Annexure-14

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Mining Plan

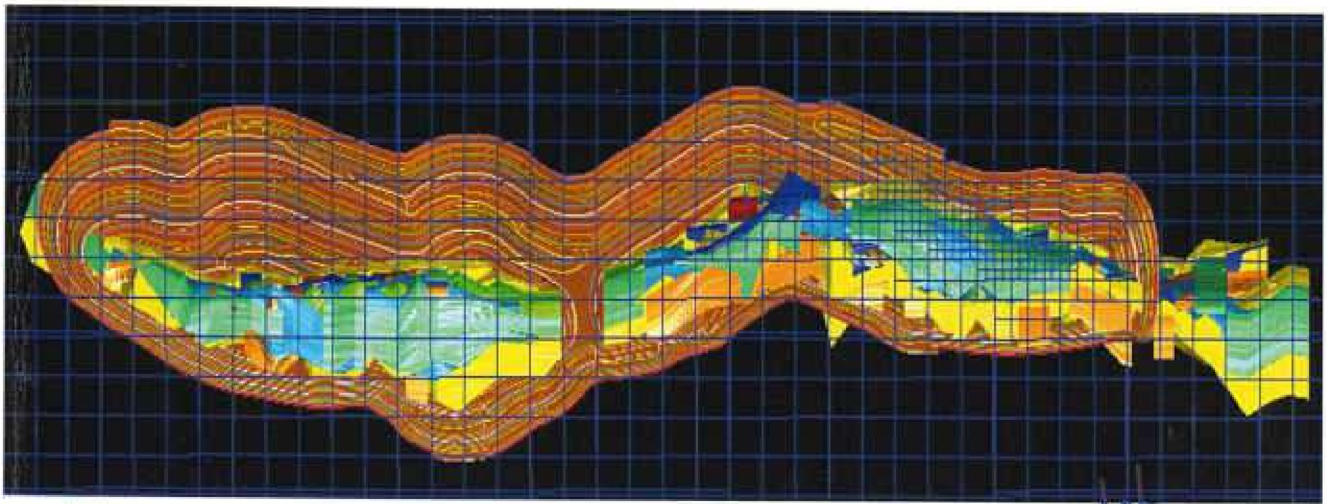
of

Bailadila Iron Ore Deposit-4

(Village – Bacheli, Tehsil – Bacheli, District – Dantewada, State – Chhattisgarh (Category 'A' Mine, Lease Area of 646.596 Ha) Forest Area: 646.596 Ha, Non-Forest Area: Nil

Mining Plan Period: 1st Year to 5th Year
Working Proposal Period: 1st Year to 5th Year

Submitted under Rule 16(1) of Minerals (Other than Atomic and Hydro-Carbon Energy Minerals) Concession Rules, 2016



Part A: Text

September 2021

क्षेत्रीय खान नियंत्रक,
Regional Controller of Mines
भारतीय खान ब्यूरो, रायपुर
Indian Bureau of Mines, Raipur

NMDC- CMDC Limited

Green Valley City, Housing Board Colony, Boriyakala, Raipur, Chhattisgarh – 492 015, Phone No: 0771 – 2971919

Prepared by

Dr. Sanjeev Kumar Sinha & Mr. R B Pradhan

NMDC Ltd

Castle Hills, Masab Tank, Hyderabad – 500 028

Mining Plan of Bailadila Iron Ore-Deposit-4 Mine over an area of 646.596 Ha submitted under Rule 16(1) of Minerals (Other than Atomic and Hydro-Carbons Energy Minerals) Concession Rules, 2016	
Mine/ Deposit Name-	Bailadila Iron Ore Deposit 4 अनुमोदित / Approved
Mining Lease no-	Bailadila Iron Ore Deposit 4
Mine Code-	
In Villages-	Bacheli
Teluq-	Bacheli
District-	Dantewada (South Bastar)
State-	Chhattisgarh
Total-Lease area-	646.596
Forest Area-	646.596
Non-Forest area-	Nil
Lease period-	LOI issued on 26.06.2021 for five years.
Mineral-	Hematite (Iron Ore)
Proposed category of Mine-	Opencast Category 'A' – Fully Mechanized
Mining plan period-	from 1ST Year To 5TH Year
Working proposal period-	from 1ST Year To 5TH Year
Applicant / lessee-	NMDC- CMDC Ltd
IBM Registration no-	IBM/ 22044/ 2018
Address -	Director (Technical) & (Production-Additional Charge)-NMDC Ltd., Nominated Owner (Bailadila Iron Ore Deposit-4), Khanij Bhavan, Castle Hills, Masab Tank, Hyderabad-500028
Phone-	040-2353 8708/09
Email-	dt@nmdc.co.in
Prepared by-	NMDC Ltd.
Qualified Person Name-	Dr. Sanjeev Kumar Sinha & Mr R B Pradhan
Address-	Resource Planning Department, NMDC Ltd., Castle Hills, Masab Tank, Hyderabad – 500 028
Phone-	Ph – 040- 23538713- 21, 23
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LIST OF CONTENTS			
PART	CHAPTER	DETAILS	PAGE NUMBER
PART A:	MINING PLAN AT A GLANCE		1-2
	CHAPTER 1	GENERAL INFORMATION	3-7
	CHAPTER 2	GEOLOGY & EXPLORATION	8-42
	CHAPTER 3	MINERAL PROCESSING	43-49
	CHAPTER 4	MINING OPERATIONS	50-75
	CHAPTER 5	SUSTAINABLE MINING	76-93
	CHAPTER 6	PROGRESSIVE MINE CLOUSER PLAN	94-101
	CHAPTER 7	FINANCIAL ASSURANCE/ PERFORMANCE SURETY	102-103
	CHAPTER 8	REVIEW OF PREVIOUS PROPOSALS	104-110
	CHAPTER 9	IMPACT ASSESSMENT	111-129
PART B:	ANNEXURES		1-370
PART C:	PLANS & SECTIONS		

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PART – A

MINING PLAN AT A GALANCE

MINING PLAN/REVIEW OF MINING PLAN AT GLANCE

1	**Name of the Applicant/ lessee**	M/s NMDC- CMDC Limited
2	**IBM Registration no**	IBM/ 22044/ 2018 अनुमोदित / Approved
3	**Address of Applicant**	Shri Somnath Nandi Director (Technical) & (Production-Additional Charge)-NMDC Ltd., Nominated Owner (Bailadila Iron Ore Deposit- 4), Khanij Bhavan, Castle Hills, Masab Tank, Hyderabad-500028 Tel. No.-040-2353 8708/09, Mobile No.-6309570111 email ID: -dt@nmdc.co.in
4	**Name of Mine**	Bailadila Iron Ore Deposit – 4
5	**Mine code**	.....
6	**Lease area in hects.**	646.596 Ha
7	**Forest area**	646.596 Ha
8	**Name of Mineral**	Hematite (Iron Ore)
9	**Lease period from to**	LOI issued on 26.06.2021 for five years.
10	**Plan proposal period-**	From 1st year to 5th Year
11	**Mineral Reserve (111 ,121 &122) in Million tonnes**	**Mineral Reserve**
		111-Nil
		121 (Insitu)– 71.78 Million Tonnes
		122 (Insitu)-28.95 Million Tonnes
		122 (Float Ore) – 8.28 Million Tonnes
12	**Mineral Resources (211, 221,222, 331, 332, 333&334) in tonnes**	**Mineral Resources**
		211 – Nil
		221(Insitu) – 8.04 Million Tonnes
		222 (Insitu)– 0.82 Million Tonnes
		331 – Nil
		332 (Float)– 0.59 Million Tonnes
		333(Insitu) – 10.94 Million Tonnes
		334 – Nil
13	**Production proposal (1st Year) in tonnes**	11,95,600 Tonnes
14	**Production proposal (2nd Year) in tonnes**	2,000,000 Tonnes
15	**Production proposal (3rd Year) in tonnes**	2,000,000 Tonnes

16	**Production proposal (4th Year) in tonnes**	2,000,000 Tonnes
17	**Production proposal (5th year) in tonnes**	2,000,000 Tonnes
18	**OB/Waste handling proposal (1st Year) CUM**	708655 Cum.
19	**OB/Waste handling proposal (2nd Year) CUM**	164147Cum.
20	**OB/Waste handling proposal (3rd Year) CUM**	107614Cum.
21	**OB/Waste handling proposal (4th Year) CUM**	299885Cum.
22	**OB/Waste handling proposal (5th year) CUM**	164666Cum.
23	**Present EC permission in tonnes**	7 MTPA PROPOSED
24	**Plantation proposal in five years in numbers**	1st Year: 3000 Plants
		2nd Year: 16000 Plants
		3rd Year: 16000 Plants
		4th Year: 13500 Plants
		5th Year: 13500 Plants
		Total Plantation – 62000 plants
25	**Plantation area proposal in five years (ha)**	1st Year: 1.248 Ha.
		2nd Year: 13.89 Ha.
		3rd Year: 15.562 Ha.
		4th Year: 13.89 Ha.
		5th Year: 13.89 Ha.
		Total Plantation - 58.48 Ha.
26	**Back filling proposal in hectares in five years**	Nil
27	**Check Dams/ Check Bund numbers in five years**	1st Year- Check Dam– 5 nos. of 50 mtr. each (50m X 5 nos.)
		1st Year- Check Bund– 9 nos. of 10 mtr. each (10m X 9 nos.)
28	**Garland drain in meters five years**	1st Year-1140 mtr.
29	**Settling ponds (Numbers)**	Nil
30	**Area put to use at end of five year in ha.**	130.927
31	**Bank Guarantee Amount Rs**	BG will be provided as performance security at the time of signing of MDPA.
32	**Validity of BG up to**	N/A
33	**Any other important information**	N/A

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CHAPTER – 1

GENERAL INFORMATION

Chapter 1: GENERAL INFORMATION

1.1: LEASE DETAILS

IBM Registration Number:	IBM/ 22044/ 2018 अनुमोदित / Approved
Lease Code:	Till Yet not allotted
Mine Code:	Till Yet not allocated
Name of Lessee:	NMDC CMDC Limited
Address of Lessee:	Shri Somnath Nandi Director (Technical) & (Production-Additional Charge)-NMDC Ltd., Nominated Owner (Bailadila Iron Ore Deposit- 4), Khanij Bhavan, Castle Hills, Masab Tank, Hyderabad-500028 Tel. No.-040-2353 8708/09, Mobile No.-6309570111 email ID: -dt@nmdc.co.in
Type of Lessee:	PSU
Name of Mining Lease:	Bailadila Iron Ore Deposit No. 4
State:	Chhattisgarh
District:	Dantewada
Tehsil/ Taluk/ Mandal:	Bacheli
Village:	Bacheli
Lease Area (Ha):	646.596
Forest Area (Ha):	646.596
Name of Minerals:	Hematite (Iron Ore)
Name of associated minerals:	
Type:	◉ Fresh Grant ○ Existing Lease
Type of working:	Opencast
Nature of Use:	Non-Captive
Category of Mine:	A-Mechanised

1.1.1: Initial/subsequent Lease grant details

Grant	From	To	Lease deed execution date	Lease registration date	Remarks
Initial grant					Fresh LOI issued

1.1.2: Mining Plan Submission Criteria Details

Type of Document	Mining Plan
Reason/s for modification	N/A
Period for which modification is proposed	N/A
LOI Number:	क्रमांक एफ 2-20/2005/12
Date:	26-06-21 and 07.08.2021(amendment)

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1.2: LAND OWNERSHIP DETAILS

S. No.	Village	Taluka	Area (Ha)	Khasra No.	Type of Land	Nature of Land
1	Bacheli	Bacheli	646.596	N/A	Forest Land	Government Waste Land

1.3: EXISTING LEASES

Date of Execution	LOI issued (Not yet executed)

1.3.1: Approval of earlier Mining Plan & Its Subsequent Review in Chronological Order

Sl. No.	Letter Number	Date	Period		Type Of Approved Document
			From	To	
N/A	N/A	N/A	N/A	N/A	

1.3.2: Partial Surrendered Area During Stages of Operations in Chronological Order

Sl. No.	Letter Number	Date	Supplementary Surrender order Letter Number	Supplementary Lease Deed Date	Final Retained Area over which current Mining Plan is Prepared (ha)
1	N/A	N/A	N/A	N/A	N/A

1.3.3: Transfer of Lease Area Subsequent to Grant

						Nature of block transferred	
Sl. No.	Letter Number	Date	Transfer of lease deed Number	Date of execution of Transfer lease deed	Name of Transferor	Granted through auction	other than through auction for captive use
1	N/A	N/A	N/A	N/A	N/A		

1.3.4: Statutory Compliances

1.3.4.1: Environment Clearance

Applicable	Yes अनुमोदित / Approved
Letter No	EC yet to be applied
Date	EC yet to be applied
Validity	EC yet to be applied
ROM Mineral in tonnes	EC yet to be applied

1.3.4.2: SPCB Approvals

validity	Yet to be applied
Approval of	Yet to be applied
Date	Yet to be applied
Validity	Yet to be applied
ROM Mineral in tonnes	Yet to be applied

1.3.4.3: Forest Clearance

Applicable	Yes
Letter No	Yet to be applied
Date	Yet to be applied
Validity	Yet to be applied
Area (Ha)	Yet to be applied

1.3.4.4: Land Acquisition Details

Total Area acquired/purchased so far	Area is completely Forest Land. No acquisition required
Total Amount Paid (INR)	

1.3.5: Mine Location Details

Toposheet Number:	E44J2

1.3.5.1: Location of Boundary Pillars

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Pillar No.	Pillar Latitude *(dd:mm:ss.ss)*	Pillar Longitude *(dd:mm:ss.ss)*
A	18:43:38.32617	81:12:03.25650
B	18:43:38.52758	81:13:04.84428
C	18:43:12.30677	81:13:06.24991
D	18:43:12.27943	81:13:03.60782
E	18:41:26.17920	81:13:07.02661
F	18:41:48.22195	81:12:31.89279
G	18:41:50.38796	81:12:02.90192

1.3.6: Owner /Nominated Owner Details

Name	PAN of Nominated Owner	Address of Nominated Owner	Mobile Number	Email	Please attach Minutes of Board Resolution in case of Nominated Owner
SHRI SOMNATH NANDI	ABHPN2393M	Shri Somnath Nandi Director (Technical) & (Production-Additional Charge)-NMDC Ltd., Nominated Owner (Bailadila Iron Ore Deposit- 4), Khanij Bhavan, Castle Hills, Masab Tank, Hyderabad-500028 Tel. No.-040-2353 8708/09, Mobile No.-6309570111 email ID: - dt@nmdc.co.in	6309570111	dt@nmdc.co.in	Please refer Board Resolution at Annexure-4

1.3.7: Qualified Person Details as per M(OAHCEM)CR, 2016

Sr. No.	Prefix	Name	PAN of QP	Address	Mobile no.	Qualification	Exp in years as prescribed under the rule	Email
1	Mr	Sanjeev Kumar Sinha	ASSPS6115L	5th Floor, Mine Planning Division (RP Department), NMDC Limited, Masab Tank, Hyderabad (50028)	8500667319	B.E. in Mining Engineering, Phd in Mining	+22 years of experience	sinhask@nmdc.co.in
2	Mr	Rahas Bihari Pradhan	BCIPP8539G		9406404938	B.E. in Mining Engineering	+14 years of experience	rbpradhan@nmdc.co.in

CHAPTER – 2

GEOLOGY & EXPLORATION

Chapter 2: GEOLOGY & EXPLORATION

2.1: GEOLOGY

2.1.1: Topography

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Terrain	Undulating

RELIEF

Highest Level (m) from MSL	1212 m
Lowest Level (m) from MSL	1020 m
Average Level (m) from MSL	
Drainage Pattern	Others
Order of Stream	Second Order
Minimum Distance of Stream from Lease Area (m)	Towards South Eastern Part of the Lease Area

2.1.2: Details of Physiographic features and Infrastructures available in and around the lease/ block area

Description	Location if existing Within the lease/block area.	Distance from boundary periphery in kms, if existing outside the lease/block area. (Within 5.00Kms)	Remark if any
River/Nallah/Reservoir	A nallah present towards eastern side of ML area		No major water bodies present in the mining lease area except a Galli nallah
Public roads (Tar Road, cart road)	NIL	4 km towards east of ML	State Highway
Railway track	NIL	2.5 kms towards east of ML	Bacheli Railway Station
Human settlements	NIL	3.5 kms towards east of ML	Bacheli Town
Archaeological monuments/ places of worships/public utilities etc.	NIL	NIL	There are no archaeological monuments present even 10 km radius.
Wild life sanctuaries/ national parks	NIL	NIL	NIL within 10 kms radius

Coastal Regulation Zone (CRZ)	N/A	N/A	
Power transmission lines/telephone lines		Power Transmission Line Inside ML area, Telephone Line-1 KM distance .	Power transmission line passing through southern side of the ML area and Telephone line is present within 1KM of ML Area (at Dep-10).
Firing range	NIL	NIL	
Ordinance factory	NIL	NIL	
grazing land/ burial ground or cremation ground	NIL	NIL	Not present within 5 kms radius
Any other specify	NIL	NIL	

Particulars	Distance from lease boundary in kms
Nearby village	Nerli -5 Kms, Porokameli- 6 Kms, Bhansi- 8.5 Kms
Nearest Railway station	Bhansi (7.5km, NNE) Bacheli (2.5 Km, East)
Nearest Port	Visakhapatnam (400 Kms Approx.)
Distance of SH/NH from lease area	4 km towards east of ML

2.1.3: Regional Geology

Regional Geology

The Bailadila Iron Ore Deposits occur in two parallel ridges in the Bailadila range of hills stretching north-south. Altogether, fourteen deposits have been located in these two ridges. The Bailadila iron ore series is considered to be equivalent to iron ore series of Jharkhand and Orissa. The Bailadila Iron Ore Deposit No. 4 is a part of Bailadila Group of rocks of Archaean- Proterozoic age of Bastar Craton. It consists of mainly the banded iron formation (BIF), associated ferruginous shales and phyllite overlies unconformably the Bengpal group. Apart from these major rock types, volcanic tuffs and quartzites are also present in and around the mine lease area. Metabasaltic traps with tuffs and cherts underlie the above suite of rocks (i.e., Bengpal Series). The basal metabasaltic lavas and dolerite intrusions are encountered along the eastern foothills of the range.

