

## Study of Specific Environmental Management Plan

**\*Dr. B.P. Sharma**

### **Abstract**

Specific Environmental Management Plan is a plan made to ensure environmental level, mining activities assessment and impact on environment. There are objectives of EMP which helps a project not just to be economical viable but also in cognizance with the environment. There are some vital activities to follow EMP and implement it in proper direction. The plan includes land reclamation, waste management, water quality, air quality, noise levels, pollution controls, health facility etc. It can be helpful for safe work and proper mitigation measures. The mitigation steps are used to reduce adverse impacts on environment due to this project of Granite mining. It can help in sustainable planning and generation of better employment opportunities in the area and development of area indeed. This paper discuss all these aspects of Environmental management Planning.

### **Introduction**

To ensure that a validate environmental management practices are practiced in compliance with the environmental legislation a Project Specific Environmental Management Plan has been put forward subsequent to a cluster EIA study as per the required terms of reference. The Environmental Management Plan (EMP) is known to be site specific plan which is developed considering the base line environmental status, mining activities and environmental impact assessment. It is expected that the area would not be affected adversely with the project and will provide, economical boost to the area and surrounding village as whole. Environmental Management for the mining activity is discussed for environmental impact pertains to the operational phase. EMP will be implemented throughout the project life cycle after formulation. An EMS (Environment Management System) can be helpful for systematic steps or framework to minimize risk and manage environmental aspects and effects. Environmental management plan explains the environmental quality control measures which are proposed for this project.

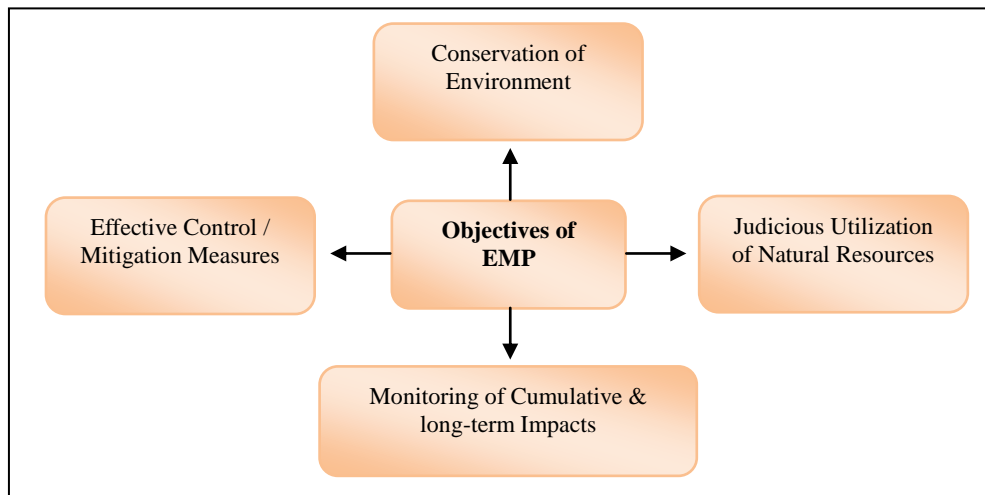
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To mitigate measures to restore and conserve the ecosystem of the possible bad impacts due to proposed project, Environment Management Plan (EMP) can be a helpful aspect. The EMP has planned improvements with adopting some control measures viz. fugitive dust reduction on roads, measures to alleviate the environmental and economic problems in affected villages near project area, opting for the sustainable development of the area/region etc.

### Objectives of Environment Management Plan



### VITAL ACTIVITIES FOR EMP APPLICATION

1. Training and Environmental Awareness;
2. Documentation and record keeping;
3. Reporting Procedures;
4. Stakeholder/ Project Proponent engagement;
5. Auditing;
6. Responding to Non-compliance

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## ENVIRONMENTAL MANAGEMENT PLAN

