# EXECUTIVE SUMMARY

## 1. PROJECT DESCRIPTION

### Introductions

The subject mining lease area is located at forest range- G. F. Sonewani, Tahsil Waraseoni, Balaghat District (M. P.). The mining lease area is being operated by the lessee firm M/s J. K. Minerals, having Reg. office at Main Road, Balaghat (MP). It is as partnership firm and names of partners are given below:

1. Shri A. J. Trivedi
2. Shri N. J. Trivedi
3. Shri P. K. J. Trivedi
4. Shri Anish P. Trivedi
5. Smt. I. V. Trivedi

The originally lease was sanctioned for 10 years from 01.07.1982 to 30.06.1992 and after that lease has been renewed for further 7 year from 30.06.1992 to 29.06.1999. After that in year 2001, lease area further renewed for 20 year upto 29.06.2019. Since the Govt. of India amended Mines and Mineral Development Act 1957 now called MMRD 2015 under section 8 A (5), the mining period is now 50 years from lease sanction date i.e. 01.07.1982 to 29.06.2032 in case of subject proposal. State Govt. of MP has also issued directions accordingly void letter no. MRD-F-19-5/2015/12-1 Bhopal dated 12.03.2015.

The lessee has already obtained the environmental clearance from State Environment Impact Assessment Authority of MP for present production capacity of 50000 Tonne vides letter no. 550/EPCO/SEIAA/11 dt. 10/10/2011.

The subject mine is proposed for excavation of Manganese ore in 33.0 ha with Expansion in Capacity from 50000 MTPA to 80000 MTPA at forest range- G. F. Sonewani Range, Tehsil- Waraseoni Dist. Balaghat (MP) with mineral beneficiation. Presently mining activity has been carried out by underground fully mechanized method with the production capacity of 50000MTPA. M/s J. K. minerals has already obtained consent to operate from M. P. Pollution Control Board for underground mining method.

The committee suggested Terms of References ('ToR') for the preparation of the Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) through its letter no. 830/PS-MS/MPPCB/SEAC-II/TOR (019)/2016 Bhopal dated 13/5/2016**,** which are incorporated in the EIA/EMP report at their respective places.

**Details of the project**

**Table – 1**

| S. No. | Particulars | Details | Block-I | Block-II |
|---|---|---|---|---|
| 1. | Locations | | | |
| | A. Forest range | | G. F. Sonewani | |
| | B. Tehsil | | Waraseoni | |
| | C. District | | Balaghat | |
| | D. State | | Madhya Pradesh | |
| | Toposheet No. | | 55O/13 | |
| 2. | Latitude<br>Longitude | | 21°51'47.4" to 21°52'02.3" N<br>79°56'44.2" to 79°57'03.4" E | 21°52'38.5" to 21°52'58.8" N<br>79°58'17.0" to 79°58'35.2" E |
| 3. | General ground level MSL | | 353 m | 375m |
| 4. | Temperature | | Min: 8.5°C and Max: 47.5°C | |
| 5. | Nearest Highway | Katangi- Lalburra Road | 2.25km – SSW | 3.50km - ESE |
| 6. | Nearest Railway Station | Chote Kochewahi | 8.50km | 10.75km |
| 7. | Nearest Airport | Nagpur | 126.0km | |
| 8. | Nearest Tourist Place | | None within 10km radius | |
| 9. | Archaeological Important Place | | None within 10km radius | |
| 10. | National park/Wild Life Sanctuaries | | None within 10km radius | |
| 11. | Reserved / Protected Forest | | G. F. Sonewani RF | |
| 12. | Nearest major city with 100000 population | | None within 10km radius | |
| 13. | Nearest Town / City within 10km radius | | None within 10km radius | |
| 14. | Nearest village | | Penditola- 1.30km – W | Kauritola – 3.25km – ESE |

