

EXECUTIVE SUMMARY

OF

ENVIRONMENT IMPACT ASSESSMENT

For

**Production of 54,500 cum/Year of Quartz &
Quartzite**
At- Balapadu, Tahasil- Rayagada, Dist- Rayagada (Odisha)

Of

BALAPADU QUARTZ & QUARTZITE MINE
(Over an area of 55.394 Ha.)

of

SRI BALAKRISHNA PADHY

Name: GREEN CIRCLE, INC
NABET: Registration No.: NABET/EIA/24-27/IA 0138
Vadodara- 390021, Gujarat

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EXECUTIVE SUMMARY

1.0 Introduction

Quartz & quartzite ore is the major requirement for construction industry. The mining of quartz & quartzite ore comes under minor mineral mining. As per EIA Notification 2006 and subsequent amendments of Environment clearance is mandatory for the entire mining project. As per the said notification the activities has been categories as Category B2 (lease area <25 Ha), B1 (Lease area 25-100 Ha) and A (>100 Ha). As per MoEF& CC notification S.O. 141(E) dt. 15th January, 2016.

The proposed project is a quartz & quartzite ore Mine. The Balapadu quartz & quartzite ore quarry leases located areas covering a total mineralized area of 136.881 Acres or 55.394 Hectares located in village/Mouza Balapadu of Sub division Rayagada & District Rayagada, Odisha has been proposed to be leased out to different intenders through auction.

2.0 Project Description

The objective of Balapadu quartz & quartzite ore Quarry is to produce 141700 ton of quartz & quartzite per annum from 55.394ha along with the judicious mining in the aspects of environmental protection, systematic development of mine and surrounding areas and conservation of national mineral wealth.

According to the EIA notification of 2006, amended December 2009, this project belongs to 'Category B'; hence obtaining an Environmental Clearance (EC) is mandatory. Balapadu quartz & quartzite ore has assigned Green Circle, INC to carry out the EIA study. Green Circle, INC has collected the required baseline data from Dec 2022 to Feb 2023 and accordingly prepared the EIA/EMP report.

The salient Features of the Project have been compiled and given in the table below.

Table-1: Salient Features of the Lease hold Area

S. No	Parameter	Remark
1.	Altitude	380mRL–680mRL
2.	Latitude	19°05'15.9"N-19°05'09.3"N
3.	Longitude	83°22'14.1"E-83°22'09.7"E
4.	Village	Balapadu
5.	Sub Division	Rayagada
6.	District	Rayagada
7.	State	Odisha
8.	Toposheet number	65 M/8
9.	Maximum temperature	30.5 °C
10	Minimum temperature	21 °C
11	Avg. Relative humidity	79% Max (Rainy season)
12	Avg. Annual rainfall	1030.21mm
13.	Topography	Undulating
14	Soil type	Alluvium
15	Climate	Hot &Arid
16	Nearest Town	Rayagada
17	Nearest Highway	National Highway (NH-326)
18	Nearest Railway Station	Rayagada railway station which is 2.05 km from the lease area.
19	Nearest village	Balapadu – 0.6km
20	Nearest Reserve Forest	Bena khamar Reserve forest-65.1 km
21	Surface Water Bodies	There is no seasonal nala within the lease area Tentaliguda Dam-5.3 Km
22	Historical place within buffer zone(10km)	Nil

Geology of the area

Regional Geology

Regionally the area forms a part of Eastern Ghat Super Group of Archean age rocks represented by Khondalites, Charnockites, Granite gneiss, Biotite Schists and pegmatite and quartz veins. Both khondalite and charnockite are marked by lit par lit injection of quartzo-feldspathic material, which has resulted in the formation of migmatite and augen gneiss. The contact between charnockite and khondalite in general is marked by a garniferous quartzo-feldspathic granulite (Leptinite). The regional geological succession after G.S.I is as follows:

The stratigraphic sequence in the region are

Soil & Alluvium (Valley areas)

Ferruginous and aluminous laterites (Hill tops)

-----Unconformities-----

Precambrian Garnetiferous Porphyritic granodiorite,

Biotite granite gneiss etc.

Garnetiferous quartzite

Local Geology:

The quartz body forms the central part of the hillock and the major portion of the area has exposures of quartz and khondalite bodies. The quartz is exposed in the middle part of the hillock in form of in-situ bodies, confined to the higher relief and boulder float embedded in soil, available on the lower elevations. On the lower altitudes the quartz body has been observed to be available under soil covers and the thickness of such soil cover has been observed to vary between 1m to 2m, as seen from the existing old pits. The quartz occurrences of the area are part of Eastern Ghat super group of rocks belonging to Archean age. These are hard and compact, semi transparent and milky white in colour, medium grained and are composed essentially of quartz, mica, garnet and ferro-magnesium minerals are in traces. Outcrops are heavily fractured and joints are prominent. The southeastern and northern part covered by khondalites and centre portion covered by soil and quartz & quartzite pebbles. The general trend of the litho units of the area are as follows:

Soil

Quartz / Quartzite

Granite gneiss and schist (Pyroxene granulites)

Brief Process Description (Mining)

Quartz and Quartzite in the M.L. area is proposed to be mined out by conventional method of semi-mechanized opencast mining through the formation of safe benched on single shift basis. Height and width of the benches will be kept at 6m each. Overall pit slope angle will be 45° with deep hole Drilling and wedging along with limited blasting will be performed depending upon the hardness of the strata, actual recovery and production requirement. It has been proposed to produce ore by scientific method of mining.