S. No.	Particular	Management Plan
1.	Land Environment (Land Reclamation and Waste Management)	<p><b><u>During Proposal Period</u></b> No reclamation has been suggested.</p> <p><b><u>At Conceptual Stage</u></b> Conceptual rehabilitation by conversion of the pit into water reservoir will be carried out in 0.7188 ha area. Greenbelt/plantation will be developed in 0.2515 ha area Undisturbed area in the around the mining lease, along the road, near the mine's office, around the pit etc. Considering the ultimate pit limit, average minerals yield &amp; overburden excavation is anticipated to about 238561 MT mine waste shall be excavated up to end of conceptual mining plan period. It will be disposed in the form of temporary external dump.</p>
2.	Water Environment (Water quality management & pollution control)	<p><b><u>Surface and Ground Water Body</u></b> There is no toxic element in and around the applied area. So, contamination of any kind is not expected for surface or any ground water source and no water treatment required. There is no seasonal nalla or river passing through the mine lease area therefore mining activities will not have any effect on surface water. The vertical drains and horizontal drains will be provided on the dumps, mining pits and benches that will properly channelize the mine water flow and surface water flow and will be connected to final drainage via check measures.</p> <p><b><u>Ground Water</u></b> Mining operations are not envisaged to adversely affect the water table of the area. Granite Mineral constitutes of fairly inert and chemically non-reactive ingredients. Water level is 80 mbgl in post-monsoon to 100 mbgl in pre-monsoon. As indicated in above table, in water table varies between 80 m to 100 m bgl and ultimate depth for mining shall be 37 m bgl which clearly shows that mining shall be restricted above water table and ground water will not be intersected at any stage of mine project working. No waste water will be generated due to mining operation.</p> <p><b><u>Hydrological Study</u></b> A hydro geological study as prescribed in the ToR has been carried out.</p> <p><b><u>Treatment and Disposal of Water from the Mine</u></b></p>

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		<p>The pumped-out water will require no treatment. Mine water will get enough time for settling and as such it will be clear. No contamination is found in mineral. For measures like dust suppression measures and watering of plants pumped-out water would be used.</p> <p><b><u>Suggested water conservation measures</u></b></p> <p>The rain collected in the pits after spell of rain will be used for plantation and dust suppression. At the end of life, part of excavated area will be used as a rain water pit which will further help in ground water recharge.</p> <p><b><u>Suggested rainwater harvesting</u></b></p> <p>Mining will be through opencast semi-mechanized method and mining operations will generate rainwater storage pits at the end of mining. The total estimated area of pits will be 0.7188 ha with ultimate depth of 37 meters. Area reclaimed by water harvesting will be 0.7188 ha. The water reservoir will attract birds and will improve aquatic environment.</p>
3.	Air Environment (Air Pollution management and its control)	<p><b><u>Haul Road</u></b></p> <p>Regular water spraying and afforestation.</p> <p><b><u>Unpaved Roads</u></b></p> <ul style="list-style-type: none"> <li>• Water sprinkling will be done for dust suppression.</li> <li>• Leveling of roads will be done to maintain the uniform speed of the trucks/tippers.</li> </ul> <p><b><u>Paved Roads</u></b></p> <ul style="list-style-type: none"> <li>• Maintenance of the road.</li> <li>• Regular cleaning of roads to reduce the chance of road dust to become airborne.</li> <li>• Adequate transportation routes will be decided to transport the mineral and will be maintained properly.</li> <li>• Limiting of vehicular speed will be adopted.</li> </ul> <p><b><u>Transportation</u></b></p> <ul style="list-style-type: none"> <li>• No overloading of trucks.</li> <li>• Trucks to be covered while transporting ore.</li> <li>• Enforcing speed limit.</li> <li>• Regular monitoring of the exhaust.</li> <li>• Proper maintenance of trucks.</li> </ul> <p><b><u>Mine workings</u></b></p> <ul style="list-style-type: none"> <li>• Regular water spraying in working areas.</li> </ul>

