

ENVIRONMENTMANAGEMENT PLAN

FOR SAND QUARRY

AREA DETAILS

Extent: 4.90.0Hectares

S.F.No: 1 (P)

Kallapalli Village,

Krishnarayapuram Taluk,

Karur District.

PROJECT PROPONENT

THE EXECUTIVE ENGINEER

*Public Works Department,
Water Resource Department,
Mining and Monitoring Division,
Trichy, TamilNadu.*

CONSULTANT



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ENVIRONMENT MANAGEMENT PLAN

1. INTRODUCTION

The Environmental Management Plan (EMP) has been formulated and integrated with the mine planning to mitigate the adverse impacts which are likely to be caused due to the quarrying operation.

2. QUARRYING PROCESS

Open cast, Mining would be carried out by opencast Manual method. Excavation of sand by manual method using hand shovel and load into Bullock Cart, As the sand is loose granular material, it does not require any drilling.

2.1 PRODUCTION DETAILS

Total production of sand is 72,709 m³ including shoal portion. The average production is about 36354.5 m³ per annum 242 m³ /per day or 341 cart load for period of Two years.

3. MANPOWER REQUIREMENT

The manpower requirement for the proposed project will be around 36. This includes manpower for excavation, maintenance as well as loading of minerals.

4. BASELINE ENVIRONMENT

The EMP has been developed considering its implementation and monitoring of environmental protection measures during quarrying operations. Baseline study was carried out during 10.12.2020.

ENVIRONMENT MANAGEMENT PLAN

There would not be any adverse impact in the existing environment arising from this mining activity. To protect the environment, the proponent would do adequate afforestation program and spend CER @ 2% of the project cost and CSR at a rate of 2.5% of the profit through local Panchayat for the welfare.

TABLE NO: 2: ENVIRONMENT MANAGEMENT PLAN

S.No	Parameters	Mitigation Measures
1	Water Environment	<ul style="list-style-type: none">▪ Mining activity will be above the ground water level and hence ground water table will not be affected.▪ Drinking water utilized from Mineral water industries▪ Total Water requirement will be 5.0 KLD
2	Air Environment	<ul style="list-style-type: none">▪ Water sprinklers along the sides of haul road shall be fixed to control fly of dust while transporting minerals and waste

		<ul style="list-style-type: none"> ▪ Avenue trees along roads around ML boundary shall be planted as per the norms of MoEF&CC to control fly of dust, noise etc. ▪ 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.
3	Noise Environment	<ul style="list-style-type: none"> ▪ This eco-friendly quarrying operation does not involve any blasting and drilling methods. Hydraulic excavator is less than 80db. ▪ Hence noise will be minimal and this is only due to the movement of Excavator and trucks. ▪ Plantation will help in arresting noise at source ▪ Periodical monitoring of noise and vibration to ensure safety environment for workers.
4	Soil Environment	<ul style="list-style-type: none"> ▪ Humus top soil shall be preserved for reuse in afforestation and agriculture.
5	Land Environment	<ul style="list-style-type: none"> ▪ By permitting quarrying of sand from this uneven bed can be remove substracals and it will help the free flow of water. ▪ Greenbelt will be developed around the mine lease boundary
6	Ecology and Biodiversity	<ul style="list-style-type: none"> ▪ No rare species of flora and fauna identified except regional common species.
7	Waste Management	<ul style="list-style-type: none"> ▪ There is no wastage is encountered during the quarrying operation the entire quarry is utilized.
8	Occupational Health and Safety	<ul style="list-style-type: none"> ▪ Workers involved in quarrying work shall be provided protective equipments such as Thick Gloves, Goggles, ear plugs, safety boot wears, etc... ▪ First Aid station as per provision under Rule (44) – schedule III of the Mines Rules 1955 to be provided. ▪ Qualified First Aid personnel should be appointed /nominated to attend emergency first aid treatment. ▪ Periodic medical examination has to be made for occupational health once in six months in addition to attending medical treatment of occupational injuries under Rule 45 (A).
9	CSR Activities	<ul style="list-style-type: none"> ▪ The proponent is proposed to spend CSR @ 2.5% of profit as per the Companies Act, 2013 and CSR Rules,

		2014 through local Panchayat for maintenance of road, street light, school sanitation etc., The CER will be @ 2% of the project cost.
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4.1. Land environment

The quarrying activity will result in disturbance of the land use pattern of the quarry lease area. The land degradation is unavoidable during mining activities like excavation, etc. 3.60.0Ha will be utilized for quarrying activities at the end of the lease period. It is a shallow quarrying to a depth of 1.0m and there is no benches shall be formed. The excavated area shall be replenished during the next rainy season naturally.

