

## **EXECUTIVE SUMMARY**

### **1. PREAMBLE**

M/s Gagan Sial is proprietary concern owned by Shri Gagan Sial. The concern is engaged in mining activity for Lime Stone, Dolomite and Marble Grade Dolomite at Village Sunehri, Tehsil Murwara District Katni in the state of Madhya Pradesh. Date of opening of this mine is 28.02.2002 The project envisages forward mining activity for Lime Stone, Dolomite and Marble Grade Dolomite ore at mine area of 15.177 hectare at Village Sunehri at district Katni, MP for the anticipated production of ores by 50000 MT per Annum of Lime Stone, 10000 MT per Annum of Dolomite and 3000 M<sup>3</sup> per annum of Marble rock per annum.

In order to assess the likely impacts on environment due to ongoing mining activity and to have a tool of environment management, M/s Gagan Sial has submitted the Rapid Environment Impact Assessment study report for mining project and summary of the same report is being submitted for the purpose of public hearing.

### **2. LOCATION**

The mining area is located in village Sunehri, Tehsil Murwara at district Katni, Madhya Pradesh located on Toposheet no. 64 A/6 by the following coordinates:

Latitude 23°40'16" to 23°40'32"

Longitude 80°27'13" to 80°27'40"

### **3. TRANSPORT**

The applied area is located at a distance of 31 km south east of Katni. While going towards Niwar, there is turning for Niwar at about 13 km on national highway no. 7 and at this Niwar is almost 6 km away from the junction. There is a tar road at south east of Niwar town for village Shahpura which is almost 8 km away from the town. There is a kachha road for village Sunehri from Shahpura which almost 4 km away from the Shahpura and the lease area can be approached from village Sunehri by cart track having distance of 200 m. Regular bus service is available for village Shahpura.

#### **4. REASON FOR ENVIRONMENTAL IMPACT ASSESSMENT (EIA)**

The impact of mine on the environment depends to a large extent on its location with respect to Human settlements, meteorological conditions, ambient air quality, water bodies, agricultural and forest land etc.

Most of the adverse impacts of mines are amenable to technological control by providing necessary preventive and control measures and finally through effective environmental management of the operating mines. Keeping in view the likely impacts of mines on environment, this Rapid Environment Impact Assessment Report has been prepared for submission to State Pollution Control Board and Ministry for Environment and Forests (MoEF) for clearance of the mining area in operation.

#### **5. PROJECT DESCRIPTION**

##### **5.1 Topography**

The lease area is having undulating topography, one small mound is located in northern part of the area and other small mound is located in central part of the area. General slope of the area is towards east and west. The highest elevation of the applied area is 447 m above MSL located at northern part where as the lowest elevation is 443 m above MSL, located in western part. Elevation difference between highest and lowest elevation is 4 m. Four working pit may be observed in the area. Site services in the form of mine office and rest shelter are constructed in the central part of the area. Three waste dumps may also be seen in the lease area and out of which one waste dump is located out side along the northwestern party of the area. Two seasonal water channel passes from the area which joins together and drains water towards North West of the area during the rainy season.

##### **5.2 Silent Feature of the Mine**

Out of total lease area of 15.17 Ha, area of 4.04 Ha consisting khasara number 72 & 69 and part of 76 has been kept for mining of marble block and remaining has been mined for dolomite and limestone. Details of conceptual mining plan of the lease area are given below:

### Silent Feature of Mine

S. No.	Particular	Details	Total Area in Ha
1	Total Lease Area	15.17 Ha	15.17
2.	Address of the lease area	Village – Sunehri Tehsil- Murwara District- Katni	
3	Area worked out so far Dolomite Area worked out so far Limestone	0.99 Ha 0.3825 Ha	1.3725
4	Existing dumps	0.2109 ha	
5	Area proposed for mining of Dolomite in first five year Area proposed for mining of lime stone in first five year	0.2205 Ha 0.3020 Ha	0.5225
6	Area to be developed for mining of Dolomite in the lease period Area to be developed for mining of Lime Stone in the lease period	1.5720 Ha 0.6420 Ha	2.214
7	Area occupied by soil dumps in five years Soil dumps in the lease period for Lime Stone	0.0749 Ha 0.1127 Ha	
8	Mine waste dumps 20% in first Five years period for Lime Stone Mine waste dumps 60% in first Five years period for Dolomite	0.133 Ha 0.176 Ha	
9	Mine waste dumps 20% in lease period for Lime Stone Mine waste dumps 20% in lease period for Dolomite	0.3180 Ha 0.2475 Ha	
10	Area to be reclaimed in five years	0.0224 Ha	
11	Area to be reclaimed in lease period	0.0675 Ha	
12	Area covered by the proposed	0.0540 Ha (Total no.	

