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# EXECUTIVE SUMMARY

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**Stone Mining Project at Village - Madurna, Thana: Bhabua, District -  
Kaimur, (Bihar). M/S Starnet Marketing Pvt. Limited**



## **1 Introduction:**

M/S Starnet Marketing Pvt. Limited, Registered Address:- Ganeshalay Apartment, Jharudih, Dhanbad, Jharkhand, was granted mine lease for hill slope mining of stone located at Khata No. 167 & Plot No-4084 (P), at Village - Madurna, Thana: Bhabua, District - Kaimur, (Bihar), over an area of 8.397 ha. Letter of Intent (LOI) has been issued in favor of M/S Starnet Marketing Pvt. Limited. for the period of five years vide letter no.-1033/Khanan date 26.07.2016. Terms of Reference (Letter F.No.-J-11015/63/2019-IA.II (M) dated 09th July 2020

As per MoEF& CC, New Delhi Gazette dated 14th September 2006 and amended thereafter, the proposed mining project is categorized as category 'B1' as mining lease area greater than 5 ha. Due to presence of Kaimur Wildlife Sanctuary is at a distance of 4.8 km from the proposed project. So, the proposed project area attracts general condition of EIA notification 2006 and its fall under 'A' category project.

The proposed project activity will be carried out from the Hill Slope. It has been proposed to collect 495285.12 Tonnes per annum of Stone Mining (Quartzite).

The proposed mining activity will be done for excavation of stone only and the mined out mineral will be used in construction works. This is an independent mining project and there are no interlinked projects involved.

### **1.1 Salient features of the project**

- Project name: Stone Mining (Quartzite)
- Mining Lease Area: 8.397 Ha
- Location of mine: Khata No. 167 & Plot No-4084 (P)
- Location : Village Madurna, Thana: Bhabua, District - Kaimur, (Bihar).
- Minerals of mine: Stone Mining (Quartzite)
- Proposed production of mine : 2495285.12 Tonnes per annum
- Method of mining: Opencast Semi Mechanized Method
- Drilling/Blasting: Drilling and Blasting is proposed shall be done after Obtaining due permissions.
- No of working days: 280 days
- Cost of the Project: Rs. 550 Lakhs
- Water demand: Total Water Requirement: 8.3 KLD
- Sources of water: Tanker Supply and the nearby available sources
- Man power: 38
- Waste Generation: Nil
- Nearest railway station: Durgauti Railway Station Approx. 21.00 km towards NNE.
- Nearest state highway/national highway: SH-14, Approx. 14.00 km towards East.
- NH-2, Approx. 20.00 km towards NE.
- Nearest airport: Varanasi Airport approx. 78.2 Km towards NW.
- Seismic zone: Seismic Zone III

## 2 Project description

### 2.1 Method of Estimation of Reserve:

- Standard Cross Sectional Area method is considered for reserve estimation
- Sections have been drawn from boundary to boundary across the lease area considering the litho units in the area. The sectional area has been estimated on the basis of the cross sections.
- Length of influence has been measured by taking half of the section interval distance on both side of each section.
- Bulk density 2.7.
- The lease boundary has been considered as the basis for Mineral resource boundary.
- Appx. 7.5 meter along the lease boundary have been left out as safety zone as per provision of the mining rules.
- Bench losses have been considered while defining the mineral reserve.

### 2.2 Geological Reserves:

Resources have been divided in two categories such as Measured Mineral Resources & Indicated Mineral Resources based on depth parameters

#### 2.2.1 Measured Mineral resources:

The measured mineral resources as per the methodology described above are given below:

| Resource Category                | Section Line | Sectional Area (Sq. M) | Influence Length (M) | Total Volume (Cum) | Specific Gravity | Total Tonnage (T) |
|----------------------------------|--------------|------------------------|----------------------|--------------------|------------------|-------------------|
| Measured                         | 1-1'         | 6250.60                | 130                  | 812578             | 2.2              | 1787671.6         |
| Measured                         | 2-2'         | 10310.75               | 131                  | 1350708.25         | 2.2              | 2971558.15        |
| Total Measured Mineral Resources |              |                        |                      |                    |                  | 4759229.75        |

