

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, semi-mechanized method of Mining would be carried out for 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 212419 m³ depths of 3m including shoal portion and recoverable reserve is estimated as 68419 m³ of Shoal (1.425) and 48,000m³ for 1m below theoretical bed level and the average production is about 320m³ /day for 150 days per annum.

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.

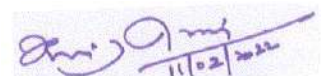
4. BASELINE ENVIRONMENT

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 Thalavai (North) Silippanur Village.

TABLE NO: 2: ENVIRONMENT MANAGEMENT PLAN



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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 4.0 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 ▪ 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 of the tank. ▪ 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



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		<p>Gloves, Goggles, ear plugs, safety boot wears, etc...</p> <ul style="list-style-type: none"> ▪ 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.

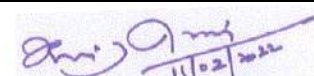
4.1. Land environment

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. 4.80.0Ha 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, semi mechanized and 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.

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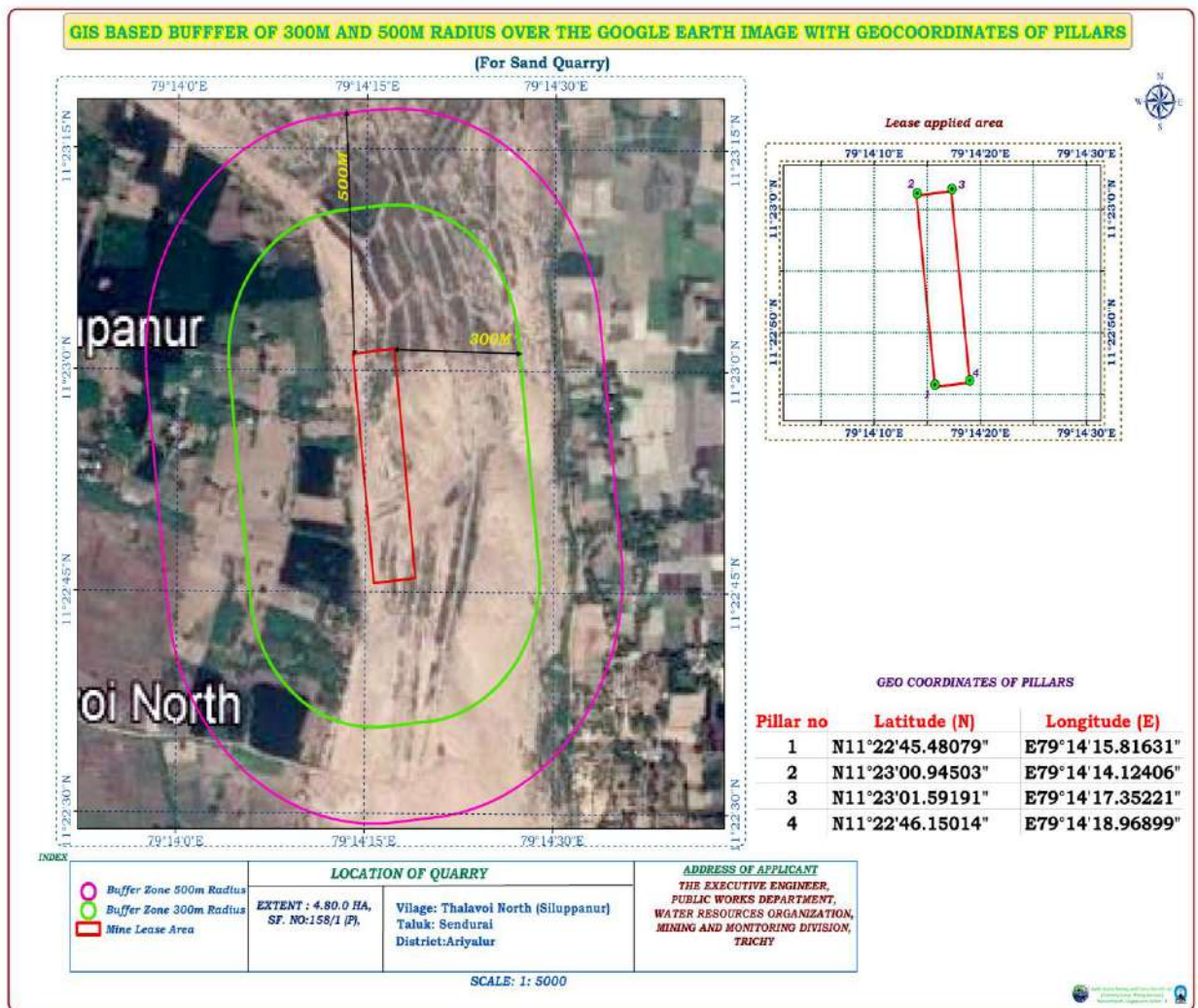