The Bailadila sequence forms a northerly plunging synclinorium (Crook shank, 1963; Ramakrishnan, 1990). According to Chatterjee (1970), the NNE plunging overturned folds in Bailadila sequence are a result of horizontal shear concomitant with flexural slip folding.

In earlier stratigraphic schemes given by Crook shank (1963) and Bandyopadhyay and Hishikar (1977), the Bailadila Group starts with feldspathic quartzites, the latter, concordantly overlie the metabasalt – metapelite of the Bengpal Group (Ramakrishnan, 1990).

A three-tier classification of Bailadila Group is proposed by Khan and Bhattacharya (1993). Khan and Bhattacharya (1993) have incorporated the hitherto mentioned metabasalt – metapelite in the Bailadila Group, naming it as Bhansi Formation.

The lithostratigraphic sequence of Bailadila Group, South Bastar, Dantewada is detailed as follows:

STRATIGRAPHIC GROUP	SUBGROUP	FORMATION	MEMBER	LITHOLOGY
BAILADILA GROUP	Upper Subgroup	Kailash Nagar Iron Formation		Banded Hematite quartzite, banded magnetite quartzite, pockets of massive, laminated ores and blue dust.
		Loa Formation	Akash Nagar Shale	Thinly laminated, soft, ferruginous shales
			Galli-Nala Conglomerate	Polymictic, unsorted, matrix supported conglomerates, Matrix variable in composition from silty tuffaceous to sandy ferruginous.
	.....Local Unconformity.....			
	Middle Subgroup	East Ridge Shale Formation		Interlaminated ferruginous tuffaceous shales and bedded cherts. Rarely carbonaceous shales/slates. Banded ferruginous cherts towards the top.
		Bacheli Meta-siliciclastic Formation		Thick to thin, graded cross bedded wackes /arenites with interbedded shaly layers, becoming common upwards
	.....Local Unconformity.....			
	Lower Subgroup	Bhansi Formation		Chlorite, micaceous phyllites with or without andalusite porphyroblasts. Metabasalts occasionally containing amygdales.
	.....Angular Unconformity.....			
	Basement: Quartz- Chlorite Schists, Recrystalized Quartzites, Magnetite Quartzites of Bengpal (Sukma)			

2.1.4: Local Geology & Structure

2.1.4.1: Local Geological Set-up

Deposit No.4 is situated in the North of Deposit No.5 and South of Deposit No.3 in the western ridge. The ore body occurs as northern continuation of north block of Deposit No.5, separated from Deposit No.5 by a narrow parting of about 150 mts of poor grade laterite ore. On the northern side, Deposit No.4 is separated from Deposit No.3 by a parting of un-enriched banded hematite-quartzite.

The ore body is divided into north and south blocks which are separated by unenriched BHQ. The deposit is bounded by a deep valley on western side and Galli nalla on eastern side. The eastern flank of the deposit is mostly covered by poor grade laterites. Small cliffs composed of hard massive ore occur on the western side of the deposit. Western boundary is often marked by sharp contact against the BHQ.

The Bailadila Range is generally composed of low grade metamorphosed Pre-Cambrian rocks. On the basis of detailed geological exploration in Dep. 4, the following local stratigraphic sequence has been established:

Lithological Succession

Soil cover and laterite Iron Ore Banded Iron formation Ferruginous shales/ slates, tuff and cherts White quartzite and Conglomerates	Bailadila Group

2.1.4.2: Structure

The Bailadila Iron Ore Deposit No. 4 has a general synclinal structure and the area has suffered multiple phases of deformations. The ore body is however, disturbed by several faults which are oblique and transverse in nature. The ore body is also characterized by cross folding, because of which the width of the ore body at places is wider and narrower. The hill ridge at Bailadila Iron Ore Deposit No. 4 trends NNE-SSW direction and the strike of the ore body is following the same trend i.e. NNE-SSW direction with dips ranging from 45° to sub-vertical towards east. The ore body has a lenticular shaped surface appearance. The deposit has a strike length of 3,500 m and width varies from 80 m to 250 m. The average width of the ore body is 150 m. Detailed exploration has established the ore body up to a maximum depth of 130 m. The average depth of bore hole is around 75m.

2.1.4.3: Lithology, Petrographic & Mineralogical Description for Major, Associated & Indicator Minerals

The major rock types of this area are banded iron formation (BIF), ferruginous shales, phyllites, tuffs and quartzites. However, detailed geological mapping, drilling and ore dressing studies have revealed various ore types in Deposit No. 4. Physical and Chemical variations in different ore types were observed with regard to degree of surface oxidation, hardness, compactness, granularity, sandy and flaky nature etc. Based on above characteristics iron ore has been broadly grouped in to six dominant ore types. They are as follows;

Type- 1: Steel grey hematite

Type- 2: Blue grey / Blue hematite

Type- 3: Laminated hematite

Type- 4: Lateritic / Limonitic

Type- 5: Blue dust / Flaky ore

Type: 8: Float Ore

All these ore types are analysed to be greater than 45% Fe; Laterite, Shale and Banded Iron Formations (BIF) analysed less than 45% Fe are considered as Waste. However, the iron ore within 45-55% Fe is considered as Subgrade Ore.

Type-1- Steel Grey Hematite:	It is very hard, compact and devoid of any lamination and banding. It has a metallic lusture. Steel grey hematite is closely jointed with filling of chert and limonite along the joints. This type is exposed on the western side of the deposit. Generally, it is found to occur in association with Type-2.
Type-2 - Blue Grey Hematite:	This ore type is also massive in appearance, dull grey/blue in colour, less hard and compact in comparison to steel grey hematite (Type-1). Sometimes it is porous in nature and well-developed laminations have also been observed. It is also found to occur in association with laminated hematite and massive steel grey hematite. Blue grey hematite is persistent at depth and is mostly exposed on the cliff.
Type-3- Laminated Hematite:	The laminated ores are moderately hard, compact and generally characterized by the presence of well-developed laminations. This ore type is prone to surface weathering and this ore type is lateritized, limonitized along fracture, joint and lamination planes. Number of ore patches sometimes in association with lateritic ore and blue grey hematite ore found to be distributed throughout the ore body. This group is characterized by intensity of weathering and laterization.
Type-4 –	The lateritized hematitic ore on oxidation has given rise to limonite, goethite and ochreous material. It is deep brown (laterite) or yellow (limonitic) in colour.

Lateritic /Limonitic Ore: It is generally encountered at the surface in the form of capping over laminated ore and sometimes over shale. Small isolated patches also occur intermixed with shale. This type of ore is low in Fe content than the previous three ore types & high in alumina.

Type-5 - Blue Dust / Flaky Ore: This ore type is very soft, powdery, unconsolidated and bluish in colour. The other variants of this ore type are sandy, friable, and biscuity type. It occurs in the form of pocket in the main ore body. At shallower depth it is generally flaky and gradually changes to powdery ore at deeper levels as observed. Along CS -41 and few other places, this type crops out on the surface. This is one of the dominant ore types in Deposit No. 4.

Apart from these above litho-units the following rock types are present in the mining lease area.

Float Ore: Float ore occurs on the eastern and western flank of the deposit. The float ore has been explored systematically by pitting on a grid pattern in both the areas. A total number of 80 pits on western flank and 46 pits on the eastern flank were carried out to work out the aerial extent, depth and concentration of float ore. There are extensive pockets of float at the foot hills of western flank. On the basis of extensive pitting on grid pattern the depth of the float ore zone is well established varying from 0.50 to 7.30 mts.

Banded Hematite Quartz (BHQ): The BHQ'S are distinctly banded and mainly occur in northern extremity as well as on the southern slope. Small isolated BHQ outcrops are also located inside the deposit. The ore changes to soft leached BHQ and then to hard BHQ in the depth as observed in the borehole.

Ferruginous shale: Pink and purple coloured (at places white) shale and slate are exposed on the entire eastern flank of the deposit. The shale has given rise to laterite and kaolin at places. The shale often grades to tuffs and some are definitely altered variants of tuffs.

No other associated rocks as well as minerals have been observed within the mine lease area apart from the above described litho-units.

The average thickness and range of assay values of different Ore Types as as follows:

Sl No	Ore Type	Avg. Thickness (In Metres)	Fe% Range	SiO2% Range	Al2O3 Range
1	Steel Grey Hematite	35.56	61.76 - 69.21	0.30 - 4.16	0.15 - 5.15
2	Blue Grey Hematite	34.93	60.86 - 69.32	0.28 - 4.26	0.17 - 4.87
3	Laminated Hematite	27.86	55.10 - 68.56	0.28 - 5.54	0.14 -11.42
4	Lateritic/Limonitic Ore	10.20	45.63 -62.05	0.42 - 16.69	0.15 - 18.54
5	Blue Dust / Flaky Ore	42.42	58.15 - 69.38	0.20 - 12.23	0.03 - 5.34
6	Float Ore (Western Flank)	3.00	65.60	1.21	2.05
	Float Ore (Eastern Flank)	1.50	63.37	1.37	3.9
Note: The assay values of float ores are given as average values.					

2.1.4.4: Mode of Occurrence & Controls of Mineralization

The Bailadila Range is composed of low grade metamorphosed Pre-Cambrian rocks and iron ore is of metasedimentary origin i.e. Hematite. The iron orebodies of Bailadila Deposits are associated with banded Hematite quartzite. The different textural types of iron ore within the deposits are mainly massive ore, laminated ore and blue dust. In addition, float ore accumulations commonly occur on the slopes of the hills. The currently accepted opinion about the origin of the ore bodies is as follows:

i. The mother rock or protoore of the iron ore was BIF.
ii. The silica has been leached out with occasional replacement by newly introduced iron.
iii. The enrichment may be caused by downward percolating meteoric Water or deep-seated heated solutions.

2.1.4.5: Extent of Weathering/ Alteration

Laterite and lateritic iron ores occur as a capping formation which are due to weathering effect observed at mineralized zone, BIFs and ferruginous shales. Goethite as alteration product occurs in the joint and fracture planes of the BIFs at few places in the surficial exposures.

2.1.4.6: Nature/Form of Mineral:

Massive, Laminated & Blue Dust

2.1.4.7: Extent of Mineralization:

The mineralization is following throughout the strike length of the deposit i.e. 3500 mts. with average width of 150 mts. The average thickness of mineralization found to be 62 mts. The maximum extent of mineralization in iron ore is analysed to be 69.38 % Fe from bore hole samples with mean value 59.78% Fe.

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2.1.4.8: Deposit Type (as per MEMC Rule)

Deposit Type	Bedded Stratiform of regular habit.
Strike / Trend of the Ore Body	N15°E to S15°W
Amount of Dip of the Ore Body (degree)	60° to 85°
Dip Direction of the Ore Body	E 45° to sub vertical
Plunge of Mineral Body (degree) (if any)	75° to 80°
Direction of Plunge	North

2.2: EXPLORATION

2.2.1: Summary of The Previous Exploration (for fresh grant) / During Last Plan Period (for existing leases)

Name of The Agency: **NMDC LIMITED (1972-1974).**

2.2.1.1: Geological Mapping:

Sl. No.	Year	Scale	Area Covered (Hect/km²)
1	1972-1974	1:1000	2.2 km²

2.2.1.2: Airborne Geophysical Survey

Sl. No.	Type of Survey	Spacing (m)	Total line (km)	Area Covered (Ha/km²)	To	From	To	From
	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL

2.2.1.3: Ground Geophysical Survey

Sl. No.	Type of Survey	Spacing (m)	Total line (km)	Area Covered (Ha/km²)	To	From	To	From
	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL

2.2.1.4: Geochemical Survey

Sl. No.	Type of Sample	No of Samples	Analysis report	Area Covered (Ha/km²)
	NIL	NIL	Attach analysis report in csv/excel format	
	NIL	NIL	Attach analysis report in csv/excel format	

2.2.1.5: Pitting

Number of Pits: **115 pits**

Sl. No.	Year	Pit ID	Length of Pit (m)	Width of Pit (m)	Depth of Pit (m)	Depth (from)	Depth (to)	Running mtr	Litho units exposed	Name of the radical	Av Grade (in %)	Lati-tude	Longitude
1	1972-1974	P2-P46 (45 No)			0.42 m - 4.75m				Float Ore	Fe, SiO2, Al2O3	65.60		
2	1972-1975	P18-P84 (70 Nos)			0.42 m - 7.27m				Float Ore	Fe, SiO2, Al2O3	63.37		
Note: The details of Float Ore Exploration is given in the exploration report in Annexure- 12													

2.2.1.6: Trenching

Number of Trenches: **Nil**

2.2.1.6.1: Spacing

Min (m) *		Max (m) *		Avg (m) *
0		0		0

Sl. No.	Year	Trench ID	Length of Trench (m)	Width of Trench (m)	Depth of Trench (m)	Depth (from)	Depth (to)	Running mtr	Litho units exposed	Name of the radical	Avg. grade	Latitude (from)	Longitude (from)	Latitude (to)	Longitude (to)
										Drop-down list of radicals					
										Drop-down list of radicals					

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2.2.1.7 Exploratory Drilling (Core/ Non-Core)

			Core holes		Non-core (RC/DTH)		Grand total				
Sl. No	Year	Exploration agency	Number of boreholes drilled	Total mtrs	Number of boreholes drilled	Total mtrs	Total boreholes	Total mtrs	Attach log sheet of each borehole in csv/excel format.	Spacing/Grid Interval	Scale of Exploration
1	1972-1974	NMDC LIMITED	81	6085.65	NIL		81	6085.65	Attached as Annexure-12(1)	125 m x 125 m & 62.5 m X 62.5 m	G1, G2 & G3

2.2.1.8: Exploratory Mining:

Sl. No.	Pit/Adit ID	Length in Mtr	Width in Mtr	Depth in mtrs	Volume (m^3)
1	Adit No-1 at RL 1100 m	170 m - East and 30 m- West (CS- 41)	Not Available	Not Available	Not Available
2	Adit No-2 at RL 1140 m	200 m- West (CS- 56)	Not Available	Not Available	Not Available

2.2.1.9: Sampling

				Location		
Sl. No	Type of sample	No of samples collected	Number of samples analysed	Latitude	Longitude	Remark if any
1	Drill core	4250	4250			Bore Hole Samples

2.2.1.10: Chemical Analysis

Sl. No.	Sample ID	Minerals	Radical with grade in %	Name of Agency	Type of agency	Attachment
1	NA	Iron Ore (Hematite)	Fe, SiO_2 & Al_2O_3	NMDC R&D Laboratory, Hyderabad	NABL accredited	Attach chemical analysis certificate (Pdf)-Please refer Annexure-12(1)

Chemical analysis of core /non-core samples may be uploaded in CSV file which shall normally include Five files namely collar file, survey file and Geology log file, Assay file and RQD File.

2.2.1.11: Petrology & Mineralogical Studies

Sl. No.	Type of Sample	Number of Sample Drawn	Number of Sample Analyzed	Petrographic Study Report
1	Mineral	5 Nos. (Steel Grey Hematite, Blue Grey Hematite, Flaky with Blue Dust, Laminated Hematite and Lateritic & Limonitic)	5 Nos.	Please refer Annexure- 13

2.2.1.12: Beneficiation Studies

Sl. No.	Type of Beneficiation	Number of Samples	Attach
1	Others	5 Nos. (Steel Grey Hematite, Blue Grey Hematite, Flaky with Blue Dust, Laminated Hematite and Lateritic & Limonitic)	**Beneficiation study report attached. Please refer Annexure-13**

2.2.1.13: Bulk Density Study as per MEMC Rules, 2016 and SOP of CGPB

Method adopted for calculating bulk density of ore and waste:

Bulk density/ Tonnage Factor of different ore types have been determined in the laboratory. Based on the results and after giving due consideration for porosity and joints etc., the tonnage factor (tonnes per Cu. Metre) of different ore types have been derived.

Sl. No.	Nature of Ore/OB	Mineral	Number of samples	Bulk Density Established (t/m³)
1	ORE	Steel Grey Hematite	NA	4.2
2	ORE	Blue Grey Hematite	NA	4
3	ORE	Laminated Hematite	NA	3.5
4	ORE	Lateritic & Limonitic Hematite	NA	3.5
5	ORE	Flaky Ore & Blue Dust	NA	3.4
6	ORE	Float Ore	NA	2.28
7	WASTE	BHQ	NA	2.7
8	WASTE	Shale	NA	2.6

Note: Tonnage factor/density are taken into consideration from exploration report (Chapter-V, Refer Annexure- 12).