Considering the safety zone of 7.5 meter all along the lease boundary as per provision of the prevailing mining rules, the resource boundary has been further reduced. After drawing the bench configuration in along the section lines it has been observed that about 33% of the measured resources will be blocked in safety zone and batter losses to reduce the resources into mineable reserve at a level of 31,75,844.1 Tons. The blocked resources calculations are given below:

| Resource Category               | Section Line | Sectional Area (Sq. M) | Influence Length (M) | Total Volume (Cum) | Specific Gravity | Total Tonnage (T) |
|---------------------------------|--------------|------------------------|----------------------|--------------------|------------------|-------------------|
| Blocked                         | 1-1'         | 1269.45                | 130                  | 165028.5           | 2.2              | 363062.7          |
| Blocked                         | 2-2'         | 4187.55                | 131                  | 548569.05          | 2.2              | 1206851.91        |
| Total Blocked Mineral Resources |              |                        |                      |                    |                  | 1569914.61        |

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**2.2.2 Mineable reserves:**

Mineable reserve have been derived after deducting the blocked mineral resources from the proved mineral resources. Sectional areas and influence zones were considered for estimation of the same. Section wise quantities and detail calculation of the mineable reserves are provided below:

| Reserve Category        | Section Line | Sectional Area (Sq. M) | Influence Length (M) | Total Volume (Cum) | Specific Gravity | Total Tonnage (T) |
|-------------------------|--------------|------------------------|----------------------|--------------------|------------------|-------------------|
| Mineable                | 1-1'         | 4981.15                | 130                  | 647549.5           | 2.2              | 1424608.9         |
| Blocked                 | 2-2'         | 6123.20                | 130                  | 796016             | 2.2              | 1751235.2         |
| Total Mineable reserves |              |                        |                      |                    |                  | 3175844.1         |

About 10% mining losses happened due to blasting powder factor, weathered fractions, irregular benches etc. An extractable reserve thus calculated after deductions of the mining losses.

| Section Line | Mineable Reserve | Losses account on of unforesen Geological features | Mining Losses | Extractable Reserve |
|--------------|------------------|----------------------------------------------------|---------------|---------------------|
| 1-1'         | 1424608.9        | 142460.89                                          | 213691.335    | 1068456.675         |
| 2-2'         | 1751235.2        | 175123.52                                          | 262685.28     | 1313426.4           |
| Total =      | 3175844.1        | 317584.41                                          | 476376.615    | 2381883.075         |

**Production Target:** Several benches will be worked simultaneously to meet the production target. Year wise Production of stone from the area has been calculated by cross sectional method. The cross sectional area has been multiplied by the advancement to be worked in each bench as length of influence to get the bull volume Thus the value obtained has been multiplied by tonnage factor to get the actual production of ore in each bench.

| Production Year | Soil (in Cum) | Stone (in Tons) |
|-----------------|---------------|-----------------|
| 1               | 31072.5       | 495285.12       |
| 2               | 10493.4       | 461869.496      |
| 3               | 14492         | 461956.704      |
| 4               | 9218.3        | 470271.12       |
| 5               | 0             | 472574.96       |
| Total =         | 65276.2       | 2361957.4       |

**2.3 Method of Mining**

Proposed method of mining:

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The entire area is highly potential area. The work will be started from the northern tip part of the lease area with an appropriate haul road and further extend towards the south. Gradually heightening happened from south to north and to attain the elevation range of about 160 m AMSL. Development through years will reduce the elevation range of the hill from 160 AMSL to about the average ground level. The benching system of 3 m X 3 m will be practiced in this planned period in order to comply with the provisions of Metalliferous Mines Regulations, 1961.

**2.3.1 Mode of working:**

- Proposed mining operation will of semi mechanized, by using DTH, Hydraulic Excavator, Compressor, Jackhammer etc.
- The benching system of 3 m X 3 m will be practiced in this planned period in order to comply with the provisions of Metalliferous Mines Regulations, 1961.
- Safety distance of 7.5 meter width will be left around periphery of the lease area.
- Blast hole will be drilled through jack hammers of 34 mm diameter for a depth range of 3.0 meter. Blasting will be done through SMS. Blasting will be done in day time only.
- Flag erection and siren signaling system will provided during the time of blasting.
- Controlled blasting will be done to reduce the possible impact.

Storage of explosive is not required at the mines site as a vendor has been assigned to the whole blasting activity in the mines lease area.

Drilling and Blasting parameters:

Blast hole will be drilled through jack hammers of 34 mm diameter for a depth range of 3.0 meter. Blasting will be done through SMS. Blasting will be done in day time only.

Yield per KG of SMS is expected to be 6.0 Tons in case of hard rocks or stones.

|                             |                       |
|-----------------------------|-----------------------|
| Average depth of blast hole | 3.0 m                 |
| Burden                      | 2.0                   |
| Spacing                     | 3.0 m                 |
| Bulk Density                | 2.2 MT/m <sup>3</sup> |

Each day around 775 cum or 1775 tonnes of stone will require drilling and blasting. This means 43 holes to be drilled per day, which can be performed by 2 drilling crew consisting of four persons.

