

ENVIRONMENTAL IMPACT ASSESSMENT REPORT & ENVIRONMENTAL MANAGEMENT PLAN FOR RIVER SAND MINING PROJECT OF

MINE CLUSTER DCL-1

VILLAGE- BHIKAMPURA; TEHSIL- Seondha; DISTRICT-Datia ; STATE- MADHYA PRADESH
MINES INCLUDED IN THE CLUSTER

S.No.	Case no.	Mine Name	Area in ha.	Capacity (m ³ /year)
1	4368/15	Bhikampura-A	15.00	288300
2	4379/15	Bhikampura-B	16.25	311364
Total			31.25	599664

EXECUTIVE SUMMARY

Applicant

**The State Mining Corporation Limited
Bhopal (M.P.)**



Prepared by

**State Forest Research Institute
Jabalpur (M.P.)**

(An ISO 9001: 2008 Certified institute and accredited by QCI/NABET)
2016



EXECUTIVE SUMMARY

1.0 Introduction

The proposed project is for mining of sand in the flood plains of river Sindh in tehsil Seondha of Datia district in Madhya Pradesh. This integrated E.I.A. report has been prepared for two mines forming a cluster as distances between the boundaries of adjacent mines is less than 500 m, although all the mines will be worked independently. Code name of the proposed cluster is DCL-1. Total lease area of the cluster is 31.25 ha.

Table-1.1: Location of mines included in the cluster, mine lease areas and capacities

S. No.	Mine name/code	Village	Khasra Nos.	Mine lease area (ha)	Capacity (M ³)
1.	Bhikampura-A/ 58	Bhikampura	278	15.000	1,50,000
2.	Bhikampura-B/ 59	Bhikampura	278	16.250	1,62,000
Total					3,12,600

2. Project category : 'B1'

3. Type of mining

Manual surface mining of sand from the flood plain of river Sindh. No in-stream mining is proposed.

4. Project proponent and lease period

The proposed mine lease area has been given on lease to Madhya Pradesh State Mining Corporation, a public sector undertaking (P.S.U.) by the Govt. of Madhya Pradesh, Deptt. of Mining, for mining of sand. The lease period is from 22.09.2010 to 21.09.2020. The lessee has, in turn, sub-leased the mining lease areas to M/s Prime vision Industries Pvt. Ltd. 303, 3rd Floor Vishal Chambers P-1 Sector-18, Noida-201301, and M/s Esteem Infrabuild Pvt. Ltd., P-4 Lal Bahadur Nagar, Durgapura, Jaipur (Raj.)-477001 for a period of 5 years. The above sub-lessees will carry out sand excavation from the mines after getting environmental clearance.

9.1 Project description

Salient features about the project

- (i) Latitude : 26 ° 14' 45.815" to 26 ° 15' 32.370"
(ii) Longitude : 78 ° 48' 8.391" to 78 ° 48' 59.323"
(iii) Elevation : From 121 m to 128m

- (iv) Survey of India Toposheet Nos: 54J15 and 54J16
(v) Nearest town : Seondha
(vi) Nearest railway station : Datia
(vii) Nearest airport : Gwalior
(viii) Nearest highway : SH-19 and SH- 45

9.1.1 Mineable area, working depth and mineable reserve

Table 10.5.1 Mineable area, working depth and mineable reserve

S.No.	Mine name/Code	Mineable area (ha.)	Working depth below ground level (m)	Mineable reserve (M ³)
1	Bhikampura-A/58	11.00	2.55	1,50,000
2	Bhikampura-B/59	11.50	2.95	1,62,000
	Total	22.50		3,12,000

9.1.2 Replenishment plan

For sustainability of river sand mining, it is necessary that the mine pits formed as a result of sand excavation are refilled with sand by natural process of replenishment in a reasonable period of time so that the area is again available for mining. The rate of excavation should be decided in accordance with the rate of replenishment which is the rate at which sand/gravel is deposited on the river flood plain by the river during monsoon season. However, determination of site-specific rate of replenishment is quite difficult as it is dependent on several factors such as geology and topography of the catchment area of the river, breadth of the flood plain, rainfall in that particular year (which is quite variable and not very much predictable much in advance), etc.

Dandy-Bolton formula is generally used to calculate the sediment yield.

However, this formula can give only a quick rough approximation of mean sediment yield at regional basis (for the whole catchment area of the river) and it can, at best, be used only for preliminary watershed planning and its use to predict sediment yield for a specific location would be unwise because of the wide variability caused by local factors, not considered in the formula.

