ENVIRONMENTAL MANAGEMENT PLAN

FOR

STONE MINOR MINERAL PROJECT

SISUNDA STONE QUARRY

Maximum Production Capacity – 2072 cum / Year

Lease Area – 12.200 Acre or 4.937Ha

Screening Category – 'B2'

Applicant

SMT. DAMAYANTI BISOYI
W/o – Hadi Bandhu Bisoyi
Plot no. 1676/2725, Patia,
Kalarahanga, Khorda, Odisha.

ENVIRONMENTAL MANAGEMENT PLAN

INTRODUCTION

Sisunda Stone Quarry Area over 12.200 acres or 4.937Ha. in village Sisunda, Tahasil Jagannathprasad, District Ganjam has been allotted to Smt Damayanti Bisoyi , the lessee through long term quarry lease basis for quarrying of ordinary stone/Road metal (minor mineral) by the Tahasildar, Jagannathprasad on behalf of Governor of Odisha in accordance with the provision of the Minor Mineral Concession (amendment) Rules, 2016 through long term quarry lease for the purpose of excavation of construction stone.

The current allotment through long term quarry lease basis in the name of

Smt. Damayanti Bisoyi for Five Years.

1. Name and Address of the holder of the Mining lease.

Smt. Damayanti Bisoyi

W/o – Hadi Bandhu Bisoyi

Plot no. 1676/2725, Patia,

Kalarahanga, Khorda, Odisha.

Details of the area:

Sisunda Stone Quarry

Village: Sisunda,

Tahasil: Jagannathprasad,

District: Ganjam,

State: Odisha

Lease Area –4.937Ha

Khata no-441

Plot no-74

1.3. Detail of Measurement of mining Pit earlier excavation in the area to be sanctioned and details of mineral Concessions situated within 100 meter periphery of this area:

Mining Plan has been prepared in conformity to Rule 28 (4) of OMMC Rules, 2016 and OMMC Rules (Amendment) 2016.

1.4. Scheme of Tree Plantation:

Greenbelt shall be developed along the boundary of stone quarry area with the native tree species. The plantation proposal has been given to plant around 440 saplings over an area of 0.275 ha in the quarry leased area. Species likely to be planted are Chakunda, Neem etc as per the availability. Spacing between the saplings will be kept 2.5 m only. However the year wise plantation schedule is given in the table no. 1 as below:

Table No 1. Yearwise Plantation Schedule

YEAR	AREA TO BE PLANTED (Hectares)	NO.OF SPECIES	LOCATION OF PLANTATION	TYPE OF SPECIES
1St year	0.055	88	Along the quarry auctioned boundary	Chakunda, Neem etc.
2nd year	0.055	88	-do-	Chakunda, Neem etc.
3rd year	0.055	88	-do-	Chakunda, Neem etc.
4th year	0.055	88	-do-	Chakunda, Neem etc.
5th year	0.055	88	-do-	Chakunda, Neem etc.
Total	**0.275**	**440**		

Plantation operation will be followed up with plantation care which includes:

(1) Periodic water supply and manure as per requirement.
(2) Weeding, soil working, pruning etc will be done.
(3) Casual replacement will be done.

(4) Insecticides will be spread for pest control.

(5) Proper watch and ward will be there to save the trees from cattle and fire.

1.5 Details and approximate distance of National Park, Sanctuary, Biodiversity area, and Inter State boundary situated within periphery of 10 Km. from the area to be sanctioned:

No National Park, wild life sanctuary, Biodiversity area, Inter State boundary is situated within periphery of 10 Km from the sanctioned area. However Reserved Forest & Protected Forests are present.

1.6 Proposed annual production of mineral:

Total production proposed 10360 cum in five years (as per mine plan). Details are given in table below:

Table No. 2 Proposed annual Production

Year	Total Production in Cum
1st Year	2072
2nd Year	2072
3rd Year	2072
4th Year	2072
5th Year	2072
Total	10360

1.7 Effect on ground water level due to mining operation and its preventive measures:

It is observed from the dug well in the adjacent area that the ground water table varies between 10 m to 15 m from the surface level. During dry season the water table falls below 15 m from the surface where as during rainy season the water table remains at 10 m from surface. As

the mining activities presently proposed are maximum 22 m at the hill tops & slopes, so water logging in the quarry is not anticipated. The quarry floor will never intersect the ground water level. During rainy season the surface run off will be allowed to flow through garland drains. The mine drainage will be channelized through small channels connecting to garland drains. The proposed dumps will be well protected by retaining walls, garland drains and settling tank to prevent wash offs of the dump. The settling tank will be cleaned regularly to clear the deposited sediments.