| | | | | |
|---|---|---|---|---|
| 15. | Nearest River | Sarathi River | 7.40km- N | 5.50km - NE |
| 16. | Nearest Lake/ Ponds | Katngajhari Canal<br>Chapa Tank<br>Katangjhari Tank<br>Kas Nalla<br>Dhokriya Nalla<br>Tondiya Nalla<br>Sarathi Tank<br>Kamti Talab<br>Water reservoir | 2.30km - SSE<br>2.75km - WSW<br>1.75km - SSE<br>6.40km- S<br>4.40km - SE<br>5.50km -E<br>7.0km – NNE<br>6.50km – E<br>2.90km - E | 3.80km - SSW<br>5.50km - WSW<br>3.50km - SSW<br>8.0km - S<br>7.25km- SE<br>3.75km- SE<br>4.70km- N<br>4.50km- ESE<br>1.50km- SSE |
| 17. | Nearest Hill Ranges | | G. F. Sonewani | |
| 18. | Source of Water for mine | | Dug well, Hand pump, Mine pit | |
| 19. | Other mines located within 10km radius | | 1. Pacific Export, Netra<br>2. A. P. Travedi Sons, Ramrama 43.086ha<br>3. J. K. Minerals, Katangjhari - I<br>4. J. K. Minerals, Katagjhari -II<br>5. Vijay Khandelwal, Botejhari<br>6. Sandesh Developers, Kamthi<br>7. J. K. Minerals, G. F. Sonewani, 10.0ha | |
| 20. | Industry located within 10km radius | | None | |

*Source:* ***Field Survey***

**Mining lease status**

The subject mine is proposed for excavation of Manganese ore in 33.0 ha with Expansion in Capacity from 50000 MTPA to 80000 MTPA at forest range- G. F. Sonewani Range, Tehsil- Waraseoni Dist. Balaghat (MP) with mineral beneficiation. Presently mining activity has been carried out by underground fully mechanized method with the production capacity of 50000MTPA. M/s J. K. minerals has already obtained consent to operate from M. P. Pollution Control Board for underground mining method.

**Mining Details**

**Table –2**

| S. No. | Particulars | Details | |
|---|---|---|---|
| | | **Block-1** | **Block-2** |
| 1. | Type of Mine | Underground | |
| 2. | Mining Lease Area | 33.0 ha | |
| | | 18.0 ha | 15.0ha |
| 3. | Existing Pits & Quarries | 2.9511ha by opencast working | |
| | | 2.0043ha | 0.9468ha |
| 4. | Existing Dumps | 5.6202ha | |
| | | 0.2690ha | 5.3512ha |
| 5. | Existing Infrastructure | 0.1559ha | |
| | | 0.0559ha | 0.10ha |
| 6. | Existing roads | 0.9759ha | |
| | | 0.4959ha | 0.48ha |
| 7. | Existing storage of rejects | 0.7788ha | |
| | | 0.5088ha | 0.27ha |
| 8. | Mineral Storage | 2.9183 ha | |
| | | 1.4783ha | 1.44ha |
| 9. | Existing Plantation | 10.06ha | |
| | | 5.35ha | 4.71ha |
| 10. | Water body | 1.25ha | |
| | | 0.75ha | 0.50ha |
| 11. | Existing backfilled area | 0.2055ha | |
| | | 0.2055ha | Nil |
| 12. | Mineable Reserve | 1365940.80MT | |
| | | 13,28,455.80MT | 37,485.00MT |
| 13. | Ultimate depth of mining | Upto 252m MSL | Upto 272m MSL |
| 14. | Method of mining | Other than fully mechanised | |
| 15. | Present capacity of mines | 50000 metric tonnes per annum | |
| 16. | Proposed Capacity of Mine | 80000 metric tonnes per annum | |
| 17. | Expected Life of Mines | 18 years | |
| 18 | Lease Period | upto 2032 | |
| 22 | Stripping Ratio | 1:0.1 | |
| 23 | Existing mode to | Road | |

| | | | |
|---|---|---|---|
| | transportation of Manganese ore | | |
| 24 | Area to be covered under dumps at the end of conceptual period | 0.2690ha | 5.3512ha |
| 25 | Area covered under pit | 2.0043ha | 0.9468ha |
| 26 | Area to be reclaimed by lease period end | 1.0ha | Nil |
| 27 | Area to be covered under plantation by lease period end | 15.2500 ha | |
| 28 | Area to be covered under water reservoir by lease period end | 1.50 ha | |
| 30 | Ground water table | | |
| | Monsoon period | 8 bgl | |
| | Dry month | 10m bgl | |
| 31 | Production per day in MT | 244 | 23 |
| 32 | Truck/dumper required per day @ 24MT | 10 | 01 |

