

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 semi-mechanized method. Excavation of sand by using hydraulic excavator into the tipper and partly 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

Geological reserves are estimated at 1,24,001 m³ depths of 3m including shoal portion and recoverable reserve is estimated at 44001 m³ to average depth of 1.1m including shoal portion and the average production is about 293 m³ /per day for period of one year.

3. MANPOWER REQUIREMENT

The manpower requirement for the proposed project will be around 42. 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.

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 of Perunavalur Village.

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

		<p>minerals and waste</p> <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 involves 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 silted bed can be deepened and it will enable to increase the water holding capacity. ▪ 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. 4.00.0Ha 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.
- Semi-mechanized Open cast, loading by hydraulic excavator and manual. Transport by bullock cart, tractors and tippers.

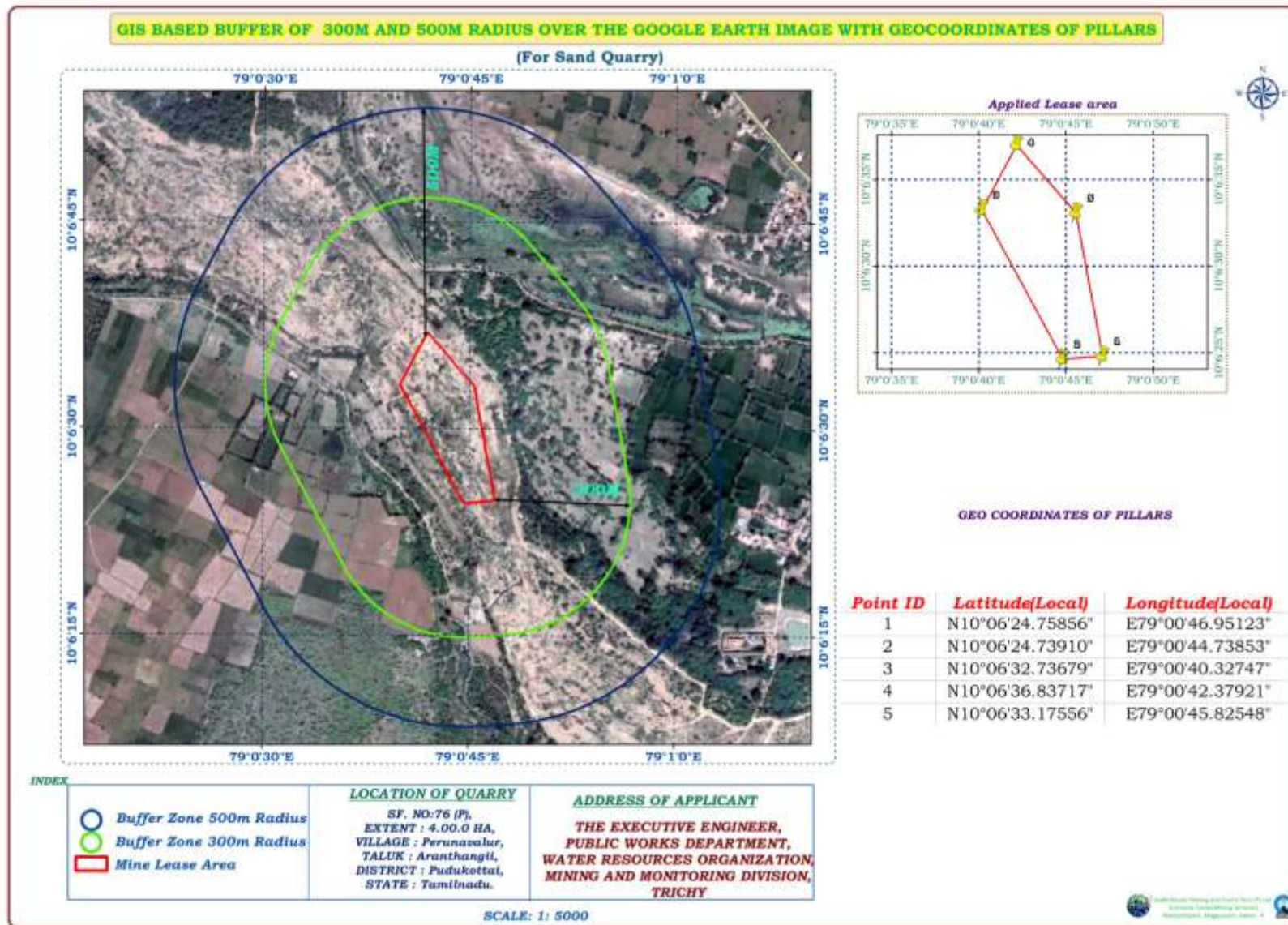


Fig No: 1. GIS Based buffer of 300/500M radius over Google Earth image

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11.2.2024

NOISE AND VIBRATION

Major noise generating sources may be considered as excavation, drilling blasting, 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