	plantation in five years	60 )	
13	Area covered by the proposed plantation in lease period	0.27 Ha (Total no. 2700 )	
14	Area covered by the existing site services including roads	0.03 Ha	
15	Total un-worked area at the end of lease period	11.5835 Ha	
16	Present Working Depth Ultimate Working Depth	5m (440 AMSL) 19 m (426AMSL)	
17	Water Table Pre Mansoon Post Mansoon	20 m ( AMSL) 14 m ( AMSL)	

### 5.3 Reserves

<b>Left out Minbeable Reserve</b>			
	<b>Limestone</b>	<b>Dolomite</b>	<b>Marble Grade Dolomite</b>
Proved	337300	335481	711478
Probable	151600	168866	356539
Possible	73800	82439	176287
	<b>562700</b>	<b>586786</b>	<b>1244304 Tonnes</b>

**Thus Total Mineable reserves =1149486 +1244304=2393790 Tonnes**

### 5.4 Anticipated Life of the Mine

Anticipated life of the mine will be obtained by computing the life of the mine by considering the proposed rate of production when the mine is fully developed and production for next years. It is estimated that 50000 MT per Annum of Lime Stone, 10000 MT per Annum of Dolomite and 3000 M<sup>3</sup> per annum of Marble rock per annum production will be taken after complete development of mine. Considering the above factors anticipated life of the mine would be around 224 years for extracting mineable reserve in proved category reserves as per the present information available.

## 5.5 Mining Method

Mining has been carried out by open cast method at present. Simultaneously mining of dolomite is being carried out as marble block and mining of limestone is being carried out for use towards industrial purposes.

As stated earlier open cast mining has been adopted for the limestone excavation by using of explosives. Two pits have already been developed for dolomite and three pits have been for lime stone. Mining of dolomite blocks has been carried out using wire saw which is made with diamond segments. Holes are matched for cutting purposes and by putting of the diamond chain into the holes; blocks are used to be cut. Derrick is used for lifting of blocks from working face to mine site. It is also being used for loading of blocks in to truck/dumpers. Presently cut blocks have been used to sale for further processing. It has been observed that the recovery percentage of limestone mineral is about 80% and rest 20 % is as waste in h form of Phyllite, similarly recovery percentage of dolomite is also observed as 80% and rest 20% is considered as waste in form of Phyllite, and out of 80% of the dolomite, 20% are to be considered as saleable blocks by volume and rest 60% volume of dolomite is in form of non saleable dolomite for block purpose.

All excavations will be done manually with hand tools like crowbars, Spades, chisels and hammer. Sorting will be done manually. Development i.e. removal of overburden will also be done manually.

## 5.6 Proposed Rate of Production

It will be about 50000 MT per Annum of Lime Stone, 10000 MT per Annum of Dolomite and 3000 M<sup>3</sup> per annum of Marble rock per annum of saleable ore for full year after complete development of the mines.

## 5.7 Present rate of Production

### (1) Production detail of last 3 years

Years	Production (MT)	
	Lime Stone	Dolomite
2003-04	3517	954
04-05	4915	1240
05-06	6480	1312

(2) **Production detail for Next Five Years**

Years	Production (MT)	
	Lime Stone	Dolomite
First	6480	8500
Second	6480	8500
Third	6480	8500
Fourth	6480	8500
Fifth	6480	8500

**5.8 Loading**

Loading of ore has been done manually to the trolley/trucks and has been sending to the end users. The overburden has been removed and stacked in a place in the surface. Subsequently it has been manually loaded to the tipper for onward dumping to the predetermined space in the lease boundary.

**5.9 Hauling/Transport**

The ore has been transported to the sorting yards by means of tubs on tracks.

**5.10 Broad Blasting Parameters**

As stated earlier that blasting is not required for the block mining of the Dolomite; however considering the massive nature of the applied are of lime stone, blasting is required on regular basis.