**Source**: Approved Mining Plan by IBM

**Mineable Reserves and Life of Mine**

**Anticipated Mine Life**

Total mineable reserves for both block = 13,28,455.80 + 37485.00 = 1365940.80MT

Life of mine is on the basis of the available Manganese ore in Block-I and Block-II

| | | |
|---|---|---|
| Total minable reserves | - | 13,65,940.80 MT |
| Total production of saleable ore (both block) in SOM period | - | 3,37,133.75 MT |
| Balance reserves in both block | - | 10,28,807.05MT |
| Hence mine life @80000MTPA | - | 5+ 10,28,807.05/800000 = 12.86 |
| Thus total mine life | - | 5+ 12.86 = 17.86 says 18 years |

The life of the mine is estimated till exhaustion of the Manganese ore of the area. Entire production of sub-grade ore may not be utilized and marketable. For this scheme of mining the reserves have been worked out a fresh considering the total available reserves in the area, mines the total production so far from the underground mining.

**Method of Mining**

The area has a long history of open cast (dump mining) as well as underground working. The underground mining in the area was in progress for the last many

years roughly from periods of 1967 up to 1970 as per old record and 1996 to 1999 in the central portion of the area. This activity was interrupted due to expiry of lease period and intervention of the Forest Department, Govt. of Madhya Pradesh. After the renewal the activity of mining consisted only of recovery of ore from old mineralized dumps. The underground workings falling in the central part of lease area are flooded for want of any mining activity since 1999. During the earlier scheme of mining period three vertical boreholes (BH-1 to BH-3) were completed in Block-1, out of three boreholes, BH1 and BH2 were positive whereas BH3 is negative and encountered pegmatite at the depth of about 120m.

In Block-2, it was proposed to give eight vertical boreholes. The lessee has completed six boreholes i.e. BH1, BH2, BH3, BH4' BH5 & BH6. Out of six bore holes one two bore holes i.e. BH2 & BH6 were positive whereas other are negative. BH3 and BH5 encountered pegmatite at the depth of about 55m and 33m respectively.

Presently underground mining has been carried out and same method will be done in future also. Lumps of Mn ore are being transported from pit bottom to surface mechanically. Regular use of explosive is being done in the area. From the loading point of view, mineral is transported by trucks/ dumpers to the user industries. Loading of mineral into trucks/dumpers is being done by loader and manually, also the same will be continued in future also.

**For Block-I**

Most of the development work is proposed by drives, x-cuts, winzes/raises in the ore body itself and the development work yields production. As such no waste is expected to be generated. Basic parameters of underground mining will remain unchanged in general unless special difficulties are presented in the course of mining.

The stoping operation has been started on completion of development up to 7.5 meters from western boundary of Lease area.

The method of stoping proposed to be followed is flat back Cut & fill method. The fill used will be sand and waste material generated in stopes. Required sand shall be obtained from nearby river.

Temporary support of stope back shall be done by roof–bolts of 1.5m length spaced at 1m grid pattern. Where necessary additional support/pillar shall be given to ensure safety.

The ore broken in stopes is hoisted to upper level by a hoist through skip which unloads into a tub. The loaded tub is trammed to grizzly at that level and unloaded in bin from where it is hoisted to surface for further processing.

Similar method of stoping is proposed to be followed in Pit No.:1 and Pit No.:3. Required permission from IBM & DGMS shall be obtained prior to starting of stoping operation. A pillar of about 10m shall be left unmined on either side (East & West) of Pit No.: 3 in P3/W6 incline. So that these entries could be used to access Ore deposit beyond north of present Lease boundary. Necessary application for lease is already submitted by the lessee.

**For Block-II**

Most of the development work is proposed by drives, x-cuts, winzes/raises in the ore body itself and the development work yields production. As such no waste is expected to be generated. Basic parameters of underground mining will remain unchanged in general unless special difficulties are presented in the course of mining.

The stoping operation has been started on completion of development up to 7.5 meters from western boundary of Lease area. The method of stoping proposed to be followed is flat back Cut & fill method. The fill used will be sand and waste material generated in stopes. Required sand shall be obtained from nearby river. Temporary support of stope back shall be done by roof –bolts of 1.5m length spaced at 1m grid pattern. Where necessary additional support shall be given to ensure safety. The ore broken in stopes is hoisted to upper level by a hoist through skip which unloads into a tub. The loaded tub is trammed to grizzly at that level and unloaded in bin from where it is hoisted to surface for further processing. Similar method of stoping is proposed to be followed in Pit No.1 and Pit No.3. Required permission from IBM & DGMS shall be obtained prior to starting of stoping operation. A pillar of about 5 m shall be left unmined on south-west of main entry i.e. Incline-2, so that this entry could be used to access Ore deposit beyond west of present Lease boundary. Necessary application for lease is already submitted by the lessee