The year-wise quartz & quartzite and waste generation are given below as per approved mining scheme.

**YEAR WISE PRODUCTION OF CONSTRUCTION STONE DURING PLAN PERIOD
YEARLY DEVELOPMENT & PRODUCTION PLAN**

Year	Cross Section	Cross section area (m ²)	Length of influence (m)	ROM (m ³)	Waste vol. 15% of ROM (m ³)
1 st year	Lapse period and no production have been carried out				
2 nd year	IJ	410	100	41000	6150
3 rd year	IJ	450	100	45000	6750
4 th year	GH	100	100	10000	1500
	IJ	400	100	40000	6000
Total				50000	7500
5 th year	GH	100	100	10000	1500
	IJ	445	100	44500	6675
Total				54500	8175
G. Total	-----	----	-----	190500	28575

Blasting:

One Wagon drill of 63 mm dia to be utilized for drilling. These holes will be drilled in staggered pattern with burden and spacing of 2.5m each. A powder factor of 6 ton/Kg explosive is considered for estimating explosive requirement. However, this may suitably be changed depending upon the type of ore and other site conditions.

3.0 Description of the Environment

The baseline environmental status was assessed based on primary and secondary data collected through on-site field observations and obtained from agencies such as Indian Meteorological Department, Geological Survey of India, State Ground Water Department, State Pollution Control Board, Census of India and Local Forest Department and Field Study. The following environmental components were focused at during this study.

- Air Environment (Meteorology, Ambient Air Quality, Noise Levels, Traffic Pattern, etc.)
- Water Environment (Quality and Quantity of Surface and Ground water sources)
- Land Environment (Geology, Hydrogeology, Land use, Solid Waste generation and characteristics)
- Ecological Environment(Terrestrial and Aquatic Flora & Fauna)
- Socio-Economic

Environmental Monitoring

For monitoring of the environmental parameters like air, water, soil and noise quality, the monitoring stations have been established at different locations in core and buffer zone of the project. The baseline data has been collected in the post monsoon season i.e. from 1st Dec 2022 to 28th Feb 2023.

Meteorology

The climate of the study area is characterized in post monsoon season. The average rainfall is 1030.21mm. The table below shows the meteorology of the site.

Table E –2: Regional Meteorological Data

	Avg. Temperature °C	Min. Temperature °C	Max. Temperature °C	Rain fall mm	Rainy days(d)	Humidity %i	Avg. Sundays (41)
January	21.5	15	28	10	1	65	8
February	24	17	31	15	1	60	8.5
March	27.5	21	34	20	2	55	8.5
April	30.5	24	37	30	3	50	9
May	32	26	38	50	5	55	8.5
June	29.5	25	34	180	12	75	6
July	27	24	30	300	18	85	4
August	27	24	30	280	17	85	4.5
September	27.5	23	31	200	12	80	5.5
October	26	22	30	120	8	75	7
November	23.5	18	29	30	2	80	8
December	21	15	27	10	1	65	8.5

Source: Green Circle Filed Survey.

Air Quality

Ambient Air Quality of the study area has been assessed through a network of ambient air quality stations located within the study area.

AAQ status has been monitored for PM₁₀, PM_{2.5}, SO₂, NO₂ and CO. PM₁₀ & PM_{2.5} at each location as per CPCB norms of 2 days/week for four weeks/month for three months.

Pre-calibrated Respirable Dust (RD) & Fine Dust (FD) samplers have been used for monitoring of the existing AAQ status.

Methodologies adopted for sampling and analysis were as per the approved methods of Central Pollution Control Board (CPCB). Maximum, minimum, average and percentile values have been computed from the raw data collected at all individual sampling stations to represent the AAQ status of the study area.