**Broad Blasting Parameters**

Burden : 1.00 m  
Spacing : 1.2 m  
Depth of drill hole : 1.5 m

Type of explosive to be used

Special gelatine with ordinary/electric detonator and fuse has been used. The total annual requirement of explosive, detonators and fuse to produce 13350 t per year has been as under:

Diameter of blast hole : 32-34 mm  
No. of holes in a row : 10nos.  
Quantity of explosive/hole : 750 gm

### **5.11 Mine Drainage**

The ground water table is encountered at about 12-14m (333 to 335m) below the ground level and the working in lease period is expected to be 5m below the water table. Therefore seepage is not seen up to 14m depth, it is anticipated at 18 to 20 m (327m to 325m). During Monsoon period the level of floodwater will be maintained by continuous dewatering by using 5 HP pump. The discharged water will be provided a settling tank for settling of suspended solid and then it will be utilised for agricultural use in the nearby area. The settling tank is proposed along with western boundary of the area.

The accumulated water in the developed pit during the rainy season will be used for green belt development.

### **5.12 Solid Waste**

Top soil will be generated at the rate of 405 and 435 cum per year in first two years and at the end of lease the total quantity will be about 2540 cum, which will be dumped in South and West direction of barrier zone. The mine waste (OB) from lime stone mining is estimated to be generated about 8838 cum, which will be dumped in west direction of the lease area in barrier zone. The mine waste (OB) from Dolomite mining is estimated to be generated about 7669 cum, which will be dumped in west direction of the lease area in barrier zone. It is estimated that total 16507 cum waste will be generated in the lease period. It is planned to dump the OB and Waste Soil in the barrier zone of 7.5 in view of utilization of the area. Out of 15.17 Ha, 1.572 Ha and 0.642 Ha area will be developed for excavation of dolomite and lime stone respectively in lease period. Hence 11.5835 Ha will be un-worked area at the end of lease period. Out of excavated area, only 0.0675 Ha areas will be reclaimed at the end of lease period while green belt will be developed over 0.27 Ha areas. Rest of the developed area at the end of lease period will be left as it is because depth wise extent of mineral is anticipated.

### **5.13 Source Requirement**

The present proposal is to carry out mining for Dolomite and Limestone at Village Sunehri, Tehsil Murwara Dist Katni, and MP. For efficient operation of the Mines all necessary utilities will be made available, a brief description of the same is given below:

### 5.13.1 Storage facility

M/s Gagan Sial has already provided adequate storage facilities for the excavated mineral, explosives, which is generated/ used during mining process. Proposed excavated minerals and waste dumps will be kept in the barrier zone of existing mining lease area.

### 5.13.2 Project Cost

#### Details of expenditure of the Mining project

Project	Estimated Cost in Rupees
Mining of Limestone and dolomite	Rs. 202161.00

### 5.13.3 Electric System

The power requirement for the project has been met by Madhya Pradesh Electricity Board.

### 5.13.4 Water Supply

Water is required for mining operation/establishment mainly for suppression of dust. The total quantity of water will be used per day is about 7.5 m<sup>3</sup>/day (7500L/day) for the domestic purposes. This quantity of water will be taken from the ground water. Out of 7500 lit, 1000 lit of the water will be generated as domestic waste water which will be given the soak pit arrangement. Rest of the volume will be used for dust suppression at haulage road, and green belt development. Further it is also explained that the accumulated water in the pit during the rainy season has also been used for agricultural and horticultural purposes after giving settling treatment to the suspended solids. The details of water balance of existing /proposed mining project are given below:

#### WATER BALANCE OF MINING PROJECT

Process	Quantity (in Kilo Litrs.)	Total
<b>Water Consumption</b>		
Drinking & Washing	2.0	2.0
<b>b) Other uses</b> (Dust suppression and Green belt)	5.5	5.5

development)		
<b>Total</b>	<b>7.5</b>	<b>7.5</b>
<b>c) Waste Water Generation</b>		
Domestic	1.0	1.0

#### 5.14 Implementation Period

This is the case of working mine having lease period from 16.05.2001 to 15.05.2021. The date of commencement of mining operation was started in the year 2002.