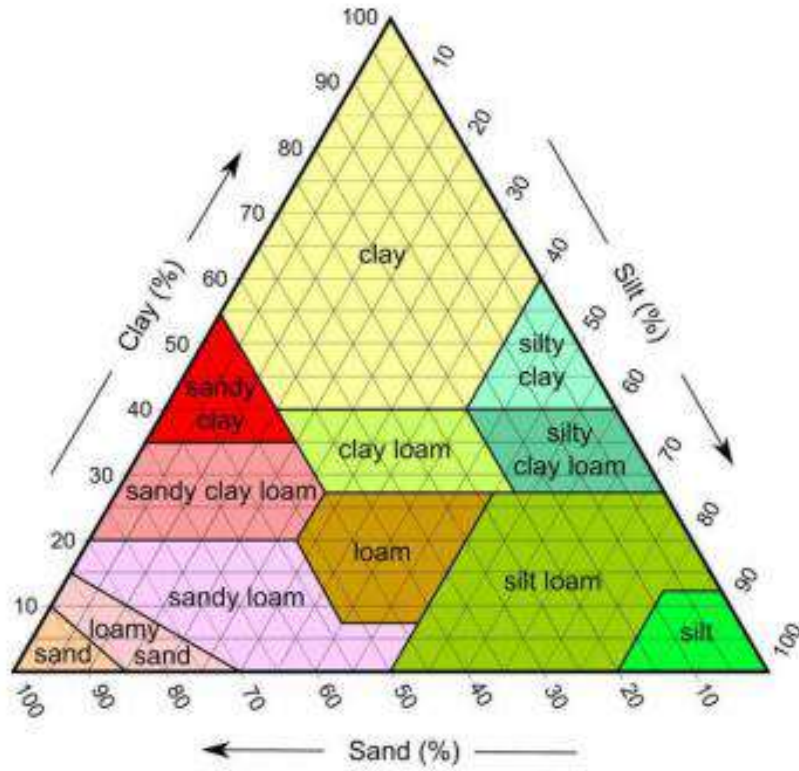
Fig No: 1. GIS Based buffer of 300/500M radius over Google Earth image

SOIL CLASSIFICATION

Land of Limestone Ferruginous red loam occurs in Ariyalur district. The texture is usually loamy, the colour varying from red at the surface to yellow at the lower horizon. The soils are of medium depth with good drainage, free from accumulation of salt and calcium carbonate, pH ranging from 6.5 to 8.0 and contain low amounts of organic matter, nitrogen and phosphorus but with generally adequate amounts of potash and lime.

Red loam soil is found to be prevalent in Sendurai, T.Palur, Andimadam, Jeyankondam blocks of Ariyalur District. Block soil is found in Thirumanur and Ariyalur blocks of the district.

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Textural triangle of Soil



Collection soil Sample

TABLE NO: 3: SOIL TEXTURE ANALYSIS

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PARAMETERS	RESULTS
pH value (10% solution)	7.87
EC@ 25°C (Micromhos/cm) (10% solution)	149
moisture	1.69%
Bulk density	1.58 g/cc
texture	Sand = 88.47% : Silt = 1.24%: Clay = 10.29%

CHEMICAL PARAMETERS

PARAMETERS	RESULTS
Alkalinity	0.009%
Calcium	0.227%
Magnesium	0.086%
Sodium	0.0018%
Potassium	0.0014%
Iron	1.22%
Copper	0.0013%
Chlorides	0.058%
Organic Matter	0.36%
Water Holding Capacity	72%

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.