Storage of Explosive

An agreement will be made with the authorized blasting agency before starting the mining operation.

Land Use pattern after first five years plan period

After five years of development, the present day hilly part will be reduced however, due to proper benching and mountaintop mining, the area will retain the shape almost same as present day. As

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far as landscape is concerned, post five years there will be creation of a small water body and bench slopes of the mined out areas will remain. Post mining activity of the initial planned five years, the land use pattern including quarried area and plantation is provided below.

Land Use pattern after first five years plan period

| land Utilisation                  | Area in Ha |
|-----------------------------------|------------|
| Dump Area inactive                | 0.75       |
| Stack yard Unutilized             | 0.35       |
| Safety zone (Plantation)          | 0.897      |
| Quarry area<br>(elevated Part)    | 3.5059     |
| Road                              | 0.05       |
| Water Body ( part of quarry area) | 2.635      |
| Sub-Total                         | 8.1879     |
| Unutilized                        | 0.2091     |
| Total                             | 8.397      |

Fuel Consumption:

| SL. No | Particulars of Machine               | Nos. | Per Day Operating Hours | Fuel Efficiency Liters/Hr. | Total Consumption (Liters) |
|--------|--------------------------------------|------|-------------------------|----------------------------|----------------------------|
| 1      | Excavator-PC-200                     | 2    | 12                      | 15                         | 360                        |
| 2      | Rock Breakers                        | 2    | 4                       | 8                          | 64                         |
| 3      | Jack Hammers                         | 2    | 4                       | 8                          | 64                         |
| 4      | Tippers-20T                          | 4    | 12                      | 8                          | 384                        |
| 5      | Water Sprinklers(3kl)Tractor mounted | 1    | 6                       | 6                          | 36                         |
| 6      | Crushers-50 TPH                      | 2    | 12                      | 18                         | 432                        |
|        | Total HSD per Day                    |      |                         |                            | 1340                       |

### 3 DESCRIPTION OF THE ENVIRONMENT

**Land Environment:** The area in general possess a flat topography except the area of interests where denudational hill is present and suitable to carry out stone mining in the area. In general the area falls under the watershed area of Karamnasa river which is flowing in west of the project area in south to north direction. Regional area is gently undulating with elevation ranges between 80 m AMSL to 90 AMSL, however the project area is hilly part and forms a part of the denudation hill which became area of interest because of the presence of highly resistant stony material.

Land Use Cover of the Project Study Area

| S.No. | Class Name              | Area (Ha)       | Area (%)     |
|-------|-------------------------|-----------------|--------------|
| 1.    | Built Up Land           | 490.82          | 1.50         |
| 2.    | Agriculture Land        | 13433.20        | 41.15        |
| 3.    | Agriculture Fallow Land | 10812.30        | 33.12        |
| 4.    | Open Land               | 1619.89         | 4.96         |
| 5.    | Water Bodies            | 702.70          | 2.15         |
| 6.    | Forest                  | 5583.04         | 17.10        |
|       | <b>Total</b>            | <b>32641.95</b> | <b>99.98</b> |

#### 3.1.1 Soil Sampling:

Total 7 locations in the study area were selected for soil sampling.

**PH:** The maximum and minimum concentrations for PH were recorded as 7.72 and 6.21 respectively. The maximum concentration was recorded at Hatta and the minimum concentration was recorded at village Nandgawan.

**P (Phosphorus):** The maximum and minimum concentrations for P (Phosphorus) were recorded as 14.0 and 9.8 respectively. The maximum concentration was recorded at Chainpur and the minimum concentration was recorded at village Udirampur.

**K (Potassium):** The maximum and minimum concentrations for K (Potassium) were recorded as 85.5 and 65.8 respectively. The maximum concentration was recorded at Udirampur and the minimum concentration was recorded at Near project Site.

**N (Nitogen):** The maximum and minimum concentrations for N (Nitogen) were recorded as 36.0 and 22.0 respectively. The maximum concentration was recorded at Udirampur and the minimum concentration was recorded at Sherpur.

**Electric Conductivity:** The maximum and minimum concentrations for Electric Conductivity were recorded as 415.0 and 354.8 respectively. The maximum concentration was recorded at Sherpur and the minimum concentration was recorded at Chainpur.

**Organic Matter:** The maximum and minimum concentrations for Organic Matter were recorded as 3.22 and 2.12 respectively. The maximum concentration was recorded at Nandgawan and the minimum concentration was recorded at Udirampur.