2.2.1.14: Area Covered under Exploration

Level of exploration	Area in Ha		Total area in Ha.
	Forest	Non-forest	
G-1	28.110	0	28.110
G-2	171.138	0	171.138
G-3	7.002	0	7.002
G-4			
Area proved as Non-mineralized	253.668	0	253.668
Area to be explored	186.678	0	186.678
Total	**646.596**		**646.596**

2.2.2: Summary of The Previous Exploration (Before Last Plan Period)

Name of The Agency: NA

2.2.2.1: Geological Mapping

Sl. No.	Year	Scale	Area Covered (ha)
N/A	N/A	N/A	N/A

2.2.2.2: Airborne Geophysical Survey

Sl. No.	Type of Survey	Spacing (m)	Total line (km)	Area Covered (ha)	Latitude	Longitude
N/A	N/A	N/A	N/A	N/A	N/A	N/A

2.2.2.3: Ground Geophysical Survey

Sl. No.	Type of Survey	Spacing (m)	Total line (km)	Area Covered (ha)	Latitude	Longitude
N/A	N/A	N/A	N/A	N/A	N/A	N/A

2.2.2.4: Geochemical Survey

Sl. No.	Type of Sample	No of Samples
N/A	N/A	N/A

2.2.2.5: Pitting

Sl. No.	Pit ID	Length of Pit (m)	Width of Pit (m)	Depth of Pit (m)	Litho Unit Exposed	Litho Unit From (m)	Litho Unit To (m)	Avg Grade (%)	Running Meters (m)	Latitude	Longitude
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

2.2.2.6: Trenching

Number of Trenches *	Number of Trenches *
N/A	N/A

Spacing		
Min (m) *	Max (m) *	Avg (m) *
N/A	N/A	N/A

Area Covered Under Trenching			
Co-ordinates			
Latitude *		Longitude *	
North	N/A	East	N/A
North	N/A	East	N/A

Sl. No.	Trench ID	Length of Trench (m)	Width of Trench (m)	Depth of Trench (m)		Litho Unit Exposed	Average Grade (%)	Running Meters (m)	From Latitude	From Longitude	To Latitude	To Longitude
N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A

2.2.2.7: Exploratory Drilling

Core/Non-core Drilling

			Core holes		Non-core (RC/DTH)		Grand total		
Sl. No	Year	Exploration agency	Number of boreholes drilled	Total meter	Number of boreholes drilled	Total mtrs	Total boreholes	Total mtr	Attach log sheet of each borehole in csv/excel format.
N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

2.2.2.8: Exploratory Mining

Sl. No.	Pit ID	Volume (m^3)
N/A	N/A	N/A

2.2.2.9: Sampling

Sl. No.	Type of Sample	Number of Samples	Area Covered (ha)	Latitude	Longitude
N/A	N/A	N/A	N/A	N/A	N/A

2.2.2.10: Chemical Analysis

S.No.	Sample ID	Minerals	Radical Analysis
N/A	N/A	N/A	N/A

2.2.2.11: Petrographic & Minera graphic Studies

Sl. No.	Type of Sample	Number of Sample Drawn	Number of Sample Analysed	Petrographic Study Report
N/A	N/A	N/A	N/A	Annexure in pdf format.

2.2.2.12: Beneficiation Test

Sl. No.	Type of Beneficiation	Number of Samples
N/A	N/A	N/A

2.2.2.13: Bulk Density

Sl. No.	Rock Types	Number of Samples	Minerals	Bulk Density Established (t/m³)
N/A	N/A	N/A	N/A	N/A

2.2.2.14: Area Covered under Exploration

G1 (Ha)	
G 2 (Ha)	
G3 (Ha)	
G4 (Ha)	
G1+G2+G3+G4 (Ha)	0.0

Year	Area converted to G1 from G2, G3 & G4	% Increase in G-1 Area	Remaining Area % in G2	Remaining Area % in G3	Remaining Area % in G4	Remaining Area in G2	Remaining Area in G3	Remaining Area in G4
Year 1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Year 2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Year 3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Year 4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Year 5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Potentially Mineralised area (Ha)								

2.2.3: Ore body geometry & Grade

Sl. No.	Name of the ore band	General Strike / Trend	Dip Of Mineral Body	Average Strike Length (m)	Avg Width (m)	Average Depth (m)	Name of the radical	Min Grade (%)	Max Grade (%)	Avg Grade (%)	Dip Of Mineral Body
1	Northern and Southern Part of Dep-4	N-S		3500	150	62	Fe, SiO_2, Al_2O_3	46.4	69.32	63.73	45° to sub vertical

2.2.4: Reserve / Resource Estimation Method

2.2.4.1: Methodology

Resource / Reserve Estimation Method

Methodology

The 3D ore body modelling and resource estimation has been carried out with the aid of mining planning software "SURPAC".

The following are the steps carried out:

- Preparation of geological database
- Preparation of 3D ore body model
- Data Compositing
- Variogram Modelling
- Preparation of Block Model
- Resource Estimation using Geo-Statistical Methods 'Ordinary Kriging'.

Geological database: The geological database consists of 602 samples which represent the geological information of total 4,250 samples obtained from 81 bore holes covering the entire mineralized area of the mining lease. The geological database is the source for preparation of geological cross sections, preparation of ore body model, block model and other geo-statistical analysis.

The total assay data is broadly classified into two categories for estimation purpose i.e. 'Ore' and 'Waste'. The ore types having Fe value greater than 45% is considered as 'Ore', and Fe values lesser than 45% is considered as 'Waste'. Litho-types 1 to 5 and 9, 10 are under 'Ore category and 6 & 7 in category 'waste'.

Data Compositing: Compositing of assay data is essential prior to 3D ore body modelling of mineral deposit. The bore hole samples are generally varying in length and thus the samples are composited to a specific sample length in order to make the sample length uniform. In this case, compositing length is taken as 12mts which is equal to bench height. The compositing is done in each domain "Ore" and "Waste" separately resulting 487 composited samples in ore category and 77 composited samples in waste category. For further analysis, this composite data is used in variogram modelling & resource estimation.

Ore Body Modelling: The Digital Terrain Model (DTM) is generated using 2mt contour map. Further DTM is used to generate profiles along the section lines. Along the section line geological cross sections are prepared using exploratory bore hole data, the surface geology and litho-logs of bore holes. A total of 43 cross sections are prepared covering all the bore holes with an interval of 125 mts between each cross-section line and 62.5 mts between intermediate sections.

Subsequently, Orebody models (3DM) are prepared for each individual ore type and finally combined to obtain a 3D ore body model, for the deposit. The most common use of 3DM is to define the boundary and trend of an ore body. The strike direction of ore body is NNE-SSW.

Variogram Modelling: Variogram is an essential and fundamental tool in Geostatistical analysis. It requires to be modelled to measure the variability of the grade for continuous distance, which is required during estimation. Variogram modelling is done for the variables Fe, SiO_2 and Al_2O_3 in both domains 'Ore' and 'Waste' separately. Two structures are selected for variogram modelling in both the domains. It is observed from variogram models that the range of influences of sample data for variables Fe, SiO_2 and Al_2O_3 varies between 400-475 mts for domain ore where as it varies from 400-450 mts for domain waste. This indicates that 'ore' data is well structured than 'waste' data.

It also indicates that beyond this distance, data is not correlated and no sample beyond this distance can be used during estimation.

Block Modelling: The block model is prepared by taking the minimum and maximum extent of Y, X and Z of the samples in the drill holes, topography and geological model of the deposit. The block size considered is 25m x 25m x 12 m with sub-blocks of 6.25m x 6.25m x 3m. The attribute for all variables i.e. Fe, SiO_2, Al_2O_3, Litho type, specific gravity etc are defined in the block model.

Ordinary Kriging: Kriging is a geostatistical estimation method that gives the best linear unbiased estimates for the required attribute in the block model. Kriging estimates are considered to be

the best in terms of minimum variance at un-sampled locations. The block model is estimated separately for individual ore types using composited data, variogram model with the defined neighbourhood.

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2.2.4.2: RESOURCE CALCULATION

A. INSITU RESOURCE

Sl. No.	Cross section/Block	Sectional Area/Block area (sq mtr)	Influence (m)	Depth in mtr	Volume (m^3)	Bulk Density (t/m^3)	Resource Quantity (t)	Level of Exploration	Type of Land	Name of the radical	Grade (%)	Method used for resource estimation
1	32				697267	3.3	2331286	G3	Forest	Fe,SiO2,Al2O3	64.36	Block Model
2	33				41258	3.5	144403	G3	Forest	Fe,SiO2,Al2O3	60.15	
3	33.5				176050	3.3	581248	G3	Forest	Fe,SiO2,Al2O3	62.33	
4	34				343365	3.4	1169774	G3	Forest	Fe,SiO2,Al2O3	62.35	
5	35				441956	3.6	1576248	G1	Forest	Fe,SiO2,Al2O3	62.1	
6	35.5				393422	3.4	1330273	G1	Forest	Fe,SiO2,Al2O3	60.15	
7	36				686389	3.6	2445263	G1	Forest	Fe,SiO2,Al2O3	63.61	
8	37				781695	3.8	2942766	G1	Forest	Fe,SiO2,Al2O3	65.62	
9	37.5				405438	3.4	1390308	G1	Forest	Fe,SiO2,Al2O3	61.26	
10	38				504271	3.5	1741712	G1	Forest	Fe,SiO2,Al2O3	61.7	
11	38.5				648896	3.5	2281289	G1	Forest	Fe,SiO2,Al2O3	62.94	
12	39				878092	3.5	3087216	G1	Forest	Fe,SiO2,Al2O3	63.11	
13	39.5				844348	3.5	2950305	G1	Forest	Fe,SiO2,Al2O3	63.42	
14	40				695607	3.7	2589861	G1	Forest	Fe,SiO2,Al2O3	64.53	
15	40.5				794078	3.6	2842167	G1	Forest	Fe,SiO2,Al2O3	64.57	
16	41				972878	3.7	3551128	G1	Forest	Fe,SiO2,Al2O3	64.85	
17	41.5				1389131	3.5	4902219	G1	Forest	Fe,SiO2,Al2O3	65.71	
18	42				2492016	3.4	8551989	G1	Forest	Fe,SiO2,Al2O3	66.05	
19	43				1845012	3.4	6304796	G2	Forest	Fe,SiO2,Al2O3	65.54	
20	44				969295	3.5	3360178	G3	Forest	Fe,SiO2,Al2O3	64.74	
21	46				982770	3.4	3354212	G3	Forest	Fe,SiO2,Al2O3	64.12	
22	47				1365957	3.3	4456055	G2	Forest	Fe,SiO2,Al2O3	63.68	
23	48				668472	3.9	2582365	G2	Forest	Fe,SiO2,Al2O3	63.85	
24	49				1161340	3.5	4106021	G1	Forest	Fe,SiO2,Al2O3	66.16	

25	49.5				367262	3.9	1445297	G1	Forest	Fe,SiO2,Al2O3	65.63	
26	50				850568	4.0	3395911	G1	Forest	Fe,SiO2,Al2O3	66.37	
27	50.5				710517	4.0	2809145	G1	Forest	Fe,SiO2,Al2O3	65.09	
28	51				943782	3.8	3632662	G1	Forest	Fe,SiO2,Al2O3	66.79	
29	52				1161607	3.6	4216523	G2	Forest	Fe,SiO2,Al2O3	65.2	
30	52.5				905641	3.4	3093565	G2	Forest	Fe,SiO2,Al2O3	65.11	
31	53				940672	3.4	3201624	G1	Forest	Fe,SiO2,Al2O3	63.91	
32	53.5				829750	3.4	2814858	G1	Forest	Fe,SiO2,Al2O3	64.11	
33	54				909190	3.4	3108158	G1	Forest	Fe,SiO2,Al2O3	64.15	
34	54.5				502101	3.3	1669731	G1	Forest	Fe,SiO2,Al2O3	62.00	
35	55				1034252	3.4	3517154	G1	Forest	Fe,SiO2,Al2O3	63.51	
36	56				1305982	3.4	4503220	G2	Forest	Fe,SiO2,Al2O3	63.97	
37	56.5				585456	3.4	2006359	G2	Forest	Fe,SiO2,Al2O3	64.42	
38	57				712405	3.7	2602002	G2	Forest	Fe,SiO2,Al2O3	65.82	
39	58				770439	3.5	2658450	G1	Forest	Fe,SiO2,Al2O3	64.01	
40	58.5				446635	3.5	1585147	G1	Forest	Fe,SiO2,Al2O3	65.63	
41	59				567748	3.6	2050406	G1	Forest	Fe,SiO2,Al2O3	65.52	
42	59.5				470433	3.5	1641663	G1	Forest	Fe,SiO2,Al2O3	66.55	
Total Resource							**120524955**				64.65	

Note: The Bulk density in the above resource calculation table are the weighted average values of different ore types in the respective cross sections, calculated through mine planning software "SURPAC".

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B. FLOAT ORE RESOURCE

Sl. No.	Cross section/Block	Sectional Area/Block area (sq mtr)	Influence (m)	Depth in mtr	Volume (m^3)	Bulk Density (t/m^3)	Resource Quantity (t)	Level of Exploration	Type of Land	Name of the radical	Grade (%) Avg.	Method used for resource estimation
1	33	11689			35068	2.28	79956	G2	Forest			
2	33.5	18522			45684	2.28	104159	G2	Forest			
3	34	41028			97027	2.28	221221	G2	Forest			
4	35	49165			121697	2.28	277469	G2	Forest			
5	35.5	30010			71232	2.28	162410	G2	Forest			
6	36	39338			71026	2.28	161939	G2	Forest			
7	37	43208			81008	2.28	184698	G2	Forest			
8	37.5	33328			78906	2.28	179906	G2	Forest			
9	38	25841			59387	2.28	135402	G2	Forest			
10	38.5	21990			46714	2.28	106509	G2	Forest			
11	39	32420			77640	2.28	177020	G2	Forest			
12	39.5	39626			98813	2.28	225294	G2	Forest	Fe, SiO2, Al2O3	Avg. 65.18 % Fe	Cross Sectional Area Method
13	40	39648			99574	2.28	227028	G2	Forest			
14	40.5	37930			95406	2.28	217525	G2	Forest			
15	41	36215			91515	2.28	208654	G2	Forest			
16	41.5	42674			112326	2.28	256102	G2	Forest			
17	42	67784			180667	2.28	411920	G2	Forest			
18	43	88328			235895	2.28	537841	G2	Forest			
19	44	92550			428539	2.28	977069	G2	Forest			
20	46	85768			223511	2.28	509606	G2	Forest			
21	47	78735			229000	2.28	522119	G2	Forest			
22	48	66704			200113	2.28	456257	G2	Forest			
23	49	51244			140514	2.28	320373	G2	Forest			
24	49.5	36607			94916	2.28	216409	G2	Forest			

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25	50	37063			94135	2.28	214628	G2	Forest			
26	50.5	40879			102824	2.28	234439	G2	Forest			
27	51	71701			176550	2.28	402535	G2	Forest			
28	52	75419			185199	2.28	422254	G2	Forest			
29	52.5	36951			83717	2.28	190875	G2	Forest			
30	53	19434			31040	2.28	70770	G2	Forest			
31	53.5	15405			23107	2.28	52685	G2	Forest			
32	54	10594			15891	2.28	36231	G2	Forest			
33	54.5	5858			8786	2.28	20033	G2	Forest			
34	58	10940			32819	2.28	74827	G2	Forest			
35	58.5	22052			66155	2.28	150833	G2	Forest			
36	59	16387			49160	2.28	112085	G2	Forest			
37	59.5	1600			4800	2.28	10944	G2	Forest			
Total Float Ore Resource							**8870026**				65·18	

Note: The details of float ore exploration are given in the exploration report in Annexure-12

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2.2.5: Reserve / Resource Estimation Method

2.2.5.1: Mineral Resource Estimate for Conversion to Mineral Reserve

The block model of individual ore types are estimated by geostatistical estimation method i.e. Kriging. Then the mineral reserve of 110.29 MT is calculated based on ultimate pit generated with the aid of "Whittle Software" after due consideration of all economical and mining parameters.

2.2.5.2: Threshold value & Cut off Parameters

As per the notification of Indian Bureau of Mines dt. 25.04.2018 the threshold value of iron ore is maintained 45% Fe; whereas the cut-off parameters is considered 55% Fe.

2.2.5.3: Mining Factors or Assumptions

The ultimate pit derived through mine planning software "SURPAC" is taken into consideration for calculation of mineable mineral reserve. The mining bench height is considered as 12 m for mine planning purpose. However, the changes in the bench parameters may lead to change in mineral reserve.

2.2.5.4: Metallurgical Factors or Assumptions

The haematitic iron ore above 45% Fe is taken into consideration for mineral reserve calculation. No metallurgical factors affect the mineral reserve calculation.

2.2.5.5: Cost & Revenue Factors

This has been deliberated in the Techno Economical Feasibility Report as attached at Annexure-14(1).

2.2.5.6: Market Assessment

This has been deliberated in the Techno Economical Feasibility Report as attached at Annexure-14(1)

2.2.5.7: Other Modifying Factors

NIL

2.2.5.8: Classification

The mineral reserve is mainly Probable Mineral Reserve (UNFC 121 and 122) and the remaining geological resources are classified as prefeasibility mineral resources (UNFC 221, 222), Indicated mineral resource (UNFC 332) and inferred mineral resource (UNFC 333).