Table E –3:Air Data of Monitoring Stations

Station Code	Location	PM1 0	PM2.5	So2	No2
A1	Balapadu	65.49	31.84	7.88	12.63
A2	Balapadu	65.0	31.79	7.89	12.64
A3	Mauganda	65	31.78	7.89	12.63
A4	Hekraparhu	65.0	31.78	7.88	12.64
A5	Singiput	66.29	31.74	7.78	12.65
A6	Berhu	64.97	31.71	7.9	12.65
A7	Kandhakhilum	64.95	31.71	7.91	12.66
A8	Gaurhakhilumu	64.96	31.70	7.9	12.66
A9	Dupa	64.91	31.69	7.87	12.66
A10	Kanohamui	64.92	31.68	7.86	12.64
NAAQ standards for industrial, residential, rural and other area (24hours)		100	100	60	80

Quartz Concentration

One sample from core zone and one set of samples from buffer zone have been analysed for quartz concentration. Results of the same are given below:

Table –4:

CODE NO	Location Name	Quartz Concentration(ug/m ³)
Core Zone		
A-1.	Balapadu Mines Area	0.0001
A-2	Balapadu Mines Area	0.0001
Buffer zone		
A-3	Mauganda	Nil
A-4	Hekraparhu	Nil
A-5	Singiput	Nil
A-6	Berhu	Nil
A-7	Kandhakhilum	Nil
A-8	Gaurhakhilumu	Nil
A-9	Dupa	Nil
A-10	Kanohamui	Nil

Noise Level

Noise levels were collected from five locations in the study area. Data was collected using Lutron, Model:SL- 4033SD. At each location Noise levels were recorded during the day and night times to compute day equivalent and night equivalent levels. The noise levels recorded are computed to obtain single value index of day- equivalent and night- equivalent. Details of noise monitoring stations and the summary of the day & night- equivalent values computed for five locations in the study area are given in **Table-5**.

Table –5: Description of Noise Monitoring Station

STATION CODE	LOCATION / VILLAGE	WITH RESPECT TO MINE SITE		NOISE LEVEL, Db(A)	
		Distance (Km)	Direction	Day Equivalent (La)	Night Equivalent
N1	Balapadu	-	NW	52.2	44.9
N2	Balapadu		SW	52.1	41.2
N2	Mauganda	1.01	NE	51.4	41.6
N3	Gaurhakhilum	2.18	NE	50.7	40.7
N4	Hekraparhu	1.67	NW	50.6	40.3
Ambient Air Quality Standard w.r.t Noise			Residential Area	55	45

Water Quality

10 water samples (5 surface and 5 ground water), were collected from different locations both from core and buffer zone during the study period.

Surface Water Quality:

Water quality of the area will not be affected by the mining activities. Measures are taken to deal with the surface runoff which may carry soil particles and other possible pollutants into nearby nala. Rain water drains around the quarries with silt settling tanks are planned to check possible impact on the surface water quality.

Analysis of Surface Water Samples:

The surface water samples are collected and analyzed as per IS3025, APHA 24th Ed. (Class A- Inland surface water) as given below.

Table – 6: Surface Water Analysis Result

S. No	Parameters	Unit	Tolerance Limits IS: 2296-1982	Analysis Result of SW-1	Analysis Result of SW-2	Analysis Result of SW-3	Analysis Result of SW-4	Analysis Result of SW-5
1	pH	-	6.5-8.5	7.4	7.2	6.9	7.1	7.1
2	Temperature	°C	-	25.1	25.1	25.2	25.2	25.3
3	Electrical Conductivity	µmos/cm	-	861	504	702	444	311
4	Turbidity	NTU	-	0.2	0.3	0.5	0.2	0.3
5	Chlorides as Cl ⁻	mg/L	600	45	60	92	30	22
6	Colour	Pt-co-	300	5	10	10	5	10
7	Odour	---	-	Odourless	Odourless	Odourless	Odourless	Odourless
8	Boron as B	mg/L	-	0.04	0.03	BDL	BDL	BDL
9	Sulphates as SO ₄	mg/L	400	64	9	38	7	6
10	Nitrates as NO ₃	mg/L	50	1.6	6.1	13.2	2.6	3.4
11	Nitrites as NO ₂	mg/L	-	BDL	BDL	0.33	0.13	BDL
12	Fluoride as F ⁻	mg/L	1.5	0.751	0.382	1.44	0.358	0.181
13	TDS at 180°C	mg/L	1500	525	295	438	272	180
14	Calcium as Ca	mg/L	-	84	32	26	44	32
15	Magnesium as Mg	mg/L	-	42	7.2	11	11	8.5
16	Mercury as Hg	mg/L	-	BDL	BDL	BDL	BDL	BDL
17	Arsenic as As	mg/L	0.2	BDL	BDL	BDL	BDL	BDL
18	Iron as Fe	mg/L	50	0.16	0.18	1.26	0.14	0.18
19	Lead as Pb	mg/L	0.1	BDL	BDL	BDL	BDL	BDL
20	Zinc as Zn	mg/L	15	0.07	0.08	0.06	0.08	0.08
21	Cadmium as Cd	mg/L	-	BDL	BDL	BDL	BDL	BDL
22	Chromium as Cr	mg/L	-	BDL	BDL	BDL	BDL	BDL
23	Nickel as Ni	mg/L	-	BDL	BDL	BDL	BDL	BDL
24	BOD	mg/L	3	2	BDL	2	BDL	BDL
25	COD	mg/L	-	24	18	24	18	16
26	TSS	mg/L	1500	14	17	15	13	16
27	Oil & Grease	mg/L	10	<1	<1	<1	<1	<1

Standard: IS 3025, Inland Surface Water

Ground Water Quality: The ground water samples were analyzed and compared with IS10500:2012 as given below. It is observed that all the parameters except the bacterial count are within the prescribed limit.