### 6. EXISTING ENVIRONMENT SCENARIO

#### 6.1 Environmental Setting of the Project

15.17 hectares of mining lease area is located at Khasara numbers 45, 46, 66, 68, 69, 71, 72 and 76, Village Sunehri, Tehsil Murwara, Dist Katni (MP). Area falls under jurisdiction of Dhimarkhera Police Station. Nearest railway station is Niwar is about 13 kms at North West on Katni-Jabalpur section of West Central Railway. Katni is nearest city which is located at about 32 km in North West of the applied area. Village Sunehri is almost 200m away at south direction from the lease area. Adjoining area up to 500m towards north, south, east and west is waste land. Power line of 220 volts passes through the southern part of the area towards north east it joins village Sunehra (500m) towards south east it joins Village (250m). Another cart track passes from the north western part of the applied area, which joins the village Bhatgawan Sunehra which is located towards North West of the lease area. Two seasonal water channel passes from the area which joins together and drains water towards North West of the area during the rainy season. The primary site details are as below:

#### DETAILS OF PROJECT SETTINGS

S. No.	Particulars	Details
1	Latitude	23°40'16" to 23°40'32"
2	Longitude	80°27'13" to 80°27'40"
3	Height above mean sea level	443 - 447 m

4	Nearest Village	Sunehri - 200m
5	Nearest Railway Station	Niwar (13 km)
6	Nearest Airport	Jabalpur
7	Nearest Highway	National Highway no. NH-7 Jabalpur- Katni
9.	Nearest Hospital	Shahpura
10	Hills/Valley	No hillock is in the lease area
11	Ecological Sensitive Zone	No
12	Historical Place	Nil
13	Nearest River	Nil
14	Annual Climatic Conditions	Max. Temperature – 47.6°C Min <sup>m</sup> Temperature – 4.1 °C Average Rainfall–1168 mm
15	Toposheet No.	64 A/6
16	List of Near by Industries	Nil
18.	Name/ Distance of Villages in core zone	Nil

## 6.2 Climate

The climate of the region is characteristically dry except in the monsoon season. All the three seasons are distinct. The summer season extends from February to June, till the onset of Monsoon. Rains are received from mid June to Mid September and winter season extends from October to January. The area receives an average annual rainfall of 1168 mm. The maximum rainfall is received through south-west monsoon during June to August.

### 6.2.1 Rainfall

The rainfall in the study area can be termed as moderate the southern and south eastern parts of the district receives more rainfall as compared to the rest of the district. As much as 95% of the annual rainfall received in the district can be attributed to the south-west monsoon. The month of August receives maximum rainfall than other months.

### 6.2.2 Temperature

Temperature reaches a minimum in the month of January. The climate is tropical. Month of May and June are the hottest months. The temperature in May reach as

high as 47.6°C. The data is based on records of observation in the Indian Meteorological Department, Nagpur. After February, a steady rise in temperature is observed. The onset of south-west monsoon sees an appreciable drop in temperature. January is the coldest month and the minimum temperature of 4.0°C has been recorded in this month.

### 6.2.3 Relative Humidity

The humidity levels are exceedingly high during monsoon months otherwise the air is generally dry over the entire district. The maximum humidity in the study area was found to be as high as 99%, the minimum humidity was found to be 5%.

### 6.2.4 Wind Pattern

During the study period the predominant wind direction was from S & SE direction in the morning and from NW & N direction in evening time. The average wind speed is 4.28 Km/h. The data is based on Regional Meteorological Department, Nagpur for wind speed and wind direction.

## 6.3 Air Quality

To establish the ambient air quality, sampling and testing were conducted. Air sampling stations were established at Nine (9) locations around the mining area to assess the background air pollution levels.

### COMPARISON OF AIR SAMPLING RESULTS WITH CPCB NORMS

	A1	A2	A3	A4	A5	A6	A7	A-8	A9	CPCB Norms	
										Indl. & Mixed used area	Residential Rural Area
<b>SPM Concentration</b>											
Minimum	128.0	242.0	126.0	92.0	95.0	96.0	98.0	88.0	89.0		
Maximum	158.0	445.0	165.0	123.0	129.0	128.0	128.0	125.0	123.0	500	200
Average	143.6	143.6	142.6	112.1	114.2	112.0	115.1	106.7	108.5		
<b>RPM Concentration</b>											
Minimum	29.4	65.0	26.6	23.8	22.0	22.0	22.2	18.4	18.6		
Maximum	55.8	135.0	54.1	43.5	45.1	45.5	46.7	38.1	40.3	150	100
Average	42.8	72.0	43.1	33.9	34.4	34.1	34.8	32.3	32.8		
<b>SO2 Concentration</b>											
Minimum	7.1	10.0	7.1	5.0	5.2	5.1	5.2	4.7	5.2		
Maximum	9.3	20.0	9.5	7.6	7.6	7.6	7.8	7.1	8.1	120	80
Average	8.3	12.2	8.2	6.3	6.4	6.4	6.5	6.0	6.7		

NOX Concentration											
Minimum	10.1	12.0	9.4	7.2	7.5	7.0	7.7	5.8	7.3		
Maximum	14.9	20.0	16.7	10.1	10.6	10.6	10.9	10.2	11.6	120	80
Average	12.2	13.8	12.3	8.9	9.1	9.1	9.2	8.4	9.6		

## 6.4 Noise Level

Ambient noise levels were measured at different locations (same as ambient air monitoring locations for two days on hourly basis) to establish present scenario which shall be described as follows.