2.2.5.9: Calculation of blocked resources (221 & 222)

A. Insitu Blocked Resource

Sl. No.	Reserves blocked due to	Cross section/ Block	Sectional area/ block area (in Sq mrt)	Influence (m)	Depth (m)	Volume (m^3)	Bulk Density (t/m^3)	Resource Quantity (t)	UNFC code	Type of Land	Name of the radical	Grade (%)	Method used for resource estimation	Column1
1	Pit limit	35.0				40312	3.5	140201	221	Forest	Fe, SiO2, Al2O3	64.66	Block Model	
2	Pit limit	35.5				9076	2.8	25441	221	Forest	Fe, SiO2, Al2O3	50.92		
3	Pit limit	36.0				703	3.7	2602	221	Forest	Fe, SiO2, Al2O3	63.61		
4	Pit limit	37.0				4688	4.2	19689	221	Forest	Fe, SiO2, Al2O3	68.59		
5	Pit limit	37.5				25313	2.8	70502	221	Forest	Fe, SiO2, Al2O3	49.84		
6	Pit limit	38.0				21563	2.7	58550	221	Forest	Fe, SiO2, Al2O3	50.49		
7	Pit limit	38.5				103711	2.9	297657	221	Forest	Fe, SiO2, Al2O3	55.41		
8	Pit limit	39.0				2227	2.7	6011	221	Forest	Fe, SiO2, Al2O3	47.73		
9	Pit limit	39.5				5391	2.7	14638	221	Forest	Fe, SiO2, Al2O3	49.38		
10	Pit limit	41.0				16406	4.2	68331	221	Forest	Fe, SiO2, Al2O3	65.87		
11	Pit limit	41.5				234	3.4	802	221	Forest	Fe, SiO2, Al2O3	65.71		
12	Pit limit	42.0				23437	3.4	79687	221	Forest	Fe, SiO2, Al2O3	67.11		
13	Pit limit	43.0				704	3.4	2394	222	Forest	Fe, SiO2, Al2O3	65.54		

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14	Pit limit	47.0				140437	2.9	405381	222	Forest	Fe, SiO2, Al2O3	57.98		
15	Pit limit	48.0				8789	2.8	24342	222	Forest	Fe, SiO2, Al2O3	54.29		
16	Pit limit	49.0				58082	3.4	197479	221	Forest	Fe, SiO2, Al2O3	66.16		
17	Pit limit	50.0				235	4.0	938	221	Forest	Fe, SiO2, Al2O3	66.53		
18	Pit limit	49.5				6210	3.4	21113	221	Forest	Fe, SiO2, Al2O3	65.63		
19	Pit limit	52.5				24844	3.1	77110	221	Forest	Fe, SiO2, Al2O3	62.37		
20	Pit limit	53.0				3867	3.0	11599	221	Forest	Fe, SiO2, Al2O3	61.16		
21	Pit limit	54.0				234	3.4	794	221	Forest	Fe, SiO2, Al2O3	64.15		
22	Pit limit	55.0				351	3.1	1102	221	Forest	Fe, SiO2, Al2O3	63.51		
23	Pit limit	56.0				3047	2.7	8331	222	Forest	Fe, SiO2, Al2O3	53.18		
24	Pit limit	56.5				27539	2.9	79525	222	Forest	Fe, SiO2, Al2O3	57.88		
25	Pit limit	57.0				66679	3.3	222572	222	Forest	Fe, SiO2, Al2O3	64.75		
26	Pit limit	58.0				522580	3.4	1757598	221	Forest	Fe, SiO2, Al2O3	63.91		
27	Pit limit	58.5				444503	3.5	1576620	221	Forest	Fe, SiO2, Al2O3	65.63		
28	Pit limit	59.0				567748	3.6	2050406	221	Forest	Fe, SiO2, Al2O3	65.52		
29	Pit limit	59.5				470433	3.5	1641663	221	Forest	Fe, SiO2, Al2O3	66.55		
Total								**8863077**				64.28		

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B. Indicated Mineral Resource (Float Ore within Fern Area, 332)

Sl. No.	Reserves blocked due to	Cross section/ Block	Sectional area/ block area (in Sq mrt)	Influence (m)	Depth (m)	Volume (m^3)	Bulk Density (t/m^3)	Resource Quantity (t)	UNFC code	Type of Land	Name of the radical	Grade (%)	Method used for resource estimation	Column1
1	Fern Area Safety Zone	35.5	1			2	2.28	4.80	332	Forest	Fe, SiO2, Al2O3	Average Fe% 63.37	Cross Sectional Area Method	
2		36	7178			10768	2.28	24549.92	332	Forest				
3		37	13965			20948	2.28	47761.37	332	Forest				
4		37.5	5990			8985	2.28	20486.92	332	Forest				
5		38	3005			4507	2.28	10276.38	332	Forest				
6		38.5	4486			6729	2.28	15341.42	332	Forest				
7		39	7174			10761	2.28	24535.96	332	Forest				
8		39.5	6965			10448	2.28	23820.33	332	Forest				
9		40	5070			7605	2.28	17339.81	332	Forest				
10		40.5	3874			5811	2.28	13250.14	332	Forest				
11		41	3548			5322	2.28	12133.62	332	Forest				
12		41.5	1734			2602	2.28	5931.94	332	Forest				
13		42	21			31	2.28	70.20	332	Forest				
14		46	1735			2602	2.28	5932.29	332	Forest				
15		47	271			406	2.28	926.30	332	Forest				
16		49	8812			13218	2.28	30137.75	332	Forest				
17		49.5	8456			12684	2.28	28920.34	332	Forest				
18		50	8399			12599	2.28	28725.31	332	Forest				
19		50.5	8254			12381	2.28	28227.65	332	Forest				
20		51	12690			19035	2.28	43400.03	332	Forest				
21		52	13850			20775	2.28	47366.99	332	Forest				
22		52.5	9736			14604	2.28	33297.87	332	Forest				
23		53	10826			16238	2.28	37023.58	332	Forest				
24		53.5	11193			16789	2.28	38279.69	332	Forest				
25		54	10594			15891	2.28	36230.95	332	Forest				

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26		54.5	5858			8786	2.28	20033.07	332	Forest				
	Total							**594005**				63·37		

C. Inferred Mineral Resource, (Insitu Ore, 333)													
Sl. No.	**Cross section / Block**	**Sectional Area/Block area (sq mtr)**	**Influence (m)**	**Depth in mtr**	**Volume (m^3)**	**Bulk Density (t/m^3)**	**Resource Quantity (t)**	**UNFC code**	**Type of Land**	**Name of the radical**	**Grade (%)**	**Method used for resource estimation**	**Column1**
1	32				697267	3.34	2331286	333	Forest	Fe,SiO2,Al2O3	64.36	Block Model	
2	33				41258	3.50	144403	333	Forest	Fe,SiO2,Al2O3	60.15		
3	33.5				176050	3.30	581248	333	Forest	Fe,SiO2,Al2O3	62.33		
4	34				343365	3.41	1169774	333	Forest	Fe,SiO2,Al2O3	62.35		
5	44				969295	3.47	3360178	333	Forest	Fe,SiO2,Al2O3	64.74		
6	46				982770	3.41	3354212	333	Forest	Fe,SiO2,Al2O3	64.12		
Total							**10941100**				64·02		

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2.2.5.10: Calculation of Reserves

A. Insitu Reserve													
Sl. No.	Cross Sectinon/ Block	Sectional area/block area in Sq mtr	Influence (m)	Depth (m)	Volume (m^3)	Bulk Density (t/m^3)	Reserves Quantity (t)	UNFC code	Type of Land	Name of the of radical	Grade (%)	Method used for resource estimation	Column1
1	35				401644	3.58	1436047	121	Forest	Fe, SiO2, Al2O3	61.85	Block Model	
2	355				384346	3.39	1304832	121	Forest	Fe, SiO2, Al2O3	60.33		
3	36				685686	3.56	2442661	121	Forest	Fe, SiO2, Al2O3	63.61		
4	37				777007	3.76	2923078	121	Forest	Fe, SiO2, Al2O3	65.6		
5	375				380125	3.47	1319806	121	Forest	Fe, SiO2, Al2O3	61.87		
6	38				482708	3.49	1683162	121	Forest	Fe, SiO2, Al2O3	62.09		
7	385				545185	3.64	1983632	121	Forest	Fe, SiO2, Al2O3	64.07		
8	39				875865	3.52	3081205	121	Forest	Fe, SiO2, Al2O3	63.14		
9	395				838957	3.50	2935667	121	Forest	Fe, SiO2, Al2O3	63.49		
10	40				695607	3.72	2589859	121	Forest	Fe, SiO2, Al2O3	64.53		
11	405				794078	3.58	2842167	121	Forest	Fe, SiO2, Al2O3	64.57		
12	41				956472	3.64	3482797	121	Forest	Fe, SiO2, Al2O3	64.83		
13	415				1388897	3.53	4901417	121	Forest	Fe, SiO2, Al2O3	65.71		
14	42				2468579	3.43	8472302	121	Forest	Fe, SiO2, Al2O3	66.04		
15	43				1844308	3.42	6302402	122	Forest	Fe, SiO2, Al2O3	65.54		
16	47				1225520	3.31	4050674	122	Forest	Fe, SiO2, Al2O3	64.25		
17	48				659683	3.88	2558023	122	Forest	Fe, SiO2, Al2O3	65.96		
18	49				1103258	3.54	3908542	121	Forest	Fe, SiO2, Al2O3	66.18		
19	49.5				361052	3.94	1424184	121	Forest	Fe, SiO2, Al2O4	66.38		
20	50				850333	3.99	3394973	121	Forest	Fe, SiO2, Al2O3	66.57		
21	505				710517	3.95	2809147	121	Forest	Fe, SiO2, Al2O3	65.09		
22	51				943782	3.85	3632660	121	Forest	Fe, SiO2, Al2O3	66.29		

23	52				1161607	3.63	4216524	122	Forest	Fe, SiO2, Al2O3	65.2		
24	525				880797	3.42	3016455	122	Forest	Fe, SiO2, Al2O3	65.18		
25	53				936805	3.41	3190024	121	Forest	Fe, SiO2, Al2O3	63.92		
26	535				829750	3.39	2814862	121	Forest	Fe, SiO2, Al2O3	64.11		
27	54				908956	3.42	3107364	121	Forest	Fe, SiO2, Al2O3	64.15		
28	545				502101	3.33	1669732	121	Forest	Fe, SiO2, Al2O3	62.00		
29	55				1033901	3.40	3516052	121	Forest	Fe, SiO2, Al2O3	63.51		
30	56				1302935	3.45	4494889	122	Forest	Fe, SiO2, Al2O3	63.99		
31	565				557917	3.45	1926834	122	Forest	Fe, SiO2, Al2O3	64.69		
32	57				645726	3.68	2379430	122	Forest	Fe, SiO2, Al2O3	65.92		
33	58				247859	3.63	900852	121	Forest	Fe, SiO2, Al2O3	64.2		
34	585				2132	4.00	8527	121	Forest	Fe, SiO2, Al2O3	65.78		
Total							**100720781**		Forest	Fe, SiO2, Al2O3	64.67		
Note: The Bulk density in the above resource calculation table are the weighted average values of different ore types in the respective cross sections, calculated through mine planning software "SURPAC".													

B. Float Ore Reserve

Sl. No.	Cross Section /Block	Sectional area/block area in Sq mtr	Influence (m)	Depth (m)	Volume (m^3)	Bulk Density (t/m^3)	Reserves Quantity (t)	UNFC code	Type of Land	Name of the of radical	Grade (%)	Method used for resource estimation	Column1
1	33	11689			35068	2.28	79956	122	Forest	Fe, SiO2, Al2O3	Average Fe% 65.3	Cross Sectional Area Method	
2	33.5	18522			45684	2.28	104159	122	Forest	Fe, SiO2, Al2O3			
3	34	41028			97027	2.28	221221	122	Forest	Fe, SiO2, Al2O3			
4	35	49165			121697	2.28	277468	122	Forest	Fe, SiO2, Al2O3			
5	35.5	30009			71230	2.28	162405	122	Forest	Fe, SiO2, Al2O3			
6	36	32159			60258	2.28	137389	122	Forest	Fe, SiO2, Al2O3			
7	37	29243			60060	2.28	136937	122	Forest	Fe, SiO2, Al2O3			
8	37.5	27338			69921	2.28	159419	122	Forest	Fe, SiO2, Al2O3			
9	38	22836			54879	2.28	125125	122	Forest	Fe, SiO2, Al2O3			
10	38.5	17504			39986	2.28	91167	122	Forest	Fe, SiO2, Al2O3			
11	39	25246			66879	2.28	152484	122	Forest	Fe, SiO2, Al2O3			
12	39.5	32661			88365	2.28	201473	122	Forest	Fe, SiO2, Al2O3			
13	40	34577			91969	2.28	209688	122	Forest	Fe, SiO2, Al2O3			
14	40.5	34056			89594	2.28	204275	122	Forest	Fe, SiO2, Al2O3			
15	41	32667			86193	2.28	196520	122	Forest	Fe, SiO2, Al2O3			
16	41.5	40940			109724	2.28	250170	122	Forest	Fe, SiO2, Al2O3			
17	42	67764			180636	2.28	411850	122	Forest	Fe, SiO2, Al2O3			
18	43	88328			235895	2.28	537841	122	Forest	Fe, SiO2, Al2O3			
19	44	91682			241973	2.28	551698	122	Forest	Fe, SiO2, Al2O3			
20	45	70502			186567	2.28	425372	122	Forest	Fe, SiO2, Al2O3			
21	46	84033			220910	2.28	503674	122	Forest	Fe, SiO2, Al2O3			
22	47	78464			228593	2.28	521193	122	Forest	Fe, SiO2, Al2O3			
23	48	66704			200113	2.28	456257	122	Forest	Fe, SiO2, Al2O3			

24	49	42432			127296	2.28	290235	122	Forest	Fe, SiO2, Al2O3			
25	49.5	28151			82232	2.28	187489	122	Forest	Fe, SiO2, Al2O3			
26	50	28664			81536	2.28	185903	122	Forest	Fe, SiO2, Al2O3			
27	50.5	32625			90444	2.28	206212	122	Forest	Fe, SiO2, Al2O3			
28	51	59011			157515	2.28	359135	122	Forest	Fe, SiO2, Al2O3			
29	52	61569			164424	2.28	374887	122	Forest	Fe, SiO2, Al2O3			
30	52.5	27215			69113	2.28	157577	122	Forest	Fe, SiO2, Al2O3			
31	53	8608			14801	2.28	33747	122	Forest	Fe, SiO2, Al2O3			
32	53.5	4212			6318	2.28	14405	122	Forest	Fe, SiO2, Al2O3			
33	58	10940			32819	2.28	74827	122	Forest	Fe, SiO2, Al2O3			
34	58.5	22052			66155	2.28	150833	122	Forest	Fe, SiO2, Al2O3			
35	59	16387			49160	2.28	112085	122	Forest	Fe, SiO2, Al2O3			
36	59.5	1600			4800	2.28	10944	122	Forest	Fe, SiO2, Al2O3			
Total							**8276022**				65.30		

2.2.5.11

Mineral		**IRON ORE (Hematite)**					
Reserves/ Resources estimated as on		**01-04-2021**					
UNIT of estimation		**Tonne**					
Classification		**Code**	**Quantity (Million Tonne)**			**Grade (Fe %)**	
			Forest	**Non-Forest**	**Total**	**Forest**	**Non-Forest**
A. Mineral Reserve							
1. Proved Mineral Reserve (A)		111					
2. Probable Mineral Reserve (A)	(Insitu Ore)	121	71.78	0	71.78	64.65	N/A
3. Probable Mineral Reserve (A)	(Insitu Ore)	122	28.95	0	28.95	65.04	N/A
	(Float Ore)	122	8.28	0	8.28	65.30	N/A
Total Mineable Reserve					**109.01**	**64.80**	

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Indian Bureau of Mines, Raipur

B. Remaining Resources							
1. Feasibility Mineral Resource (B)		211					
2. Prefeasibility Mineral Resource (B)	(Insitu Ore)	221	8.04	0	8.04	64.71	N/A
3. Prefeasibility Mineral Resource (B)	(Insitu Ore)	222	0.82	0	0.82	60.09	N/A
4. Measured Mineral Resource (B)		331					
5. Indicated Mineral Resource (B)	(Float Ore)	332	0.59	0	0.59	63.37	N/A
6. Inferred Mineral Resource (B)	(Insitu Ore)	333	10.94	0	10.94	64.02	N/A
7. Reconnaissance Mineral Resource (B)		334					
Total Remaining Resources					**20.39**	**64.12**	
Total Mineral Resources (A+B)					**129.40**	**64.69**	

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2.2.6: Future Exploration Proposal

2.2.6.1: Geological Mapping

Sl. No.	Year	Scale	Area Covered (ha)
1	Year1		NIL
2	Year2		NIL
3	Year3		NIL
4	Year4		NIL
5	Year5		NIL