Table E –7: Ground Water Analysis Result

S. No	Parameters	Unit	Max. Desirable limit as per IS-10500:2012	Max. Permissible Limit in absence of Alternate Source As per IS10500:2012	Analysis Result of GW-1	Analysis Result of GW-2	Analysis Result of GW-3	Analysis Result of GW-4	Analysis Result of GW-5
1	Colour	Hazen	5	15	<5	<5	<5	<5	<5
2	Odour	--	Agreeable	Agreeable	Un-Objectionable	Un-Objectionable	Un-Objectionable	Un-Objectionable	Un-Objectionable
3	Taste	--	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity	NTU	1	5	0.06	0.08	0.07	0.06	0.07
5	pH Value	--	6.5-8.5	6.5-8.5	6.91	7.84	7.64	7.32	7.24
6	Temperature	°C	—	—	16.3	16.5	17.2	16.2	16.3
7	Total Hardness As CaCo3	mg/l	200	600	167	172	166	163	167
8	Iron As Fe	mg/l	0.3	0.3	0.22	0.18	0.44	0.23	0.17
9	Chloride As Cl	mg/l	250	1000	214	224	237	218	222
10	Total Dissolved Solids	mg/l	500	2000	440	887	1024	442	825
11	Electrical Conductivity	µS/c	500	2000	1154 µmhos/cm	1173 µmhos/cm	1265 µmhos/cm	1173 µmhos/cm	1265 µmhos/cm
12	Calcium as Ca	mg/l	75	200	88	108	103	96	112
13	Magnesium as Mg	mg/l	30	100	57.63	43.52	38.67	52.42	47.32
14	Copper as Cu	mg/l	0.05	1.5	<1.0	<1.0	<1.0	<1.0	<1.0
15	Manganese	mg/l	0.1	0.3	0.023	0.027	0.018	0.024	0.025
16	Sulphate as SO4	mg/l	200	400	93	134	109	108	127
17	Nitrate as NO3	mg/l	45	45	27.25	33.16	28.27	27.27	31.27
18	Fluoride as F	mg/l	1.0	1.5	1.12	0.86	1.40	1.14	0.85
19	Mercury as Hg	mg/l	0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
20	Cadmium as Cd	mg/l	0.003	0.003	<0.002	<0.002	<0.002	<0.002	<0.002
21	Arsenic as As	mg/l	0.01	0.05	<0.004	<0.004	<0.004	<0.004	<0.004
22	Cyanide as CN	mg/l	0.05	0.05	<0.003	<0.002	<0.003	<0.003	<0.002
23	Lead as Pb	mg/l	0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01

24	Zinc as ZN	mg/l	5	15	<0.05	<0.04	<0.04	<0.04	<0.04
25	Chromium as Cr	mg/l	4	4	<0.02	<0.02	<0.02	<0.02	<0.02
26	Mineral oil	mg/l	0.5	0.5	Nil	Nil	Nil	Nil	Nil
27	Aluminum as Al	mg/l	0.03	0.2	<0.02	<0.02	<0.02	<0.02	<0.02
28	Boron as B	mg/l	0.05	1	<0.05	<0.04	<0.05	<0.04	<0.04

Standard: IS 10500:2012

Land use

The land use/ land cover assessment of the study area has been made through the analysis of Satellite imagery. Major land use/land cover categories identified in the Study area are settlements, agricultural land, forests, water lands, mining area, water bodies etc. The project area constitutes agriculture and wasteland.

Core Zone:

The leasehold area comprises of private agricultural land and wasteland. There are no forest lands in the lease area.

Pre-existing land use pattern of the M.L area as per land schedule as follows:

Table – 8: Land Use Pattern

Type of	Area in ha
Area of excavation	0.067
Storage for topsoil	0
Over burden dump	0
Mineral storage	0.004
Infrastructure	0
Roads	0.023
Greenbelt	0
Others	0
Undisturbed area - balance area is	
Total	55.394

SOIL QUALITY

The main soils in the District are Red soils, Sandy Loams and sandy Clay and they constitute 96% of the total area. The soils in the District are predominantly loamy with medium fertility. There are mostly red loamy soils, as far as dry lands are concerned and clay loamy in case of wet lands. It is likely that the thick soil cover might represent alluvium along the valleys. Different types of rocks are in abundance in the District.

Soil samples collected indicated predominantly sand, sandy loam and loamy sand texture. The pH of the samples collected in the study area, were found in neutral range.

Based on the secondary information available Department of Agriculture Govt. A.P the most of the soils of the study area are Moderately alkaline in pH, Medium range of Nitrogen, organic carbon, Deficient of Boron, Manganese and Zinc, Sufficient range of Sulphur, Iron and Copper, High in Phosphorus and Very High range of Potassium.

