DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT
& ENVIRONMENT MANAGEMENT PLAN
of
Executive Summary – English

KALWAR IRON ORE BLOCK

at

village: Kalwar, Tehsil: Durgkondal, District: Kanker, State: Chhattisgarh.

Area: 23.72 ha

at

Khasra no. 29,30,31,32, 39/1,39/3 40/1,40/2

Capacity : 70,000.88 Tons per annum

Proposal No. SIA/CG/MIN/434123/2023.

Applicant

M/s. PITAMBRA LOGISTICS AND INFRASTRUCTURE PVT. LIMITED

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SUMMARY

INDEX

SI.NO.	CONTENTS	PAGE NO.
1.	INTRODUCTION	2
2.	ENVIRONMENTAL CLEARANCE	2
3.	TERMS OF REFERENCE	2
4.	BRIEF DESCRIPTION OF PROJECT	2
5.	LOCATION	3
6.	RESERVES	3
7.	MINING	5
8.	AFFORESTATION	6
9.	LAND USE PATTERN	6
10.	ANALYSIS OF ALTERNATIVES	7
11.	DESCRIPTION OF ENVIRONMENT	7
12.	AMBIENT AIR QUALITY	7
13.	NOISE ENVIRONMENT	8
14.	WATER ENVIRONMENT	8
15.	SOIL ANALYSIS REPORT	8
16.	BIOLOGICAL ENVIRONMENT	8
17.	WATER REQUIREMENT	9
18.	POST MINING LAND USE	10
19.	ENVIRONMENTAL MANAGEMENT PLAN	13
20.	CONCLUSION	14

INTRODUCTION

Environmental Impact Assessment (EIA) is a process, used to identify the environmental, social and economic impacts of a project prior to decision-making. It is a decision making tool, which guides the decision makers in taking appropriate decisions for proposed projects. EIA systematically examines both beneficial and adverse consequences of the proposed project and ensure that these impacts are taken into account during the project designing.

1 ENVIRONMENTAL CLEARANCE

The proposed project is categorized under 1 (a) (< 50 hectare of mining lease area) of Gazette Notification dated Sep 14th, 2006, Dec 1, 2009 and subsequent amendment made on 15 jan 2016. As per the Gazette Notification, 2006, the proposed project is under "B1" category.

2 TERMS OF REFERENCE

The State level Expert Appraisal Committee, Chhattisgarh for mining projects considered the project. Based on the information contained in the documents submitted and the presentation made, the EAC-MoEF prescribed the Terms of Reference (TOR).

3 BRIEF DESCRIPTION OF PROJECT

This report has been prepared for the Environmental Impact Assessment of Kalwar Iron Ore (23.72 Ha) for the proposed production from of 70,000 TPA at Village: Kalwar, Tehsil: Durgkondal, District: Kanker, State: Chhattisgarh. The purpose of the report is to provide a complete information base of the study area in a document which is drafted in a standard format of EIA / EMP as required by the MoEF, Government of India. The investigation provides status of present environment in core zone (Mining Lease) as well as buffer zone (10 km radius around core zone) of the proposed Kalwar iron ore deposit.

4 LOCATION

The mining area is located at the village: Kalwar, Tehsil: Durgkondal, District: Kanker, State: Chhattisgarh.