1.8 Details of Scheme of continuous reclamation and rehabilitation of the land degradation due to mining operation:

During the plan period the mined out land will be 0.468 ha. Besides this, the dump area is 0.030 ha. Since the quarry is at the development stage and the excavation of construction stone from the quarry area has not been completely exhausted so proposal for reclamation of mined out land would not be provided at this stage. The reclamation proposal will be provided in the next plan period/conceptual period of mining.

The **Sisunda stone quarry** comprises of 12.200 acre under Jagannathprasad Tahasil of Ganjam District. The existing & land use at the end of the Plan Period is given below:

Table 3. Existing & End LAND USE

Sl. No.	Type of land use	Area in hectares	
		At Present (Existing)	During Plan period
1	Area under excavation	0.042	0.468
2	Waste/reject Dump	---	0.030
3	Road metal stack	---	0.017
4	Road	0.018	0.012
5	Plantation	---	0.275
6	Unutilized area	4.887	4.135
	Total	**4.937**	**4.937**

1.9 Details of preventive and control scheme of air and water pollution.

Table No 4 Preventive and Control Scheme of Pollution.

	Particulars	Details
Air Quality Management	**Operation**	• Water sprinkling will be done before loading by making it moist. • Water will be sprinkled at quarry faces & along loading sites to reduce dust emission. • There is no habitation within 500 meter of quarry area. • Wet blasting & compressed drilling operations will be adopted.
	Transportation	• Water sprinkling during transportation over approach roads will be done for suppression of dust. • Construction of well-compacted roads. • Regular maintenance of machinery will be carried out. • Overloading will be prevented. • Trucks/Dumpers will be covered by tarpaulin covers. • Supply of dust masks for the drill operators
	Plantation	• Plantation will be carried out at the approach road, and vicinity area in village roads in consultation with local authorities. • Green areas are proposed along the marginal slope of the dump to check erosion.
	Monitoring	• Periodic air quality monitoring will be done and adequate measures will be taken at the

		high pollution potential areas.
Noise Management	**Transportation**	• Noise level shall be maintained within prescribed limits in the working zone (for 8 hr. Exposure). • Diesel powered machineries, which are major; source of noise in open cast environment will be properly maintained. Undesirable noise will be prevented at the work-place. Attention shall be paid towards rigorous maintenance of the silencer of the diesel engines, machines and equipments. • Optimum placement of waste dumps, location of haul roads, location of fixed plant loading hoppers. Waste dumps, stockpiles can be used to shield fixed items of plant which generate noise. • Oiling & greasing at regular interval will be done. • Static diesel engines shall be housed as far as possible. If possible they will be placed on vibration isolators. • Minimum use of horns and speed limit of 10 km/hr. in the village area. • Truck drivers will be issued ear plugs and ear muffs. Duty of the operators of the noisy machineries will be regulated to keep their noise exposures levels within the limits • Green belt will be developed around to reduce noise exposure level. • It will be ensured that all transportation

		vehicles carry a valid PUC Certificates.
Vibration Management	**Drilling/Blasting**	• Reducing the maximum instantaneous charge (MIC) by using delays, reduced hole diameter and/or deck loading • Drilling & blasting will be carried out in small scale only to develop cracks in the parent rock mass. • Changing the burden and spacing by: altering the drilling pattern, and/or delay layout, or altering the hole inclination • Exercising strict control over spacing and orienting all blast drill holes. • Establish times of blasting to suit local conditions.
Green area	**Plantation**	• Plantation will be carried out at the approach road, dump site and vicinity area to control dust, air & noise Pollution and improve aesthetic environment.
Water Quality management	**Surface water quality mgt.**	• No perennial water body is present in the close proximity to the mine • During monsoon period surface runoff around the quarries and dumps near the natural drains will follow the garland drains to arrest the eroded sediments, which shall pass through a series of garland drains before being discharged to the natural drainage system. • Otherwise the water from garland drains shall be collected in reservoirs after settling and shall be used for a forestation uses.