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		<ul style="list-style-type: none"> <li>• Green belt surrounding the mine lease area</li> <li>• Personal protective equipment like dust mask, ear muffs/ plugs and goggles will be provided to the employees.</li> </ul> <p><b><u>Controlling of SO<sub>2</sub> &amp; NO<sub>2</sub> Levels</u></b></p> <p>The source of SO<sub>2</sub> &amp; NO<sub>2</sub> would be due to HEMM and vehicular emissions. This can be controlled by proper maintenance and servicing of machineries. No hazardous or toxic contamination is supposed to contaminate air quality at the end of mining site life. Ambient air quality monitoring will be carried out as per CPCB norms except monsoon season.</p> <p><b><u>Other Measures</u></b></p> <ul style="list-style-type: none"> <li>• Personal Protective Equipment's like dust mask, ear plugs, ear muffs etc. will be provided to the persons/ workers.</li> <li>• Regular monitoring and analysis will be carried out through collection of air samples from strategic monitoring sites. Corrective regulation measure will be carried out if the parameters go beyond the permissible tolerance limits.</li> </ul>
4.	Noise Environment (Noise levels and Vibrations & its Mitigation)	<ul style="list-style-type: none"> <li>• Noisy activities will be scheduled at normal working hours (daytime hours) to the extent possible when the environment is least sensitive to noise impact.</li> <li>• List of all noise generating machinery onsite along with age to be prepared. Equipment to be maintained in good working order.</li> <li>• Vehicle trips to be minimized to the extent possible.</li> <li>• Regular inspection and maintenance of vehicles and equipment will be performed to ensure efficiency and worn parts will be replaced.</li> <li>• The vehicles will be maintained in good condition and overloading will be avoided.</li> <li>• Speed limits will be enforced in relation to road conditions and on-route communities.</li> <li>• Noise monitoring will be conducted on a regular basis to determine compliance with noise criteria.</li> <li>• Plantation of dense hedges on the boundary of lease area, these will reduce dust and noise in the vicinity area.</li> <li>• Personal protective devices i.e., earmuffs and earplugs will be provided to workers, working in high noise areas.</li> <li>• Periodical medical checkup will be organized for all workers to check any noise related health problems.</li> </ul>

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5.	Occupational Health and Safety	<p>The working conditions in the mines are governed by the enactments of the Director General of Mines Safety (DGMS). As per the guidelines of the Mines Act, the management will take all important safeguards.</p> <ul style="list-style-type: none"> <li>• Lease area will have sanitary facilities.</li> <li>• Management will carry a periodic health check-up for workers.</li> <li>• Dust pollution, noise pollution, blasting and injuries from equipment's and fall from high places are occupational accidents involved in mines. DGMS has given important guidelines for safety against these occupational accidents. These guidelines will be followed strictly by management.</li> <li>• Medical facilities and other required first aid facilities will be provided to the workers. Proper fire protection and firefighting equipment will be available in mine for any emergency. Training will be given to operators and mechanics to handle firefighting equipment's. Further all the necessary protective equipment's such as helmets, safety goggles, earplugs, earmuffs, etc. will be provided to persons working in mines as per Mines Rules, 1955.</li> <li>• Initial and periodical medical examination will be carried out of persons employed in the mine as per Mines Rule, 1955. During periodical examination it will be ensured that every worker is examined once in five years. Schedule of examination will be fixed accordingly.</li> <li>• Due to various pollutants, there can be adverse effect on health of workers and to avoid those sufficient measures relating to safety and health will also be carried out such as: <ul style="list-style-type: none"> <li>✓ Protective safety boots, goggles, hand glove and helmets will be provided to the person working in the opencast works;</li> <li>✓ Employee will be adequately trained and educated for involvement in and commitment in to the implementation of health and safety guidelines;</li> <li>✓ Provision of all necessary resources for safety and health of employees and contractors engaged in mining;</li> <li>✓ Periodical Medical Examination (PME) of all workers by a medical officer;</li> <li>✓ First Aid facility is provided at the mine area;</li> <li>✓ Close surveillance of the factors in working environment and work practices which may affect environment and worker's health;</li> </ul> </li> </ul>
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		<ul style="list-style-type: none"> <li>✓ Proper ear plugs and muffs will be provided to mine workers in high noise area to protect them from noise hazards;</li> <li>✓ For minimizing the adverse impact of dust, the mine workers working in the dust area will be provided dust masks for their occupational safety;</li> </ul> <p>External accidents involve injuries to human, cattle and plants, which could occur during mining operations. These injuries could be due to ore transport vehicle lose control; internal accidents occur due to unhygienic work conditions or carelessness of the workers involved in mining operations. Long time effect of Internal hazards can be seen. The mining operation is unlikely to cause any adverse impact due to the above factors in buffer zone due to the EMP planned. The mine management will provide proper health care facilities near the mine area. This will be provided to the surrounding villages in case of emergencies. All measures to provide a safe environment will be taken by the management. Hence adverse impact on health &amp; safety of the workers and local population is not expected.</p>
6.	Biological Environment	<p>Within a period of three years a total of about 328 trees of native species along with some fruit bearing and medicinal quality carrying trees will be planted at different places around the working area. The green belt development will be carried out by Project Proponent and maintenance will also be done. Greenbelt development programme is given in Table 1.</p>
Impact on fauna		<p>Noise vibration and loss of vegetation cover there can be effect on fauna species. Suggested measures to decrease the impact are discussed below and will be followed sincerely.</p> <ul style="list-style-type: none"> <li>• No disturbance would be in the migrating routes of wild animals and action should be taken as per the guideline of State Forest Department. This is also regulated under the Wildlife (Protection) Act, 1972.</li> </ul>
7.	Socio-Economic Aspect	<ul style="list-style-type: none"> <li>• Local people will get direct employment which will help to sustain their livelihood.</li> <li>• Indirect employment will also develop during the operational phase by the implementation of certain CER activities.</li> <li>• Better livelihood.</li> </ul>