Table 1 Project Co-ordinates of Proposed Project

Pillar No.	Pillar Latitude	Pillar Longitude
K1	20° 25' 45.97749" N	80° 59' 08.35717" E
K2	20° 25' 47.50115" N	80° 59' 08.02717" E
K3	20° 25' 48.03598" N	80° 59' 06.84185" E
K4	20° 25' 48.53137" N	80° 59' 07.75594" E
K5	20° 25 49.58802" N	80° 59' 07.00355" E
K6	20° 25' 50.27734" N	80° 59' 09.65901" E
K7	20° 25' 51.09940" N	80° 59' 09.58047" E
K8	20° 25' 51.22000" N	80° 59' 10.95349" E
K9	20° 25' 54.87947" N	80° 59' 12.18146" E
K10	20° 25' 55.13942" N	80° 59' 10.69156" E
K11	20° 25' 58.72749" N	80° 59' 11.16763" E
K12	20° 25' 58.93923" N	80° 59' 10.65587" E
K13	20° 25' 59.80682" N	80° 59' 10.68502" E
K14	20° 25' 58.47141" N	80° 59' 16.06141" E
K15	20° 25' 59.29794" N	80° 59' 16.06134" E
K16	20° 26' 05.38483" N	80° 59' 11.57720" E
K17	20° 26' 05.37057" N	80° 59' 12.77370" E
K18	20° 26' 04.03481" N	80° 59' 13.47507" E
K19	20° 26' 03.08824" N	80° 59' 25.49171" E
K20	20° 25' 56.88587" N	80° 59' 25.81386" E
K21	20° 25' 56.99994" N	80° 59' 24.25645" E
K22	20° 25' 56.59817" N	80° 59' 24.20361" E
K23	20° 25' 55.78654" N	80° 59' 25.22222" E
K24	20° 25' 54.34090" N	80° 59' 31.05091" E
K25	20° 25' 55.22570" N	80° 59' 35.23125" E
K26	20° 25' 52.62187" N	80° 59' 32.07353" E
K27	20° 25' 51.75920" N	80° 59' 32.00374" E
K28	20° 25' 50.84906" N	80° 59' 30.28240" E

K29	20° 25' 53.11708" N	80° 59' 25.42369" E
K30	20° 25' 51.71750" N	80° 59' 23.01084" E
K31	20° 25' 50.11251" N	80° 59' 23.87505" E
K32	20° 25' 49.21309" N	80° 59' 21.96563" E
K33	20° 25' 48.01802" N	80° 59' 21.09584" E
K34	20° 25' 47.97609" N	80° 59' 19.46258" E
K35	20° 25' 46.93314" N	80° 59' 18.94335" E
K36	20° 25' 45.12657" N	80° 59' 19.67060" E
K37	20° 25' 44.78288" N	80° 59' 16.40570" E
K38	20° 25' 44.35266" N	80° 59' 16.10473" E
K39	20° 25' 44.16444" N	80° 59' 14.10345" E
K40	20° 25' 45.03952" N	80° 59' 12.27465" E
K41	20° 25' 45.72525" N	80° 59' 08.77636" E
1	20° 25' 49.95801" N	80° 59' 08.43310" E
2	20° 25' 51.60218" N	80° 59' 11.33695" E
3	20° 25' 52.45946" N	80° 59' 11.54506" E
4	20° 25' 53.78082" N	80° 59' 12.25014" E
5	20° 25' 56.95332" N	80° 59' 10.97586" E
6	20° 25' 59.51769" N	80° 59' 11.56161" E
7	20° 25' 59.44894" N	80° 59' 12.93491" E
8	20° 25' 58.86431" N	80° 59' 14.29313" E
9	20° 25' 58.49149" N	80° 59' 15.27350" E

5 RESERVES

The total mineral resources and reserves have been calculated by Plan area method. In this method the reserves/resources have been estimated by Plan area method. Influence of the area is multiplied by width to assess the area in sq. meter. After estimating the area it is again multiplied by average depth of the Iron ore bearing gravels to calculate the volume and finally the volume is divided by 20% (as per recovery report 20.75%) of presence iron ore pebbles in influence area of borehole and finally iron pre pebbles volume is multiplied by bulk density of the iron ore to estimate the reserve of the Iron Ore in tons.

RESERVE CALCULATION IN THE PROSPECTED AREA (23.72 Hect.):

- Surface area method has been used to calculate the Geological Reserve/Resources of Iron Ore shown in the Surface Geological Section.

- From the borehole data the average thickness of Iron ore bearing body has been considered for reserve calculation.
- The general formula of reserve estimation is: Tonnage of ore = Influenced area x Depth of iron ore bearing gravels X.

Bulk density = Volume of iron ore bearing gravels = 20% (as per recovery report 20.75%)

- Iron ore pebbles presence is consider in total Volume of iron ore bearing gravels X 3.5 (As per bulk density report 3.45 t/m3 and it can be rounded to nearest tenth is as 3.5t/m3).

Ore : The resources/reserves of ore up to actual depth of Bore hole & exploratory pit is considered under Mineral Resources (331 & 332).

- An area 2.00 hectare of Iron bearing area is considered for calculate to reserve under the G1 category and 7.65ha under G2 category on the basis of exploratory pit data.
- The recovery of 20% (as per recovery report 20.75%) by volume has been taken of recoverable float ore volume. Tonnage factor of 3.5 (As per bulk density report 3.45 t/m3 and it can be rounded to nearest tenth is as 3.5t/m3) has been applied to calculate the resource in tones.