Fig.2: Image showing Measuring Noise Level

TABLE: NO: 3 AMBIENT NOISE LEVELS

S. No	Location	Noise levels dB (A)	Limits as per TNPCB dB(A)
			(Day Time: 6:00 AM – 10:00PM)
1	Core zone	35.4	Industrial – 75db (A) Residential – 55dB (A)
2	At Pillars lease boundary	38.2	
		35.7	
		34.5	
		36.4	

- The noise level found to be within the limits as per TNPCB Standards. Being manual mining the noise pollution is very minimal level.

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)

AIR ENVIRONMENT

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.



Fig: No: 3: Ambient Air Monitoring

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: NO: 4 AMBIENT AIR QUALITY MONITORING

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})	43	100
3	Sulphur Dioxide (SO_2)	12	80
4	Nitrogen Dioxide (NO_2)	11	80
5	Ozone (O_3)	19	180
6	Lead (Pb)	BDL (DL=0.1)	1
7	Carbon Monoxide (CO) 1 hour	BDL (DL=1.17)	4
8	Ammonia (NH_3)	25	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 and waste.
- This is the semi-mechanized Open cast method quarry.

Hence the emission from the machineries is absent. The dust is comes from loading of sand with least level. 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.

SOIL CLASSIFICATION

The soils of the district can be classified into black, red, ferruginous, lateritic, alluvial and beach soils. Black soils are formed in the western part of the district. Red ferruginous lateritic soils are formed on the high grounds, south of Annavasal, west of Illupur, north of Malaipatti around Kulakurichchi near Gandarvakottai, east of Arantangi around Arimalam and Alangudi. Alluvial soils consisting of blackish and brownish sandy and silty soils are observed along the course of the Vellar, Agniyar and Ambuliyar rivers, where as the beach sands are noticed along the coast of the district.



Fig No-4. Collection soil Sample

TABLE NO:5: SOIL TEXTURE ANALYSIS

PARAMETERS	RESULTS
pH value (10% solution)	8.73
EC@ 25°C (Micromhos/cm) (10% solution)	148
moisture	0.068%
Bulk density	1.40 g/cc
texture	Sand -59.09% Silt - 27.27 % Clay -13.63% "SANDY LOAM"

CHEMICAL PARAMETERS

PARAMETERS	RESULTS
Calcium (mg/kg)	12.32
Calcium Carbonate (mg/kg)	69.5
Chloride (g/100g)	29.35
Organic Matter (g)	14.70

WATER ENVIRONMENT

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.

TABLE: NO: 6 WATER QUALITY ANALYSIS- SAMPLE
Physical and Chemical Properties of Ground water sample

S.No	Parameters	Units	Results	Limits
1.	Acidity as CaCO ₃	mg/l	20	2mg/l to 1000mg/l
2.	Bicarbonate	mg/l	499.7	1mg/l to 5000mg/l
3.	Calcium as Ca	mg/l	5.24	0.4mg/l to 2000mg/l
4.	Carbonate	mg/l	0	1mg/l to 5000mg/l
5.	Chloride as Cl ⁻	mg/l	88.695	1mg/l to 5000mg/l
6.	Electrical Conductivity(EC)	μS/cm	604	0.1μS/cm to 50000μS/cm
7.	Magnesium as Mg	mg/l	15.362	0.4mg/l to 1000mg/l
8.	pH	-	8.28	8.05 ± 0.011
9.	Total Alkalinity as CaCO ₃	mg/l	499.7	1mg/l to 1000mg/l
10.	Total Dissolved Solids (TDS)	mg/l	530	500mg/l to 2000mg/l
11.	Total Hardness as CaCO ₃	mg/l	194.02	1mg/l to 5000mg/l
12.	Total Suspended Solids(TSS)	mg/l	0.006	2mg/l to 5000mg/l
13.	Turbidity	NTU	0.007	1 NTU to 100NTU