As per the replenishment plan of Bhikampura-A mine length and average width of the recommended area for mineral extraction have been taken as 0.52 and 0.26 km, respectively and the mineable mineral potential has been taken as 1,50,000 m³. Similarly, in case of Bhikampura-B mine length and average width of the recommended area for mineral extraction have been taken as 1.02 and 0.159 km respectively and the mineable mineral potential has been taken as 1,62,000 m³.

In mine plans of the concerned mines also, it has been specifically mentioned that the factor of annual replenishment has been taken into consideration while calculating the mineral reserves. It has also been observed that during flooding, all the pits replenish with sand. Hence, mined out areas in the pre monsoon

season will be completely replenished with sand during monsoon. Therefore, it has been assumed that the pits will be replenished after each monsoon.

10.4.3 Excavation, dumping and transportation

Excavation will be done manually. Depth of excavation will be restricted to 3m below ground level or the ground water table, whichever is less. If the rate of replenishment is not found keeping pace with the expected rate, the working depth will be accordingly reduced. The excavated material (sand) may have to be dumped for a short period within the mine lease area itself in a non-working block. Dumpers will be used for dumping. Transportation of sand will be done by dumpers/trucks/tractor trolleys. Excavation will be done only in open season and during day light hours. Leaving monsoon season when the mining and other related activities will remain suspended, average number of working days in a year has been taken as 280. Thus, on an average, about 2010 tons of sand will be produced in a day from the proposed cluster.

The capacity of transport vehicles will also vary with the type of vehicles used. However, for the sake of simplification, the average capacity of transport vehicle may be taken as 20 tons. At this rate, average number of trucks likely to be engaged per day works out to about 100. Thus 80-120 trucks are likely to be engaged daily in sand transportation.

10.4.4 Water requirement and supply

Total 49.3 KLD water will be required for dust suppression, toilet, and watering of plants and other purposes which will be drawn from Sindh river itself which is a perennial river with sufficient flow of water throughout the year. Total 0.8 KLD water will be required for drinking by mine workers which will be brought from the handpumps/wells/tubewells located in nearby villages with prior permission of and payment to the owner/owners.

10.4.5 Manpower requirement and supply

Manpower requirement for operation of the mines in the cluster is estimated as: supervisory (02), skilled (03) semi skilled (03) and unskilled (156). It does not include the manpower to be engaged in transportation as the transportation will be arranged by the purchasers themselves. Since many local villagers already have previous experience of working in mines, there appears to be no problem in supply of the required manpower.

10.4.6 Energy consumption

There will be no consumption of electricity as mining will be done only during day light period. Quantity of diesel to be consumed in transportation will depend on the distances of destinations from the project site.

10.4.7 Infrastructure

No permanent building or new road will be constructed. Only temporary day-rest shelter, portable toilet and an approach road of approx. length 0.089 km joining the project site with the nearby village bypass road will be constructed for transportation of sand from Bhikampura-A mine. This temporary infrastructure will be dismantled after the lease period is over.

10.4.8 Capital cost estimates

These include all items of one time expenditures such as cost of preparation of EIA/EMP, erection of boundary pillars for demarcation of mine boundaries, construction of temporary infrastructure as given in para 10.5.7, provision of face masks and first aid kit, expenditure on plantation and sapling distribution but do not include recurring expenditure on payment of annual royalty, expenditure incurred in excavation and dumping of sand, maintenance of infrastructure machinery, vehicles and plantations, organization of health check up camps and collection and testing of air/water/soil samples.

The various activities can be grouped into two categories. The activities coming under the first category are those which are to be undertaken combinedly for the whole cluster whereas the activities coming under the second category are to be undertaken separately for each individual mine in the cluster. Accordingly, the capital cost estimates for both categories of EMP activities are given below in the **Table-10.5.2 & 10.5.3**

Table 10.5.2: Capital cost of activities to be undertaken for the whole cluster

S. No.	Particulars	Qty.	Rate (in Rs.)	Capital cost (Rs. In lakhs)
1.	Preparation of EIA/EMP	31.25 ha	Rs. 38292 per ha	11.97
2.	Construction of approach road	0.89 ha	Rs. 1,00,000 per km	0.89
3.	Distribution of saplings	3125 (@ 100 plants per ha)	Rs. 15 per sapling	0.47
4.	Installation of water sprinkler system	4 kms	Rs. 1.5 lakhs per km	6.0
5.	Road / river side plantation	2032	Rs. 500 per plant	10.16
6.	Rehabilitation of degraded forest	31.25 ha	Rs. 8,000 per ha	2.50
Total				31.99