2.2.6.2: Ground Geophysical Survey

Sl. No.	Type of Survey	Spacing (m)	Total line (km)	Area Covered (ha)	Latitude	Longitude
1		NIL	NIL	NIL		
2		NIL	NIL	NIL		
3		NIL	NIL	NIL		
4		NIL	NIL	NIL		
5		NIL	NIL	NIL		

2.2.6.3: Pitting

Number of pits:

Sl. No.	Year	Land type	Pit ID	Length of Pit (m)	Width of Pit (m)	Depth of Pit (m)	Latitude	Longitude
1	Year1		NIL	NIL	NIL	NIL		
2	Year2		NIL	NIL	NIL	NIL		
3	Year3		NIL	NIL	NIL	NIL		
4	Year4		NIL	NIL	NIL	NIL		
5	Year5		NIL	NIL	NIL	NIL		

2.2.6.4: Trenching

Number of Trenches: Nil

2.2.6.4.1: Spacing

Min (m) *		Max (m) *		Avg (m) *
0		0		0

2.2.6.4.2: Area Covered Under Trenching

Co-ordinates

Sl. No.	Year	Land type	Trench ID	Length of Trench (m)	Width of Trench (m)	Depth of Trench (m)	From Latitude	From Longitude	To Latitude	To Longitude
1	Year1		NIL	NIL	NIL	NIL				
2	Year2		NIL	NIL	NIL	NIL				
3	Year3		NIL	NIL	NIL	NIL				
4	Year4		NIL	NIL	NIL	NIL				
5	Year5		NIL	NIL	NIL	NIL				

2.2.6.5: Exploratory Drilling

2.2.6.5.1: Core Drilling & Non-Core Drilling

A. Drilling Proposal at Mineralized Area (Core Drilling)

Sl. No	Year	In forest area				In Non- forest				Total bore-hole	Total Mtr	Attachment
		No. of bore-holes	Total mtr	Type of borehole	Grid interval	No. of bore-holes	Total mtr	Type of bore-hole	Grid interval			
1	Year1	18	1800	vertical/ Angular	62.5m x 62.5m	NIL	NIL	NIL	NIL	18	1800	
2	Year2	18	1800	vertical/ Angular	62.5m x 62.5m	NIL	NIL	NIL	NIL	18	1800	
3	Year3	18	1800	vertical/ Angular	62.5m x 62.5m	NIL	NIL	NIL	NIL	18	1800	
4	Year4	14	1400	vertical/ Angular	62.5m x 62.5m	NIL	NIL	NIL	NIL	14	1400	
5	Year5	12	1200	vertical/ Angular	62.5m x 62.5m	NIL	NIL	NIL	NIL	12	1200	
Sub Total (A)										**80**	**8000**	

B. Drilling Proposal at Waste Dumping Area (DTH/Non-Core Drilling)

Sl. No	Year	In forest area				In Non- forest				To tal bore-hole	Total Mtr	Attachment
		No. of bore-holes	Total mtr	Type of borehole	Grid interval	No. of bore-holes	Total mtr	Type of bore-hole	Grid interval			
1	Year1	4	120	Vertical	375 m x 250 m	NIL	NIL	NIL	NIL	4	120	
2	Year2	4	120	vertical	375 m x 250 m	NIL	NIL	NIL	NIL	4	120	
3	Year3	4	120	vertical	375 m x 275 m	NIL	NIL	NIL	NIL	4	120	
4	Year4	4	120	vertical	250 m x 250 m	NIL	NIL	NIL	NIL	4	120	
5	Year5	4	120	vertical	250 m x 250 m	NIL	NIL	NIL	NIL	4	120	
Sub Total (B)										**20**	**600**	
Total Proposal (A+B)										**100**	**8600**	

2.2.6.6: Exploratory Mining

Sl. No.	year	Pit ID	Length in mtrs	Width in mtrs	Depth in mtrs	Volume (m^3)
1	Year1	N/A	N/A	N/A	N/A	N/A
2	Year2	N/A	N/A	N/A	N/A	N/A
3	Year3	N/A	N/A	N/A	N/A	N/A
4	Year4	N/A	N/A	N/A	N/A	N/A
5	Year5	N/A	N/A	N/A	N/A	N/A

2.2.6.7: Sampling

A. Core Drilling in Mineralized Area					
Sl. No.	Type of Sample	Number of Samples proposed	Area Covered (ha)	Latitude	Longitude
1	Drill core	4000	NA		
2	DTH /Rock-chip	120	NA		
Total		4120			

2.2.6.8: Petrographic & Mineragraphic Studies

Sl. No.	Type of Sample	Number of Sample proposed
1	Mineral	NIL
2	Waste	NIL

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CHAPTER – 3

MINERAL PROCESSING

Chapter 3: MINERAL BENEFICIATION / PROCESSING

Name of The Ore/Mineral	Hematite (Iron Ore)

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3.1: Mineralogy of the ROM ore/ Mineral:

S. No.	Valuable Mineral Name	Approx. Mineral %	Gangue Mineral/s Name	Approx. Gangue Mineral %
1	Hematite (Iron Ore)	64% Fe Average grade	BHQ, Shale	less than 45% Fe

3.2: Complete Chemical Analysis of the ROM Ore/Mineral:

Sl. No.	Radicals	Wt %
1	Lump Recovery% (-40 mm +10mm) Steel Grey Hematite	84.2
2	Lump Recovery% (-40 mm +10mm) Blue Grey Hematite	81.7
3	Lump Recovery% (-40 mm +10mm) Laminated	47.4
4	Lump Recovery% (-40 mm +10mm) Lateritic	58.1
5	Fines Recovery% (-10 mm +6mm) Steel Grey Hematite	5
6	Fines Recovery% (-10 mm +6mm) Blue Grey Hematite	5.1
7	Fines Recovery% (-10 mm +6mm) Laminated	10.3
8	Fines Recovery% (-10 mm +6mm) Lateritic	7.9
9	Fines Recovery% (-6 mm +65mesh) Steel Grey Hematite	8.8
10	Fines Recovery% (-6 mm +65mesh) Blue Grey Hematite	10.5
11	Fines Recovery% (-6 mm +65mesh) Laminated	31.3
12	Fines Recovery% (-6 mm +65mesh) Lateritic	25.5

3.3: Crushing Section:

3.3.1: Primary Crushing

Sl. No.	Type of Crusher	Make	Capacity of Crusher (tph)	Feed Size (mm)	Product Size (mm)	Remarks
1	Jaw Crusher	Not Yet Decided	400	250	-80	2 Numbers for 1st Five Years
2	Gyratory Crusher	Not Yet Decided	2000	-1000	-100	After 5 years till the life of mine

3.3.2: Secondary Crushing

Sl. No.	Type of Crusher	Make	Capacity of Crusher (tph)	Feed Size (mm)	Product Size (mm)	Remarks
1	Cone	Not Yet Decided	400	-80	-40	2 numbers for 1st Five Years
2	Cone	Not Yet Decided	1200	-1000	-100	After 5 years till the life of mine

3.3.3: Tertiary Crushing

Sl. No.	Type of Crusher	Make	Capacity of Crusher (tph)	Feed Size (mm)	Product Size (mm)	Remarks
1	Cone Crusher		800	-100	10 to 40 mm	After 5 years till the life of mine

3.4: Grinding Section

3.4.1: Dry Grinding

Not applicable

Sl. No.	Type of Mill	Stages	Make of the mill	Feed Flow Rate (tph)	Feed Size (mm)	Product Size Mill Discharge	Type of screen	Make	Aperture Size of Screen/Classifier (mm), if	Classifier / Screen undersize	Classifier / Screen oversize (tph)

3.4.2: Wet Grinding

Not applicable

Sl. No.	Type of Mill	Stages	Make of the mill	Feed Flow Rate (t/h)	Feed Size (mm)	Product Size (mm)	Type of screen / Classifier	Aperture Size of Screen/Classifier (mm), if applicable	Classifier / Screen undersize (tph)	Classifier / Screen oversize (tph)	Water Requirement (l/h)	Fresh Water Requirement (l/h)	Recirculated Water (l/h)

3.5: Dry Processing

3.5.1: Screening and Classification

Sl. No. B89:K92	Type of screen / classifiers	Stages	Make	Capacity (tph)	Aperture Size of Screen/Classifier (mm), if applicable	Feed Size (mm)	Product Size (mm)	Product quality (if applicale)	Remarks
1	Vibrating Screen	Multiple	Not Yet Decided	400	-40mm to +10mm and -10mm	-40	-40mm to +10mm and -10mm	Lump (-40mm to +10 mm) and Fines (-10 mm) above 64% Fe	2 numbers for 1st Five Years
2	Primary Vibrating Screen	Multiple	Not Yet Decided	750	-100mm to +40 mm and -40 mm	-100	-100mm to +40 mm and -40 mm	above 64% Fe	After 5 years till the life of mine
3	Secondary Vibrating screens	Multiple	Not Yet Decided	550	-40mm to +10 mm and -10 mm	-40	-40mm to +10 mm and -10 mm	Lump (-40mm to +10 mm) and Fines (-10 mm) above 64% Fe	After 5 years till the life of mine

3.5.2: Other Operations

Not applicable

Sl. No.	Type of equipment / operation	Stages, if applicable	Make	Capacity (tph)	Feed Size (mm)	Product Size (mm)	Product-Mid (tph), if available	Product-Tail (tph)

3.5.3: Product Quality

Products	Wt %	In tonnes	Size (range) mm	Complete chemical analysis	Remarks
Concentrate	43.00	3975509	Lump/CLO (-40mm+10mm), Lump/CLO (-20mm+10mm)	Average Fe% =64% and above	अनुमोदित / Approved For 1st Five Years
Concentrate	57.00	5220091	Fines (-10mm)	Average Fe% =64% and above	
Sub-grade	Nil	Nil	Nil	Nil	
Rejects	Nil	Nil	Nil	Nil	
Concentrate	37	24805134	Lump/CLO (-40mm+10mm), Lump/CLO (-20mm+10mm)	Average Fe% =64% and above	After 5 years till the life of mine
Concentrate	63	41737800	Fines (-10mm)	Average Fe% =64% and above	
Sub-grade	Nil	Nil	Nil	Nil	
Rejects	Nil	Nil	Nil	Nil	

3.6: Wet Processing

3.6.1: Scrubbing / Washing

Not applicable

Sr No.	Type of Scrubbers/ washers	Stages, if applicable	Make	Capacity (tph)	Feed Size (mm)	Product Size (mm)	Product quality (if applicable)	Water Requirement (l/h)	Fresh Water Requirement (l/h)	Recirculated water (l/h)

3.6.2: Screening and Classification

Sl. No.	Type of screen /	Stages, if applicable	Make	Capacity (tph)	Aperture Size of Screen/Classifier (mm	Feed Size (mm)	Product Size (mm)	Product quality (if applicable)	Water Requirement (l/h)	Fresh Water Requirement (l/h)	Recirculated water (l/h)	Remarks

1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	For 1st Five Years
2	Wet Screen	Multiple	Not yet Decided	2000	40mm, 10mm, 6mm, 3mm and 0.074mm	-40 mm	-40mm +10mm, 10mm+6mm, 6mm+3mm and -3mm+0.074mm and -0.074mm(tailings)	above 64% Fe (-40mm +10mm, -10mm +6mm, -6mm +3mm and -3mm +0.074mm) and 58%-62%Fe (-0.074 mm-tailings)	3570500	584200	2986300	After 5 years till the life of mine

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3.6.3: Gravity Separation

Not applicable

Sl. No.	Type of separators (jig, table, spiral, etc.)	Stages, if applicable	Make	Capacity (tph)	Feed Size (mm)	Product (Conc) (tph)	Product-Mid (tph), if available	Product-Tail (tph)	Water Requirement (l/h)	Fresh Water Requirement (l/h)	Recirculated water (l/h)

3.6.4: Magnetic Separation

Not applicable

Sl. No.	Type of magnetic separators (magnetic intensity)	Stages, if applicable	Make	Capacity (tph)	Feed Size (mm)	Product-Mag (tph)	Product-Mid (tph), if available	Product non-Mag (tph)	Water Requirement (l/h)	Fresh Water Requirement (l/h)	Recirculated water (l/h)

3.6.5: Flotation

Not applicable

Sl. No.	Type of flotation equipment (froth/ column)	Stages (rougher/ cleaner, etc), if applicable	Make	Capacity (tph)	Feed Size (mm)	Product-Float (tph)	Product non-Float (tph)	Water Requirement (l/h)	Fresh Water Requirement (l/h)	Recirculated water (l/h)

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3.6.6: Other Operations

Not applicable

Sl. No.	Type of equipment / operation	Stages, if applicable	Make	Capacity (tph)	Feed Size (mm)	Product-Conc (tph)	Product-Mid (tph), if available	Product-Tail (tph)	Water Requirement (l/h)	Fresh Water Requirement (l/h)	Recirculated water (l/h)

3.6.7: Product Quality (wet processing)

Products	Wt %	In tonnes	Size (range) mm	Complete chemical analysis	Remarks
Concentrate	35	11645013	-40mm+10mm	Average Fe% =64% and above	After 5 years till the life of mine
Concentrate	60	19962880	-10mm+6mm,-6mm+3mm and -3mm+0.074mm	Average Fe% =64% and above	
Concentrate	5	1663574	-0.074mm(tailings/slimes)	Average Fe% =58% to 62 %	
Sub-grade	Nil	Nil	Nil	Nil	
Rejects	Nil	Nil	Nil	Nil	

3.7: Overall Product Quality (Dry cum Wet Processing)

Products	Wt %	In tonnes	Size (range) mm	Complete chemical analysis	Remarks
Concentrate	36	40425656	Lump/CLO (-40mm+10mm), Lump/CLO (-20mm+10mm)	Average Fe% =64% and above	Throughout the Life of the Mine

Concentrate	60	66920771	Fines (-10mm)	Average Fe% =64% and above
Concentrate	1	1663574	- 0.074mm(tailings/slimes)	Average Fe% =58% to 62%
Sub-grade	Nil	Nil	Nil	Nil
Rejects	Nil	Nil	Nil	Nil

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3.8: Disposal Method for tailing/ rejects

a) Explain the disposal method for tailing or reject from processing plant with detail chemical / mineral analysis of tailing	Please refer Annexure-14 (2)
b) Size and capacity of tailing pond, toxic effect of such tailings, process adopted to neutralise its effect (if any)	Please refer Annexure-14 (3)
c) Any other data (if available)	TEFR- Please refer Annexure-14(1)

3.9: Overall water requirement of mining and mineral processing

Indicate quantity, source of supply, disposal of water and extent of recycling and chemical analysis of water	Please refer Annexure-15 (3)

3.10: Flow sheets and charts

Material balance chart of mineral processing plant(s) (each stage of process)	Please refer Annexure-15 (3)
Attach flow sheet of beneficiation of plant(s)	Please refer Annexure-15 (1)
Any other data (if applicable)	Layout of OCSL Plant facilities -Please refer Annexure- 15(2)

CHAPTER – 4

MINING OPERATIONS

Chapter 4: MINING OPERATIONS

4.1: MINING METHOD (Opencast)

4.1.1: Existing Method of Mining

Not applicable

HEMM with deep hole drilling	HEMM with deep hole drilling	HEMM with deep hole drilling	HEMM with deep hole drilling

4.1.2: Proposed Method of Mining

Mechanized

HEMM with deep hole drilling	HEMM with deep hole drilling	HEMM with deep hole drilling	HEMM with deep hole drilling

Reasons for Proposed Changes: Mining has not been commenced till yet.