- There is no removal of vegetation such as plants, bushes in the quarry area
- No effluent generation as any further processing of mineral is proposed. Hence no ground water contamination due to the proposed quarrying activity.
- Opencast manual mining is adapted to Excavate sand.

i. Mitigation measures

Land requirement for the project has been assessed considering functional needs. For this Green belt development is proposed all around quarry lease area. The mined out area is small, the removal of sand will help for free flow of water.

4.2 Water quality

Quarrying does not have any significant impact on the water quality, as the neither quarrying nor intercept with the ground water level neither there is any surface water body near the site.



Image No.1 water sample collection

Table 1: Physical and Chemical properties

S.no	Parameters	Unit	Results (Bore water)	As per IS 10500: 2012	
				Requirement (Acceptable limit)	Permissible limit in the absence of alternate source
1	pH value at 25°C	-	7.86	6.5 – 8.5	6.5 – 8.5
2	Turbidity	NTU	BDL	1	5
3	Electrical conductivity at 25°C	Microm hos/cm	1316	-	-
4	Total Suspended Solids	mg/l	2	-	-
5	Total Dissolved Solids	mg/l	656	500	2000
6	Total Hardness as CaCO ₃	mg/l	546	200	600
7	Chlorides as Cl	mg/l	381.58	250	1000
8	Sulphates as SO ₄	mg/l	49.974	200	400
9	Total Iron as Fe	mg/l	-	0.3	0.3
10	Silica (Reactive) as SiO ₂	mg/l	-	-	-

MICROBIOLOGICAL EXAMINATION

S.NO	Parameters (MPN / 100 MI)	Results Bore water	Requirement as per IS 10500: 2012 Second revision (Acceptable Limit)
1	Total Coliforms	180	Shall not be detectable in any 100 ml
2	E.Coli	Absent	Shall not be detectable in any 100 ml

i. Mitigation measures

- The quality of ground water is fairly good. There is no liquid waste discharge from quarrying activity, which is likely to pollute water.
- Drinking water will be utilized from the Mineral water Industries.
- Total water requirement will be 5.0 KLD.

4.3 Noise and vibration

Major noise generating sources may be considered as excavation, loading and vehicle movement during transportation of minerals. With the starting of quarrying operations, it is imperative that noise levels shall increase. In order to assess the impact baseline ambient noise level, noise monitoring has been carried out at different points using Sound level meter.

Image No.2 Noise level monitoring



Table 2: Ambient Noise levels

S. No	Location	Latitude	Longitude	Noise levels dB (A)	TNPSB Standards
1	Core zone	10°57'23.06"N	78°20'41.30"E	36.2	Day Time Industrial – 75 dB (A) Residential – 55 dB (A)
2	Lease boundary (Pillar No.1)	N10°57'20.48"	E78°20'37.18"	37.6	
3	Lease boundary (Pillar No.2)	N10°57'26.87"	E78°20'37.13"	39.9	
4	Lease boundary (Pillar No.3)	N10°57'26.87"	E 78°20'45.22"	40.1	
5	Lease boundary (Pillar No.4)	N10°57'20.47"	E78°20'45.26"	38.4	

The noise level found to be within the limits as per TNPSB Standards.

i. Mitigation Measures

- Greenbelt will be developed around the mine lease as well as safety zones which will help in arresting noise at source
- Safety devices provided to workers, where noise is more than 80dB (A)


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- Limiting time exposure of workers to excessive noise
- Proper and regular maintenance of vehicles & machinery.
- Periodic inspection of all equipment and risk prone areas
- Regular lubrication & replacement of worn out parts etc.,

4.4 Air Quality

Drilling and blasting operations are source of fugitive dust emission but its effect is more or less localized. Ambient Air monitoring has been carried out in the core zone. The major part of the dust generated during such operations usually gets settle down and thus the effect of such operation will be localized phenomenon.