Table 2: A. Mineral Reserve

Classification	Code	Quantity			Grade		Remark
		Forest	Non-Forest	Total	Forest	Non-Forest	
1. Proved Mineral Reserve (A)	111	0.00	0.00	0.00	NA	NA	Nil
2. Probable	121	0.00	91000.00	91000.00	NA	Fe-Av.56.78%	Nil

Mineral Reserve (A)							
3. Probable Mineral Reserve (A)	122	0.00	219611.83	219611.83	NA	Fe-Av.56.78%	Nil

Table 3: B. Remaining Resources

Classification	Code	Quantity			Grade		Remark
		Forest	Non-Forest	Total	Forest	Non-Forest	
1. Feasibility Mineral Resource (B)	211	0.00	0.00	0.00	NA	NA	Nil
2. Prefeasibility Mineral Resource (B)	221	0.00	0.00	91000.00	NA	NA	Nil
3. Prefeasibility Mineral Resource (B)	222	0.00	21551.23	21551.23	NA	Fe-Av.56.78%	Nil
4. Measured Mineral Resource (B)	331	0.00	0.00	0.00	NA	NA	Nil
5. Indicated Mineral Resource (B)	332	0.00	0.00	0.00	NA	NA	Nil
6. Inferred Mineral Resource (B)	333	0.00	0.00	0.00	NA	NA	Nil

6 MINING

Method of mining has been proposed by Open Cast Mechanized Mining Method. The production and development will be done by mechanical and manual means**.** The mining operations will be carried out in the pit surface of the lease area by mechanized open cast method which consists of following operations.

(i) Sorting and sizing of ore will be done by manually or mechanical means.

(ii) Excavation and loading of ore will be done by mechanical means.

(iii) Drilling of 32mm dia hole will be carried out.

(iv) No deep hole drilling and blasting will be carried out. Blasting has been done for heaving purpose in ore.

(v) The ore will be sized according to the consumer specification and stacked on the mine surface. The stacked ore will be transported to the consumers by their hired dumper.

(vi) Arrangement for dewatering accumulated rain water through diesel pumps.

(vii) The height of the ore bench will be 3.0m while the width will be 3.0m to 6.0m. The height of the top soil bench will not be more than 1.5m.

(viii) The ultimate pit slope 45 degree and bench slope 60 degree will be maintained.

(ix) The existing haul road will be extended at a gradient of 1 in 16. The gradient ramp will be 1 in 10.

(x) The production of iron ore from this mine is fully dependent on the demand of the market.

(xi) The production capacity of plan period is 62001.6 MT/Year (average). Pit and bench parameter has been marked on year wise production and development plan and sections.

YEAR WISE PRODUCTION DETAIL:-

Table 4 YEAR WISE PRODUCTION DETAIL

S.No	Year	Total Topsoil Volume (m^3)	Total Overburden Volume (m^3)	Total Overburden Quantity (t)	Total ROM Volume (m^3)	Total ROM Quantity (t)
1	Year 1	6026.60	42001.20	75602.16	10500.30	36751.05
2	Year 2	9590.80	72292.00	130125.60	18073.00	63255.50
3	Year 3	10231.50	80000.34	144000.61	20000.09	70000.32
4	Year 4	10484.20	80000.26	144000.47	20000.06	70000.21
5	Year 5	9346.00	80001.00	144001.80	20000.25	70000.88
		45679.10	**354294.80**	**637730.64**	**88573.70**	**310007.96**

7 AFFORESTATION

The future mining will hardly effect the existing vegetation. However, plantation will be taken up in the area to upgrade the scenic beauty of the area. It is proposed to plant 4785 sampling of native species.

Table 5, Year wise Afforestation Schedule

S. No.	Year	Plants
1	First Year	957
2	Second Year	957
3	Third Year	957
4	Fourth Year	957
5	Fifth Year	957
Total		**4785**

8 LAND USE PATTERN

637730.64 Tons of waste will be generated during the next five year of Plan Period. This waste will be dumped on ground level 2.7 Ha area which will be covered under dump. No Reclamation by Backfilling has been proposed for this plan period, and year wise plantation w will be proposed along the lease boundary. The proposal of re-grassing will be done after closure of mines.