		• A boulder bund will be provided beyond the toe of the waste dump which retains dump wash offs during rains. • At a distance of 3-4m beyond the retaining wall, a garland drain with settling tank will be provided to allow slime and silt to settle down.
	Ground water quality management	• The ground water table of the area is much below ground level. So seepage of water is likely to be encountered when the mining activities continue below this depth. • Excavation will be carried out up to a maximum depth from the surface of lease area.
	Waste water management	• Waste water will not be generated during removal/ collection of mined material. • Washrooms will be made available near working blocks. • Septic tanks and soak pits will be provided for the disposal of domestic/ washrooms effluents.

1.10 Provision for separate stacking of surface soil excavated from mining operation and its utility:

The part of the soil covered area though contains rock below has been chosen for disposal of waste & overburden by dumping. The land in Northern part has been earmarked for the proposed dump site. The site for dumping of waste material is shown in the development plan. (Ref. Plate IV of Approved Mine Plan)

1.11 Details of social and economic up gradation of mining effected area due to proposed project:

There is a positive impact on the socio economic condition of the local people. The proposed mining activity will generate direct employment and indirect employments for the people living in the surrounding area.

1.12 Details of budgetary arrangement for environment management:

Total Rs. 1.3 Lakhs will be utilized annually for environment management like Plantation, Water sprinkling on transport road, Water sprinkling on stock yard etc and Rs 0.4 Lakh for CSR activities like Health, Education, Insurance of workers etc. The details of expenditure are given in table below:

Table: Budgetary measures for EMP

Proposed Action Plan	Expenses per Year (in Rs.)
Pollution Control • Dust Suppression	20,000
Expenditure for Environment Monitoring	20,000
CSR Activities	40,000
Development of Green Belt	20,000
Haul road repair	20,000
Miscellaneous	10,000
TOTAL	1,30,000

1.13 Any other details desired to be submitted by mineral concession holder:

Change in topography & land use pattern.

The mining activity involves in the excavation of mineral Ore those results in the creation of depressions in the area. But the excavated pits created will be converted to water recharge pits during the conceptual period. Hence there would be temporary change in the topography and land use pattern which are reclaimed after mining.

1.14.1 Effect on Flora & Fauna.

Mining activity causes impact on flora and fauna due to land degradation, deforestation, etc, however as the mining is restricted to very small area there is no likelihood of any deforestation being caused. No impact on fauna and flora is anticipated due to propose mine.

1.14.2 Effect on Climate.

There is no impact on the climate as the proposed mining will adopt the mitigation measure to control the pollution. No pollutants are envisaged hence, there will not change in any natural wind barrier or microclimate regime.

1.14.3 Noise Pollution

Noise is generated during mining and allied activities. The vehicles adopted for mining activities will be regularly maintained. Controlled blasting & compressed drilling will be done.

1.14.4 Accumulation of Wastes

The part of the soil covered area though contains rock below has been chosen for disposal of waste & overburden by dumping. The land in Northern part has been earmarked for the proposed dump site. The site

for dumping of waste material is shown in the development plan. (Ref. Plate IV of Approved Mine Plan)

1.44.5 Visual Impact

After reclamation aesthetic value will enhance.

1.15.7 Historical Monuments

There is no place of tourist interest, historical or religious importance in the close proximity.

2. ENVIRONMENT MONITORING PLAN

2.1 INTRODUCTION

Regular monitoring of environmental parameters is of immense importance to assess the status of environment during project operation. The knowledge of baseline conditions comes through monitoring of environmental parameters; the monitoring program will serve as an indicator for environmental conditions due to operation of the project. Monitoring is an important tool for the management, environmentalist and policy maker to make changes in pollution control equipments, environmental policy to save environment. It is decision making tool for the state of environment carried out through periodic monitoring. Further, impact assessment study is carried over short period of time and the data cannot bring out all variations induced by the natural or human activities. Therefore, regular monitoring program of the environmental parameters is essential to take into account the changes in the environmental quality over the period of time to comply environmental conditions necessary to save environment.