Table 10.5.3: Cost of EMP activities to be undertaken separately for each mine

S.No.	Particulars	Capital cost (Rs. In lakhs)
1.	Demarcation of mine areas, mineable areas and erection of boundary pillars	0.10
2.	Provision of face masks and first aid box	0.05
3.	Provision of filters at each mining site for drinking water	0.10
4.	Provision of portable toilet	0.15

S.No.	Particulars	Capital cost (Rs. In lakhs)
5.	Construction of temporary day-rest shelter	0.35
	Total	0.75

Thus, the total capital cost of the project is estimated to be Rs. 33.49 lakhs.

10.5 Analysis of alternatives

No alternatives were considered as the project is site-specific and mineral-specific.

10.6 Baseline environmental status

10.6.1 Study area

The baseline environmental status was assessed in the core zones (mine lease areas of individual mines forming the cluster) and the combined buffer or impact zone of the cluster (within 10 kms from the mine boundaries). Since severity of impact is inversely proportional to the distance from the project site, the impact zone, was sub divided into three sub-impact zones viz.(i) high impact zone (0-2 kms), (ii) medium impact zone (2-5 kms) and low impact zone (5-10 kms)

10.6.2 Methodology

Both, primary and secondary data, were used in the assessment. For collection of primary data, investigation teams were sent to visit the core and buffer zones, collect air, water and soil samples and noise data, measure depths of sand deposits, lay out quadrats in forest area for phyto-sociological survey and biodiversity assessment, conduct village level and household level sample surveys in randomly selected villages in different sub-impact zones and to collect other relevant information about the environmental setting. Survey of India maps, satellite imageries, census data, district statistics book, forestry working plan and reports of various departments were used as secondary sources of information.

10.6.3 Environmental setting of the impact zone

(i) Forests/wildlife protected areas/biosphere reserve/eco-sensitive zone

There is no wildlife protected area, bio-sphere reserve or eco-sensitive zone in the impact area. The nearest forest area from the proposed cluster is located at a distance varying from 3.0 km to 3.8 km. Forest area of compartments 1 (part), 2 (part), 3, 4, 5, 6 (part), 7 (part), 10 (part), 11 and 12 of Seondha Range of Datia Forest Division lie in the impact zone. The forest is a tropical dry deciduous mixed forest and tropical thorny scrub forest of density varying between 0.2 to 0.4. General site quality of the forests is V with some patches of site quality IVB. Main tree species are *Prosopis juliflora*, *Anogonius pendula*, *Acacia nilotica*, *Prosopis cineraria* and medicinally important species are *Balanites aegyptiaca* and *Tephrosia purpurea*.

(ii) Major water bodies

There is no major water-body in the impact zone, other than the river Sindh itself.

(iii) Seismic sensitivity of the area

Datia district lies in seismic zone II which is a low seismic sensitivity zone.

(iv) Places of archaeological/tourism/religious importance

There is no place of archaeological, tourism or religious importance in the impact zone

(v) Defense installation

There is no defense installation in the impact zone

(vi) Other mines

There is no other mine in the impact zone of the proposed cluster.

10.6.4 Land environment

10.6.4.1 Legal status and present land use of mine lease areas

All the mine lease areas are govt.-owned revenue lands and are presently under no other land use such as cultivation. Also, there is no forest land involved.

10.6.4.2 Land use and land cover

Total area of the buffer or impact zone is 36,057.63 ha. The area presently under different land uses as per the LULC map prepared by interpretation of satellite imageries is, as given below –

(i) Agriculture	-	18772.99 ha
(ii) Forest cover	-	1976.43ha
(iii) Settlements	-	1920.15 ha
(iv) Water bodies	-	15.84 ha
(v) Open land	-	11500.65 ha
(vi) Barren land	-	2739.03 ha
(v) River bed	-	980.81 ha

10.6.4.3 Geology

Bhander formation of rocks.

10.6.4.4 Soils

Deep alluvial soil of yellowish-brown color and sandy loam texture.

10.6.4.5 Cropping pattern

Main crops in *rabi* season are wheat and mustard, whereas main *kharif* crops are sorghum and pearl millet.

10.6.5 Air environment

10.6.5.1 Climate

The area falls in semi-arid zone with average annual rainfall as 852.0 mm. Average normal maximum temperature in the month of May is 42.1 °C, although it

sometimes reaches as high as 48⁰C. The minimum temperature during the month of January is 7.1⁰C.