Table 6, Stage Wise Land Use Pattern

Mined Out area in the lease	Area under Dumps(in hect)	Area under the Tailing Dam	Area under utility services(in hect)	Area undistur bed/virgin	Mined out Area Reclaimed but not rehabilitated(i n hect)	Mined outArea fully Rehabilitated from Reclaimed area(in hect)	Area under Water Reservoir considered Rehabilitated (in hect)	Stabililized Waste dump Rehabilitated (in hect)	Virgin area under Green Belt (in hect)	Rehabilitated Area under utility services(in hect)	Rehabilitated Area under Tailing dam (in hect)
9.14	2.70	0.00	0.17	11.71	0.00	9.14	0.00	0.00	14.41	0.14	0.00

9 ANALYSIS OF ALTERNATIVES

The mine is operated by Opencast Mechanized Mining Method with drilling and blasting. No

other alternative technologies can be used because of the hard nature of the ore. The project is using eco-friendly measures to minimize the impact of mining on the surrounding environment.

10 DESCRIPTION OF ENVIRONMENT

This section contains the description of baseline studies of the 10 km radius of the area. The baseline environment quality was carried out over a radial distance of 10 km around the mine during pre monsoon season covering the months of **Dec, 2022 to Feb, 2023.**

The data collected has been used to understand the existing environment scenario around the proposed mining project against which the potential impacts of the project can be assessed.

Environmental data has been collected in relation to propose mining for:-

(a) Land

(b) Water

(c) Air

(d) Biological

(e) Noise

(f) Socio-economic

11 AMBIENT AIR QUALITY

The results of AAQ are given in Chapter-3, the results of PM_{10} recorded within the study area was in the range of **40.25 µg/m3 to 65.31 µg/m^3 ,** PM 2.5 in range of **10.05 µg/m^3 to 24.48 µg/m^3** , the result of SO_2 recorded within the study area was in the range of **5.53 µg/m^3 to 10.00 µg/m^3**, the result of NOx recorded within the study area was in the range of **9.60 µg/m^3 to 17.17 µg/m^3** and CO recorded within the study area was in the range of **0.28 mg/m^3 to 1.30 mg/m^3.**

12 NOISE ENVIRONMENT

Assessment of hourly night time Leq (Ln) varies from 36.2 to 41.8 dB (A) and the hourly daytime Leq (Ld) varies from 40.4 to 57.2 dB (A) within the study area. The status of noise quality within the 10 km zone of the study area is, therefore, within the MoEF standards.

13 WATER ENVIRONMENT

The water quality in the impact zone was assessed through physico- chemical and bacteriological analysis of ground water samples. The results have been compared with the drinking water quality standards specified in IS: 10500. It was observed that all the physico chemical parameters and heavy metals from surface and ground water samples are below stipulated drinking water standards.

All the ground water samples analyzed can be considered fit for drinking purpose in the absence of alternate sources.

14 SOIL ANALYSIS REPORT

Physical characteristics of soil were characterized through specific parameters viz bulk density, porosity, water holding capacity, pH, electrical conductivity and texture. Soil pH plays an important role in the availability of nutrients. Soil microbial activity as well as solubility of metal ions is also dependent on pH. In the study area, variations in the pH of the soil were found to be slightly alkaline (6.98 to 7.67). Electrical conductivity (EC) is a measure of the soluble salts and ionic activity in the soil. In the collected soil samples the conductivity ranged from 199 - 270 µmhos/cm.

The soils with low bulk density have favorable physical condition where as those with high bulk density exhibit poor physical conditions for agriculture crops.

15 BIOLOGICAL ENVIRONMENT

The lease area as well as buffer zone area reveals no endangered and endemic species of flora and fauna in the area.

16 WATER REQUIREMENT

The daily water requirement for the proposed Mining activity will be 7.50m3/day. Actual water required for Domestic & Environment maintenance and other is 7.50m3/day. Water is being sourced from bore wells. The break-up of water requirement is given below. The following table shows the water balance of the mine activity:

Table 7, Water consumption (KLD)

Sr. No.	Purpose	Daily Water Requirement (M3/day)
1	Dust suppression	2.70
2	Drinking	2.00
3	Green belt	2.00
4	Other	1.00
5	Grand Total	7.50
TOTAL		**7.50 (M3/day)**

