.12%. About 4.72% of the study area is covered by built-up land.

3.2 Soil Environment

The district is characterized by Red, Black and Brown soils. The major part of the area is characterized by red soil, which can be either transported or lateritic (insitu). These are medium to heavy textured soils with moderate to higher permeability. The black soils are limited to less than 1% of the area. They are fine textured with low permeability. The brown soils are limited to less than 1% of the area and they characterized by low permeability.

Soil samples were collected from 5 sampling locations within an area of 10 km radius for analysis of the physio-chemical characteristics of the soil quality.

Six soil samples were collected, one in core zone and another five samples collected in the buffer zone. pH ranges from 7.63 to 8.36.

There was no heavy metals intrusion/leaching into the ground strata. These soils would support the vegetation, if amended suitably. The soil water properties reveal that the soil will suit for salt tolerant and semi salt tolerant plants.

3.3 WATER ENVIRONMENT –

Hydrology: More than 90% of the district is underlain by hard rocks. Theni District Stage of Ground Water Development is 78% (Semi Critical Category). Devathanapatti Firks is also falls in Semi Critical Category (75%).

Water Quality: Groundwater is being used as source of water in almost all the villages via open wells and tube wells. Grab water samples from eight (8) locations were collected based on reconnaissance survey.

In general, the water quality of surface waters was found to be within the prescribed CPCB norms for surface waters. The water quality of ground waters were found to be within the prescribed IS: 10500-2012 Norms for Drinking in the absence of an alternative source.

Groundwater –

- The pH was varying from 7.05 to 7.62
- The Calcium value was in the range of 65.3 to 98.2 mg/l.
- The TDS values is ranging from 562 to 832mg/l
- Hardness values is ranging from 291.2 to 430.4mg/l

Surface Water–

- The pH was varying from 7.01 to 7.55.
- The Calcium value was in the range of 54.3 to 85.6 mg/l.
- The TDS values is ranging from 477 to 691 mg/l
- Hardness values is ranging from 231.6 to 351.3mg/l

Analysis of different Samples of ground water shows that all parameter are well within prescribed limit.

3.2 Air Environment – Meteorology (Climate) –

The Theni's climate is classified as tropical. The area receives **rainfall of about 850 mm/annum** and the rainy season is mainly Northeast Monsoon (Oct.-Dec.). The summer is hot with maximum temperature of 42⁰ C and winter encounters a minimum temperature of 23⁰ C.

Air quality Monitoring -

The monitoring was carried out during December, 2019 – February 2020 for all 12 parameters such as PM₁₀, PM_{2.5}, SO₂, NO_x, CO, O₃, NH₃, As, Ni, Pb, Bap & C₆ H₆. Ambient air quality monitoring was carried out at a frequency of two days per week at each location for three months at 24 hours continuously. Methodologies adopted for sampling and analysis were, as per the approved methods of Central Pollution Control Board (CPCB). Samples for PM_{2.5} and PM₁₀ have been collected on 24 hourly basis while samples for SO₂& NO_x have been collected on 8 hourly basis.

S.No	Parameter	Result in µg/m ³ (98 th percentile value)	CPCB Standard
1	PM ₁₀	50.1	100
2	PM _{2.5}	31.5	60
3	SO ₂	9.4	80
4	NO ₂	15.7	80

From the table it can be seen that the existing Ambient Air Quality levels for SO₂, NO₂, PM₁₀ and PM_{2.5} are within the prescribed CPCB limits.

3.3 Noise Environment –

Noise levels recorded in buffer zone during day time were from 40.6 - 42.3 dB(A) Leq and during night time were from 35.9 - 37.5 dB(A) Leq. Thus, the noise level for Industrial and Residential area meets the requirements of CPCB.

From the results, it can be seen that the Day equivalents and the Night equivalents were within the Ambient Noise Standards of Industrial / Commercial / Residential Area.

3.4 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.

An extent of 608.95 sq.km forest areas in Dindigul and Theni District has been declared as ‘Kodaikanal Wildlife Sanctuary’ vide G.O Ms. No.143 e & F (FR.5) Department dated 20.9.2013. Murugamalai RF (in Western Ghats Slope) is located in the northern parts of the Study Area as part of Kodaikanal WLS. There is no corridor connectivity between the WLS and the Study Area. At the lowest levels, the natural vegetation consists of scrub jungle only. In addition to these natural vegetation, forest plantations also cover a sizable area in the district. It is estimated that such man - made forest plantations cover nearly 45 sq.km. area. Wattle, Softwood, Fuel wood, Cashew, Neem, Tamarind are the main forest plantation species in these RFs.

Socio Economics –

The socio-economic and health environment surveys were carried out for assessing the baseline status. There are 20 Revenue villages, 1 Municipality, 3Town Panchayats and 5 Slums in the study area of 10 km radius. The relevant socio-economic data such as demographic features including population distribution, literacy rate, occupational status, etc., The buffer zone encompassing 10 km radius from the periphery of core zone consists of 46 villages within 10km radius from the study area.