10.6.5.2 Ambient air quality

Concentrations of various pollutants in the atmosphere inside the impact zone are given in **Table 10.7.1**.

Table 10.7.1: Ambient air quality parameters

Parameter	Unit	Maximum	Minimum
PM ₁₀	µg/m ³	41.1	13.1
PM _{2.5}	µg/m ³	17.4	8.2
SO ₂	µg/m ³	6.2	<5
NO _x	µg/m ³	9.2	<5
CO	mg/m ³	<0.1	-

From these figures, it is obvious that the major pollutant is dust which is reflected in PM₁₀ and PM_{2.5} concentrations. However, these are within the permissible CPCB limits of 100 and 60 µg/m³, respectively. Concentrations of pollutant gases viz. SO₂, NO_x and CO are quite negligible.

10.7.5.3 Wind velocity

Wind velocity in the month of March-April was found to vary from 1.6 to 1.8 meters/sec. Prominent wind directions are NW and W.

10.6.6 Water environment

10.6.6.1 Surface water

The mines are located in the flood plain of river Sindh which is a perennial river having sufficient water flow throughout the year. There is no other major water body in the impact zone.

10.6.6.2 Surface water quality

Surface water quality parameters are found to be within permissible limits. However, it is not fit for drinking due to unagreeable test and presence of microbial load.

10.6.6.3 Ground water

The study area is a drought prone zone and water scarcity is a major issue, especially during summer season.

Depth of water table was found to be between 127 ft to 195 ft in the impact zone.

10.6.6.4 Ground water quality

Ground water quality was found to be satisfactory according to the test results of water sample collected.

10.6.7 Noise environment

Ambient noise level varies between 44 to 62 dB

10.6.8 Biological environment

There is hardly any vegetation in the core zones of the cluster except few stunted and lopped trees of *Babul*, Kardhai and *Prosopis* at the periphery and weeds and grasses. The main species in the forest of impact zone are *Prosopis juliflora*, *Zizyphus numularia*, *Zizyphus oenoplia*, *Capparis zeylanica*, *Acacia catechu*, *Anogeissus pendula*, *Zizyphus mauritiana*, *Balanites aegyptica* and *Tephrosia purpurea*. 31 species of terrestrial fauna, 68 species of avifauna and 16 species of aquatic fauna have been reported in the forestry working plan. No rare, endangered, threatened or endemic species of flora or fauna have been reported. Wild boars and blue bulls frequently raid and damage agricultural crops. No breeding or hibernating site of any wild life was observed near the sand mining area.

10.6.9 Socio-economic environment

The study area includes 50 villages in Mihona, Mehgaon, Gohad and Lahar tehsils of Bhind district and Seondha tehsil of Datia district within 10 kms from the mine boundaries as per majuli maps of the respective tehsils. The socio-economic status of the study area is shown in the **Table 10.7.2**.

10.7.2.: Socio-economic status of the study area

S. No.	Particulars	Details	
1	No. of villages	50	
2	Total population	36917	
	Male population	20491	(55.35%)
	Female population	16426	(44.65%)
3	Literacy	20615	(55.84%)
	(a) Male	14136	(68.98%)
	(b) Female	7319	(44.55%)
4	Main workers	14050	(38.05%)
	(a) Male	11102	(79.01%)
	(b) Female	10114	(71.98%)
5	Marginal workers	1941	(7.19%)
	(a) Male	1058	(54.50%)
	(b) Female	820	(45.50%)
6	Non workers	24294	(65.80%)
	(a) Male	9439	(38.85%)
	(b) Female	14755	(61.15%)

10.7 Anticipated impacts and mitigation measures

The summary of anticipated environmental impacts due to the proposed project and mitigation measures are given below in **Table – 10.8.1**