Fig: No: 3: Collection of Water sample

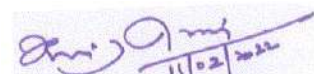
TABLE: NO: 4 WATER QUALITY ANALYSIS- SAMPLE -1

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Physical and Chemical Properties						
SL. NO	PARAMETERS	UNITS	SAMPLE 1 (SURFACE WATER) RESULT	SAMPLE 2 (GROUND WATER) RESULT	AS PER IS 10500:2012	
					REQUIREMENT (ACCEPTABLE LIMIT)	PERMISSIBLE LIMIT IN THE ABSENCE OF ALTERNATE SOURCE
1	pH value at 25°C	-	9.0	8.03	6.5 – 8.5	6.5 – 8.5
2	Turbidity	NTU	-	-	1	5
3	Electrical conductivity at 25°C	Micromhos/cm	556	1000	-	-
4	Total Suspended Solids	mg/l	0.01	0.044	-	-
5	Total Dissolved Solids	mg/l	626	1942	500	2000
6	Total Hardness as CaCO ₃	mg/l	187.48	409	200	600
7	Chlorides as Cl	mg/l	41.88	566	250	1000
8	Sulfates as SO ₄	mg/l	-	-	200	400
9	Total Iron as Fe	mg/l	-	-	0.3	0.3
10	Silica (Reactive) as SiO ₂	mg/l	-	-	-	-

SI. No	PARAMETERS	UNITS	SAMPLE 1 (SURFACE WATER) RESULT	SAMPLE 2 (GROUND WATER) RESULT	Requirement as per IS 10500: 2012 Second revision (Acceptable LiMit)
1	Total Coliforms	MPN / 100ml	Absent	2/ml	Shall not be detectable in any 100 ml
2	E.coli	MPN / 100ml	Absent	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.
- People already consuming this water for drinking purposes and no health implications reported.
- Total water requirement will be 4.0 KLD

• 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



Fig.8: Image showing Measuring Noise Level

TABLE: NO: 6 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	36.4	Industrial – 75db (A) Residential – 55dB (A)
2	At Pillars lease boundary	40.4	
		40.7	
		45.5	
		42.4.	

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

i. Mitigation Measures

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

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.



Fig: No: 5: 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.

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TABLE: NO: 7 AMBIENT AIR QUALITY MONITORING

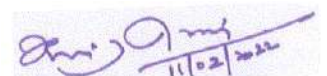
S. No	Parameters ($\mu\text{g}/\text{M}^3$)	Measured Value	NAAQS
1	Particulate Matter ($\text{PM}_{2.5}$)	28	60
2	Respirable Particulate Matter (PM_{10})	45	100
3	Sulphur Dioxide (SO_2)	9	80
4	Nitrogen Dioxide (NO_2)	13	80
5	Ozone (O_3)	20	180
6	Lead (Pb)	BDL (DL=0.1)	1
7	Carbon Monoxide (CO) 1 hour	BDL (DL=1.17)	4
8	Ammonia (NH_3)	21	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

- Dust extractor or wet drilling to be followed to control dust at source of emission
- Water sprinklers along the sides of haul road shall be fixed to control fly of dust while transporting minerals and waste
- 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.



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EIA General Conditions

Table No: 8: General conditions

Interstate Boundary	ii) Interstate boundary is located at 160kms from site to Tamil Nadu – Andhra pradesh border line on the N directions
Coastal Zone	iv) The proposed quarry is located 64. Kms away from Bay of Bengal on towards eastern side
Reserve Forest	Vangaram R.F found about 9.51Km SW direction from proposed project site
Park	No within 10km radius

1. Power Lines (HT / LT)

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

2. Water bodies

The groundwater table is reported as 6m depth in nearby bore wells on this area. The de silting will facilitate rain water harvesting and recharging of the water table in the surrounding area. For quarry operation water is not required.

3. Archaeological / historical Monuments

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

4. Road (NH, SH others).

The NH-532 road is situated at 17kms away from site connecting Salem-Vridhachalam and S.H-141 situated 3Km Connecting Tittagudi-Virudhachalam. 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.

6. SOLID WASTE MANAGEMENT

No wastes are anticipated.

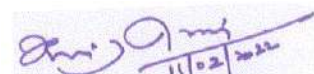
8. GREEN BELT

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.

9. COST OF EMP IMPLEMENTATION

EMP Cost

a) Environmental Monitoring	=	Rs. 1,50,000
b) Sanitary arrangements	=	Rs 1,00,000
c) Safety kits	=	Rs 75,000
d) Water supply for dust control	=	Rs 1,00,000


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e) Afforestation cost = Rs. 75,000

Total = Rs 5.0 lakhs

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

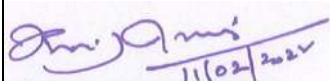
10. PROJECT BENEFITS

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.

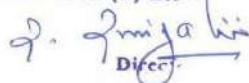
**Signature of Project Proponent
Along with name and address**



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

Signature of the EIA Coordinator

For Aadhi Boomi Mining &
Enviro Tech (P) Ltd.



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