### **3.1.2 Air Environment: 7 locations in the study area were selected for Air sampling.**

**PM<sub>10</sub>**: The maximum and minimum concentrations for PM<sub>10</sub> were recorded as 74.6 µg/m<sup>3</sup> and 51.2 µg/m<sup>3</sup> respectively. The maximum concentration was recorded at Chainpur and the minimum concentration was recorded at village Near project site.

**PM<sub>2.5</sub>**: The maximum and minimum concentrations for PM<sub>2.5</sub> were recorded as 47.6 µg/m<sup>3</sup> and 25.7 µg/m<sup>3</sup> respectively. The maximum concentration was recorded at the Chainpur the minimum concentration was recorded at village Nandgawan.

**SO<sub>2</sub>**: The maximum and minimum SO<sub>2</sub> concentrations were recorded as 18.9 µg/m<sup>3</sup> and 9.1 µg/m<sup>3</sup> respectively. The maximum concentration was recorded at village Sherpur and the minimum concentration was recorded at Chitadhi.

**NO<sub>x</sub>** : The maximum and minimum NO<sub>x</sub> concentrations were recorded as 28.6 µg/m<sup>3</sup> and 19.8 µg/m<sup>3</sup>. The maximum concentration was recorded at village **Chainpur** and the minimum concentration was recorded at village Sherpur, Nandgawan & Udirampur.

**CO**: The maximum and minimum CO concentrations were recorded as 0.80 mg/m<sup>3</sup> and 0.27 mg/m<sup>3</sup>. The maximum concentration was recorded at village **Sherpur** and the minimum concentration was recorded at village Udirampur.

### **3.1.3 Noise Environment: 7 locations in the study area were selected for Noise sampling.**

The maximum and minimum concentrations for Noise were recorded as 53.2 dB (A) and 45.7 dB (A) respectively in day. The maximum concentration was recorded at Chitadi and the minimum concentration was recorded at village Sherpur.

The maximum and minimum concentrations for Noise were recorded as 43.8 dB (A) and 31.3 dB (A) respectively in Night. The maximum concentration was recorded at near project site and the minimum concentration was recorded at village Kharaundia.

### **3.1.4 Water Environment: 3 Location sample were selected for Ground Water and 2 Location sample**

were selected for Surface water.

### **3.1.5 Result summary**

Ground Water Quality

- The analysis results indicate that the pH ranges in between 7.79 to 7.21, which is well within the specified standard of 6.5 to 8.5. The minimum pH of 7.21 was observed at Chitadi and the maximum pH of 7.79 was observed at Chainpur.
- Total hardness was observed to be ranging from 625.5 to 812.9mg/l. The minimum hardness was recorded at Hatta and the maximum hardness (205 mg/l) was recorded at Chitadi.
- Total Alkalinity was observed to be ranging from 675.0 to 541.6mg/l. The minimum hardness was recorded at Chitadi and the maximum hardness was recorded at Hatta.

- Chlorides were found to be in the range of 170.4 to 144.4 mg/l, the minimum concentration of chlorides was observed at Chainpur, whereas the maximum value of chlorides was observed at Hatta.
- Sulphates were found to be in the range of 136.8 to 96.5. The minimum value observed at Chainpur whereas the maximum value observed at Hatta.
- The Total Dissolved Solids (TDS) concentrations were found to be ranging in between 1224 to 1088.0 mg/l, the minimum TDS observed at Chitadi and maximum concentration of TDS observed at Hatta.
- Iron is found in between 0.19 to 0.26 mg/l and Nitrate found to 34.6 to 42.2 the minimum Iron observed at Chitadi and maximum concentration of Iron observed at Chainpur and the minimum Nitrate observed at Chainpur and maximum concentration of Nitrate observed at Hatta respectively.

#### Surface Water

Observation on Surface Water Quality Surface water quality of both the ponds was found to meet the Best Designated Use (BDU) Criteria of CPCB. No metallic contamination was found in surface water samples.