Five soil samples were collected from various locations within study area and analyzed to study the fertility. **Fig-3 . 9** and **Table-3.11** shows the location of soil sampling stations. **TABLE-3.11.**

TABLE-3.12: SUMMAY OF SOIL QUALITY

Physical Properties of Soil

Station Code	Colour	Texture	Water Holding Capacity(%)	Porosity (%)	Sand (%)	Salt (%)	Bulk Density Gm/cc	Permeability ml
S1	Red	Sandy loam	30.3	31.6	73	0.034	1.52	1.3
S2	Red	Loam	32.3	31.2	67	0.035	1.64	1.32
S3	Brownish Red	Clay Loam	27.5	32.4	66	0.033	1.62	1.34
S4	Brownish Red	Clay	28.5	32.3	72.2	0.032	1.56	1.2
S5	Red	Loam	32.2	31.4	64	0.033	1.62	1.33

Chemical Properties of Soil					
Parameters	Samples				
	S1	S2	S3	S4	S5
pH	6.2	6.4	6.5	6.4	6.2
Conductivity	0.104	0.102	0.102	0.103	0.103
Chloride	0.743	0.727	0.736	0.745	0.723
Sodium Absorption Ratio	0.117	0.121	0.116	0.122	0.118

BIOLOGICAL ENVIRONMENT

Ecological studies were carried out in the study area **during Winter Season - 2022**. Area within 10 km of the project site considered to be the "zone of influence" or the "buffer study area" of the project. The objectives of the study are:

- 1) Identification of sensitive habitats
- 2) Documentation and evaluation of the status of the terrestrial flora of the core area and surrounding areas (buffer area).
- 3) Assessment of the Shannon-Wiener Indices of diversity of
- 4) Structural species in the dominant plant communities.
- 5) Identification of fauna (mammals, birds, reptiles and amphibians etc) based on direct sightings, calls, pug marks, droppings, nests, etc
- 6) Identification of threatened faunal species listed in Schedule-I of Wildlife Protection Act 1972.
- 7) Preparation of Wildlife Conservation Plan for the Schedule-I fauna if any
- 8) Identification of presence of Protected areas as per Wildlife Protection Act, 1972

Socio-Economy

Secondary data of census of India, 2011 has been used for establishing the demographic profile of the study area.

PROJECT SITE

The Balapadu Quartz & Quartzite lease area is spread over an extent of 55.394 hectares of Balapadu Village of Rayagada District, Odisha.

SOCIO ECONOMIC PROFILE NEAREST VILLAGE/JURISDICTION VILLAGE

The Project site falls under the jurisdiction of Balapadu Village.

The demographic profile of the village is given below:

- Total population-173
- Number of Houses-43 houses
- Literacy rate-49.6%
- Schedule Caste(SC)-0%
- Schedule Tribe(ST)-90.75%
- **Education:** Total Government primary schools available are 1

- **Health:** The village has one mobile Health center available, one primary health sub centers is available.
- **Drinking Water:** Untreated tap water supply is available all around the year. Hand pump and tube wells are also available.
- **Drain water** is will be treated in the soak pit.
- **Communication facilities** areas available in the form of telephones, public call office and mobiles.
- **Post office** facility is available
- **Transport:** Public and private bus facility is available in 5-10 km radius from the village
- **Roads:** Pucca road, kuccha road, macadam road and foot path are available
- **Power Supply:** The village has 15-hour power supply in the summers and 18-hour supply during the winters
- **Welfare schemes:** Agriculture credit services, self –help groups and public distribution system are available. Integrated child development scheme, Anganwadi centers and ASHA workers are helping the area.

4.0 Anticipated environmental impacts & mitigation measures

Opencast mining activity causes some adverse impacts on the surrounding environment unless proper environmental management plan is adopted. Selecting suitable sites for mining and also adopting all the guidelines. Balakrishna Padhy will take enough care in the mine to avoid adverse impacts on the surrounding environment.

In this chapter, an attempt has been made to quantify the possible environmental impacts on various features such as air, water, land and socio economic factors. The following aspects have been studied to identify the impacts of the Quartz and quartzite mine.

The magnitude and significance of the environmental pollution caused by mining depends on method of mining, scale and concentration of mining activity.

This chapter deals with the impacts arising out of the quartz production.

There is no mine within 500m from the proposed area resulting in cluster situation.

5.0 Sri Balakrishna Padhy ensures the implementation of Environmental Monitoring program for various environmental components as per OSPCB/IBM/CPCB guidelines and also the company will monitor quartz & quartzite in ambient air, soil, water sources, vegetation and urine sample of workers. Regular monitoring of various environmental parameters is necessary to evaluate the efficacy of the management programme so that necessary corrective measures can be taken. The sampling and analysis of the environmental attributes will be as per the guidelines of Central Pollution Control Board/Odisha State Pollution Control Board(OSPCB).The frequency of sampling and location of sampling will be as per the EC/Consent conditions prescribed by SEIAA, Odisha and OSPCB, Odisha. Since environmental quality parameters at work zone are important for maintaining safety, the monitoring work forms part of safety measures also.