- All the values are well within the norms prescribed by CPCB for industrial and commercial area.
- Main source of noise are traffic movements.

S. No.	Location	Location No.	( Day ) Leq	(Night ) Leq.
	Mine Site	N-01	62	52
1	Sunehri	N-02	54	46
2	Mainban	N-03	58	46
3	Mohaniya	N-04	54	42
4	Sunehra	N-05	52	50
5	Pipriya	N-06	49	46
6	Malhan	N-07	46	42
7.	Amagawan	N-08	52	41

Units are in dB(A) Leq.

## 6.5 Water Quality

### 6.5.1 Surface Water

There is no major river within the core zone and the buffer zone of mining lease area. Two seasonal water channel passes from the area which joins together and drains water towards North West of the area during the rainy season. Water quality assessment of surface water sources was carried out within the area of buffer zone. During the study period out of two seasonal nalla, one was dry and another having lean flow and hence for surface water analysis, sampling were done from seasonal nalla as there is no major surface water source in the buffer zone of 5 km radius.

Sampling of pond water of the village was carried out to analysis the surface water. The data conform to the water quality standards for most of the parameters. The dissolved oxygen levels range 2.38 mg/l, Total Hardness ranges 112 mg/l, MPN levels are as low 10 no.. The heavy metal content has been observed within the limit. The physico-chemical and biological analysis revealed that all the parameters are well within the prescribed limits of IS: 2296.

#### **6.5.2 Ground Water**

The study area falls in moderate ground water potential zone. The water table is found to be 14 m from surface during Monsoon during the monsoon period. It recedes to a level of 18-20 m from surface during dry months. The nearby population depends upon ground water for drinking purpose. The population collect drinking water from bore wells/hand pumps. The samples were collected and analysed as per the procedures specified in “standard Methods for the examination of water & Wastewater” published by American Public Health association (APHA). pH in ground water sample was observed to be in the range 7.4 to 7.7, while turbidity was observed in the range 1.4 to 1.6 NTU. The value of alkalinity and hardness were observed in the range of 212-288 mg/l and 185-211 mg/l respectively. Whereas heavy metal was found to be within the limit.

Total coliform were found to be 03. The physico-chemical and biological analysis revealed that all the parameters were well within the prescribed limits of IS: 10500.

#### **6.6 Soil Quality**

The entire study area is covered by clayey and loamy soil. The colour of the soil varies from black to yellowish, brownish, yellow silty sometimes the colour is ashen, which is a characteristic of this area.

For general characterization of soil a few random samples from the study area to the depth of about 15 cm were collected. Soil samples were brought to the Laboratory for analysis. Samples under all the categories were analysed for various parameters like texture, colour, pH, and conductivity, using standard

methods. The texture of the soil was observed to be clayey at 4 sampling point. The organic carbon was found to be in the range of 0.85 to 1.05. The nitrogen and phosphorus were observed to be in the ranges of 380 to 410 kg/Hec and 29 to 32 kg/Ha gm respectively the pH range at the soil vary in between 6.69 to 7.9. The moisture values ranged between 14.5% to 15.1%

## **6.7 Flora and Fauna**

The climate, rainfall and vegetation type contribute to decide the type of faunal community in the area.