#### **3.1.6 Socio Economic:**

Population of the study area: The Total Population of study area is **96620** individuals and **15457** numbers of households. A comparative assessment has been made for the respective demographic aspects, based on the year 2011 data, which has been discussed in the following sections. The percentages of male & female population are 51.2 % & 48.8 % respectively. Breakup of the population for male and female is given in following Table:

| Particulars             | Number |
|-------------------------|--------|
| No of households        | 15457  |
| Total population        | 96620  |
| Male population         | 49427  |
| Female population       | 47193  |
| Average family size     | 6      |
| Total Scheduled Castes  | 17628  |
| Scheduled Castes Male   | 9031   |
| Scheduled Castes Female | 8597   |
| Total Scheduled Tribes  | 3468   |
| Scheduled Tribes Male   | 1704   |
| Scheduled Tribes Female | 1764   |

| Particulars      | Number |
|------------------|--------|
| Total Literates  | 49450  |
| Male Literates   | 29379  |
| Female Literates | 20071  |

### **3.1.7 Biological Environment:**

Biological diversity comprises the variability of species, genus and ecosystems and is very crucial for maintaining the basic processes on which the life depends. Broadly it can be divided in to two types i.e. the floral diversity and faunal diversity. Conservation of the biodiversity is essential for the sustainable development as it not only provides the food, fodder and medicine but also contribute in improvement of essential environmental attributes like air, water, soil, etc.

Before starting any Environmental Impact Assessment study, it is necessary to identify the baseline of relevant environmental parameters which are likely to be affected as a result of operation of the proposed project. A similar approach has been adopted for conducting the study on Biological Environment for this Project. **Since Kaimur Wildlife Sanctuary is coming at a distance of 4.8 km from the lease boundary**, extensive study has been carried out to assess the Biological Environment. Both terrestrial and aquatic ecosystems have been studied to understand the biological environment. The secondary data of flora and fauna is obtained from the authentic literatures and forest working plans.

Kaimur Wildlife Sanctuary is at a distance of 4.8 km from the proposed project. On the basis of primary survey key flora & fauna in buffer zone of 10 KM on the basis of primary survey.

The main animals found at Kaimur Wildlife Sanctuary are Bengal tigers, Indian leopards, Indian boars, sloth bears, sambar deers, chitals, four-horned antelope and Nilgais.

Three Schedule I Species as per WPA like **Indian Leopards, Peafowl Four-Horned Antelope is found in the study area. Hence Wild life conservation plan prepared with cost of 10 Lakhs will be allocated during phage of the project.**

## 4 ENVIRONMENT IMPACT ASSESSMENT

### 4.1 AIR ENVIRONMENT

Emission of fugitive dust is envisaged due to:

- Mining Activities includes blasting, excavation and lifting of minerals. The whole process will be done by semi-mechanized process with drilling and blasting. Therefore, the dust generated is likely to be significant as happens in mining processes involving drilling, blasting, mechanized loading etc.

Transportation of minerals will be done by road using trucks. Fugitive dust emission is expected from the transportation of trucks on the haul roads. Evaluation of fugitive dust emission has been done by using line source model.

The maximum incremental ground level concentrations of Total Suspended Particulate Matter (PM10) from the different mining activities for study period with EMP are predicted to be 18.3 $\mu\text{g}/\text{m}^3$ .

Prediction of Maximum GLC due to Project Activity

| S.No. | Pollutant                | Unit                     | Baseline Concentration | Predicted Max GLC | Cumulative GLC | NAAQS Limit |
|-------|--------------------------|--------------------------|------------------------|-------------------|----------------|-------------|
| 1     | PM <sub>10</sub> (24 Hr) | $\mu\text{g}/\text{m}^3$ | 74.6                   | 7.09              | 81.69          | 100         |
| 2     | SO <sub>2</sub> (24 Hr)  | $\mu\text{g}/\text{m}^3$ | 18.9                   | 1.49              | 20.39          | 80          |
| 3     | NO <sub>2</sub> (24 Hr)  | $\mu\text{g}/\text{m}^3$ | 28.6                   | 11.9              | 40.5           | 80          |
| 4     | CO (1Hr)                 | $\text{mg}/\text{m}^3$   | 0.80                   | 318               | 318.8          | 4000        |

### 4.2 LAND ENVIRONMENT

The impact on land form or Physiography will be landuse on the hilly terrain will undergo radical changes due to open cast mining.

Mitigation Measures

Adopting suitable, site specific mitigation measures can reduce the impact of mining on land. Some of the land-related mitigation measures are as follows:

- Present land-use pattern of the lease area is waste land and at conceptual stage the land use pattern will remain the same, hence it will not change.
- A proper scheme for waste management is provided as detailed out in mining plan.
- No acid rain receive is there within the area therefore, no proposal has been given for discharge of acid mine drainage. Hence no change in drainage pattern will be there.
- After five years of development, the present day hilly part will be reduced however, due to proper benching and mountaintop mining, the area will retain the shape almost same as present day. As far as landscape is concerned, post five years there will be creation of a small water body and bench slopes of the mined out areas will remain.