Table 10.8.1: Summary of anticipated environmental impacts

Impacts	Mitigation measures
Land environment	
<ol style="list-style-type: none"> 1. Creation of temporary pits after excavation of sand. These pits will be filled by natural process of replenishment in due course of time. 2. No Impact on topography, drainage pattern, soil quality, or agriculture is anticipated. 3. Very little possibility of soil erosion/subsidence as working depth will be confined to only 3 m. below ground level. 4. Some adverse visual impact due to formation of the mining pits. 	<ol style="list-style-type: none"> 1. Regular monitoring of sand replenishment in mined pits and reduction of working depth if replenishment rate is found inadequate. 2. No excavation within a distance of 30m. from the river bank. 3. Factor of slope stability to be taken into consideration while excavating sand from the pit. 4. Tree planting along the approach road to minimize adverse visual impact.
Air environment	
<ol style="list-style-type: none"> 1. Since the mining will be done without blasting, dust generation during excavation will be insignificant. However, there will be some deterioration in air quality as a result of generation of dust during loading and transportation. 2. Air-borne dust particles may cause diseases of respiratory system. 3. Emission of smoke and other harmful gases from transport vehicles may deteriorate air quality 	<ol style="list-style-type: none"> 1. Regular sprinkling of water on haul roads for dust suppression. 2. Compaction of haul roads. 3. Planting on both sides of haul roads. 4. If sand is dry, water will be sprayed over it to make it wet. 5. Transport vehicles will be covered with tarpaulin. 6. Regular maintenance of vehicles. 7. Regular maintenance of roads-fortnightly scraping of road surface.
Water environment	
<ol style="list-style-type: none"> 1. No adverse impact on ground water regime is anticipated as there is no proposal of stream bed mining or diversion of any stream and the depth of mining is to be restricted to 3m. bgl. or the ground water table, whichever is less. 2. The water drawal is estimated to be only 89.6 KLD from the river and 0.8 KLD from the nearby ground water sources. Since the river has sufficient water flow throughout the year and there is not much ground water drawal, the impact of water 	<ol style="list-style-type: none"> 1. Use of temporary portable toilets at the project site. 2. No mining activity during rainy season. 3. Periodic monitoring of water quality.

Impacts	Mitigation measures
<p>drawal will also be insignificant.</p> <p>3. No impact on the quality of surface/ground water due to discharge from mining, habitations and leachates from solid waste dumps, etc is anticipated as there will be no discharge from mining. Mining will be done during day time by local workers. So, there will be no new habitation. Leachate from temporary sand dumps does not contain any toxic substance.</p>	
Noise environment	
<p>1. Generation of noise & vibrations from the machines and transport vehicles may cause some impact on the health of workers</p>	<p>1. Regular maintenance of vehicles and machines.</p> <p>2. Plantation along approach roads.</p> <p>3. Regular health check up.</p> <p>4. Only trained workers to be allowed to operate machines.</p> <p>5. Regular maintenance of smoke silencers.</p> <p>6. Creation of awareness among truck drivers not to unnecessarily blow loud horns.</p> <p>7. Periodic monitoring of noise levels</p>
Biological environment	
<p>1. No adverse impact on forest resources and economically or medicinally important plant species is anticipated. There is no threat to terrestrial or aquatic fauna, biodiversity or wild life. However, there may be some retardation in growth of plants due to deposition of dust on foliage. Dust generated during transportation of sand may cause some harm to people and animals.</p>	<p>The following green areas are proposed to be developed :-</p> <p>a) Road side plantation over length of 0.089 km on both sides of the approach road.</p> <p>b) Road side plantation over a length of 1.520 km. on both sides of the existing road to be used in transportation of sand.</p> <p>c) Planting over a length of 1.860 km. along the river side above highest flood level.</p> <p>d) Free distribution of 3,125 no. of saplings to villagers in Bhikampura and Ruhera villages for planting on field bunds and homesteads.</p> <p>e) Rehabilitation of 31.25 ha. of degraded forest in the impact zone.</p>
Socio-economic environment	
<p>1. Direct employment to about 164 persons in mining and other related activities and indirect employment to hundreds of people.</p> <p>2. Improvement in economic status due to increase in income.</p>	<p>1. Engagement of locally available workers on priority.</p> <p>2. Organization of regular health check up camps for workers and villagers twice in a year.</p>

Impacts	Mitigation measures
3. Some health implications on the workers engaged in mining and other related activities due to noise and air pollution.	

10.8 Environmental monitoring programme

10.8.1 Soil

Soil samples will be collected from strategic locations once in a year and got tested for physico-chemical properties.

10.8.2 Water

Depth of water table will be measured twice in a year. Surface and ground water samples will be collected once in a year and got tested / analyzed for their physico-chemical and micro-biological properties.

10.8.3 Air

Air quality monitoring will be carried out as per the norms of CPCB.

10.8.4 Noise

Noise levels will be recorded as per CPCB norms at the designated three locations.

10.8.5 Health and sanitation

Health check up camps will be organized twice in a year. Clean drinking water and toilet facility will be provided to workers.