### **6.7.1 Flora**

The core zone is devoid of any forest growth and bushes may be seen here and there. The Katni district area of the dry topical type of forest and can be divided into northern and southern tropical dry deciduous forest. Northern tropical dry deciduous forest is confined to Katni, Sihora and Vijayraghavgarh tehsil. Sal is the predominant species in these forest. It is associated with Saj ( *Terminalia tomentosa*), Dhaora ( *Anogeissus latifolia* ), Tendu ( *Diospyros melanoxylon*), Lendia ( *Lagerstremia parviflora* ), Kari ( *Saccolobium tomentosum* ), Bija ( *Pterocarpus marsupium*), Mahua ( *Madhuca latifolia*), Gunja ( *Lannea gradies*), Salai ( *Boswellia serrata*), Dhotin ( *Dalbergia paniculata* ), Haldu ( *Adina Cardis*), Koha ( *Terminalia arjuna*), Harra ( *Terminalia Chebula*), Siris ( *Albizia Lebbek*), Jamun ( *Eugenia jambolana*, Achar ( *Buchanania lanzan*), Alona ( *Emblica officinalis*) Amaltas ( *Cassia fistula*) Tinsa ( *Ougenia dalbergioides*, Dhana ( *Grewia tilifolia* ), Palas or Chheola ( *Butea monosperma*) and a few other species. Bamboo is commonly found in these forests on the slopes and occasionally in the flat country where the forest is rather open. Chhind ( *Phoenix anaulis* ), Kharasi or Sihore ( *Nyctanthes arbor-tristis* ), Karonda ( *Carissasp*), Dhawai or Jilbile ( *Woodfordia floribunda*) etc occur as the undergrowth which is sparse when the canopy is dense> Teak is sparsely observed in Katni tehsil.

### **6.7.2 Fauna**

According to Survey of India, the study area does not host natural wild life because no forest has been found within the 10 km radius of the project site. There are also no zoos or bird sanctuaries in the study area.

Rodents, monkeys, jackals and large birds constitute the natural fauna in the study area. Peasants, pigeon, peacock can be sighted occasionally along with the birds of common occurrence in the study area. Even forestland has only sparse row of trees and is not able to sustain much natural fauna. The species of fauna encountered are listed in table below.

#### **LIST OF FAUNA OF THE STUDY AREA**

<b>LIST OF FAUNA OF THE STUDY AREA</b>	
Bengal Monkey ( <i>Macacus rhesus</i> )	Jungle cat ( <i>Felis chaus</i> )
Mongoose ( <i>Herpestes mingo</i> )	Sambhar ( <i>Carabus unicolor</i> )
Kalmuha monkey ( <i>Semnopithecus on lellccs</i> )	Common haw cuckoo ( <i>Cuculus microptercus</i> )
House sparrow ( <i>Passer domesticus</i> )	House crow ( <i>Corvus splendens</i> )
Common maina ( <i>Acrida tetrastris</i> )	

#### **Domestic Animals**

Animal husbandry plays an important role in rural economy and its contribution to the economic upliftment of the rural area is considered as important in agriculture. The livestock in the study area comprises of cows, buffaloes, goats, cocks, hens, ducks, horse, donkeys and pigs.

**Other animals:** Sloth bear (*Melursus ursinus*) is sometimes seen in the hilly tracts of the forest area. Hares (*Lepus ruficaudatus*), Langurs (*Semnopithecus entellus*). Porcupine and Squirrel (*Sciurus indicus*) are found in the region. The Five-striped Squirrel (*Funambulus pennanti*) is a familiar diurnal rodent and other species like the rats; bandicoots and mice are also common. In the countryside Jungle Cat (*Felis chaus*) is found. The small Indian Civet (*Viverricula indica*) is the most commonly civets and the Mongoose (*Herpestes edwards*) is a common resident of fields and gardens.

#### **6.8 Land Use Pattern**

The study area covers about 14304 Ha. For computation of the land use pattern in the study area based on the village-wise land-use data given in the census

records, the geographical area of all settlements covered within the study area, though many villages in the peripheries of the circular study area are partially covered. Perfect delineation and quantification of land uses for the partially covered parts of villages of the study area is not possible, hence the entire village area is considered for the study, irrespective of its coverage within the village boundary.

The land use is classified into four types – viz. forests, area under cultivation, culturable waste and the area not available for cultivation. The land under cultivation is further sub-divided into two types viz. irrigated and un-irrigated.

#### **Land-use Pattern in the Study Area**

<b>S. N.</b>	<b>Particulars</b>	<b>Study Area (ha)</b>	<b>Percentage Coverage</b>
1.	Forest Land	2399	16.77
2.	Land under Cultivation		
	a) Irrigated Land	858	5.99
	b) Un irrigated Land	5162	36.08
3.	Culturable Waste Land	3487	24.37
4.	Area not available for cultivation	2398	16.76
	<b>Total Area</b>	<b>14304</b>	<b>100</b>

#### **6.9 Socio-Economic Conditions**

The study area falls in Murwara Development Block of Katni district. The district is dominated by rural population (about 50 % of the total population). Scheduled tribes account for about 42.24% of the total population. Scheduled Cast account for about 8.36% of the total population. Total work force of study area is reported to be about 43.82% of the total population. An examination of the occupational pattern reveals that about 79.31% of the total workers are engaged in farming or in associated activities either as cultivators or as agricultural laborers. Thus, it can be inferred that a major portion of the population derives their livelihood from agricultural sector.