### **4.3 WASTE GENERATION**

This area is a virgin area and there O.B. is gritty soil, during mining operation this soil will be temporarily dumped with suitable precaution on the southern corner and this will be backfilled in the exhausted quarry on the northern part on conceptual period.

- Main source of air pollution is dust from the movement of trucks from mining site to stock yard site. The road is metalled except that inside the connecting link. The same is paved using waste stones. This reduces the dust level from the movement of vehicles to a large extent.
- The sprinkling of water is further undertaken as and when required on roads as well as stockpile.
- The dust is also generated due to low level ballasting. It is very limited to the explosion site within 100 m. It is minimized by plantation around the mine boundary.
- Further while manual lifting the material and dumping into truck or by using excavator in this case being stone pieces, the dust generated is minimum. However, when excavator is used the drivers are trained to drop the material from minimum height.
- Plantation is carried out on slopes; along the roads.
- Proper maintenance of vehicles will be done to minimize the pollutants; Pollution under Control certificates will be maintained for the trucks and drivers are instructed to drive at slow speed and proper supervision is maintained.
- Use of windbreaks will be done at the site as needed.
- The trucks are covered while moving the material and it is ensured that loading is done so that there is no spillage of material during the movement.
- Effective traffic management will be done by ensuring that there are no traffic jams on mine route by deputing manpower and by planning truck movement.
- Proper management of waste dump yard.
- Effective mine closure plan or post mining land use
- Provision of dust filters/mask to workers working at highly dust prone and affected areas.
- Ambient Air Quality Monitoring will be conducted on regular basis to assess the quality of ambient air as per the proposed monitoring plan to have a watchful eye on dust levels and to assess the effectiveness of mitigation measures.

### **4.4 WATER ENVIRONMENT**

There is no water consumption in the mining process as it involves only manual or semi-mechanized uplifting. The use of water if any is for drinking of 38 persons during the working hours as nobody stays at mine site at night. It is provided to the persons in pitcher at site. The further use is for sprinkling or plantation. The total water consumption is expected to be around 8.3 KLD only. The sprinkler water demand is minimized by paving the roads using waste material; the plantation also requires water initially and local species will be used for plantation which sustain well. In addition, the runoff after rainfalls shall be tapped and used for plantation. There is no abstraction of water at mine site and water is taken from authorized sources and consent from the village panchayat is taken.

Surface Water

No water bodies exist within lease area. The rainwater channelizes through the slope & gullies & meets the drainage. The opencast mining operation usually causes surface water pollution. The sources of pollution generally are run-off from waste dump and mining area. During the mining activity period, there is a possibility of mixing of freshly disturbed material with the rain water. The mining area lies on hilly land having rocky exposure and has no soil cover, therefore storage of soil is not required. However if some soil is encountered in small patches during mining, then it will be recovered carefully and used for plantation purpose. There is proposal for waste dump. There is proposal of utilization of waste material in construction of parapet walls, retaining walls & check dams and paved roads.

#### Ground water

The water table in hills is usually very deep and does not have any relevance with mining activities & nor water is likely to be encountered while carrying out mining operations. Ground water pollution can take place only if dumps and stockpiles contain harmful chemical substances that get leached by precipitation of water and percolate to the ground water table. This is not the case with this mine; the mining does not intersect with the ground water table. The excavation of stone further does not add to any harmful ingredients that could leach down to the water table. The composition of stone is mainly CaO and MgO. Thus the mine workings shall not affect the ground water quality.

#### Mitigation Measures to minimize Water Pollution

- To prevent the mixing of freshly disturbed material with rain water, retaining walls & check dams have been provided along the drainage & only clear water allow to flow & meet the drainage.
- The plantation as detailed out in EMP shall further help reduce surface water pollution.

#### **4.5 NOISE ENVIRONMENT**

Mining operations e.g. excavation of mineral (Drilling & Blasting) transportation by trucks will produce both dust & noise. Mining in the adjoining area is being carried out for several years. No landslide or subsidence has been noticed which can be attributed to vibrations due to blasting. Emissions of noxious gases due to incomplete detonation of explosive may sometimes pollute the air. Since mining operations proposed are on a very small scale & occurrences are also rare, therefore there will be no impact due to this, also there will be no impact observed on slope stability due to vibrations caused by blasting is likely.

The following control measures shall be adopted to keep the ambient noise levels well below the limits at the mine boundary:

- Plantation shall be carried out along mining lease boundary and sides of haul roads, etc. The greenbelt minimizes propagation of noise.
- Proper maintenance of vehicles shall be done.
- Mine operations shall be limited to day time.
- Speed limitation for transportation vehicle.
- Power Horns shall not be allowed in trucks. Drivers shall be further instructed not to use music systems at high volumes.
- Regular maintenance of mining machinery.

