# Environment Management Plan

<table>
<thead>
<tr>
<th>Near Village</th>
<th>Tehsil</th>
<th>District</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sugaliya Jodha</td>
<td>Ahore</td>
<td>Jalore</td>
</tr>
</tbody>
</table>
**Environment Management Plan**
The environmental management plan consists of a set of mitigation, management, monitoring and institutional measure to be taken during implementation and operation of the project, to eliminate adverse environmental impact or reduce them to acceptable levels. The present environmental management plan addresses, the component of environment, which are likely to be affected by the different operation in cluster of Masonry Stone mine.

**The objectives of EMP area:**
- Overall conservation of environment.
- Minimization of waste generation and pollution.
- Judicious use of natural resources and water.
- Safety, welfare and good health of the work force and populace.
- Ensure effective operation of all control measures.
- Vigilance against probable disasters and accidents.
- Monitoring of cumulative and long term impacts.
- Ensure effective operation of all control measures.

<table>
<thead>
<tr>
<th>S. No.</th>
<th>M.L No</th>
</tr>
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<tbody>
<tr>
<td>1.</td>
<td>364/ 1996</td>
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</table>
Baseline information: For the preparation M.L.No–364/1996 mine data is taken for preparation

Water regime The average annual rainfall in the area is not exceeds 300mm per year.

Under ground water:- The Ground water table is 40m (in rainy season) to 45m (in Dry Season).

Flora and fauna There are few shrubs & other bushes exist in the lease area. No Fauna exist in the lease area.

Quality of air, ambient noise level and water The quality of air could be said quite clean and natural, free from any harmful gases arising out of any industrial establishment/ complex including mining ventures. The area in and around the mine could be said free from any nuisance of repetitive nature such as noise. Thus, it is quite calm. The noise level is also not much high.

Climatic conditions The Climate of the area is dry with extreme temperature variation i.e. in summer as high as 44°C whereas in lowers to 6°C or even less. Most of the rain falls during the period of July to September. Maximum and Minimum rain fall varies (300mm).

Human settlements The human settlement in the 10 km of the cluster leases area is as:-

Vii) Public buildings, places of worship and monuments
a) School: Arsipur, about 1.2km away from ML area in NE direction.
b) Hospital: Arsipur, about 1.2km away from ML area in NE direction.

Does area (partly or fully) fall notified area under water (prevention & control of Pollution) Act, 1974
No the cluster area does not fall notified area under water (prevention & control of Pollution) Act, 1974.

Air quality
The following table shows the National Ambient Air Quality Standards and the cluster shall comply the standards.

<table>
<thead>
<tr>
<th>S.no.</th>
<th>Pollutant</th>
<th>Time Weighted Average</th>
<th>Concentration in Ambient Air</th>
<th>Method of Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Industrial Area, Residential Rural Other Areas Ecological Sensitive Area (Notified by Central Govt.,)</td>
<td></td>
</tr>
<tr>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
</tr>
<tr>
<td>1.</td>
<td>sulphur Dioxide (SO2) μg/m3</td>
<td>Annual Average* 24 hours**</td>
<td>50 80</td>
<td>20 80</td>
</tr>
</tbody>
</table>
|   | Oxides of Nitrogen as No2 μg/m³ | Annual Average* 24 hours** | 40   | 80  | 1. Modified Jacob & Hochhiesier (Na-Arsenite) Method.  
2. Chemiluminescence (Gas Phase). |
|---|--------------------------------|-----------------------------|------|-----|----------------------------------|
|   | Particulate Matter (size less than 10μm) or PM2.5μg/m³ | Annual Average* 24 hours** | 60   | 100 | 1. Gravimetric,  
2. TOEM,  
3. Beta Attenuation |
|   | Particulate Matter (size less than 2.5μm) or | Annual Average* 24 hours** | 40   | 60  | 1. Gravimetric,  
2. TOEM,  
3. Beta Attenuation |
|   | Ozone (O₃), μg/m³ | 8 Hours** 1 Hours* | 100  | 180 | 1. Uv photometric,  
2. Chemiluminescence,  
3. Chemical method |
|   | Lead(Pb), μg/m³ | Annual Average* 24 hours** | 0.50 | 1.0 | 1. AAS/ICP Method after sampling on EMP 2000 or equivalent filter paper.  
2. ED-XRF using Teflon filter. |
|   | Carbon Monoxide (CO), μg/m³ | 8 Hours** 1 Hours* | 02   | 04  | Non Depressive infrared (NDIR) Spectroscopy. |
|   | Ammonia (NH₃), μg/m³ | Annual Average* 24 hours** | 100  | 400 | 1. Chemiluminescence  
2. Indophenols blue method. |
|   | Benzene (C₆H₆), μg/m³ | Annual Average* | 05   | 05  | 1. Gas chromatography based continuous analyzer.  
2. Adsorption And |
### Water quality
The water from all sources remains suitable for drinking purposes as all the constitutes shall be within the limits prescribed by drinking water standards promulgated by Indian standards IS: 10500

### Noise levels
In order to know the baseline noise levels, in and around the proposed mine Site, noise levels were measured at site and villages in the Study area. Workings of mine lease not breach national ambient noise standards.