Villages in the study area depend upon both rain water and village tanks apart from bore wells and River Water for the agriculture needs. A sizable percentage of households in each village are engaged in cattle rearing, which fetches them a reasonable income. The graze-land is available throughout, as much of the project impact zone comprises of uncultivable or rain-fed land. Also these people have very well banking facilities.

4 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Environmental Component & Anticipated Impacts	Mitigating Measures
<p>1. Land Use: - There are number of Rough Stone Quarries in between Andipatti-Kullapuram Area (DSR for Theni District). There are 2 operating quarries, 1 abandoned quarry and a Crusher (KMC Blue Metals) within 500 m radius area of proposed Quarry Lease. Existing Quarries occupy 6.33.5 Ha and 1 other proposed of 3.24.5 ha and this proposed Quarry occupies 7.41.5 Ha. Thus, 13.75.0 Ha will be under Quarries. Quarries area which is barren in nature. There is no Govt./Forest land involved. As there is no Mineral Rejects/Solid Wastes from these Quarries, there will no Waste Dumps in the area. There is also no proposal for back filling, reclamation and rehabilitation.</p>	<p>At Conceptual Stage, the effective quarry area of 6.19.0 Ha will be converted as water reservoir to harvest the rain water in enabling the ground water-table charging in its vicinity.</p> <p>Earthen bunds with Garland Drains shall be provided along the boundaries to arrest wash-offs.</p> <p>Adequate Green Belt will be developed and maintained along the boundaries as per approved Mining Plan.</p>
<p>2. Agriculture: - Fugitive emissions and haulage may have impact on the Agricultural activities in the vicinity.</p>	<p>Theni district is endowed with agro- climatic conditions conducive for growing a wide of horticulture crops such as Fruits, Vegetables, Spices, Banana, Flowers, Medicinal and Aromatic plants. Periyar Main Canal runs parallel to Vaigai River and irrigates the Region in southern parts of the Study Area. Controlled emissions and haulage in dedicated road to nearby Crusher will not have any significant impact in its vicinity. Also, there is no Agriculture lands nearby and there will be no impact due to the Quarry operations.</p>
<p>3. Air Quality: - The quarrying, loading and transporting activities would generate both fugitive dust emissions and smoke from HEM Machineries/Equipment's and Transporting Tippers.</p> <p>Prediction Modelling: - Fugitive emissions are predicted by using standard equations given in 'Indian Mine and Engineering Journal' and suggested by USEPA (AP-42) The modelling is done for the entire production from these Quarries and Crusher (Cumulative Impact). AERMOD View Software is used for the Prediction Modelling. The respective Input values are used for individual Quarry for running the Model. The Model Inputs and Outputs are appended.</p>	<p>Water will be sprinkled on haul road shall be adopted to control fugitive emissions.</p> <p>Covering of tippers with tarpaulin shall be done during transportation.</p> <p>All the machineries shall be maintained in good conditions as per RTO and TNPCB Norms.</p> <p>Adequate Green Belt will be developed and maintained as per approved Mining Plan.</p> <p>Air quality will be monitored periodically as per norms.</p>

The maximum GLC (Cumulative) predicted. The maximum incremental GLC of PM10 due to Cumulative Operations is 3.7 ug/m³ (PM is 37.11 ug/m³). As per the prediction, Adequate Buffer (56.30%) for PM10 exists in the Air Environment for the proposed QL activity. The predicted GLCs are superimposed on the baseline map to arrive at the likely resultant concentrations due to the Proposal. The predicted value will not have any significant impact on the Air Environment.

Other pollutants SO₂ and NO_x emissions due to mining activities will be insignificant.

5 ANALYSIS OF ALTERNATIVES (TECHNOLOGY AND SITE)

Site Alternatives –

No alternative site has been proposed as Rough stone and Gravel 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 –

Mining will be carried out through Opencast mechanized method, as it is more economically viable, and preserves the conservation of minerals and environment. Unlike other industries, the project cannot be shifted to other sites.

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 this mining case include, waste dump and heavy earth moving machinery. 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 risk factors. Proper risk management plan will be proposed to avoid any kind of accident/ disaster.

8 PROJECT BENEFITS –

This Rough stone and Gravel quarry project falls in the area of Theni District, Tamil Nadu where scanty agricultural activities are been carried out and the new industries are springing up in the district.

The area applied for mining lease is devoid of any major industries and agricultural activities. The earning source in the targeted area is limited, most of the people in and around the area depend upon the seasonal agriculture and much of the people migrate to nearby towns where good number of industries and factories are growing up.

This project will provide direct for about 23 persons and indirect employment for 50 peoples in various sectors like transportation and mineral processing etc., Mineral Industries of the state of Tamil Nadu provides employment opportunities for the people of the state as well as in the specific project area.

- 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 carry out 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 proponent shall organize an Environment Monitoring Cell 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.

Occupational Health and Safety:-

The working condition in the quarry is governed by the enactments of the Director General of Mines Safety (DGMS). Necessary precautions regarding health and safety of workers will be strictly followed as per the guidelines of the Mines Act, sanitary facilities will be provided within the project area and periodic health check-up will be carried out to all the workers.

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.