A control and mitigation measure for the adverse impacts has been proposed.

The environmental parameters as per OSPCB/IBM/CPCB guidelines and also the company will monitor Quartz in ambient air, soil, water sources, vegetation and urine sample of workers.

AMBIENT AIR QUALITY (AAQ)

Seasonal ambient air quality of the study area will be monitored in and around the mines at following locations for PM10, PM2.5, and SO2and NO2.

MONITORING LOCATIONS OF AMBIENT AIR QUALITY

Code	Location Name
A-1	Mines area
A-2	Mines area
A-3	Mauganda
A-4	Hekraparhu
A-5	Singiput
A-6	Berhu
A-7	Kandhakhilum
A-8	Gaurhakhilumu
A-9	Dupa
A-10	Kanohamui

WATER QUALITY

Quality of water from different locations like groundwater and potable water will be monitored to know the seasonal variations at following locations for the parameters as per IS 10500 once in a season

MONITORING LOCATIONS OF WATER QUALITY

Code	Location Name
W1	Balapadu
W2	Tentuligurha
W3	Dupa
W4	Jamberhi
W5	Barha Irukubarhi

SOIL QUALITY

Soil quality from the following locations will be monitored periodically to know the fertility once in a season.

Monitoring locations of Soil Quality

Code	Location Name
S1	Balapadu Mines area
S2	Balapadu Mines area
S3	Mauganda
S4	Hekraparhu
S5	Kodukhiluma

NOISE LEVELS

Noise levels from the following five stations will be periodically monitored once in a season.

MONITORING LOCATIONS OF NOISE LEVEL MEASUREMENT

Code	Location Name
N-1	Balapadu Mines area
N-2	Balapadu Mines area
N-3	Mauganda
N-4	Gaurhakhilumu
N-5	Hekraparhu

The collection of samples and the analytical procedures will be adopted adhering strictly to the guidelines of CPCB and in case of any anomaly; remedial measures will be taken promptly.

6.0 Additional Studies

Public Consultation:

The Public consultation will be done with appropriate person(s) to get some additional information. It will help in identification of real problems, needs and importance. It also helps to get reaction and feedback on proposal and evaluate the alternatives.

Risk Assessment & Management:

RISK ASSESSMENT

Sri Balakrishna Padhy will carry out mining operations by mechanized mining method. Risk assessment was carried out to identify hazards associated with mining operations to prevent accidents.

Each of the mining operations have been evaluated to understand the following steps

1. Identify the hazard
2. Identify who is at risk
3. Remove the hazard
4. Evaluate the risk
5. Decide on control measures

The following criteria have been followed for evaluation of the risk and consequence level.

EVALUATION CRITERIA FROM RISKS

Severity (SV)	Weightage	Duration (DU)
Trivial Risk	(1)	<Minute
Tolerable Risk	(2)	<input type="checkbox"/> Minute < Hour
Moderate Risk Substantial	(3)	<input type="checkbox"/> Hourbut <8Hours
High Risk	(4)	<input type="checkbox"/> 8Hours

RISK LIKELIV HOOD

Weightage	Probability	Risk Likely Hood
(1)	>Month	Highly Unlikely (HU)
(2)	□Month >Week	Unlikely(UL)
(3)	□Week >Day	Likely(L)
(4)	□Day	Very Likely (VL)

Social Assessment:

Socio-economic impact assessment has taken on a new and important direction. Decision makers at all levels, as well as community members have developed an increasing awareness of the need for estimating the effects for large projects on communities. Estimation and analysis of these impacts have direct and immediate action in planning for change and growth that might occur as a result of large projects. No displacement is required for the proposed project. Hence R&R action plan is not applicable for the project.

7.0 Project Benefits

Mining activity will help in improving the socio–economic benefits in areas like employment, communication and infrastructure development etc.

8.1 ENVIRONMENT

The project will be implemented complying with Environmental Management Plan.

8.2 SOCIAL

The mining activity will create rural employment. It has been observed that local people mainly depend upon agricultural, where the income is irregular and low. The mining activity in the region will have positive impact on the social economic condition of the area by way of providing employment to the local in–habitants; wages paid to them will increase the per capita income, housing, education, medical and transportation facilities, economic status, health and agriculture by improving the life style of the people.

8.3 EMPLOYMENT POTENTIAL

Sri Balakrishna Padhy will employ 100 persons for carrying out the mining operations. Further 76 people will be employed during progress of quartz & quartzite production. There will be indirect employment to many more people in the form of contractual jobs, business opportunities, service facilities etc. This will enhance the economic status.