**Requirements for the project**

**Land Requirement**

Total mining lease area is 33.0Ha. The status of the land is given below**:**

**Table -3**

| District/ State | Taluka | Forest range | Compartment No. | Area |
|---|---|---|---|---|
| Balaghat (MP) | Waraseoni | G. F. Sonewani Block-1 | Part of 467, 468 | 18.0 ha |
| | | Block-2 | Part of 464 & 466 | 15.0 ha |
| | | | Total | 33.0ha |

**Source**: Approved Mining Plan by IBM & P-II form

**Water Requirement**

The total water requirement is 150KL/day.

**Manpower Requirement**

Estimated requirement of manpower for this project will be about 580 no. Details has been given in chapter -2

**Power Requirement**

Power requirement is being made available from M.P. State Electricity Board. For smooth operation, four DG sets in Block-I and one DG set in Block-II has been installed. Solar energy has already been used in site office, rest shelter and details has been given in below table

| Location | Capacity | Type |
|---|---|---|
| Pit office | 2.00 KW | Solar Battery |
| Mine office<br>Rest house at Ramrama | 2.0 KW | Solar Battery |
| Weight Bridge | 0.5 KW | Solar Battery |

## 2.0 DESCRIPTION OF THE ENVIRONMENT

**Baseline details**

During the study period, ambient air quality and noise level monitoring was done at 8locations whereas, surface & ground water sampling was carried out at 9 & 9 locations respectively and soil sampling was done at 5 locations. Results for the same are summarized below:

**Table –4**

**Baseline Data: 1st March, 16 to 31st May, 2016**

| Particulars | Details | Standards |
|---|---|---|
| **Ambient air quality** | | NAAQS |
| $PM_{10}$ | Max. 84.84 & Min. 41.03 | 100 µg/m$^3$ |
| $SO_2$ | Max. & Min. <6.0 | 80 µg/m$^3$ |
| $NO_2$ | Max. 12.27 & Min. <8.0 | 80 µg/m$^3$ |
| **Noise level** | | CPCB Standard |
| Day time (6:00 am to 10:00 pm) | Max. 68.8 & Min. 42.2 | 75 Leq. dB (A) |
| Night time (10:00 pm to 06:00 am) | Max. 42.2 & Min. 32.6 | 70 Leq. dB (A) |
| **Water quality** | IS 10500:2012 (Desirable limits) | |
| **Surface water** | | |
| pH | Max. 8.12 & Min. 6.99 | 6.5-8.5 |
| TDS | Max. 342.00 & Min. 98.00 | 500 mg/l |
| Total Hardness | Max. 220.00 & Min. 60.00 | 300 mg/l |
| **Ground water** | | |
| pH | Max. 8.01 & Min. 6.53 | 6.5-8.5 |
| TDS | Max. 274.00 & Min.80.00 | 500 mg/l |
| Total Hardness | Max. 268.00 & Min. 74.00 | 300 mg/l |

**Biological environment**

Since there are no notified endangered species in the area, which may be affected due to the mining activities, therefore the biological environment will not have significant impact due to proposed activity. The impact on the biological environment due to amount of dust generation is minimised by well-developed green belt in and around mining lease area.

**Mitigation measure**

Extensive plantation is being carried out around the mine site, which is serving not only as a sink for pollutant but also as a noise barrier. Lessee has planted about 15573 no of trees in subject lease area and other lease area i.e. Katangjhari -1 (K-01) and Katangjhari-2 (K-02) and own private land, which is near the lease area, which is covered about 17.455ha area. out of 17.455ha area, 5.35ha and 4.71ha area is planted in block-I and block-II respectively. Plantation has been carried out by considering that each plant cover about 3x3 m area and survival rate is considered about 80%. Plants like Neem, Mango, Karanj, Ashok and other varieties have been put in consultation with local forest department

- Proper land management to restore the ecological conditions in the region
- Proper handling of mineral and overburden will significantly reduce fugitive emissions and hence minimal impact is expected on surrounding flora and fauna due to deposition of dust
- Proper implementation of comprehensive green belt development programme as given in the report