- The compressor used for drilling holes shall be provided with proper enclosures.
- The blasting is of low impact type with a maximum impact area of 500 m.
- The excavator use will be for limited hours with breaks at regular intervals. The driver is provided with ear plugs. The excavator will be regularly serviced.
- By carefully designing a blast hole using experience and deciding drilling pattern or blast geometry with appropriate burden distance, spacing as holes, hole size, hole depth, and stemming height, and powder factor.
- In order to reduce the effect of noise pollution, ear plugs/earmuffs shall be provided to workers.
- Ambient and Source Noise level Monitoring will be conducted on regular basis to assess the quality of ambient air w.r.t noise as per the proposed monitoring plan to have a watchful eye on noise levels and to assess the effectiveness of mitigation measures.

#### **4.6 BIOLOGICAL ENVIRONMENT**

The existing mine lease area is wasteland. Kaimur Wild Life Sanctuary is situated at a distance of 4.8 km from the mine lease, there's no forest land in or adjacent to the mine lease area. Due to the mining activities habitat disturbance will take place for the fauna dwelling in the area. The mining activities may cause impacts on ecology of the area. Due to dust in atmosphere from mining activities, when deposited on the leaves of the plants in the surrounding areas may retard their growth.

Though the impact on biological environment is nominal due to mining activities at low scale and limited period, the mining activities may cause an impact on the flora and fauna scenario of the area, if proper mitigation measures are not adopted.

**Impact on Flora and Fauna:** The activities as blasting including drilling holes, operation of machinery as excavator and movement of trucks can have impact in terms of disturbance due to noise; interference in movement etc.

Mitigation Measures:

- Plantation will be developed in the mining lease area as per plantation programme so as to improve the floral cover of the area. The greenery and plantation development will eventually attract fauna in the area.
- Assistance will be taken from local forest department in selection of species of plants so that green coverage could improve very fast. The varieties would include those plants, which are suitable in the area.
- Mining activities shall be restricted to day time so that fauna is not disturbed at night.
- Proper traffic management including ban on use of pressure horns; restriction on use of music in vehicles at high volume as well as regular maintenance of vehicles shall be insisted to minimize disturbance from vehicular movement.
- The noise causing activities as operation of excavator shall be stopped at regular intervals so that the continuity is broken. The blasting shall be restricted of low impact and shall be planned in consultation to have minimum impact.

- The dust is the only major pollutant which will be generated from different activities of mining. The effect of particulate matter on vegetation is in the form of incrustation, plugging of stomata loss of chlorophyll and reduction of photosynthesis process. Disturbance in plant metabolism due to deposition of dust particles on foliar surfaces leads to reduction in plant growth. The atmospheric concentrations normally do not reach a level sufficient to induce acute injury. A perusal of previous section reveals that the maximum incremental ground level concentrations for PM<sub>10</sub> likely to be encountered in the mine operations are well within the NAAQS standards. Moreover, progressive afforestation programme activity over a period of time in the core zone will create favourable conditions for fauna in the area and hence reversible impact is anticipated after presence of favourable condition.

## 5 ENVIRONMENTAL PROTECTION MEASURES:

| SI. No. | Description of Item              | Capital Cost (Lakhs Rs) |
|---------|----------------------------------|-------------------------|
| 1       | Air Pollution (Water Sprinkling) | 4.0                     |
| 2       | Green Belt Development           | 5.0                     |
| 3       | Haul road development            | 4.0                     |
| Total   |                                  | 13.0                    |

## 6 PUBLIC CONSULTATION

As per the appendix IV of EIA Notification 2006 & ToR issued by SEIAA Bihar, public Hearing/consultation was held on 20.10.2020 under the chairmanship of "Additional Collector cum District Public Grievance officer- Kaimur (Bhabhua) – Dr. Sanjay Kumar (Nominated by District Collector-Kaimur) at Block Office Chainpur, District- Kaimur, Bihar. In Public Hearing local persons participate & raise their issues & concern in the environmental impacts of the project. Proper video recording was done for this meeting.

The Public Hearing was arranged by the Regional office of Bihar State Pollution Control Board- Patna (BSPCB).

### 6.1 RISK ASSESSMENT:

All types of industries face certain types of hazards which can disrupt normal activities abruptly and lead to disaster like fires, inundation, failure of machinery, explosion, to name a few. Similarly stone mines also have impending dangers or risk which needs to be investigated and addressed. Disaster management plan is formulated with an aim to taking precautionary steps to avert disaster and also to take such action after the disaster which limits the damage to the minimum.