### Vibration level due to blasting
Operation of heavy earth moving machines and allied mining operations such as transport, workshop activities etc. may produce noise pollution in the mining area unless appropriate abatement measures are planned and effectively carried out. The noise and vibrations mainly generated by mining machineries, background noise levels shall be kept in the range of 74 to 85dBA. The noise sources shall not generate sound levels above 90 dBA. The noise and vibration generated due to the blasting operations can be kept well within the limits by using millisecond-delays electric detonators. The noise generated during the time of blasting will be controlled by using the millisecond delay detonators.

### Impact of Vibrations Due To Blasting
The ground vibration is expected to be generated during blasting. This can be minimized by adopting down the whole initiation system. Blasting operations, rock bursts and rock bumps, subsidence due to mining operations, deployment of mobile equipments causes ground vibrations. Blasting also generates air vibration waves. Vibration may cause structural damages, which depend on periodical acceleration due to vibration. Air blasts can damage structurally unsound buildings and cause window shattering. Blasting is associated with Fly rock hazard. The oscillation of rock particles is called Particle Velocity and its value is called Peak Particle velocity (PPV), which is measured in millimeter per second. The standards for safe limit of PPV are established by Director General of Mines Safety for safe level criteria through Circular No.7 dated 29/8/1997. The safe level criteria PPV as mentioned in Circular No.7 of DGM Sis presented below:

Table 4.3
Permissible Peak Particle Velocity (mm/s)

<table>
<thead>
<tr>
<th>S. No</th>
<th>Type of Structure</th>
<th>Dominant excitation Frequency</th>
<th>≤8 Hz</th>
<th>≤8-25 Hz</th>
<th>&gt;25 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Buildings/structures not belonging to the owner</td>
<td>5 10 15</td>
<td>2 5 10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Domestic houses/structures [Kuchcha brick and cement]</td>
<td>5 10 15</td>
<td>2 5 10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Industrial Buildings [RCC and framed structures]</td>
<td>10 20 25</td>
<td>15 25 50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Objects of historical importance and sensitive structure</td>
<td>2 5 10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Buildings belonging to the owner with limited life span</td>
<td>10 15 25</td>
<td>15 25 50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Domestic houses/structures [Kuchcha brick and cement]</td>
<td>10 15 25</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Industrial Buildings [RCC and framed structures]</td>
<td>15 25 50</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: DGMS circular No. 7 dated 28/08/1997

As the distance increases the PPV value is likely to reduce, the ground vibrations generated by blasting during the mining operations shall be well within the standards prescribed by DGMS for controlled blasting. Ground vibrations will not likely to affect the structures in the vicinity of mine lease area. By practicing controlled blasting, the problems will be greatly minimized and the impact will also minimized by using Latest techniques for blasting:

- Use of Nonels,
- Optimization of blasting parameters, Face orientation,
- Use of Rock breaker - No secondary blasting is done,

Water regime

Impact on Surface Water

During rains water will precipitate within the mine and in the vicinity. For that garland drains all along the quarry surface edge keeping a barrier from the mine surface will be constructed to arrest incoming water to the mine. Water flows in its normal course. There will be no hindrance or sudden rush of water due to mining activities, which may lead to erosion of water courses. At the ‘conceptual stage’ as area of 3.40 ha will be converted into water reservoir which will serve as recharge pits. Besides, there will be no toxic element in the mined out material, which may contaminate ground/surface water.

It is, therefore, apparent that there will be negligible impact of mining on the surface water regime.
Impact on Ground Water
The water table in this region is at a depth of 40-45m below general ground level. Mining will be carried out above the ground water table. No chemical having toxic elements will be used for carrying out mining activity. Rainwater expected to be accumulated in the pit will be pumped out and will be discharged into storm water drains provided for the purpose which will join the natural surface water drains existing in the area.

Socio-economics,
Positive impacts:
Employment:
Employment will be created during planning and preparation, construction and operational phases of the project. Employment opportunities created by cluster of lessees will provide a sustainable and safe working environment for women.
Community Skills Development:
The employees will benefit from the training programmers that will be instituted by cluster of leases to enable the community labor force to work in the different areas of project operations. This training will increase the number of technicians, electricians, and mechanics, among others, that will not only benefit cluster of leases but also the community at large during and after the project life.