OTHER TANGIBLE BENEFITS

Corporate Environmental Responsibility

Corporate Environmental Responsibility (CER) refers to voluntary actions undertaken by the project proponent either to improve the living conditions (economic, social, and environmental) of local communities or to reduce the negative impacts of mining activity. By definition, voluntary actions are those that go beyond legal obligations, contracts, and license agreements. CSR programs usually invest in infrastructure (potable water, electricity, schools, roads, hospitals, hospital equipment, drainage repairs, etc

CER activities

The following community development measures will be implemented:

- Regularly supplying the drinking water in and around the neighboring villages.
- Providing financial aid for their each and every reasonable need.

- Providing building material for the construction of dwelling houses.
- Providing medical camps in and around the neighboring villages.
- 100 persons from local will be employed for carrying out mining operations
- Formation of roads to the destinations is also implemented as a part of community development measures.
- Water sprinkling on the road for dust suppression
- Distribution of sapling to nearby villagers

Sri Balakrishna Padhy has budgeted an amount of Rs **28.25Lakhs** for Corporate Environment Responsibility (CER) in accordance to the **MoEFCC's office Memorandum # F.No. 22-65/2017-IA.III dated 01.05.2018** against requirement of Rs. 20000 /-.

Sri Balakrishna Padhy will form a co-ordination committee in consultation with the District Administration to prioritize the activities to be taken up under Corporate Environment Responsibility (CER).

The following are the CER activities planned in the two years.

Sl. No.	Activity	Budget (Rs in lakhs)	Time
1	Installation of Hand pump	1.0	1year
	Supply of drinking water	10.0	Annual
2	Greenbelt development	1.25	As soon as Mines start
3	Toilets for women in mines	0.50	3months
4	Development of Villages	2.0	2years
5	Occupational health checkup	1.0	6month
6	Employment opportunity	6.0	As soon as Mines start
7	Water sprinkling on the road for dust suppression.	4.0	Annual
8	Provision of PPES	2.0	Per annum
9	Promotion of Education programme	0.5	Annual
Total		28.25	-

8.0 Detailed Budget and Procurement Schedule

Sri Balakrishna Padhy has incurred an amount of Rs.18.5 Lakhs towards Capital expenditure and Rs.5.2 Lakhs towards recurring expenditure per annum for implementation of the environmental monitoring program.

9.0 Environmental Management Plan

The **Environment Management Plan (EMP)** is required to ensure sustainable development in the study area. Hence it needs to be a comprehensive plan for which the industry, Government, Regulating agencies likes Pollution Control Board working in the region and more importantly the population of the area need to extend their co-operation and contribution. It has been evaluated that the project area will not be affected significantly due to mining activity. Mitigation measures at the source level and an overall Management Plan at the site level are elicited so as to improve the surrounding environment.

Sri Balakrishna Padhy proposes quartz & quartzite ore production for 54500 cum/year from Balapadu quartz & quartzite lease area spread over an extent of 55.394 Ha.

The potential impact due to the project is on air quality which is mainly dust from mining operations. Dust suppression measures are being implemented, mainly water sprinkling.

Impact due to noise is negligible and confined to the work zone of mine area where all personnel working are provided with Personal Protection Equipment.

The wastewater generated from the toilets will be treated in septic tank followed by Soak pit.

Quartz & quartzite ore available is soft and friable in nature and drilling and blasting is not required. Hence there will be no impact on ground vibrations due to mining operations.

Impact on water regime is mentioned in chapter 4.5.2. Impact on land environment and control measures are highlighted in chapter 4.6. Impact on traffic is addressed Under Para - 4.10. Occupational Health management measures are addressed under Para-4.9. Social welfare measures are addressed under Para-4.8.

Chapter – 6, Paragraph 6.1 details the monitoring program to ensure compliance with relevant standards.

Chapter– 10, Paragraph 10.4 details the allocation of budget for plan implementation of Environmental Management Plan.

Table –13: Environmental Management Plan

S. No	Parameters	Mining Activity	Mitigation measures
1.	Air Environment	Loading	Water sprinkling bed one before loading by making it moist
		Transportation	<ul style="list-style-type: none"> • Water sprinkling will be done on haul road to • Control fly of dust while transporting mineral sand waste • Overloading will be prevented • Trucks/Dumpers covered by tarpaul in covers
		General measures	<ul style="list-style-type: none"> • Labours engaged in such dust prone areas should be provided with safety devices like ear muff, mask, and goggles as per the MMR, 1961 amendments and circulars of DGMS. • Ambient Air Quality Monitoring will be conducted on regular basis to assess the quality of ambient air.
2.	Water Environment	Surface water	<ul style="list-style-type: none"> • Waste water discharge from mine if any will be treated in settling tanks before using for dust suppression and tree Plantation purposes.
		Ground water	<ul style="list-style-type: none"> • The mining activity will not intersect the ground water table • Desilting will be carried out before and immediately after the monsoon season.