4.2: Operational Parameters

4.2.1: Inventory of Existing Pits & Dumps

4.2.1.1: Pits

S.No.	Pit ID	Pit Status	Area Covered by Pit (Ha)	Pit Dimension (m x m x m)
1	No existing pit, Mining operation not yet commenced			

4.2.1.2: Dumps & Stack

4.2.1.2.1: Dump Details

S.No.	Dump ID	Dump Status	Type of Dump	Total Dump Quantity (t)	Area covered by Dump (Ha)	Height (m)	Location
1	No existing dump, Mining Operation not yet commenced						

4.2.1.2.2: Stack Details

Sl. No.	Stack ID	Type of Stack	Total Stack Quantity (t)	Area covered by Stack (Ha)	Height (m)
1	No existing stack, Mining Operation not yet commenced				

4.2.1.3: Details of Stabilized dumps

Sl. No.	Dump ID	Number of Terraces	Average Height of Terraces (m)	Length of Toe Wall (m)	Length of Garland Drain (m)	Area Stabilized (ha)	Method of Stabilization
1	No existing dump, Mining Operation not yet commenced						

4.2.2: Opencast Mining

4.2.2.1: Bench Parameters

Pit Id	Year	Max Height of the Benches in Over Burden (m	Min Width of the enches in Over Burden (m)	Slope of the Bench in Over Burden	Max Height of the Benches in Mineral (m)	Minimum Width of the Benches in Mineral (m)	Slope of the ench in Minera (degree)	Over all Slope of Pit (degree)	Number of Benches in Top Soil	Number of Benches in Over Burden	Number of Benches in Mineral	Max Depth of Workings (m)	Depth of Water Table (m)	lax Slope Angle of Haul Roads (1 in)	Year-Wise Development & Production Plan	Year-Wise Development & Production Section
North Pit	Year 1	12	60	70	12	60	70	45	0	1 (common for Over burden & Mineral)	1 (common for Over burden & Mineral)	12 from hill top	below 900mRL	16	Furnished the 1st year Development & Production Plan	Furnished the 1st year Development & Production section
North Pit	Year 2	12	60	70	12	60	70	45	0	3 (common for Over burden & Mineral)	3 (common for Over burden & Mineral)	36 from hill top	below 900mRL	16	Furnished the 2nd year Development & Production Plan	Furnished the 2nd year Development & Production section
North Pit	Year 3	12	60	70	12	60	70	45	0	3 (common for Over burden & Mineral)	3 (common for Over burden & Mineral)	36 from hill top	below 900mRL	16	Furnished the 3rd year Development & Production Plan	Furnished the 3rd year Development & Production section
North Pit	Year 4	12	60	70	12	60	70	45	0	3 (common for Over burden & Mineral)	3 (common for Over burden & Mineral)	36 from hill top	below 900mRL	16	Furnished the 4th year Development & Production Plan	Furnished the 4th year Development & Production section
North Pit	Year 5	12	60	70	12	60	70	45	0	3 (commo n for Over burden & Mineral)	3 (commo n for Over burden & Mineral)	36 from hill top	below 900mR L	16	Furnished the 5th year Developmen t & Production Plan	Furnished the 5th year Development & Production section

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4.2.2.2: Year wise Opencast Development

Sr No	Year	Pit ID	Bench	Direction	Bulk density of Overburden (BD1) (ton/m3)	Bulk Density of Mineral (BD2) (tonn/m3)	Top Soil Volume (Length x Width x Height) (m3)	Over Burden Volume (Length x Width x Height) (m3)	Over Burden Quantity (t)	ROM Volume (Length x Width x Height) (m3)	ROM Quantity (t)	Recovery	Mineral Reject (t)	Production Main (t)	Production Associated (t)	Location of Advancement	OB to Ore Ratio (ton/m3)
1	Year 1	North Pit	Bench 1	South	2.6	3.5	N/A	2518.84	6800.88	209849.2	733643.3	733643.3	0	733643.3	N/A	North Pit-From North to South, Top Bench	1:0.003
2	Year 1	North Pit	Bench 2	North	2.6	3.5	N/A	910.03	2457.09	25850.37	90461.15	90461.15	0	90461.15	N/A	From the Haul Road development from Crushing Plant to 1st Bench(Hill Top).	1:0.01
3	Year 1	North Pit	Bench 3	North	2.6	3.5	N/A	12881.7	34780.59	13891.07	48502.26	48502.26	0	48502.26	N/A	From the Haul Road development from Crushing Plant to 1st Bench(Hill Top).	1:0.27
4	Year 1	North Pit	Bench 4	North	2.6	3.5	N/A	35356.52	95462.61	10647.35	37465.02	37465.02	0	37465.02	N/A	From the Haul Road development from Crushing Plant to 1st Bench(Hill Top).	1:0.94
5	Year 1	North Pit	Bench 5	North	2.6	3.5	N/A	12759.02	34449.35	345.16	1381.46	1381.46	0	1381.46	N/A	From the Haul Road development from Crushing Plant to 1st Bench(Hill Top).	1:9.24
6	Year 1	North Pit	Bench 6	North	2.6	3.5	N/A	7933.96	21421.69	14323.2	52857.75	52857.75	0	52857.75	N/A	From the Haul Road development from Crushing Plant to 1st Bench(Hill Top).	1:0.15

7	Year 1	North Pit	Bench 7	North	2.6	3.5	N/A	20559.54	55069.29	34794.39	126885.6	126885.6	0	126885.6	N/A	From the Haul Road development from Crushing Plant to 1st Bench(Hill Top).	1:0.16
8	Year 1	North Pit	Bench 8	North	2.6	3.5	N/A	2449.04	6612.4	28864.06	101656.4	101656.4	0	101656.4	N/A	From the Haul Road development from Crushing Plant to 1st Bench(Hill Top).	1:0.02
9	Year 1	North Pit	Bench 9	North	2.6	3.5	N/A	3220.6	8695.61	804.52	2747.09	2747.09	0	2747.09	N/A	From the Haul Road development from Crushing Plant to 1st Bench(Hill Top).	1:1.17
10	Year 1	North Pit	Bench 5	North	2.5	3.5	N/A	17993.09	44982.72	NIL	NIL	NIL	NIL	NIL	N/A	Undefined Material will be produced during development of road from proposed Crushing Plant location to Pit and Waste dump	
11	Year 1	North Pit	Bench 6	North	2.5	3.5	N/A	43661.5	109153.8	NIL	NIL	NIL	NIL	NIL	N/A	Undefined Material will be produced during development of road from proposed Crushing Plant location to Pit and Waste dump	
12	Year 1	North Pit	Bench 7	North	2.5	3.5	N/A	38905.79	97264.48	NIL	NIL	NIL	NIL	NIL	N/A	Undefined Material will be produced during development of road from proposed Crushing Plant location to Pit and Waste dump	

13	Year 1	North Pit	Bench 8	North	2.5	3.5	N/A	21649.25	54123.12	NIL	NIL	NIL	NIL	NIL	N/A	Undefined Material will be produced during development of road from proposed Crushing Plant location to Pit and Waste dump	
14	Year 1	North Pit	Bench 9	North	2.5	3.5	N/A	30971.6	77429.01	NIL	NIL	NIL	NIL	NIL	N/A	Undefined Material will be produced during development of road from proposed Crushing Plant location to Pit and Waste dump	
15	Year 1	North Pit	Bench 10	North	2.5	3.5	N/A	25144.27	62860.68	NIL	NIL	NIL	NIL	NIL	N/A	Undefined Material will be produced during development of road from proposed Crushing Plant location to Pit and Waste dump	
16	Year 1	North Pit	Bench 11	North	2.5	3.5	N/A	21330.18	53325.46	NIL	NIL	NIL	NIL	NIL	N/A	Undefined Material will be produced during development of road from proposed Crushing Plant location to Pit and Waste dump	

17	Year 1	North Pit	Bench 12	North	2.5	3.5	N/A	46454.09	116135.2	NIL	NIL	NIL	NIL	NIL	N/A	Undefined Material will be produced during development of road from proposed Crushing Plant location to Pit and Waste dump	
18	Year 1	North Pit	Bench 13	North	2.5	3.5	N/A	52079.54	130198.9	NIL	NIL	NIL	NIL	NIL	N/A	Undefined Material will be produced during development of road from proposed Crushing Plant location to Pit and Waste dump	
19	Year 1	North Pit	Bench 14	North	2.5	3.5	N/A	67084.35	167710.9	NIL	NIL	NIL	NIL	NIL	N/A	Undefined Material will be produced during development of road from proposed Crushing Plant location to Pit and Waste dump	
20	Year 1	North Pit	Bench 15	North	2.5	3.5	N/A	38682.86	96707.15	NIL	NIL	NIL	NIL	NIL	N/A	Undefined Material will be produced during development of road from proposed Crushing Plant location to Pit and Waste dump	

21	Year 1	North Pit	Bench 16	North	2.5	3.5	N/A	30623.47	76558.69	NIL	NIL	NIL	NIL	NIL	N/A	Undefined Material will be produced during development of road from proposed Crushing Plant location to Pit and Waste dump	
22	Year 1	North Pit	Bench 17	North	2.5	3.5	N/A	21793.44	54483.6	NIL	NIL	NIL	NIL	NIL	N/A	Undefined Material will be produced during development of road from proposed Crushing Plant location to Pit and Waste dump	
23	Year 1	North Pit	Bench 18	North	2.5	3.5	N/A	30311.05	75777.63	NIL	NIL	NIL	NIL	NIL	N/A	Undefined Material will be produced during development of road from proposed Crushing Plant location to Pit and Waste dump	
24	Year 1	North Pit	Bench 19	North	2.5	3.5	N/A	50440.06	126100.2	NIL	NIL	NIL	NIL	NIL	N/A	Undefined Material will be produced during development of road from proposed Crushing Plant location to Pit and Waste dump	

25	Year 1	North Pit	Bench 20	North	2.5	3.5	N/A	23764.57	59411.43	NIL	NIL	NIL	NIL	NIL	N/A	Undefined Material will be produced during development of road from proposed Crushing Plant location to Pit and Waste dump	
26	Year 1	North Pit	Bench 21	North	2.5	3.5	N/A	21899.87	54749.68	NIL	NIL	NIL	NIL	NIL	N/A	Undefined Material will be produced during development of road from proposed Crushing Plant location to Pit and Waste dump	
27	Year 1	North Pit	Bench 22	North	2.5	3.5	N/A	16119.23	40298.08	NIL	NIL	NIL	NIL	NIL	N/A	Undefined Material will be produced during development of road from proposed Crushing Plant location to Pit and Waste dump	
28	Year 1	North Pit	Bench 23	North	2.5	3.5	N/A	11157.53	27893.83	NIL	NIL	NIL	NIL	NIL	N/A	Undefined Material will be produced during development of road from proposed Crushing Plant location to Pit and Waste dump	
29	Year 2	North Pit	Bench 1	South	2.6	3.5	N/A	0	0	26286.4	91943.78	91943.78	0	91943.78	N/A	North Pit-From North to South-Top 1st Bench	1:0
30	Year 2	North Pit	Bench 2	South	2.6	3.5	N/A	37562.94	101419.9	296720.58	1031471	1031471	0	1031471	N/A	North Pit-From North to South-Top 2nd Bench	1:0.04

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QP: R.B.PRADHAN

31	Year 2	North Pit	Bench 3	South	2.6	3.5	N/A	126197.89	333592.8	246295.2	873717.1	873717.1	0	873717.1	N/A	North Pit-From North to South, Top 3rd Bench	1:0.14
32	Year 2	North Pit	Bench 4	North	2.6	3.5	N/A	386.58	1043.77	819.63	2868.69	2868.69	0	2868.69	N/A	North Pit-From North to South, Top 4th Bench	1:0.13
33	Year 3	North Pit	Bench 1	South	2.6	3.5	N/A	19	51.29	128	457	457	0	457	N/A	Haul Road	1:0.04
34	Year 3	North Pit	Bench 2	South	2.6	3.5	N/A	52543.49	141867.4	486316	1726290	1726290	0	1726290	N/A	North Pit-From North to South, Top 2nd Bench	1:0.03
35	Year 3	North Pit	Bench 3	South	2.6	3.5	N/A	9572.52	24846.97	65904.39	228274	228274	0	228274	N/A	North Pit-From North to South, Top 3rd Bench	1:0.04
36	Year 3	North Pit	Bench 4	South	2.6	3.5	N/A	45479.05	120494.5	10994	44979	44979	0	44979	N/A	North Pit-From North to South, Top 4th Bench	1:0.01
37	Year 4	North Pit	Bench 2	South	2.6	3.5	N/A	52.87	142.75	0	0	0	0	0	N/A	Haul Road	0
38	Year 4	North Pit	Bench 3	South	2.6	3.5	N/A	159697.95	430605.8	187947.23	624689.9	624689.9	0	624689.9	N/A	North Pit-From North to South, Top 3rd Bench	1:0.26
39	Year 4	North Pit	Bench 4	South	2.6	3.5	N/A	98293.76	262734.4	314273.99	1113418	1113418	0	1113418	N/A	North Pit-From North to South, Top 4th Bench	1:0.09
40	Year 4	North Pit	Bench 5	South	2.6	3.5	N/A	41840.06	112730.7	67414.12	261892.3	261892.3	0	261892.3	N/A	North Pit-From North to South, Top 5th Bench	1:0.16
41	Year 5	North Pit	Bench 2	South	2.6	3.5	N/A	3.2	8.65	65.23	228.31	228.31	0	228.31	N/A	Haul Road	1:0.01
42	Year 5	North Pit	Bench 3	South	2.6	3.5	N/A	44771.58	118707.7	378795.5	1319987	1319987	0	1319987	N/A	North Pit-From North to South, Top 3rd Bench	1:0.03
43	Year 5	North Pit	Bench 4	South	2.6	3.5	N/A	18929.21	50983.78	80156.26	268885.1	268885.1	0	268885.1	N/A	North Pit-From North to South, Top 4th Bench	1:0.07

44	Year 5	North Pit	Bench 5	South	2.6	3.5	N/A	33702.62	89506.23	113217.6	410900	410900	0	410900	N/A	North Pit-From North to South, Top 5th Bench	1:0.08
45	Year 5	North Pit	Bench 4	North	2.5	3.5	N/A	1912.99	4782.49	NIL	NIL	NIL	NIL	NIL	N/A	Undefined Material will be produced during development of road from proposed Crushing Plant location to Pit and Waste dump	
46	Year 5	North Pit	Bench 5	North	2.5	3.5	N/A	12239.23	30598.07	NIL	NIL	NIL	NIL	NIL	N/A	Undefined Material will be produced during development of road from proposed Crushing Plant location to Pit and Waste dump	
47	Year 5	North Pit	Bench 18	North	2.5	3.5	N/A	10501.79	26254.46	NIL	NIL	NIL	NIL	NIL	N/A	Undefined Material will be produced during development of road from proposed Crushing Plant location to Pit and Waste dump	
48	Year 5	North Pit	Bench 19	North	2.5	3.5	N/A	28639.76	71599.39	NIL	NIL	NIL	NIL	NIL	N/A	Undefined Material will be produced during development of road from proposed Crushing Plant location to Pit and Waste dump	
49	Year 5	North Pit	Bench 20	North	2.5	3.5	N/A	13965.91	34914.78	NIL	NIL	NIL	NIL	NIL	N/A	Undefined Material will be produced during development of road from proposed Crushing Plant location to Pit and Waste dump	

S.No.	Pit ID	Total Topsoil Volume (m^3)	Total Over Burden Volume (m^3)	Total Over Burden Quantity (t)	Total ROM Volume (m^3)	Total ROM Quantity (t)	Remarks
1	North Pit	0	767642	2054486	2614703	9195600	For 1st Five Years
2	Undefined Material will be produced during development of road from proposed Crushing Plant location to Pit and Waste dump	0	677325	1693315	0	0	For 1st Five Years

4.2.2.3: Transportation & Hauling Equipment

S. No.	Type	Make	Capacity (m^3)	No. of Equipments	Remarks
1	Truck	Mining Operation Not yet commissioned	10	18	Hauling Equipment- 1st 5 Years
2	Truck	Mining Operation Not yet commissioned	10	71	Transporting Equipment- 1st 5 Years
3	Water Tanker	Mining Operation Not yet commissioned	10	2	1st 5 Years
4	Dumper	Mining Operation Not yet commissioned	100T	18	After 5th Years to till life of mine
5	Water Tanker	Mining Operation Not yet commissioned	28	4	After 5th Years to till life of mine

4.3: Material Handling Summary

4.3.1: Studies Undertaken

Blast Vibration Study Report	No	
Slope Stability Study Report	No	**(If yes attach report as annexure)**
Recovery Study Report	Yes	**Please refer Annexure-13**
Hydrological Study Report	No	**(If yes attach report as annexure)**
Mineral Beneficiation Study Report	Yes	**Please refer Annexure-13**
Underground Rock Displacement Study Report	No	**(If yes attach report as annexure)**
Subsidence Study Report	No	**(If yes attach report as annexure)**
Underground Geotechnical Study Report	No	**(If yes attach report as annexure)**
Any Other Study Report	No	**(If yes attach report as annexure)**
Bulk Density Study Report	No	**(If yes attach report as annexure)**

4.3.2: Insitu Mining

Sl. No.	Year	Total Handling (t)	Waste Quantity (t)	ROM Quantity (t)	ROM Quantity Saleable Mineral (t)	ROM Quantity Mineral Reject (t)	OB to Ore Ratio (Waste Quantity / ROM Quantity)	Grade Range (%
1	Year 1	2986514	1790914	1195600	1195600	0	1.5	ORE is above 61% Fe, WASTE is less than 45% FE. Waste excavation is included the quantity of undefined (ud) material of 1.52 million Tonne, which is likely to be excavated from the haul road development outside the Ore boundary and inside ML
2	Year 2	2436057	436057	2000000	2000000	0	0.22	ORE is above 61% Fe, WASTE is less than 45% FE
3	Year 3	2287260	287260	2000000	2000000	0	0.14	ORE is above 61% Fe, WASTE is less than 45% FE
4	Year 4	2806214	806214	2000000	2000000	0	0.4	ORE is above 64% Fe, WASTE is less than 45% Fe
5	Year 5	2427356	427356	2000000	2000000	0	0.21	ORE is above 63% Fe, WASTE is less than 45% FE. Waste excavation is included the quantity of undefined (ud) material of 0.17 million Tonne, which is likely to be excavated from the haul road development outside the Ore boundary and inside ML

4.3.3: Dump workings

Sl. No.	Year	Dump Id	Location Latitude	Location Longitude	Area (m^2)	Avg Height of Dump (m)	Volume (m^3)	Total Dump Quantity (t)	Proposed Dump Handling Quantity (t) (A)	Proposed Recovery of Saleable Mineral (t) (B)	Proposed Waste Quantity (t) (A-B)	Grade Range (%)	Justification
1	Year 1		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	Year 2		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3	Year 3		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4	Year 4		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5	Year 5		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

4.3.4: Calculation Summary

Year	Year 1	Year 2	Year 3	Year 4	Year 5	Total
(A) Total ROM quantity (t)	1195600	2000000	2000000	2000000	2000000	9195600
(B) Saleable ore from ROM (t)	1195600	2000000	2000000	2000000	2000000	9195600
(C) Proposed Dump Handling Quantity (t)	0	0	0	0	0	0
(D) Saleable Ore recovered from dump workings (t)	0	0	0	0	0	0
(E) Total Saleable Ore (t) (=B+D)	1195600	2000000	2000000	2000000	2000000	9195600
(F) Total Quantity Handled (t) (=A+C)	1195600	2000000	2000000	2000000	2000000	9195600

The overall rated capacity for the proposed iron ore mine during its lifetime is kept at 7.0 Mtpa, which will be achieved in 9th year of its operational life. In the first five years, peak rated capacity is limited to 2.0 Mtpa which will be gradually increased to 7 Mtpa between 6th to 9th year.