## 3.0 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

**Impact on Air Environment**

The main pollutants from the existing & proposed mining activity will be $PM_{10}$ due to mining operations. Fugitive emissions are generated during various mining activities such as drilling, blasting, breaking, crushing and loading etc. The primary blasting emissions are quite substantial over a large area in mines but these emissions last only for a few minutes. The results of the background $PM_{10}$ concentration at all receptors over the area are insignificant and are very low as compared to the standards prescribed by the CPCB for ambient air quality. Thus, it can be safely stated that due to the existing as well as proposed mining activity, there will be no insignificant impact on the existing ambient air quality. Following air pollution control measures has already been taken to minimize negative impact due to mining activity:

- Dumping has been observed in near mine office of the lease area away from the nalla i.e. eastern direction.
- Over burden dumps has been observed as stabilized with legumes and grasses, which help to prevent the erosion of soil and to arrest the dust emission during windy days. These dumps should be completely stabilized and same shall be taken up at earliest as backfilling
- Water has been sprayed over the muck pile and dumps to reduce the dust generation and same will be continue in future also;
- Dust mask has been provided to all workers,

- Regular spraying of water by tanker fitted water sprinkling system over haulage and village roads and after capacity expansion frequency will be increased.
- Good plantation has been developed along the mining lease boundary.
- Periodic maintenance of haulage and village road
- Regular maintenance of vehicles and machinery's to control emissions and same will be continue in future also
- Use of wet drilling method like water injection system to reduce the dust emission and same will be continue in future also
- Crusher will be installed in the lease area with all supporting pollution control measures i.e. water spray arrangement on all transfer point and crushing point.
- Covered vibrating screen will be proposed for reducing of dust in atmosphere

**Impact on Water Environment**

Topographically the area is hilly and around the area the lessee has already constructed garland drains and settling tanks. Any solid wash off is collected through these drains which are connected with settling tanks, where the de-silted water is drained into local nala/ agriculture land. In the lease area there is partial backfilled Quarry and it is water logged. As in the area groundwater resource is available in the form of bore well and well near office of the lease area. The present working is encountered with sub surface ground water and seepage is observed in the underground working. As per the received information, the water table during the post monsoon season is around 8m bgl and in pre monsoon it is around 10m bgl. Ensuing five year to conceptual period proposals are given up to 252m MSL and 272m MSL in Block-I and Block-II respectively which will be below to GWT hence adequate pumping will be arranged. The water resource is available in the form of bore well/ dug well and hand pump and dependency of people in core zone is only the ground-water. One seasonal Nallah flows across ML area of block-II from North to South and also along strike over the underground workings. There is no other source of water on the surface except those pumped from the mine workings. The seasonal nallahs get charged in monsoon & dries up later.

Maximum make of water is in the open pits/ underground is generally during the monsoon season. To control the inflow of rain water into the pits garland drains have been planned. Pumps of adequate capacity will be installed with provision of spare pumps as well as spare parts. The water level in all the sumps will be kept at least 1.00 Meter below the overflow level. It is proposed to seal all the boreholes, likely to increase the water intake in the workings in the Post Monsoon.

Seepages of water in underground working have been diverted to main sump by making suitable drains all along the drives and crosscuts. Following control measures have been observed within lease areas.

- Good network of garland drain have been developed. Dumps have been provided with garland drains ending at settling pond/pit.
- Bunds have been provided to remove the suspended solids.
- Cleaning of drains has been observed which help to arrest the siltation.
- The accumulated water is being provided to farmers of the villages also apart from other uses
- Toilet facility has been provided near to the office
- Reusing of water for dust suppression, wet drilling and green belt development in O/C and U/G mine
- Stone pitching and bund has been observed to control the soil erosion.

**Impact on Noise**

Major noise generating sources may be considered as excavation, blasting, drilling and loading and dumper movement used for transportation of minerals. In order to control the noise levels in the work zone following measures are proposed:

1. Hydraulic drills has been used for drilling;
2. All moving and non-moving parts has been properly lubricated; and

A) **Blasting**

- Blasting has well designed and arranged in such a way that limited number of holes has been blasted at a time with the use of short delay detonators in combination with sequential blasting machine and also maintaining the charge per delay;
- Explosives has been blasted in confined stage or optimum stemming column is maintained during charging of holes;
- Blasting has been practiced between 12 noon's to 4 pm when temperature inversions are not likely to be there and air density is less.
- Row of trees has already been planted all around mine premises to reduce propagation of noise and dust due to blast outside the lease;
- No blasting has been carried out when the sky is clouded because cloud cover can cause reflection of pressure wave back to the ground level at some distance from the blast;
- The workforce working at the mining face, where high noise level is expected, shall be provided with protective device for occupational safety, however it's wearing should be made compulsory to them.
- Inspection and maintenance scheduled need to be nicely formulated and strictly adhered to.
- Noise generating machinery, should strictly be in compliance with the recommendations of the manufacturers. This would ensure an installation free from vibration and exhaust leaks which are also major contributors to increased noise levels