Table 3: Ambient Air monitoring station

Table 3: Ambient Air Monitoring result

S.No	Parameters ($\mu\text{g}/\text{m}^3$)	Measured Value	NAAQS
1	Particulate Matter ($\text{PM}_{2.5}$)	29	60
2	Respirable Particulate Matter (PM_{10})	39	100
3	Sulphur Dioxide (SO_2)	9	80
4	Nitrogen Dioxide (NO_2)	12	80
5	Ozone (O_3)	16	180
6	Lead (Pb)	BDL (DL = 0.1)	1
7	Carbon Monoxide (CO) 1 hour	BDL (DL = 1.15)	4
8	Ammonia (NH_3)	19	400
9	Arsenic (As)	BDL (DL = 1.0)	6
10	Nickel (Ni)	BDL (DL = 0.1)	20
11	Benzene (C_6H_6)	BDL (DL = 0.1)	5
12	Benzo (a) Pyrene	BDL (DL = 0.1)	1
BDL = Below Detectable Limit, DL = Detection Limit NAAQS = National Ambient Air Quality Standards			

The above results comply with NAAQS. The generation of dust is controlled and suppressed at source by sprinkling of water on haul roads, loading points at regular intervals as shown below.

i. Mitigation Measures

- Water sprinklers along the sides of haul road shall be fixed to control fly of dust while transporting minerals.
- Avenue trees along roads around ML boundary shall be planted as per the norms of MoEF&CC to control fly of dust, noise etc...
- Labours engaged in such dust prone areas should be provided with safety devices like ear muff, mask, and goggles as per the MMR, 1961 amendments and circulars of DGMS.

4.5 Soil Environment

Soil sample has been collected in the quarry lease area for analysis its physical and chemical characteristics.



Image No.3 Soil sample collection

Table 3 Soil Test Report

Physical Parameters	Results
pH value (10% Solution)	7.52
EC@ 25°C (Micromhos/cm) (10% solution)	92
Moisture	1.14%
Bulk Density	1.32 g/cc
Texture	Sand =90.45% : Silt = 6.76 %: Clay = 2.70% "Sand"
Chemical Parameters	Results
Calcium(%)	0.686
Magnesium (%)	BDL

Chlorides (%)	0.0006
Organic Matter	0.0251%
Water Holding Capacity	40%

i. Observations & Mitigation measures

- The pH of the soil found to be 7.52 indicating neutral in nature.
- Bulk Density of the soil found to be 1.14 g/cc
- The Water Holding Capacity of the soil is found to be 40%.

5. SOLID WASTE MANAGEMENT

No wastes are anticipated.

6. GREEN BELT

Local trees like Neem will be planted along the lease boundary and avenues as well as over Non-active dumps at a rate of 100 trees per annum with interval 5min between. The rate of survival expected to be 80% in this area.

7. COST OF EMP IMPLEMENTATION

EMP Cost

a) Environmental Monitoring	=	Rs. 1,00,000
b) Sanitary arrangements	=	Rs 50,000
c) Safety kits	=	Rs 50,000
d) Internal road & Maintenance	=	Rs 100,000
e) Afforestation cost	=	Rs. 100,000
Total	=	Rs 4.0 lakhs

The quarrying activity shall be undertaken in accordance with the environmental conditions as prescribed in the EC.

8. PROJECT BENEFITS

The quarrying activities in this area will benefit to the local people both directly and indirectly. The direct beneficiaries will be those who get employed in the mines as skilled and un-skilled workers. 30 persons will be employed in this quarry. The extent of impact will however be confined to lease area only. This operation doesn't need relocation of any habitats.

The proponent is proposed to spend CSR @ 2.5% of profit as per the Companies Act, 2013 and CSR Rules, 2014 and 2% of the Project Cost will be spend as corporate Environmental Responsibility (CER) through local Panchayat for maintenance of road, street light, school sanitation etc.

Green belt will be developed around the quarry lease boundary. At the end of life of mine, excavated pit will be backfilled and reclaimed and rehabilitated by plantation with native species so as to restore the natural eco-system which could have positive impact on the environment.

**Signature of Project Proponent
Along with name and address**



Project Proponent,
THE EXECUTIVE ENGINEER
Public Works Department,
Water Resource Department,
Mining and Monitoring Division,
Tiruchirappalli, TamilNadu.

Date: 11.02.2022

Place : Salem

Signature of the EIA Coordinator



S.Suriyakumar
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