2.2 MONITORING OBJECTIVE

Monitoring will conform to commitments and compliances. This may take the form of direct measurement and recording of quantitative

information, such as amount and concentrations of discharges. The objectives of the monitoring are:-

- Very effectiveness of planning decisions;
- Measure effectiveness of operational procedures;
- Conform statutory and corporate compliance; and
- Identify unexpected changes.

2.3 ENVIRONMENTAL MONITORING CELL

A centralized Environmental Monitoring Cell will be established for monitoring of important and crucial environmental parameters which are of immense importance to assess the status of environment during mine operation. With the knowledge of initial parameters, deviations in environmental conditions due to operation of the mine will be assessed and mitigation steps will be taken to safeguard the environment. The routine monitoring program will be implemented under the project monitoring as per CPCB & MoEF & CC guidelines. Officer not below the rank of General Manager will be responsible of Environmental Management Cell and execution of environmental monitoring program.

Hierarchy of Environmental Management Cell

In order to maintain the environmental quality within the stipulated standard, regular monitoring of various environmental parameters will be necessary. Environmental Management Cell under Senior Officer (not below the rank of General Manager) will be constituted for regular monitoring, compliances, supervision and hearing of complain and reporting.

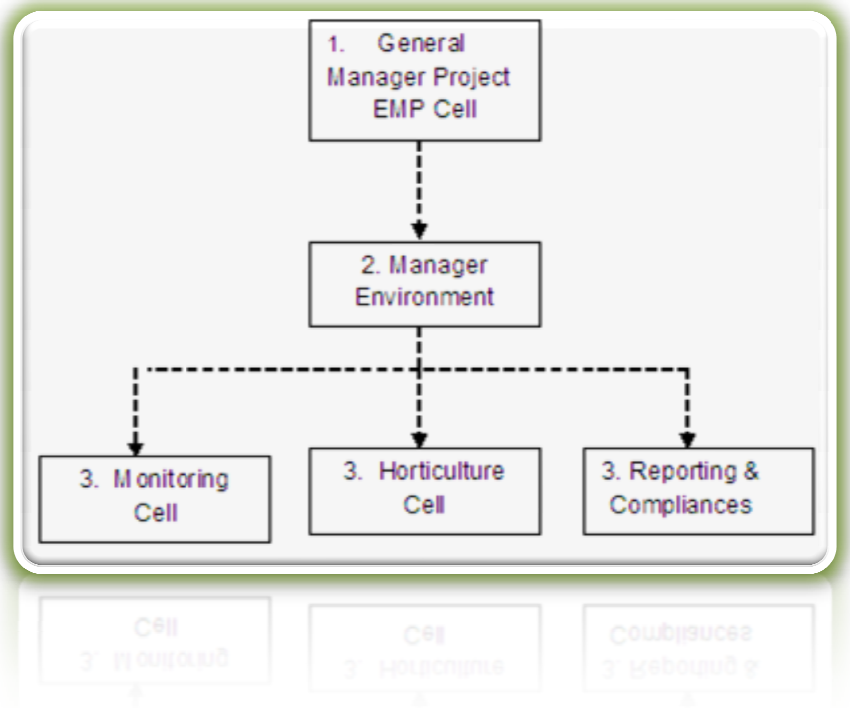

Fig: Hierarchical Structure of Environmental Cell

The core responsibilities of the Environmental Monitoring Cell will be:-

- The organization and interpretation of the environmental monitoring data to establish a record of change associated with the implementation of a project or the operation of an organization.
- The process of verification that all or selected parameters measured by Environmental Monitoring Program are in compliance with regulatory requirements, internal policies and standards, and established environmental quality performance limits.

Assessment of the effective environmental management system, practices and procedures:

- The environmental monitoring and audit work will be carried out by qualified personnel.
- A summary of non-compliance of the environmental quality performance limits.

- To implement and monitor the control and protective measures based on the EMP.
- To coordinate the environment related activities to the top management within as well as with outside concerned agencies.
- To provide of health check up of workers and the people living in nearby villages.
- To develop greenbelt in the nearby villages, schools, Govt. offices and transportation routes.

2.4 ENVIRONMENTAL PARAMETER

Environmental monitoring schedules will be prepared covering various phases of project advancement, such as Mining and regular operational phase. Environmental Monitoring Program will be conducted once in season except monsoon.