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S. No.	Land use Category	Present (Ha)	End of 5 <sup>th</sup> year (Ha)	End of mine (Ha)
1.	Pit & Quarries	-	0.7188	0.7188
	i. Water Reservoir	-	-	0.7188
	ii. Backfilling	-	-	-
2.	Waste Dump	-	0.0200	-
3.	Backfilled Area	-	-	-
4.	Mineral Stack Yard	-	-	-
5.	Mineral Storage	-	0.0040	-
6.	Built up area / Roads	-	0.0060	-
7.	Green Belt	-	0.2515	0.2515
8.	Reclamation	-	-	-
9.	Undisturbed/Non Utilized	1.0003	-	0.03
<b>Total</b>		<b>1.0003</b>	<b>1.0003</b>	<b>1.0003</b>

Table 1. Greenbelt development programme

Year	Un-worked Area		Waste Dump		Outside Mine lease area		Top Soil Dumps		Total	
	Area (Ha)	No. of Trees	Area (Ha)	No. of Trees	Area (Ha)	No. of Trees	Area (Ha)	No. of Trees	Area (Ha)	No. of Trees
Existing	--	--	--	--	--	--	--	--	--	--
I	0.0845	84	--	--	0.0786	78	--	--	0.1631	162
II	0.0835	83	--	--	MAINTENANCE TO BE DONE	--	--	--	0.0835	83
III	0.0835	83	--	--					0.0835	83
IV	MAINTENANCE TO BE DONE									
V										
At the End of Life of Mine	--	--	--	--	--	--	--	--	--	--
<b>Total</b>	<b>0.2515</b>	<b>250</b>	--	--	<b>0.0786</b>	<b>78</b>	--	--	<b>0.3301</b>	<b>328</b>

Total 328 saplings will be planted over an area of 0.3301 hectare (33% of the mine lease area) out of which 250 saplings will be planted at the undisturbed area of 0.2515 hectare during first three years and 78 saplings will be planted over an area of 0.0786 ha. outside the mine lease area remaining Part of Own Khasra No. 2489 & 3868/2489 in first year (Completing 33 % of mine lease area in three years). *It will be ensured that after ceasing mining operations re-grassing of the mining area and any other area which may have been disturbed due to the mining activities is done and will restore the land to a condition which is fit for growth of fodder, flora, fauna etc. as per the MoEF & CC O.M vide No. 22-34/2018-IA.III dated 16<sup>th</sup> Jan 2020*

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**ENVIRONMENTAL ACTION PROGRAMME**

The Project Proponent is quite conscious of its responsibility for maintaining clean and a healthy environment. The management is also determined to change and to conduct better ways to deal with environmental pollution sources. Adequate fund for pollution control measures is provided as a part of overall project financing to ensure the availability of proper treatment facilities. The overall investment in the project is assumed to be 80 lacs capital cost & 4.0 lacs recurring cost. This cost will be spending phase wise along with the growth of project. Effective and appropriate measures will be reviewed periodically and the protection measures area also active.