During the first five years, all necessary infrastructure facilities, such as crushing and screening facilities, downhill long-distance conveyors, railway sidings, etc. will be established and hence there would be a cap of 2.0 Mtpa on production capacity.

22/9/2021

क्षेत्रीय खान नियंत्रक,
Regional Controller of Mines
भारतीय खान ब्यूरो, रायपुर
Indian Bureau of Mines, Raipur

4.4: Machine Calculation

4.4.1: Machine Requirement Summary

Machine Requirement			Remarks (after 5 Years to fill life of the Mine)
Number of Average Working Days in One Year (A)		268	268
Number of Shifts per Day (B)		2	3
Material Handling Required per Day (t) ((D)=Largest of (Q1, Q5)/(A))		11144	50052
Material to be Handled per Shift (t) ((E)=(D)/(B))		5572	16684
Handling Required per Hour (t) ((F)=(E)/8 hours)		696.5	2085.5
Effective Shift Time	7 hrs	00 mins	7.00Hrs

4.4.2: Shovel / Excavator Requirement

Effective Shift Time:	7 hrs	00 mins

Sl. No.	Type	Bucket Capacity (m^3) (A)	Bucket Fill Factor (B)	Swell Factor (C)	Tonnage Factor (m^3/t) (D)	Machine Utilization Factor (%) (U)	Efficiency (%) (E)	Cycle time (sec) (F)	(G) TPH =TPH (G) = ((3600 x A x B x C x D x E x U) / F)/1000	Total Hours (H) =Number of working days x Number of shifts/day x Effective shift hours	Yearly handling by one Excavator (t) (I) =(G x H)	Maximum handling of the material by this machine during the block period (t) (J)	Number of excavator machines required (K) = (J / I)	Standby excavator (L)	Remarks
1	Hydraulic	3.2	0.7	1.3	3.5	70	70	60	299.64	3752	1124267	2000000	1.8	1	For 1st Five Years (Ore Excavation)
2	Hydraulic	3.2	0.7	1.4	2.6	70	70	60	239.72	3752	899414	1790914	2.0	1	For 1st Five Years (Waste Handling)
3	Electric	8	0.7	1.3	3.5	70	70	60	749.11	5628	4216002	7000000	1.7	1	After 5th Years to Till life of Mine (10 cum. Excavator derated to 8 cum.) for Ore
4	Electric	8	0.8	1.4	2.6	70	70	60	684.90	5628	3854631	6414000	1.7	1	After 5th Years to Till life of Mine(10 cum. Excavator derated to 8 cum.) for Waste

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4.4.3: Dumper Requirement

Effective Shift Time:	7 hrs	00 mins

Sl. No.	Total Hours=Number of working days (W)x Number of shifts/day x Effective shift hours (Machine Requirement Summary) (A)	Capacity of Dumpers (t) (B)	Speed of the dumper (KMPH) (i)	Lead Distance (KM) (ii)	Time taken to cover distance in minutes(iii) =(ii/i) x 60	Queuing, Loading Time at Shovel (min) (iv)	Queuing, Unloading Time during unloading (min) (v)	Total Time to complete one trip(vi) = (iii + iv + v)	No. of Trips / hr =(60 / vi)	Total transportation per hour =(B X vii)	Yearly handling by one dumper (ix) = A x TPH	Maximum handling of the material by this machine during the block period (t) (x)	Number of dumpers will be (xi) =(x / ix)	Plus Standby dumper (xii)	Remarks
1	3752	25	20	6	18	5.35	1.5	24.85	2.41	60.36	226478.87	2986514	13.19	4	For 1st Five Years (Ore & Waste handling Inside ML)
2	2680	25	20	30	90	5.35	15	110.35	0.54	13.59	36429.54	2000000	54.90	16	For 1st Five Years (Ore handling from Inside ML to Loading plant area outside ML)
3	5360	100	20	6	18	7.5	3.5	29	2.07	206.90	1108965.52	7000000	6.31	2	After Five years to Till Life of the Mine (Ore Handling)

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4	5360	100	20	7	21	7.5	3.5	32	1.88	187.50	1005000.00	6414000	6.38	2	After Five years to Till Life of the Mine (Waste Handling)

4.4.4: Drill Machine Requirement

Effective Shift Time:	7 hrs	00 mins

Sl. No.	Type of Drill	Depth of Hole (including Sub-grade Drilling (m)	Spacing (m)	Burden (m)	Bulk Density of Waste (t/m³)	Bulk Density of Mineral (t/m³)	Yield per Hole (t)	Yield per Meter (t/m)	Annual Target Known (t)	Drilling Requirement per Day (m)	Drilling Requirement per Shif t(m)	Rate of Drilling per Hours (m/hr)	Required Number of Drills (m/c)	Stand by Drill	Remarks
1	Hydraulic	13.2	4.5	3.5		3.5	727.65	55.13	36281.18	135.38	67.69	15	0.64	1	For 1st Five Years (Ore)
2	Hydraulic	13.2	6	5	2.6		1029.6	78.00	22960.44	85.67	42.84	12	0.51		For 1st Five Years (Waste)
3	Electrical	13.2	6	5		3.5	1386	105.00	66666.67	248.76	82.92	15	0.79	1	After Five years to Till Life of the Mine (Ore)
4	Electrical	13.2	6	5	2.6		1029.6	78.00	82230.77	306.83	102.28	12	1.22		After Five years to Till Life of the Mine (Waste)

4.4.5: Machine Deployment Details

4.4.5.1: Excavator & Loading Equipment

S. No.	Type	Make	Capacity (m^3)	No. of Equipments	Type	Remarks
1		Not yet decided (Mining operation not started)	3.2	6	Hydraulic Excavator	For 1st Five Years
2		Not yet decided (Mining operation not started)	4	2	Hydraulic Front-End Loader	For 1st Five Years
3		Not yet decided (Mining operation not started)	8	6	Electric Excavator (10cum derated to 8cum.)	After Five years to Till Life of the Mine
4		Not yet decided (Mining operation not started)	8	2	Hydraulic Front-End Loader	After Five years to Till Life of the Mine

4.4.5.2: Dozers Details

S. No.	Type	Make	Capacity (hp)	No. of Equipments	Type	Remarks
1		Not yet decided (Mining operation not started)	410	2	Bull Dozer	For 1st Five Years
2		Not yet decided (Mining operation not started)	850	1	Bull Dozer	After Five years to Till Life of the Mine
3		Not yet decided (Mining operation not started)	450	4	Bull Dozer	After Five years to Till Life of the Mine
4		Not yet decided (Mining operation not started)	500	1	Wheel Dozer	After Five years to Till Life of the Mine

4.4.5.3: Drilling Details

Sl. No.	Type	Make	Capacity (t)	Diameter of Hole (mm)	Type
1		Not yet decided (Mining operation not started)	3 nos	150	Hydraulic
2		Not yet decided (Mining operation not started)	2 nos	100	Hydraulic
3		Not yet decided (Mining operation not started)	4 nos	250	Electric
4		Not yet decided (Mining operation not started)	3 nos	100	Hydraulic

4.5 Blasting Requirement

4.5.1: Blasting & Explosive Requirement in Waste/Development

Sl. No.	Drill Pattern / Spacing of Holes (m)	Burden of Holes (m)	Number of Rows / Rings	Yield per Holes in Waste (m^3)	Frequency of Blasting in a Week	Maximum Number of Holes Blasted in a Round	Charge per Hole (kg)	Charge per Round (kg)	Explosive Requirement Per Month in Development (kg)	Powder Factor in Development / Waste (kg/t)	Depth Of Hole	Remarks
1	3.5	4.5	2	189	2	42	120	5040	40320	4 Tonne/ Kg (Average)	12m	For 1st five years
2	5	6	3	360	3	40	300	12000	144000	4 Tonne/ Kg (Average)	12m	After 5th Year till life of the Mine

4.5.2: Blasting & Explosive Requirement in Mineral / Ore

Type of Explosive	Type of Explosives used / to be Used
Slurry Explosives	Bulk Slurry Explosives/SME
Slurry Explosives	Aluminised Gelled Slurry Explosives (Small Diameter)

Sl. No.	Total ROM proposed to be handled in CUM/annul	Total ROM proposed to be handled in CUM day	Spacing of Holes (m)	Burden of Holes (m)	Number of Rows	Yield per Holes in ROM Zone (m^3)	Frequency of Blasting in a Week	Maximum Number of Holes Blasted in a Round	No of Holes Required to be Blasted per Round	Charge per Hole (kg)	Charge per Round (kg)	Explosive Requirement Per Month for ROM Zone Blasting (kg)	Powder Factor in Ore (kg/t)	Pop Shooting (no of Boulders)	Plaster Shooting (no of Boulders)	Use of Rock breaker	Capacity	Secondary Blasting Requirements	Depth Of Hole	Powder factor in Tonne/Kg
1	572235	2135	3.5	4.5	2	189	2	36	36	140	5040	40320	Slurry Explosives	200	Nil	No		Yes	1.5	Powder Factor=4 Tonne/ Kg (Average)
2	1988636	7420	5	6	3	360	3	42	42	300	12600	151200	Slurry Explosives	200	Nil	No		Yes	1.5	Powder Factor=4 Tonne/ Kg (Average)

QP: DR. SANJEEV KUMAR SINHA QP: R.B.PRADHAN

4.6: Man Power Deployment

4.6.1: Managerial

Sr No	Particulars	Number of Persons in Shift 1	Number of Persons in Shift 2	Number of Persons in Shift 3	Number of Persons in General Shift	Total No. of Persons per day
1	1st Class	1	1	0	6	8
2	2nd Class Manager	0	0	0	0	0
3	Mining Engineer	0	0	0	1	1
4	Geologist	1	1	0	0	2
5	Mechanical Engineer	1	1	0	0	2
6	Electrical Engineer	1	1	0	0	2
7	Others	0			12	12

4.6.2: Supervisory

Sl. No.	Particulars	Number of Person in Shift 1	Number of Person in Shift 2	Number of Person in Shift 3	Number of Person in General Shift	Total Number of Person per Day
1	Foreman	7	7	0	6	20
2	Mine-mate	4	4	0	4	12
3	Blaster	0	0	0	3	3
4	Other	0	0	0	4	4

4.6.3: Skilled Workers / Operators

Sr No	Particulars	Number of Persons in Shift 1	Number of Persons in Shift 2	Number of Persons in Shift 3	Number of Persons in General Shift	Total No. of Persons per day
1	Technician	19	19		6	44
2	Operator	5	5			10
3	Dumper Operator	83	83			166
4	Pump Operator	1	1		1	3
5	Drill Operator	10	10			20
6	Dozer/Grader Operator	3	3		2	8
7	Crane Operator	1			1	2
7	Other	6	6		3	15

4.6.4: Semi-skilled Workers

Number of Persons in Shift 1	Number of Persons in Shift 2	Number of Persons in Shift 3	Number of Persons in General Shift	Total No. of Persons per day
2	2	0	1	5

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4.6.5: Unskilled Workers

Number of Persons in Shift 1	Number of Persons in Shift 2	Number of Persons in Shift 3	Number of Persons in General Shift	Total No. of Persons per day
20	20		10	50

Others Specify

Sr No	Particulars	Number of Persons in Shift 1	Number of Persons in Shift 2	Number of Persons in Shift 3	Number of Persons in General Shift	Total No. of Persons per day
						0

4.6.6: No. of Persons Engaged Per Day

Number of Persons in Shift 1	Number of Persons in Shift 2	Number of Persons in Shift 3	Number of Persons in General Shift	Total No. of Persons per day	Remarks	Manpower after five years to Till Life of Mine
165	164	0	60	389	For 1st Five Years	Please refer Annexure - 14(5)

No. of Shifts per Day ((A) = Machine Requirement Summary (B))	2
Average Daily Employment per Shift ((B) = (Total Number of Person per Day) / (A))	195
Material to be Handled per Shift ((C) = Machine Requirement Summary (E))	11144

4.6.7: Supervision

Sl. No.	Particulars	Qualification	Requirement / Proposed	In Position / Existing Strength	(-) Shortage / (+) Excess	Remarks
1	Agent	Graduate	1	In Position	Excess	

4.7: Waste Management

4.7.1: Existing Dump

Sl. No.	Year	Dump Id	Type of Dump	Proposed Area (ha)	Height (m)	Total Dump Quantity (m^3)	Existing Dump Location
1	Year 1	No existing dump, Mining Operation not yet commenced					No existing dump, Mining Operation not yet commenced

4.7.2: New Dump

Sl. No.	Year	Dump Id	Type of Dump	Proposed Area (ha)	Height (m)	Total Dump Quantity (m^3)	New Dump Location
1	Year 1	D1	Waste	1.69	20	72339	Northing-2069730 to 2069450 & Easting-522341 to 522456
2	Year 1	D2	Waste	20.07	150	636316	Northing -2070536 to 2069913 & Easting-521581 to 522111
3	Year 2	D2	Waste	20.07	150	164147	Northing -2070536 to 2069913 & Easting-521581 to 522111
4	Year 3	D2	Waste	20.07	150	107614	Northing -2070536 to 2069913 & Easting-521581 to 522111
5	Year 4	D2	Waste	20.07	150	299885	Northing -2070536 to 2069913 & Easting-521581 to 522111
6	Year 5	D2	Waste	20.07	150	164666	Northing -2070536 to 2069913 & Easting-521581 to 522111

4.7.3: Existing Stack

Sl. No.	Year	Stack ID	Type of Stack	Proposed Area (ha)	Height (m)	Total Stack Quantity (m^3)	Existing Stack Location
1	Year 1	No existing stack. Mining Operation not yet commenced					

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4.7.4: New Stack

Sl. No.	Year	Stack ID	Type of Stack	Proposed Area (ha)	Height (m)	Total Stack Quantity (m^3)	New Stack Location
1	Year 1	No proposed stack for waste or mineral rejects					
2	Year 2	No proposed stack for waste or mineral rejects					
3	Year 3	No proposed stack for waste or mineral rejects					
4	Year 4	No proposed stack for waste or mineral rejects					
5	Year 5	No proposed stack for waste or mineral rejects					

4.8: Mineral Waste Handling to Utilize as Minor Mineral

Sl. No. +B407: K412	Year	Dump Id	Type of Dump	Proposed Area (ha)	Quantity Handled (t)	Quantity Recovered (t)	Name Of Minor Mineral	Alternative Waste Utilization (m^3)	Remarks
1	Year 1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	अनुमोदित / Approved
2	Year 2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
3	Year 3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
4	Year 4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
5	Year 5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

4.9: Use of Minerals

Sl. No.	Proposed Use of Mineral	Name Of Mineral	Relevant Use of Mineral	Physical Specifications	Chemical Specifications
		List	List		
1	Direct selling	Hematite (Iron Ore)	Steel Plant, Pellet Plant, Sponge Iron Plant	Lump, CLO, Fines and Fine Tailings	More than 64% Fe (Lump, CLO & Fines), Between 58% Fe to 62% Fe (Fine Tailings)

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CHAPTER – 5

SUSTAINABLE MINING

Chapter 5: SUSTAINABLE MINING

5.1: Sustainable Mining and SDF Implementations in Compliance of Rule 35 of MCDR'2017

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All possible precautions for undertaking sustainable Mining while conducting prospecting, Mining, Beneficiation in the areas will be taken care. Online monitoring will be done for the Mining and allied activities as per the notified template of star rating in the format prescribed in this behalf by the IBM and will submit online its self-assessment report before the 1st day of July every year for the previous financial year along with the soft copy, of high-resolution satellite images covering the Mining lease and an area of 2KMs from the lease boundary to the regional controller or the authorised officer of IBM. Moreover, Sustainable Mining and SDF implementations in compliance of Rule-35 of MCDR-2017 will be taken care throughout the life of the Mine.

Compliance of Vishakha Committee Guidelines for prevention of women harassment at workplace:

Not implemented

As per the Vishakha Committee Guidelines the following steps will be taken care once the Mining operation commenced:

(i) Express prohibition of sexual harassment at workplace as defined in the guidelines will be notified, published and circulated in appropriate ways.

(ii) Appropriate work conditions will be provided in respect of work, leisure, health and hygiene to further ensure that there is no hostile environment towards women at work places and no employee woman would have reasonable grounds to believe that she is disadvantages in connection with her employment.

(iii) An Internal Complaints Committee will be formed at project level by the employees of NCL as well as NGO/Experts. The committee will take care all the complaints and would recommend the actions as and when necessary to the Competent Authority.

(iv) Employees will be allowed to raise issues of sexual harassment at Worker's meeting and in other appropriate forum and it will be affirmatively discussed in Employer-Employee Meetings.

(v) Awareness of the rights of female employees will be created in particular by prominently notifying the guidelines in a suitable manner.