Table: Environmental Parameter and Frequency

S.No.	Potential Impact	Parameters for Monitoring	Frequency of Monitoring	Location
1	Air Emission	PM_{10}, $PM_{2.5}$, SO_2, NO_X & CO	As per CPCB / MoEF & CC requirement i.e. 24 hourly monitoring for one month in each season except monsoon season.	Two locations in the core mining area and four in buffer area.
2	Noise	Spot Noise level recording Leq (day), Leq (night), Leq (dn)	Periodic / As per CPCB norms i.e. Once in season (1-hourly)	Two locations in the core mining area and four in buffer area.

3	Water Quality	As per drinking water standards	Once in a season except monsoon.	Two locations in the core mining area and four in buffer area.
4	Soil Quality	Analyzed as CPCB method	Once in a season except monsoon.	Two locations in core and two in the buffer area.
4	Health	Total health parameters	Initial Medical Examination (IME) and Periodic Medical Examination – Once in a five year as per Mines Rules, 1955.	All employees

Ambient air quality monitoring

Workspace Monitoring

The concentration of air born pollutants in the workspace / work zone environment will be monitored periodically. If concentrations higher than threshold limit values will be observed, the source of fugitive emissions will be identified and necessary measures will be taken as detailed in EMP.

The ground level concentrations of PM_{10}, $PM_{2.5}$, SO_2, NOx and CO in the ambient air will be monitored at regular intervals except monsoon. Monitoring locations will be decided on the meteorology of the area, topography potential of receptors in the core and buffer area locations. Any abnormal rise will be investigated to identify the causes. Greenbelt will be developed for minimizing dust propagation.

Monitoring of water quality

Monitoring of Ground Water: The monitoring of groundwater is the most important tool to find out the depletion in level of water table. Water table will be monitored at regular interval to check the behavior pattern of the water table. It is suggested to collect water samples and analyze. Records of analysis will be maintained.

Monitoring of Surface Water: Samples will be collected from well-mixed section of the river (main stream) and will be analyzed. There are two locations to collect the samples from the surface water. The objective is to collect the water samples in up-stream and down-stream of the river and analyzed for physical, chemical and biological parameters to study the seasonal variation of water quality except monsoon.

Monitoring noise levels

Potential receptors of Noise levels in the core and buffer areas are identified based on the present noise levels and proposed increment. Noise levels in the work zone environment shall be monitored. The frequency will be once in three months (one season) in the work zone. Noise monitoring will be conducted in three seasons except monsoon with monitoring frequency once in a season carried on hourly basis for 24-h representing site, human settlements, close to high ways, commercial and residential areas and for the industrial area (if any). Similarly, ambient noise levels near habitations will also be monitored once in three months. Audiometric tests will be conducted periodically for the employees working close to the high noise sources.

Reporting schedules of the reporting data

It is proposed that voluntary reporting of environmental performance with reference to the EMP will be undertaken.

The Environmental Monitoring Cell will co-ordinate all monitoring programs at site and data thus generated will be regularly furnished to the State regulatory agencies/ State Pollution Control Board at the frequency of six month. The Environmental audit reports will be prepared for the entire year of operations and will be regularly submitted to regulatory authorities.

Conclusion

Post Project Environmental monitoring is an essential tool in Environmental Management Program to check Environmental Quality status through monitoring of Environmental parameters as per frequency and method recommended by CPCB. It helps environmental planners, policy makers, managements, scientists and technologists to make amendment at the appropriate placers for clean technology and green environment. Mitigation measures are applied at the various stages; fuel, technology and house-keeping and waste management. Mitigation may be in form of technology up-gradation, design modification or modification in environmental policy. Environment works on cause -and -effect relationship. Clean technology will provide green environment. Clean mining activity will be required for sustainable growth.

The Environmental Monitoring Cell will co-ordinate all monitoring program, environmental awareness program, training and its importance in proposed project at site. Data generated will be furnished as per statutory requirements in CTE/CTO and the environmental conditions. The frequency of monitoring will be one month in each season except monsoon. Half yearly report will be submitted on June and January of each year to the Regional Office of MoEF &CC, Odhisa. The Environmental audit reports will be prepared for the entire year of operations and will be regularly submitted to regulatory authorities. Objective of entire process will be to improve environment and reduce the impact of project / project activities on environment.