Improved Standard of Living:
Employment opportunities created by the projects will increase income and therefore improve the overall standards of living in the area.
Community Organizational Capacity Development:
Through engagement of community members in development structures such as Community Development Committees, the community organizational capacity will be developed.

Improved Water Supply:
Supply of safe water for the community by cluster of leases will improve health standards and living conditions in the villages.

Economic Exposure and Development:
Running of the cluster project will make infrastructure and services available to the people. This will expose and introduce the local population to factors of economic development.

Adverse Social Impact
Price Inflation:
Increase in purchasing power of the community members through higher incomes from the mining, compounded by population increase and low agricultural productivity as a result of project will lead to inflation in the cost of goods and services, much to the detriment of the local population especially the poor and vulnerable.

Livelihood change
Due to the labor intensity of the mining, the project will attract the more able-bodied Persons from the community which in turn will lead to low labor availability in other sectors of the economy including agricultural, education and health skilled
workers. Local employment opportunities will be created by the project. This impact will not be significant due to low level of education and skills in the area which will result in sourcing skilled workforce from outside the immediate area. But the magnitude of this impact will be high due to high number of dependants in a household.

**Historical monuments etc.**
There is no historical monument in the core zone / lease area. So, there will be no impact on the historical monument due to proposed mining activity in the area.

**a) Environmental Management Plan**
   (i) No Temporary storage and utilization of topsoil

**Reclamation Plan for Land**
At the conceptual stage, out of total mine lease area (i.e. 1.13), 1.13 ha will be excavated, 0.85 Hect. area will be water reservoir.
At the end of life of mine, 0.28 ha of land will remain undisturbed.

**Programme of afforestation**
Mining shall continue in the pits so no reclamation is purposed in first five years. Green belt is proposed to be developed in this period. During the conceptual plan it is proposed to plant area equal to 33% of the total lease area of cluster.

**Stabilisation and vegetation of dumps along with waste dump management year wise for the first five years (land up to conceptual plan for ‘A’ category mines).**
The waste rock generated will be properly stacked at the proposed dump yard and dump rock heaps will be properly leveled, as and when required.

**Measures to control erosion/sedimentation of water courses**
Retaining wall (1m high) and Plantation on Dumps, garland is proposed around the dumps, which stops shall flow of fines from dumps.

**Treatment and disposal of water from mine**
No disposal of water from mine so no plan proposed

**Measures for minimizing adverse effects on water regime**
No plan proposed as no effect is likely to be on water regime

**Protective measures for ground vibrations/air blast caused by blasting.**
By practicing controlled blasting, the problems will be greatly minimized and the impact will also be minimized by using Latest techniques for blasting:
- Use of Nonels,
- Optimization of blasting parameters, Face orientation,
- Use of Rock breaker - No secondary blasting is done,
- Lessees shall regular service the machines & provide Earplug to workers.

**Measures for protecting historical monuments and for rehabilitation of human settlements likely to be disturbed due to mining activity.**
No protecting historical monuments and for rehabilitation of human settlements falls near the lease area so no plan is proposed

**Socioeconomic benefits arising out of mining.**
The local workers will be preferred for the purpose of employment.
b) Monitoring schedules for different environmental components after the commencement of mining and other related activities (for ‘A’ Category mines only)
Details of the Environmental Monitoring schedule, which will be undertaken for various environmental components.

POST PROJECT MONITORING

<table>
<thead>
<tr>
<th>S. No.</th>
<th>DESCRIPTION</th>
<th>FREQUENCY OF MONITORING</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Ambient Air Quality at Plant/mine site</td>
<td>Half Yearly</td>
</tr>
<tr>
<td>2.</td>
<td>Water Quality</td>
<td>Half Yearly</td>
</tr>
<tr>
<td>3.</td>
<td>Noise level Monitoring</td>
<td>Half Yearly</td>
</tr>
<tr>
<td>4.</td>
<td>Soil Quality</td>
<td>Half Yearly/Yearly</td>
</tr>
<tr>
<td>5.</td>
<td>Monitoring of Agriculture crops</td>
<td>Yearly</td>
</tr>
<tr>
<td>6.</td>
<td>Socio-economic status of nearby area</td>
<td>Yearly</td>
</tr>
</tbody>
</table>

Cluster shall provided:

1. Water arrangement for fauna.
2. Ambulance for nearby villagers.
3. Awareness camps for environment protection.
4. Publicity for environment.
5. Maintenance of road.
7. Arrangement of fuel like gas etc.