- Ground vibration study is recommended at least once in year to avoid in complication and conflict with the villagers.
- Maintenance of machines and vehicles has been carried out regularly. The scheduling of frequency is need attraction.
- Use of physical barriers and green belt development around the mine to restrict the noise from going outside the mine boundary during operation

  All the necessary precautions such as hoisting of red flag at a safe distance, alarming the people by whistling and shouting will be taken before blasting

  **Impact on Land & Soil Environment**

  All precautions has been taken to curb air pollution and soil erosion caused due to stored mine waste by constructing garland drain and grasses. The mineral or overburden does not contain any harmful ingredients, which could leach down to the water table and pollute the ground water. Hence this will not posses any threat to water and land environment. During the opencast mining, generated waste has been dumped at lease area which is covered about 0.2690ha and 5.3512ha area in block-I and Block-II respectively and cumulative dumps area of both blocks is 5.6200ha area. Presently all waste dumps are observed inactive and afforested by way of plantation and grasses. About 0.7788ha area has been covered by mineral reject in both blocks. Some mineral reject dumps are observed active which is used for future dumping purpose. During the proposal period, assessment of old dump will be carried out for availability of Mn ore, if Mn ore found in dumps, dumps ore working will be carried out. Following measures shall be taken to avoid/minimise the adverse effects of proposed mining activity:
  - Vegetation shall be removed only from the specific site on which extraction of mineral to be taken place, if any.
  - The soil will be used for afforestation purpose and will not be kept active for longer period.
  - Re handling of dump shall be taken carefully to avoid spillage towards agricultural field.

## 4.0 POST PROJECT ENVIRONMENTAL MONITORING PROGRAMME

**Table –5**

**POST PROJECT MONITORING PROGRAMME**

| S. No. | Environmental Attributes | Locations | Parameters | Period and Frequency |
|---|---|---|---|---|
| 1 | Ambient Air quality | • Mine Site (Block-I & Block-II)<br>• Village – Katangjhari- I & II | $PM_{10}$, $SO_2$, NOx, CO and as directed by MPPCB | 24 hr. samples every month during mining phase |
| 2 | Ground water | Existing mine borewell, well (both block) and | Drinking Water parameters as per IS 10500 | Pre Monsoon and Post Monsoon |

| S. No. | Environmental Attributes | Locations | Parameters | Period and Frequency |
|---|---|---|---|---|
| | | hand pumps of penditola and Katangjhari | | |
| 3 | Surface water | Mine pit (both block), water reservoir near block-II & Katangjhari Tank | pH, conductivity, Alkalinity, TS, TDS, TSS, Total Hardness, Cl, $SO_4$, Ca, Mg, K, Na, Al, Mn, Fe, Zn, Total Coliform | Pre Monsoon and Post Monsoon |
| 4 | Ambient Noise | mine site (near the working pit during excavation, drilling, blasting and around the lease periphery) total 04 point | dB (A) levels | Hourly day and night time Leq levels every quarter |
| 5 | Mines Water Discharge into drains | Mining Area, underground seepage water, mine discharge after settling tank | pH, conductivity, Alkalinity, TS, TDS, TSS, Total hardness, Cl, $SO_4$, Ca, Mg, K, Na, Al, Mn, Fe, Zn, | Pre and Post Monsoon |
| 6 | Soil Quality | In and around the site | Organic matter, P, K, N, heavy metal | Annual |

## 5.0 ADDITIONAL STUDIES

The Additional Studies conducted as per the Terms of Reference (ToR) issued by SEIAA/SEAC vide letter no. 830/PS-MS/MPPCB/SEAC-II/TOR (019)/2016 Bhopal dated 13/5/2016 with regard to Public hearing & subsequent CSR plan.

## 6.0 PROJECT BENEFITS

**Socio-economic benefits**

It is appreciated that project authorities that area in regular touch with local surrounding villages to monitor the implementation of various developmental schemes made.