10.8.6 Mitigation measures

Regular monitoring of the implementation of mitigation measures will be done.

10.8.7 Replenishment of sand

Monitoring of the rate of replenishment will be done annually, immediately after the monsoon season.

10.8.8 Survival and growth of plantations

Plantations raised will be monitored for the survival and growth of plants. Measurements will be made twice in a year in the months of November and May.

10.9 Additional studies

10.9.1 Public consultation

Public hearing will be conducted as per the provisions of E.I.A. notification dated 14-09-2006 issued by MoEF and the views expressed, suggestions given and objections raised in it will be duly considered and responded to in the final report.

10.9.2 Risk assessment and disaster management plan

10.9.2.1. Risk analysis

Risk analysis has been conducted in which possible risks have been identified. Risk likelihood levels have been categorized as L₁ (almost certain), L₂ (quite likely), L₃ (possible), L₄ (unlikely) and L₅ (rare). Consequences have been categorized as C₁ (catastrophic), C₂ (major), C₃ (moderate), C₄ (minor) and C₅ (insignificant). Points ranging from 1 to 25 have been assigned for different combinations of risk likelihood (L₁ to L₅) and consequences (C₁ to C₅). Three categories of risk rating on the basis of points scored have been made as high risk (1-6), medium risk (7-15) and low risk (16-25).

The following risks have been identified:

Accidents during mining due to slope failure, quick sand etc.

L₃ X C₂ = 8 (medium risk)

Accidents due to dump failure or subsidence

L₅X C₄ = 23 (low risk)

Accident during loading

L₃X C₄ = 18 (low risk)

Road accidents during transportation

L₃X (C₁-C₅) = 4 (high risk) to 22 (low risk)

Accidents due to inundation/flooding

L₅X C₁ = 11 (medium risk)

Occupational health risks

Excessive dust, noise and vibration can be counted as occupational health hazards. Other occupational health risks could be exhaustion, heat/sun stroke and irritation in eyes caused by sand. The likelihood of these risks is L₃ X C₄ in 18 (low risk)

10.9.2.2. Safety measures

- Sand excavation will not be done below the ground water table.
- Regular maintenance of machines will be done and these will be operated only by licensed and trained staff.
- Notices warning inadvertent entry of persons will be displayed at conspicuous places, particularly near mine entry.

- Danger signs will be displayed near the excavation sites.

10.9.2.3. Safety measures to prevent accidents during dumping, loading and transportation

1. Sand dump will not be made of very steep slope. It will be with proper angle of repose.
2. The loading truck will be brought to a lower level so that the loading operation suits to the ergonomic condition of the workers.
3. Loading should be done from one side of the truck only.
4. The laborers engaged in the loading operation shall be provided with gloves and safety shoes.
5. Opening of the side covers of the loading truck should be done carefully and with warning to prevent injury to the loaders.
6. Loading operation will be done during day time only.
7. Over loading will be strictly banned to avoid spillage of sand on the roads.
8. The dumpers/trucks will stand near the loading equipment and fully braked when the mined material is getting loaded.
9. The truck will be covered with tarpaulin to prevent any spillage.
10. No person will be permitted to enter into area where reversing of truck takes place. Stopper will be posted to guide reversing.
11. The transport vehicles must be maintained in good repairs and thoroughly checked at least once in a week.
12. Speed breakers will be constructed at strategic places to prevent over speeding.
13. The truck drivers must have proper and valid driving license.

10.9.2.4. Safety measures to prevent incidents during inundation/flooding

All mining/transportation operations will remain suspended during monsoon months.

10.9.2.5 Measures to mitigate occupational health risks

1. Personal protective equipments (PPEs) like dust masks/earplugs/muffs will be provided for use by the workers
2. First aid kits will be kept at the mine sites.
3. Day-rest shelters with amenities like resting, drinking water and toilet facilities, will be provided for mine workers.
4. All workers will be subjected to medical examination both at the time of appointment and subsequently, at half-yearly intervals by organizing health camps.
5. Dust will be suppressed by water spraying.
6. Rigorous activities will be avoided in hot weather.
7. At noisy working activity, exposure time will be minimized.

8. Telephone numbers of hospitals / doctors / call centre for ambulances will be displayed on notice board at the mine sites for emergencies.