The breakup of the proposed cost for Environment Management Program is given as under: -

**TABLE 3 PROVISIONS FOR ENVIRONMENTAL PROTECTION MEASURES**

S. No.	Description	Capital Cost (Rs. in lacs)	Recurring Cost (Rs. in lacs)	Basis for cost estimation
1	Air pollution monitoring	--	1.00	As there are no proposed stacks hence the capital cost is nil. Recurring cost would include cost of monitoring of ambient air environment at the mining lease season wise and measuring dust fall rate at villages in two seasons such as summer and winter.
2	Water Quality analysis	--	0.30	Surface and sub-surface water
3	Water sprinkling for dust suppression and green belt	--	0.50	Tanker water
4	Noise pollution control	--	0.20	Recurring cost includes monitoring cost of noise measurement at different locations.
5	Water conservation and management	1.00	0.50	Construction of rainwater conservation structures and its regular maintenance. Construction of toilet with soak pit.
6	Green belt	--	0.50	<b>Cost Calculation</b>
7	Contribution towards construction and maintenance of the kachha roads after consultation with the concerned gram Panchayat and local people	--	1.00	--
<b>Total</b>		<b>1.00</b>	<b>4.00</b>	

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Greenbelt and Afforestation	Cost per sapling (Rs)
Digging pits and filling up of pit with nutrients	50
Saplings	25
Tree guard	150
<b>Total</b>	<b>225</b>

Table 4. Provisions for Environmental Protection Measures

Sr. No.	Head	Recurring Cost per annum (in Rs Lac)							Basis for cost estimation
		L.O.I No. 101/20 18	M.L. No. 20/20 18	M.L. No. 37/20 18	M.L. No. 19/20 18	M.L. No. 21/20 18	M.L. No. 55/20 18	M.L. No. 12A/2 013	
1	Air pollution monitoring	1.00	1.00	1.00	1.00	1.00	1.00	1.00	As there are no proposed stacks hence the capital cost is nil. Recurring cost would include cost of monitoring of ambient air environment at the mining lease season wise and measuring dust fall rate at villages in two seasons such as summer and winter.
2	Water Quality analysis	0.30	0.30	0.30	0.30	0.30	0.30	0.30	Surface and sub-surface water and ground water quality analysis.
3	Water requirement	0.50	0.80	0.80	0.80	0.80	0.80	0.80	Water sprinkling for dust suppression and green belt via tanker water supply.
4	Noise pollution control	0.20	0.20	0.20	0.20	0.20	0.20	0.20	Recurring cost includes monitoring cost of noise measurement at different locations.
5	Water conservation and management	0.50 1.00 (Capital Cost)	0.50 1.00 (Capital Cost)	0.50 1.00 (Capital Cost)	0.50 1.00 (Capital Cost)	0.50 1.00 (Capital Cost)	0.50 1.00 (Capital Cost)	0.50 1.00 (Capital Cost)	Construction of rainwater conservation structures and its regular maintenance, construction of garland drains.
6	Green belt	0.50	1.00	1.00	1.00	1.00	1.00	0.70	Cost Calculation

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7	Contribution towards construction and maintenance of the kachha roads after consultation with the concerned gram Panchayat and local people	1.00	1.20	1.20	1.20	1.20	1.20	1.00	--
<b>Total</b>		<b>4.00</b>	<b>5.00</b>	<b>5.00</b>	<b>5.00</b>	<b>5.00</b>	<b>5.00</b>	<b>4.50</b>	<b>33.50 Lacs</b>

### 10.5 CONCLUSION

Evaluation of different mining activities was done. Environmental Management Plan was put together and fund has been allocated for the possible ways to mitigate the environmental concerns. The EMP is dynamic, flexible and subjected to periodic review. For project where the major environmental impacts are associated, EMP will be under regular review. Senior Management is responsible for the project and will conduct a review of EMP and will responsible for implementation to ensure that the EMP remains effective, suitable and appropriate. Thus, right steps will be taken to achieve all the goals mentioned in the EMP and the project will bring the pragmatic and useful impact in the study area.

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