Micro biological examination

S. No	Parameters	Protocol	Unit	Result	Range
1	<i>Escherichia coli</i>	IS 5887 (Part 1): 1976	Per 100ml	9/100 Present	Qualitative
2	Total Coliforms	IS 5401 (Part 2): 2012	Per 100ml	Absent	Qualitative





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.
- People already consuming this water for drinking purposes and no health implications reported.
- Total water requirement will be 5.0 KLD

Flora and Fauna



a)Flora

Table No.7.A List of Flora of the lease area

S. No.	Tamil /English Name	Botanical Name	Number of Trees	Photograph
1.	Vivasaaya Maram	Acasia bushes	Innumerable	
2.	Panai/ Palmyra tree	Borassus fiabellifer	Innumerable	
3.	Echa Mamaram	Phoenix sylvestris	5	
4.	Thennai maram	Coconut Tree	Innumerable	

d) Shrubs:

Table No.7.B List of Shrubs of the lease area

S.No.	Tamil Name	Botanical Name	Number of Plants	Photograph
1.	Erukku Chedi	Calotropis Gigantea	Innumerable	
2.	Oomathi	Datra alba nees	Innumerable	

Fauna:

The fauna species may be found around the project site is given below,

a) Mammals:

Table No.8.A List of Mammals of the lease area

S.No.	Tamil & English Name	Zoological Name
1.	Keeri(Common Mongoose)	Herpestes edwardsii
2.	Anil (Three Striped Squirrel)	Funambulus palmarum
3.	Thavalai (Frog)	Cane toad

b) Avian Fauna:

Table No.8.B List of Avian Fauna of the lease area

S.No.	Tamil & English Name	Zoological Name
1.	Kalugu (<i>Black kite</i>)	Milvis migrans
2.	Myna (<i>Black drogue</i>)	Dicrurus macrocercus
3.	Kakka (<i>House crow</i>)	Corvus splendens
4.	Chittukuruvi (<i>Indian Robin</i>)	Saxicoloides fulicatus
5.	Parunthu(Brahminy Kite)	Haliastur indus

c) Butterfly/Insects:

Table No.8.C List of Butterfly/Insects of the lease area

S.No.	Tamil & English Name	Zoological Name
1.	Theil (Scorpion)	Scorpiones
2.	Vannthupoochi (Millipedes)	Diplopoda

EIA GENERAL CONDITIONS

1. There is no reserve forest situated around 10km radius from lease applied area. Hence, The area does not attract the Forest (Conservation) Act 1980.
2. Interstate boundary is located at 191km on western side between Tamil Nadu and Kerala border.
3. There is no wild animal sanctuary within 10km radius from the project site area under the Wildlife (Protection) Act, 1972.
4. The proposed quarry is located 24km away from Bay of Bengal on Eastern side.

OTHER PERMANENT STRUCTURES

1. Power Lines (HT / LT)

There is no HT or LT lines are found in 50m radius.

2. Water bodies

The site itself is a river bed.

3. Archaeological / historical Monuments

There is no Archeological /Historical Monuments within a radius of 500 km.

4. Road (NH, SH others).

The NH-210 road is situated at 27km away from site connecting Karaikudi -Pudukkottai and S.H-26 situated about 300m Connecting Nimisal -Aranthangi. MDR is connecting Avudaiyar koil - kalakkam situated about 3.6km on southeast. A Village road is available nearby the site on the western side for transportation of materials..

5. Places of worship (Temple, Church, Mosque etc.,)

No infrastructures like residential building, places of special interest like temples, Sanctuaries etc., are found in the radius of 300m. No quarry is found around 500m radius. The quarry lease area does not attract the general conditions as per EIA Notification, 2006.

The project cost is about Rs. 25.0Lakhs and EMP cost is Rs. 6.0 Lakhs.

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. 2,00,000
b) Sanitary arrangements	=	Rs 50,000
c) Safety kits	=	Rs 50,000

d) Internal road & Maintenance	=	Rs 200,000
e) Afforestation cost	=	Rs. 100,000
Total	=	Rs 6.0 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. 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

For Aadhi Boomi Mining &
Enviro Tech (P) Ltd

Director

S.Suriyakumar
M.Sc., M.Phil, F.C.C. (Min)
PGDBA, DIPC
EIA Co-ordinator (Mining)