10.9.2.6 Disaster management plan

The proposed project is a manual open cast surface mining project with shallow depth activities and as such, there is little possibility of any high risk accident due to side fall or collapse. However, all persons in the supervisory capacity will be provided with proper communication facilities for relief and rescue in case of any such eventuality. Training will be provided to the employees and workers regarding safety/rescue measures to be taken at the time of any accident or natural calamity.

10.9.3 Natural resource conservation

The rate of excavation (working depth) will not be allowed to exceed the rate of replenishment. No wastage of water will be allowed. All activities will be done during day time only to conserve energy.

10.9.4 R & R action plan

Two mines included in the cluster are situated in the river flood plain. There is no other land use such as agriculture or habitation. Thus, there will be no evacuation or displacement of population from the project area as a result of project activities and therefore, is no need of any R & R action plan.

10.9.5 Replenishment study

For sustainability of river sand mining, it is necessary that the mine pits formed as a result of sand excavation are refilled with sand by natural process of replenishment in a reasonable period of time so that the area is again available for mining.

10.9.6 Traffic study

There are two state highways viz; SH 19 and SH 45 in the area. These two state highways are connected by a 'Prime Minister Gram Sadak Yojna' tar road. From this tar road near Ruhera, there is a pebble road of length 3.35 km towards village Bhikampura. Village Bhikampura is joined to this pebble road by a kuchha road of length 1.03 km from Bhikampura-A mine, a motorable approach road of approximate length 89 meter will be constructed by the sub-lessee for transportation of sand.

For transportation of sand from Bhikampura-B mine, there is already a kuchha road of approximate length 490 meters to join the existing pebble road. The excavated material (sand) will be transported through above mentioned roads and state highways. Therefore, a study was conducted to assess the existing (Pre-project situation) traffic load near village Ruhera on 'Prime Minister Gram Sadak Yojna' tar road joining SH 19 and SH 45. For this, number of vehicles of

different types passing through this road in 24 hours were counted and the figures were converted into equivalent PCUs (Passenger Car Units) as per Indian Road Congress guidelines. Accordingly, the existing traffic load was assessed as 117 PCU/day. After commissioning of the proposed project, the traffic load will increase by about 454.5 PCU/day due to movement of sand transport vehicles.

10.10 Project benefits

Production of sand will facilitate infrastructure development, creation of new employment opportunities, enhancement of income and alleviation of poverty. It will also result in annual revenue generation to the tune of approx. Rs. 3.90 crores as royalty to the state government. Legalized sand mining will help in the prevention of illegal mining and loss of revenue. The proposed planting on both sides of the approach road/village road and free distribution of seedlings to the villagers for planting on their field bunds/homesteads will contribute to the enhancement of green cover. Organization of free health check up camps for mine workers and villagers will help in preventing and controlling diseases, thereby improving their general health status. Monitoring of ground and surface water for water quality as proposed in the project will help in early detection of any deterioration of water quality and in preventing the spread of water-borne diseases.

10.11 Environmental management plan

A comprehensive environmental management plan (EMP) has been prepared for mitigation of likely adverse impacts of the project, compliance of environmental regulations and also for the overall improvement in the physical and socio-economic environment of the area. The EMP has the following specific objectives:

- Conservation of environment
- Minimization of dust generation and air pollution
- Judicious use of water and other natural resources
- Safety, welfare and good health of workmen and surrounding population
- Vigilance against probable disaster and accidents
- Ensure effective operation of all control measures
- Monitoring of cumulative and long term impacts

The following specific activities/actions have been proposed in the E.M.P.

10.11.1 Demarcation of mine areas

Mine lease areas will be demarcated with the help of boundary pillars to ensure that the sand excavation is confined within the boundaries of notified mine lease areas.

10.11.2 Restrictions on mining

Working depth will be restricted to 3m. below ground level or the depth of ground water table, whichever is less. There will be no mining in the river bed or within a distance of 30m. from the edge of embankment.

10.11.3 Mitigation measures against degradation of land environment

- Piling of excavated sand/gravels, etc. in the river bed strictly prohibited. It will be done only at one designated place inside the mine lease area or on the adjoining land with prior permission of the land owner.
- Avoiding mining during monsoon season and at the time of floods
- Division of the mine lease area into annual working blocks
- Synchronizing mining schedule with the direction of water flow in the river and the gradient of the land.
- Making minimum necessary haulage roads and as far as possible in the direction parallel to the river bank and with least steepness towards the river bed.
- Road/footpath will be constructed at least 50 m. away from the river's edge.