Nevertheless, the following natural/industrial problems may be encountered during the mining operation:

- Inundation-Filling of the mine pit due to excessive rains/flooding.
- Slope failures at the mine faces.
- Accident due to storage of explosive and blasting.
- Accident due to fire.

As per proposal made under the Mining Plan, during existing working, the area has been developed by means of opencast mining method with drilling & blasting. Exploitation and transportation-of mineral are to be carried out by semi-mechanized means respectively.. Bench height and width shall be kept 3 m X 3m .The proposed mining will not intersect the ground water level. But possibility of accidental disaster is also not ruled out. Therefore, all the statutory precautions should be taken for quick evacuation as per the Mines Act 1952, the Mines Rules 1955, Rule of MMR-1961 and the Rules of MCDR-1988.

### **6.1.1 Disaster Prevention Measures**

In order to take care of above hazard / disasters the following control measures have been envisaged:

- Checking and regular maintenance of garland drains and earthen bunds to avoid any inflow of surface water in the mine pit.
- Provision of high capacity pumps for pumping out water from the mining pit.
- Entry of unauthorized persons will be prohibited.
- Firefighting and first aid provision shall be kept in the mines office complex and mining area.
- Safety equipment such as safety boots, helmets, goggles etc. will be made available to the employees and regular checked for their use.
- Training and refresher courses for all the employees working in the mine.
- Working of mine as per approved plan and regularly updating the mine plans.
- Regular cleaning of mine faces.
- Regular maintenance and testing of all mining equipment as per manufacture's guidelines.
- Suppression of dust on the haulage roads.
- Increasing the awareness of safe practices through competitions, posters and other similar drive.

## **7 Project Benefit**

The project activity together with inflow of capital, in-migration and employment of local inhabitants has shown positive impact on the overall social and economic condition of the people of the area. The project has provided a direct job opportunity to the local persons as both technical and non-technical workers. Literacy has further increased because of better income and awareness amongst the people. The project has provided direct employment opportunity to local people. Indirect employment is being generated in trade and other ancillary services. Employment in these sectors is both permanent and temporary or contractual and involvement of unskilled labour. A major part of this labour force is mainly from local villagers who are expected to engage themselves both in agriculture and project activities. This enhances their income and lead to overall economic growth of the area. The following socio-economic changes have taken place due to project activities:

- The project is having a positive employment and income effect, both direct as well as indirect.
- Expected Improvement of infrastructure & transportation.
- The project is having positive impact on consumption behaviour by way of raising average consumption and income through multiplier effect.
- The project has brought about changes in the pattern of demand from food to non-food items as sufficient income is being generated.
- People located in the project area and in close vicinity, enjoying positive changes in life style and better quality of life.

**Executive summary Stone Mining Project at Village - Madurna, Thana: Bhabua, District - Kaimur, (Bihar). M/S Starnet Marketing Pvt. Limited.**

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**7.1 PLANTATION:**

The year wise rehabilitation programme within lease area is given below:

| Year                 | No. of saplings |
|----------------------|-----------------|
| 1 <sup>st</sup> year | 500             |
| 2 <sup>nd</sup> year | 500             |
| 3 <sup>rd</sup> year | 500             |
| 4 <sup>th</sup> year | 500             |
| 5 <sup>th</sup> year | 500             |
| Total                | 2500            |

**7.2 BUDGETARY PROVISION FOR ENVIRONMENTAL MANAGEMENT:**

**7.2.1 COST OF ENVIRONMENTAL PROTECTION MEASURES**

| SI. No. | Description of Item              | Capital Cost<br>(Lakhs Rs) |
|---------|----------------------------------|----------------------------|
| 1       | Air Pollution (Water Sprinkling) | 4.0                        |
| 2       | Green Belt Development           | 5.0                        |
| 3       | Haul road development            | 4.0                        |
| Total   |                                  | 13.0                       |

**7.2.2 CORPORATE ENVIRONMENTAL RESPONSIBILITY (CER) PLAN AND BUDGET:**

| SI. No.                     | Activity                                                | Capital Cost (in Rs.) |
|-----------------------------|---------------------------------------------------------|-----------------------|
| 1                           | Provide drinking water facility in surrounding villages | 400000                |
| 2                           | Re-construction of village roads                        | 200000                |
| 3                           | Medical camp for villagers                              | 200000                |
| 4                           | Plantation in community areas                           | 250000                |
| 5                           | Recreation & Other sports activities                    | 50000                 |
| <b>TOTAL (in life time)</b> |                                                         | <b>1100000/-</b>      |