#### **ESTIMATED BASIC STATISTICS OF THE STUDY AREA**

Households	4360
Population	22137
Male	11360
Female	10777

Schedule Cast	1851
Schedule Tribe	9351
Literacy Rate	50.27
Occupational Pattern :	
(A) Total Working Population (% of total population )	43.82%
(i) Cultivators (% of total working population)	38.32%
(ii) Agricultural Labors (% of total working population)	40.99%
(iii) House Hold Labors (% of total working population)	3.77%
(iv) Other Workers (% of total working population)	16.90%
(1) Main workers (% of total working population )	59.96%
(2) Marginal Workers (% of total working population )	40.04%
(B) Total non working population (% of total population)	56.18%

## 7. IMPACT ASSESSMENT

Mining activities is bound to have an adverse impact on existent environment. An understanding of the nature and extent of various impacts is essential in devising the methods and advance planning to mitigate the impacts and ultimately restore the land to useful conditions.

## 8. IMPACT EVALUATION

An attempt has been made to evaluate the impact of project in terms of both quality and quantity by using modified matrix method for crucial environmental parameters. The environmental impact evaluation of possible effects as a result of proposed mining area is primarily based on study of objectives, process, surrounding environment etc. The aspects such as water, air, land and related issues have been assessed on the basis of mining operations for similar activity. The environmental impacts identify the possible relationship of proposed mining operations with respect to environmental parameters. Their relationship can be beneficial or adverse and can be further classified as short term, long term, reversible, irreversible, local or regional. The evaluations of the impact of proposed activity are presented in Table below:

Parameters	Weight PIU	Baseline EIU (a)	Without EMP EIU (b)	With EMP EIU (c)	Change EIU (c-b)	Change EIU (c-a)
Biological	300	194	183	200	17	6

Environment						
Environmental Pollution	<b>450</b>	<b>343</b>	<b>318</b>	<b>347</b>	<b>29</b>	<b>4</b>
Aesthetic	<b>100</b>	<b>77.25</b>	<b>66.75</b>	<b>75.75</b>	<b>9.0</b>	<b>-1.5</b>
Human Interest	<b>150</b>	<b>114.5</b>	<b>112</b>	<b>127.5</b>	<b>15.5</b>	<b>13</b>
Grand Total	<b>1000</b>	<b>728.75</b>	<b>679.75</b>	<b>750.25</b>	<b>70.5</b>	<b>21.5</b>

## **9. ENVIRONMENT MANAGEMENT PLAN**

### **9.1 Reclamation of Land**

Out of 15.17 Ha, 1.572 Ha and 0.642 Ha area will be developed for excavation of dolomite and lime stone respectively in lease period. Hence 11.5835 Ha will be un-worked area at the end of lease period. Out of excavated area, only 0.0675 Ha areas will be reclaimed at the end of lease period while green belt will be developed over 0.27 Ha areas. Rest of the developed area at the end of lease period will be left as it is because depth wise extent of mineral is anticipated. Restoration will visualize after completion of mining, there will be no dumps in the lease area and total 0.0675 ha areas will be reclaimed. Area to be rehabilitated by way afforestation is 0.27 ha.

The leveling & grading of the ground will be done and converted into agriculture land. An effective land reclamation plan of this mining lease area will again restore the aesthetic beauty.

### **9.2 Green Belt Development**

Till date 60 trees (0.0325 ha), has been planted in lease boundary area and further 100 sampling shall be planted in next five years which will cover 0.054 Ha of area. Till date 0.01 ha area has been planted over the existing dumps and 0.02 ha around the pits and peripherals.

At the end of lease period total 1000 number of trees will be planted over 0.27 ha of area.

### **9.3 Measures to Improve Socio-Economic Conditions**

The impacts of the project would be felt in an integrated manner on the socio-economic environment in the study area. There is no village in core zone and further no displacement is required for the proposed project and therefore impact will be positive side rather negative. The impacts on the different components viz employment, housing, educational, and 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.