17 POST MINING LAND USE

Post mining lands use and environment management of core zone

Table 8, Post Project monitoring programme

Attributes	Sampling		Measurement Method	Test Procedure
	Network	**Frequency**		
A. Air Environment				
Meteorological · Wind direction · Relative humidity · Rainfall	Minimum 1 site in the project impact area	Regularly in one season by Weather Monitoring Station	Mechanical/automatic weather station	-
Pollutants PM_{10}	4 locations in the project impact area (Minimum 2 locations in upwind side, 2 sites in downwind side / impact zone)	Revised National Ambient Air Quality Standards (NAAWS) vide MoEF circular, dated 16.11.2009	Gravimetric method	-
$PM_{2.5}$			Gravimetric method	-
SO_2			EPA Modified West & Geake method	Absorption in Potassium Tetra Chloromercurate followed by Colorimetric estimation using P-Rosaniline hydrochloride and Formaldehyde

				(IS: 5182 Part - II).
NO_2			Arsenite modified Jacob & Hochheiser	Absorption in dil. NaOH and then estimated colorimetrically with sulphanilamide and N (I-Nepthyle) Ethylene diamine Dihydrochloride and Hydrogen Peroxide (CPCB Method).
CO			Non Dispersive Infra Red (NDIR) Spectroscopy	-
B. Water Environment				
pH, Turbidity, Colour, Odour, Taste, TDS, Total Hardness, Calcium hardness, Magnesium hardness, Chloride, Fluoride, Sulphate, Nitrates, Alkalinity, Iron, Copper, Manganese, Mercury, Cadmium, Selenium, Arsenic, Cyanide, Lead, Zinc,	Set of grab samples during pre and postmonsoon for ground and surface Water in the vicinity.	Diurnal and Season wise	As per IS 10500-	Samples for water quality should be collected and analyzed as per : IS : 2488 (Part 1-5) methods for sampling and testing of Industrial effluents Standard methods for examination of water and wastewater analysis published by American Public

Chromium, Aluminum, Boron, Phenolic compounds				Health Association.
C. Noise				
Noise levels at Day & night time - Leq dB (A)	Mine Boundary, High noise generating areas within the lease	Quarterly / Half yearly	As per CPCB norms	As per CPCB norms
D. Soil				
pH, Bulk Density, Soil texture, Nitrogen, Available Phosphorus, Potassium, Calcium, Magnesium, Sodium, Electrical Conductivity, Organic Matter, Chloride	5 locations in the project impact area	Yearly/half yearly	As per USDA Method	As per USDA Method
E. Socioeconomic				
· Demographic structure · Infrastructure resource base · Economic resource base · Health status: Morbidity pattern · Cultural and Aesthetic attributes · Education	Socioeconomic survey is based on proportionate, stratified and random sampling method	Minimum for two phases of the project	Primary data collection through questionnaire	Secondary data from census records, statistical hard books, topo sheets, health records and relevant official records available with Govt. agencies

18 ENVIRONMENTAL MANAGEMENT PLAN

The mining activities involve, dozing, excavation, loading, haulage and transportation of the Iron Ore. These activities lead to generation of air borne dust, which can cause air pollution in and around the mining lease area, if appropriate control measures are not taken. Similarly mining causes Land Degradation, Noise and Water Pollution etc. in the area.

In order to minimize impacts of mining on different environmental parameters and to keep air and water quality within prescribed limits of CPCB, a rapid Environmental Management Plan (EMP) is prepared to strictly follow it. This helps in resolving all environmental and ecological issues due to mining in the area. The environmental management plan includes all measures and safety precautions necessary for safe mining along with rehabilitation measures for mined out areas.

Table 9, Budget for Environmental protection

Particulars	**Capital Cost**	**Recurring Cost/ year in Rs.**
Environmental Protection		
Dust Suppression	70,000	30,000
Tarpaulin and cover for stack of fly ash	50,000	20,000
Environmental Monitoring	60,000	30,000 (Air – 10,000 Water -10000 Soil and Noise- 10000)
Green Belt along with chain link fencing in barrier zone	1606750	447928
Total	**1786750**	**5,27,928**

19 CONCLUSION

As discussed, it is safe to say that the project is not likely to cause any significant impact on the ecology of the area, as adequate preventive measures will be adopted to contain the various pollutants within permissible limits. Green belt development around the area will also

be taken up as an effective pollution mitigative technique, as well as to control the pollutants released from the premises of the mine.

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