10.11.4 Mitigation measures against degradation of water environment

- Erection of drain around the stacking dump to prevent leachate from reaching the river.
- No excess withdrawal of ground water beyond the recharge capacity.
- Avoid washing of trucks in the river

10.11.5 Mitigation measures against degradation of air environment

- Water sprinkling on unpaved roads for dust suppression
- Proper maintenance of approach road and other roads used in transportation of sand
- Ensure proper maintenance of vehicles used for transportation to control air emissions
- Cover transport vehicles with tarpaulin
- Construction of speed breakers at appropriate places to control the speed of vehicles
- Avoid overloading in transport vehicles
- Wetting of sand in case it is dry.
- Periodic scraping of road to prevent accumulation of loose dust on road and shifting it to the sides of the road
- Keep roads almost leveled to ensure smooth movement of vehicles

10.11.6 Mitigation measures for noise environment

- Regular maintenance of vehicles and machinery

- Keeping smoke silencers of vehicles in good condition
- Minimum use of pressure horns/DJ sound systems in vehicles while plying near habitations

10.11.7 Mitigation measures against degradation of biological environment

- Distribution of bamboo plants and saplings of tree species such as teak, babul, khamer, sissu, siris, neem, aonla, etc. to willing villagers for planting on their field bunds and of edible fruit bearing species such as ber, guava, mango, jamun, pomegranate, lemon, munga, etc. for homestead planting.
- Plantation of shade bearing and ornamental tree species such as mango, tamarind, jamun, neem, amaltas, gulmohur, etc. in the premises of panchayat building, school and other community buildings in the village with the consent of concerned authorities
- Roadside planting of tree/shrub species along the stretches passing through the village
- Planting along the river bank for slope stabilization and erosion control
- Rehabilitation of degraded forest in the buffer zone
- Avoidance of migratory route of wild animals, if any

10.11.8 Mitigation measures for socio-economic environment

- Engagement of locally available manpower on priority in mining and other related activities to provide livelihood
- Organizing general health checkup camps in the village

10.11.9 Occupational health and safety

- Provision of face masks to workers to prevent ill effects of dust on health, especially respiratory system.
- Regular annual health checkup of workers
- Provision of first aid kits at the mine site
- Avoidance of mining activities when there is likelihood of subsidence or flood
- Avoidance of rigorous activities in the afternoon during hot weather

10.11.10 Provision of amenities

Provision of following amenities for workers at the mine site;

- Filter for clean and safe drinking water
- Temporary day-rest shelter
- Portable toilet

10.11.11 Minimization of use of natural resources

- Economy in the use of water. Total avoidance of the wastage of water.
- Manual and only day time mining to save energy

10.11.12 Training and generation of environmental awareness

- Organizing training for workers to impart skills and generate awareness about their personal safety from accidents and natural calamities, environmental conservation and hygiene.
- Organizing training for vehicle drivers to generate awareness about proper maintenance and upkeep of vehicles and avoidance of unnecessary blowing of horns.

10.11.13 Cost of implementation of E.M.P.

Thus, the total capital cost of EMP for the cluster is estimated to be Rs. 16.88 lakhs, whereas the total recurring cost per annum will be about Rs. 17.12 lakhs.

10.11.14 Corporate social responsibility (CSR)

Activities proposed to be taken up under CSR in two villages viz., Bhikampura and Ruhera by the sub lessees are shown in Table 10.11.1:

Table 10.11.1: Activities and amount to be spent under CSR

S.no	Activity	Quantity (nos.)	Rate	Amount (Rs. In Lakhs)
1.	Construction of Toilets	20	15,000	3,00,000
2.	Distribution of Books and stationary to poor students	50	2,000	10,000
Total				3,10,000

10.12 Conclusion

The E.I.A. study was conducted as per the standard ToR. Baseline status of land, air, water, noise, biological and socio-economic environment was duly assessed by conducting field investigation as well as by having an access to the available secondary information. The related project impacts were identified and evaluated. Considering all the possible ways to mitigate the environment al concerns, an E.M.P. was prepared which is dynamic, flexible and subject to periodic review.

From the study made, it can be safely concluded that the collection of sand from the proposed site is not likely to cause any significant adverse impact on the ecology or the physical or social environment of the areas. The excavated mineral is replenishable naturally and the excavation will not cause any irreversible damage to

the topography, drainage pattern, land use or land cover. Adequate measures will be taken to control fugitive emissions. The project will rather contribute to enhancement of green cover, increased revenue to the state government, increased availability of sand, generation of employment opportunities to the local people and overall development of the area.