**Existing development activities**

M/s J. K. Minerals has already been carried out number of welfare activities in the area viz.:

| | |
|---|---|
| 1- Donated A College Building in the Balaghat for higher education | Approximate cost of Building is Rs. 5,00,000/- |
| 2-Eye camp at Village Ramrama | Rs. 37000/- |
| 3-Regular supply of material for maintenance of village road | Rs.3,00,000/- per year |
| 4- Donation to Red Cross Hospital for improving the environment near Rani Talab | Rs. 50,000/- |
| 5-Creation Charitable trust for helping needy & deserving cause | Rs.2,50,000/- annually |
| 6-Construction of High School Building at Village Katangjhari | Rs. 17.00Lac |
| 7-Medical check-up of employees and their family each year | Rs 1.0 Lac |
| 8-Additional fund for socio economic development for each year | Rs 2.0 Lacs |
| 9-Constructed Hanuman Mandir at Katangjhari village | Rs. 3.0 Lacs (Approx) |
| 10-Constructed a Shabha Manch at Katangjhari village | Rs.1.0 Lac (Approx) |
| 11-Constructed a Main Gate for Ramrama Mahadev Mandir Entrance | Rs.1.0 Lac |

Following activities has been carried out frequently

1. Repairing of Village road Katangjhari to Ramrama.
2. Medical camp in village i.e. Katangjhari, Ramrama.

## 7.0 ENVIRONMENT MANAGEMENT PLAN

### SOCIO-ECONOMIC ENVIRONMENT

The impacts on the different components viz employment, housing, educational, medical and transport facilities, fuel availability, economics, status, health agriculture is not significant because size of project is very small. However, it would definitely increase the employment opportunity (primary as well as secondary) in the project area. Some of these impacts would be beneficial. It is not out of place to mention that another two mines, which in the vicinity and both are operational at small level**.**

The expectation of the people of the area is concerned towards employment, education, and health facilities. The literacy rate of the study area is medium. The literacy rate may be increased with the economic benefits may arises from the mining activities. Further the villagers and workers may also get benefitted by medical camps and primary medical facilities, which will be provided by the management.

### GREENBELT DEVELOPMENT AND PLANTATION PROGRAMME

Plantation has been done within the northeastern barrier zone of 7.5m, benches & backfilled area. Plantation has been carried out by considering that each plant cover about 3x3 m area and survival rate is considered about 80%. Plants

like Neem, Mango, Karanj, Babool and other varieties have been put in consultation with local forest department. Sapling has been planted in 30-cm. deep hole covered with soil and manure.

**OCCUPATIONAL HEALTH AND SAFETY MEASURES**

Measure to control and minimize the risks at workplace, SIS will implement Health & Safety with the following objectives:

- To prevent hazards may be due to slope failure
- To provide safe and healthy environment to all the employees.

Fugitive dust, noise and fines may affect the health of workers. Safety of employee during operation will be taken care of as per mine regulations act 1961. To avoid any adverse affects on the health of workers due to dust & noise, sufficient measures have been provided in the mining project. These may include:

- Provision of rest shelters for mine workers with amenities like drinking water, fans, toilets etc.
- Provision of personal protection devices to the workers;
- Dust suppression of haul road.
- First-aid facilities within lease area.
- Height, slope and width of dump shall be developed as per the approved mining plan.
- Regular medical examination shall be conducted for the employees.
- Working benches and dump benches shall be developed as per approved mining plan.

## 8. Implementation Schedule of Mitigation Measures

The mitigation measures which given in chapter-10 at EMP, suggested above shall be implemented so as to reduce the impact on environment due to the operations of the proposed capacity expansion project. In order to facilitate easy implementation of mitigation measures, these are phased as per the priority implementation as given in **Table- 6**.

**Table No. 6**
**Implementation Schedule**

| Sr. No | Recommendations | Time Requirement | Schedule |
|---|---|---|---|
| 1 | Air pollution control measures | Stage wise implementation | Immediate and progressive |
| 2 | Water pollution control measures | | Immediate continual |
| 3 | Noise control measures | | Immediate continual |
| 4 | Ecological preservation and upgradation | | Immediate & Progressive |

## 9. CONCLUSION

As discussed, it is safe to say that the project is not likely to cause significant impact on the ecology and environment of the area, as adequate preventive

measures will be adopted to contain the pollutants within permissible limits. Green belt development around the area would also be taken up as an effective pollution mitigative technique, as well as to control the pollutants released due to mining.