- i) The project will have a strong positive employment and income effect, both direct as well as indirect.
- ii) Migrant-Non migrant ratio shall shift towards migrant side. This will happen because of (i) better employment opportunities due to this project and (ii) relatively low agricultural yield through traditional agricultural practice with monocrops.
- iii) The project shall speed up the growing view on importance of education among people in study area.
- iv) The project is going to bring about changes in the pattern of demand from food to non-food items if sufficient income is generated.
- v) The project is not going to influence the existing traditional agricultural situation significantly. It may help to improve agricultural production by way of providing additional income to the farms from supplementary sources.

People perceive that the project will bring handfull gains by way of creating significant job opportunities along with development of social infrastructure.

### **9.4 Air Pollution Control Measures**

Following measures shall be taken to mitigate the effect of mining operation over ambient air environment:

1. Regular spraying of water by water sprinkling system over haulage roads.
2. To reduce dust generation during loading operation, water has been sprayed over the muck pile to the loaded;
3. To reduce dust generation during plying of dumpers on the haul road. Water sprinkling is done at frequent intervals. Water sprinklers shall be installed at the mine haulage road;
4. To reduce spread of dust, plantation along the mining lease boundary is under progress and plantation shall be also done along haul roads.
5. Periodic maintenance of haulage roads.
6. All over burden dumps has been stabilized with legumes and grass to prevent the erosion of soil and arrest the dust emission during windy days.

In addition to the above following additional mitigation measures has been adopted and it is expected to continue in future also:

1. Dust due to drilling has been minimised by using wet drilling method like water injection system.
2. Dust mask has been provided to all workers working in dusty atmosphere.
3. Tree Saplings has been planted at the periphery of mining lease.
4. Regular maintenance of vehicles and machinery's has been carried out in order to control emissions;
5. A good house keeping and proper maintenance has been practiced which will help in controlling pollution.

#### **9.5 Noise Pollution Control Measures**

The main sources of noise in mining activity are drilling, blasting, material handling machinery, loading equipment, etc. Following mitigation measures should be taken to control noise pollution:

1. Wherever the noise levels exceed 85 dBA, workers has been provided with earmuffs, ear plugs etc.
2. Hydraulic drills has been used for drilling;
3. All moving parts of machine has been properly lubricated;

4. Non-moving parts of machine has been properly fastened;
5. Blasting has been well designed and arranged in such a way that only one or two holes are blasted at a time with the use of short delay detonators in combination with sequential blasting machine;
6. No trunk line of detonating fuse has been used on surface (Even if detonating fuse is used as trunk line with cord relays, then it shall be covered with clay properly);
7. No blasting has been done when the sky is cloudy because cloud cover can cause reflection of pressure wave back to the ground at some distance from blast.
8. Electric detonators have been used instead of the detonating fuse as trunk line.
9. Blast has been designed in such a way that fragmentation is proper and over size boulder generation is minimum. So secondary blasting is avoided;
10. Blasting has been done between 12 noon to 4 pm when temperature inversions are not likely to be there and air density is less;
11. A barrier of overburden at mine boundaries has been made and three rows of trees are proposed to be planted to reduce propagation of noise;
12. Secondary blasting is not required and hydraulic rock breaker is used.
13. Noise barriers, silencers and enclosures have been incorporated for equipments, which emit high noise levels.
14. All the basic equipments and various machinery have been kept well maintained.
15. Thick green belt around the mining pit and along the haulage roads.
16. As far as possible heavy and noisy workers has been avoided during nighttime.
17. Unnecessary use of horns by the drivers of the vehicles has been avoided.

### **9.5 Water Pollution Control measures**

Following measures have been taken to avoid accumulation of water:

1. Pump having required capacity has been installed to lift accumulated rain water from working pit.
2. There shall not be no over flow on wash off from dumps nor is there any beneficiation plant. Only rainwater is pumped out of the mine;
3. There is no toxic constituent in water and soil so water collected in sump is free from any toxic substances.
4. A silt-settling tank has been constructed in northern barrier zone area to settle heavy particle before discharging water into drain.
5. Quality of water accumulated in the working pit may be checked during monsoon.
6. It shall be ensured that silt content in the mines discharged is minimum.
7. It has been ensured that quality of drinking water for the worker is hygienic and good sanitation system is available.

### **10.0 CONCLUSION**

The Limestone, Dolomite and Dolomite Marble block mining project of M/s Gagan Sial, village –Sunehri, Tehsil Murwara, Katni District (MP) will be environmental compatible to the surrounding due to the high standards of pollution control measures to be adopted during the operation activity. Thus it can be safely stated that the mining activities will not have any adverse effect on the surroundings, if the proper environmental management plan is adopted.