		Storm water	<ul style="list-style-type: none"> • Pit will be used for Storage of rain water • Rainwater will be collected in sump in the mining pit and will be allowed to store • Collected water will be judiciously used for dust suppression onwards and such sites where dust likely to be generated and for developing green belt. • The proponent will collect and judiciously utilize the rainwater as part of rain water harvesting
		General measures	<ul style="list-style-type: none"> • Regular monitoring and analyzing the quality of water
3.	Noise Environment	Transportation	<ul style="list-style-type: none"> • Proper and regular maintenance of vehicles, machinery and • The noise generated by the machinery will be reduced by proper lubrication of the machinery and other equipments. • Speed of trucks entering or leaving them will be limited to moderate speed to prevent undue noise from empty vehicles. • Adequate silencers will be provided in all the dieseling of vehicles. • Minimum use of horns and speed limit of 10km/hr in the village area. • It will be ensured that all transportation vehicles carry a valid PUC Certificates.
		General measures	<p>Use of personal protective devices i.e., earmuffs and earplugs by workers, who are working in high noise generating areas</p> <ul style="list-style-type: none"> • Provision of Quiet areas, where employees can get relief from workplace.
4.	Vibration	Blasting	<ul style="list-style-type: none"> • No blasting will be adopted.
5.	Soil Environment	Topsoil	<ul style="list-style-type: none"> • No generation of topsoil.
6.	Waste Dump	Stabilization of Dumps	<ul style="list-style-type: none"> • The waste dump shall be properly terraced into 3m benches with proper repose angle • Garland drainage around dump shall prevent under wash of dump by hydrostatic pressure to be developed by surface water and control wash outs and collapse

7.	Plantation	Mine lease boundary	<ul style="list-style-type: none"> Plantation will be done all along the safety zone.
8.	Land Environment		<ul style="list-style-type: none"> Land will be used as water reservoir post mining.
9.	Socio Economic [STANDARDT OR # 37]		<ul style="list-style-type: none"> Good maintenance practices will be adopted for machinery and equipment, which will help to avert potential noise problems. Greenbelt will be developed in and around the project site as per Central Pollution Control Board (CPCB) guidelines. Appropriate air pollution control measure will be taken so as to minimize the environmental impact within the core zone. An emergency preparedness plan will be prepared in advance, to deal with fire fighting, evacuation and local communication. For the safety of workers, personal protective appliances like hand gloves, helmets, safety shoes, goggles, aprons, nose masks and ear protecting devices has been provided which meet 'BIS' (Bureau of Indian Standards). As a part of CSR activities, community welfare activities will be undertaken by the proponent which leads to socio economic development
10.	Occupational Health		<ul style="list-style-type: none"> First-aid facilities as per provisions under Rule(44) of Mines Rules 1955 Initial and Periodical medical examination shall be conducted for the employees under Rule 29B & 45 (A). Insurance will be taken in the name of the labourers working in the mines Workers involved in mining work shall be provided protective equipments such as Thick Gloves, Goggles, ear plugs, safety boot wears, et.

DESCRIPTION OF ENVIRONMENT

Collection of base line data is an integral part of the preparation of environmental impact assessment reports. The baseline monitoring study has been carried out **winter Season 2022** covering the months of December, 2022 to February, 2023 to assess the existing environmental scenario in the area. For the purpose of EIA studies, mine lease area was considered as the core zone and area outside the mine lease boundary up to 10km radius from the lease boundary was considered as buffer zone.

METEOROLOGY

The predominant wind directions during this period were from NNE- NE- E- ESE- SE- SSE-S-SSW-SW-WSW sector accounting to about 21.61% of the total time. The wind of less than 1.01 kmph was treated as calm, about 44.57% of the time the winds were under calm condition.

AIR ENVIRONMENT

Ambient air quality of the study area has been assessed through a network of ambient air quality locations.

The Ambient Air Quality monitored in the study area was found to be well within the limits of NAAQ standards prescribed for Residential, Rural & Other Areas.

NOISE ENVIRONMENT

Ten monitoring locations were selected to assess the noise levels in the study area. Noise levels recorded in the surrounding villages were found to be in the range of 50.6–52.2dB (A) during day time and in the range of 40.3–44.9 dB (A) during night time.

WATER ENVIRONMENT

Five ground water samples and five surface water samples were collected from in and around the study area. The parameters thus analysed were compared with IS – 10500. All the samples were found to be well within the limits.

SOIL ENVIRONMENT

Five soil samples were collected within 10 km radial distance of the study area and were analyzed to study the soil quality.

BIOLOGICAL ENVIRONMENT

From the study it has been observed that there are no endangered, endemic or threatened species.

10.0 Conclusion

All possible environment aspects have been adequately assessed and necessary control measures have been formulated to meet statutory requirements. Any adverse impacts on existing for reduction of either forest cover or loss of wild life is not at all expected. No long term, irreversible impact is envisaged by this project. Thus implementing the proposed project will not have any appreciable negative impacts. Moreover, the afforestation, reclamation work done will help in creation of a greenbelt, which not only be aesthetically pleasing, but also add to the forest cover area of this region.