5.2: CSR INITIAYIVES

5.2.1: YEAR 1-5 (Separate form for each year as below)

1st YEAR	
Details of Work Proposed during the Year / Measures Planned for the Affected Segment	**Cumulative Work done / Measures Taken** अनुमोदित / Approved
5.2.1.1: Area to be Developed for Recreation	
Area (Ha) 0.5 Ha	**Area (HA)**
There is no proposal for recreation during the 1st five years of Mining Plan period for inside the Mining Lease. However, for outside the Mining Lease, facilities will be extended similar to the existing project of NMDC in consultation with State Government.	NIL
5.2.1.2: Area for Water Storage & Recharge Facility	
Area (Ha) 0.25 Ha	**Area (Ha)**
There is no proposal for Water Storage & Recharge facilities during the 1st five years of Mining Plan period for inside the Mining Lease. However, for outside the Mining Lease, facilities will be extended similar to the existing project of NMDC.	NIL
5.2.1.3: Efforts Made towards Housing for Local Communities	
Number of Houses	**Number of Houses**
NA	NIL
5.2.1.4: Efforts Made towards Providing Transport to Local Communities	
Number of Beneficiaries 1365	**Number of Beneficiaries**
Facilities will be extended similar to the existing project of NMDC in consultation with State Government.	NIL
5.2.1.5: Efforts Made towards Providing Healthcare to Local Communities	
Number of Beneficiaries 1365	**Number of Beneficiaries**
Nearby villages are getting medical facilities free of cost in NMDC. Facilities will be extended similar to the existing project of NMDC in consultation with State Government.	NIL
5.2.1.6: Efforts Made towards Providing Hygiene & Sanitation to Local Communities	
Number of Beneficiaries 500	**Number of Beneficiaries**
At present NMDC is creating Swachh Bharat Mission throughout the nearby villages. Facilities will be extended similar to the existing project of NMDC in consultation with State Government.	NIL

5.2.1.7: Efforts Made towards Skill Development Programs to Local Communities	
Number of Beneficiaries : 50	**Number of Beneficiaries**
NMDC is giving its effort in a large scale for the Skill development of the local communities of the nearby villages. Facilities will be extended similar to the existing project of NMDC in consultation with State Government.	NIL

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5.2.1.8: Efforts Made to Promote Education & Knowledge Based Initiatives		
Number of Beneficiaries		**Number of Beneficiaries**
NMDC is giving its effort in a large scale to promote Education & knowledge of the local communities of the nearby villages, Facilities will be extended similar to the existing project of NMDC in consultation with State Government.	50	NIL

5.2.1.9: Communication Facilities Provided to Local Communities	
Number of Beneficiaries : 100	**Number of Beneficiaries**
Communication Facilities for the local communities will be extended similar to the existing project of NMDC.	NIL

5.2.1.10: Any Other Steps Taken for Improving the Socio-Economic Standard of Local Communities		
Number of Beneficiaries		**Number of Beneficiaries**
Facilities will be extended similar to the existing project of NMDC in consultation with State Government.	50	NIL

5.2.1.11: Adoption of ODF		
Number of Toilets Built inside the Lease Area:	**Number of Toilets Built outside the Lease Area: 2**	**Number of Beneficiaries**
Facilities will be extended similar to the existing project of NMDC in consultation with State Government.	Facilities will be extended similar to the existing project of NMDC in consultation with State Government.	Facilities will be extended similar to the existing project of NMDC in consultation with State Government.

5.2.1.12: Awareness Program among Mine Workers for Swatchata	
Number of Swatchata Programmes proposed:	**Number of Swatchata Programmes Held:**
One	NIL

5.2.1.13: Efforts for green energy		
Total energy consumption (KWh)	**Green energy consumption (% of total)**	
400 KVA (Appx. Demand) is proposed. Total energy consumption can be given once Mining operations started.	It can be given once Mining operations started.	

5.2.1.14: Water & recycled use		
Total water consumption (KLD)	**Water recycled (% of total)**	
1000	No proposal to recycle during the 1st five years of mining.	

2ND YEAR	
Details of Work Proposed during the Year / Measures Planned for the Affected Segment	**Cumulative Work done / Measures Taken**
5.2.1.1: Area to be Developed for Recreation	
Area (Ha) 0.5 Ha	**Area (Ha)**
There is no proposal for recreation during the 1st five years of Mining Plan period for inside the Mining Lease. However, for outside the Mining Lease, facilities will be extended similar to the existing project of NMDC in consultation with State Government.	NIL
5.2.1.2: Area for Water Storage & Recharge Facility	
Area (Ha) 0.25 Ha	**Area (Ha)**
There is no proposal for Water Storage & Recharge facilities during the 1st five years of Mining Plan period for inside the Mining Lease. However, for outside the Mining Lease, facilities will be extended similar to the existing project of NMDC.	NIL
5.2.1.3: Efforts Made towards Housing for Local Communities	
Number of Houses	**Number of Houses**
N/A	N/A
5.2.1.4: Efforts Made towards Providing Transport to Local Communities	
Number of Beneficiaries 1365	**Number of Beneficiaries**
Facilities will be extended similar to the existing project of NMDC in consultation with State Government.	NIL
5.2.1.5: Efforts Made towards Providing Healthcare to Local Communities	
Number of Beneficiaries 1365	**Number of Beneficiaries**
Nearby villages are getting medical facilities free of cost in NMDC. Facilities will be extended similar to the existing project of NMDC in consultation with State Government.	Nil

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5.2.1.6: Efforts Made towards Providing Hygiene & Sanitation to Local Communities	
Number of Beneficiaries : 500	**Number of Beneficiaries**
At present NMDC is creating Swachh Bharat Mission throughout the nearby villages. Facilities will be extended similar to the existing project of NMDC in consultation with State Government.	NIL

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5.2.1.7: Efforts Made towards Skill Development Programs to Local Communities	
Number of Beneficiaries : 50	**Number of Beneficiaries**
NMDC is giving its effort in a large scale for the Skill development of the local communities of the nearby villages. Facilities will be extended similar to the existing project of NMDC in consultation with State Government.	NIL

5.2.1.8: Efforts Made to Promote Education & Knowledge Based Initiatives		
Number of Beneficiaries		**Number of Beneficiaries**
NMDC is giving its effort in a large scale to promote Education & knowledge of the local communities of the nearby villages, Facilities will be extended similar to the existing project of NMDC in consultation with State Government.	50	NIL

5.2.1.9: Communication Facilities Provided to Local Communities		
Number of Beneficiaries		**Number of Beneficiaries**
Communication Facilities for the local communities will be extended similar to the existing project of NMDC .	100	NIL

5.2.1.10: Any Other Steps Taken for Improving the Socio-Economic Standard of Local Communities		
Number of Beneficiaries		**Number of Beneficiaries**
Facilities will be extended similar to the existing project of NMDC in consultation with State Government.	50	NIL

5.2.1.11: Adoption of ODF		
Number of Toilets Built inside the Lease Area: NIL	**Number of Toilets Built outside the Lease Area:** 2	**Number of Beneficiaries**
Facilities will be extended similar to the existing project of NMDC in consultation with State Government.	Facilities will be extended similar to the existing project of NMDC in consultation with State Government.	Facilities will be extended similar to the existing project of NMDC in consultation with State Government.

5.2.1.12: Awareness Program among Mine Workers for Swatchata	
Number of Swatchata Programmes proposed:	Number of Swatchata Programmes Held:
One	NIL

5.2.1.13: Efforts for green energy		
Total energy consumption (KWh)	Green energy consumption (% of total)	
400 KVA (Appx. Demand) is proposed. Total energy consumption can be given once Mining operations started.	It can be given once Mining operations started.	

5.2.1.14: Water & recycled use		
Total water consumption (KLD)	Water recycled (% of total)	
1000	No proposal to recycle during the 1st five years of mining.	

3RD YEAR	
Details of Work Proposed during the Year / Measures Planned for the Affected Segment	**Cumulative Work done / Measures Taken**
5.2.1.1: Area to be Developed for Recreation	
Area (Ha) : 0.5 Ha	**Area (Ha)**
There is no proposal for recreation during the 1st five years of Mining Plan period for inside the Mining Lease. However, for outside the Mining Lease, facilities will be extended similar to the existing project of NMDC in consultation with State Government.	NIL
5.2.1.2: Area for Water Storage & Recharge Facility	
Area (Ha) 0.25 Ha	**Area (Ha)**
There is no proposal for Water Storage & Recharge facilities during the 1st five years of Mining Plan period for inside the Mining Lease. However, for outside the Mining Lease, facilities will be extended similar to the existing project of NMDC.	NIL
5.2.1.3: Efforts Made towards Housing for Local Communities	
Number of Houses	**Number of Houses**
N/A	NIL
5.2.1.4: Efforts Made towards Providing Transport to Local Communities	
Number of Beneficiaries 2068	**Number of Beneficiaries**
Facilities will be extended similar to the existing project of NMDC in consultation with State Government.	NIL
5.2.1.5: Efforts Made towards Providing Healthcare to Local Communities	
Number of Beneficiaries 2068	**Number of Beneficiaries**
Nearby villages are getting medical facilities free of cost in NMDC. Facilities will be extended similar to the existing project of NMDC in consultation with State Government.	NIL

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5.2.1.6: Efforts Made towards Providing Hygiene & Sanitation to Local Communities	
Number of Beneficiaries : 500	**Number of Beneficiaries**
At present NMDC is creating Swachh Bharat Mission throughout the nearby villages. Facilities will be extended similar to the existing project of NMDC in consultation with State Government.	NIL

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5.2.1.7: Efforts Made towards Skill Development Programs to Local Communities	
Number of Beneficiaries : 50	**Number of Beneficiaries**
NMDC is giving its effort in a large scale for the Skill development of the local communities of the nearby villages, However, after EIA study for Deposit No. 4, NCL will do all the activities related to skill development of the local communities of the nearby villages.	NIL

5.2.1.8: Efforts Made to Promote Education & Knowledge Based Initiatives		
Number of Beneficiaries		**Number of Beneficiaries**
NMDC is giving its effort in a large scale to promote Education & knowledge of the local communities of the nearby villages. Facilities will be extended similar to the existing project of NMDC in consultation with State Government.	50	NIL

5.2.1.9: Communication Facilities Provided to Local Communities	
Number of Beneficiaries 100	**Number of Beneficiaries**
Communication Facilities for the local communities will be extended similar to the existing project of NMDC.	NIL

5.2.1.10: Any Other Steps Taken for Improving the Socio-Economic Standard of Local Communities		
Number of Beneficiaries		**Number of Beneficiaries**
Facilities will be extended similar to the existing project of NMDC in consultation with State Government.	50	NIL

5.2.1.11: Adoption of ODF		
Number of Toilets Built inside the Lease Area: NIL	**Number of Toilets Built outside the Lease Area:** 2	**Number of Beneficiaries**
Facilities will be extended similar to the existing project of NMDC in consultation with State Government.	Facilities will be extended similar to the existing project of NMDC in consultation with State Government.	Facilities will be extended similar to the existing project of NMDC in consultation with State Government.

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5.2.1.12: Awareness Program among Mine Workers for Swatchata	
Number of Swatchata Programmes proposed:	**Number of Swatchata Programmes Held:**
ONE	NIL

5.2.1.13: Efforts for green energy		
Total energy consumption (KWh)	**Green energy consumption (% of total)**	
400 KVA (Appx. Demand) is proposed. Total energy consumption can be given once Mining operations started.	It can be given once Mining operations started.	

5.2.1.14: Water & recycled use		
Total water consumption (KLD)	**Water recycled (% of total)**	
1000	No proposal to recycle during the 1st five years of mining.	.

4TH YEAR	
Details of Work Proposed during the Year / Measures Planned for the Affected Segment	**Cumulative Work done / Measures Taken**
5.2.1.1: Area to be Developed for Recreation	
Area (Ha) : 0.5Ha	**Area (Ha)**
There is no proposal for recreation during the 1st five years of Mining Plan period for inside the Mining Lease. However, for outside the Mining Lease, facilities will be extended similar to the existing project of NMDC in consultation with State Government.	NIL
5.2.1.2: Area for Water Storage & Recharge Facility	
Area (Ha) 0.25Ha	**Area (Ha)**
There is no proposal for Water Storage & Recharge facilities during the 1st five years of Mining Plan period for inside the Mining Lease. However, for outside the Mining Lease, facilities will be extended similar to the existing project of NMDC.	NIL
5.2.1.3: Efforts Made towards Housing for Local Communities	
Number of Houses	**Number of Houses**
N/A	N/A
5.2.1.4: Efforts Made towards Providing Transport to Local Communities	
Number of Beneficiaries 2068	**Number of Beneficiaries**
Facilities will be extended similar to the existing project of NMDC in consultation with State Government.	NIL
5.2.1.5: Efforts Made towards Providing Healthcare to Local Communities	
Number of Beneficiaries 2068	**Number of Beneficiaries**
Nearby villages are getting medical facilities free of cost in NMDC. Facilities will be extended similar to the existing project of NMDC in consultation with State Government.	NIL

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5.2.1.6: Efforts Made towards Providing Hygiene & Sanitation to Local Communities	
Number of Beneficiaries ; 500	**Number of Beneficiaries**
At present NMDC is creating Swachh Bharat Mission throughout the nearby villages. Facilities will be extended similar to the existing project of NMDC in consultation with State Government.	NIL

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5.2.1.7: Efforts Made towards Skill Development Programs to Local Communities	
Number of Beneficiaries ; 50	**Number of Beneficiaries**
NMDC is giving its effort in a large scale for the Skill development of the local communities of the nearby villages. Facilities will be extended similar to the existing project of NMDC in consultation with State Government.	NIL

5.2.1.8: Efforts Made to Promote Education & Knowledge Based Initiatives		
Number of Beneficiaries		**Number of Beneficiaries**
NMDC is giving its effort in a large scale to promote Education & knowledge of the local communities of the nearby villages, Facilities will be extended similar to the existing project of NMDC in consultation with State Government.	50	NIL

5.2.1.9: Communication Facilities Provided to Local Communities	
Number of Beneficiaries ; 100	**Number of Beneficiaries**
Communication Facilities for the local communities will be extended similar to the existing project of NMDC .	NIL

5.2.1.10: Any Other Steps Taken for Improving the Socio-Economic Standard of Local Communities		
Number of Beneficiaries		**Number of Beneficiaries**
Facilities will be extended similar to the existing project of NMDC in consultation with State Government.	50	NIL

5.2.1.11: Adoption of ODF		
Number of Toilets Built inside the Lease Area: NIL	**Number of Toilets Built outside the Lease Area:** 2	**Number of Beneficiaries**
Facilities will be extended similar to the existing project of NMDC in consultation with State Government.	Facilities will be extended similar to the existing project of NMDC in consultation with State Government.	Facilities will be extended similar to the existing project of NMDC in consultation with State Government.

5.2.1.12: Awareness Program among Mine Workers for Swatchata	
Number of Swatchata Programmes proposed:	**Number of Swatchata Programmes Held:**
ONE	NIL

5.2.1.13: Efforts for green energy		
Total energy consumption (KWh)	**Green energy consumption (% of total)**	
400 KVA (Appx. Demand) is proposed. Total energy consumption can be given once Mining operations started.	It can be given once Mining operations started.	

5.2.1.14: Water & recycled use		
Total water consumption (KLD)	**Water recycled (% of total)**	
1000	No proposal to recycle during the 1st five years of mining.	

5TH YEAR	
Details of Work Proposed during the Year / Measures Planned for the Affected Segment	**Cumulative Work done / Measures Taken**
5.2.1.1: Area to be Developed for Recreation	
Area (Ha) : 0.5 Ha	**Area (Ha)**
There is no proposal for recreation during the 1st five years of Mining Plan period for inside the Mining Lease. However, for outside the Mining Lease, facilities will be extended similar to the existing project of NMDC in consultation with State Government.	NIL
5.2.1.2: Area for Water Storage & Recharge Facility	
Area (Ha) 0.25 Ha	**Area (Ha)**
There is no proposal for Water Storage & Recharge facilities during the 1st five years of Mining Plan period for inside the Mining Lease. However, for outside the Mining Lease, facilities will be extended similar to the existing project of NMDC.	NIL
5.2.1.3: Efforts Made towards Housing for Local Communities	
Number of Houses	**Number of Houses**
N/A	N/A
5.2.1.4: Efforts Made towards Providing Transport to Local Communities	
Number of Beneficiaries 200	**Number of Beneficiaries**
Facilities will be extended similar to the existing project of NMDC in consultation with State Government.	NIL
5.2.1.5: Efforts Made towards Providing Healthcare to Local Communities	
Number of Beneficiaries 200	**Number of Beneficiaries**
Nearby villages are getting medical facilities free of cost in NMDC. Facilities will be extended similar to the existing project of NMDC in consultation with State Government.	NIL

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5.2.1.6: Efforts Made towards Providing Hygiene & Sanitation to Local Communities	
Number of Beneficiaries : 500	**Number of Beneficiaries**
At present NMDC is creating Swachh Bharat Mission throughout the nearby villages. Facilities will be extended similar to the existing project of NMDC in consultation with State Government.	NIL

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5.2.1.7: Efforts Made towards Skill Development Programs to Local Communities	
Number of Beneficiaries : 50	**Number of Beneficiaries**
NMDC is giving its effort in a large scale for the Skill development of the local communities of the nearby villages. Facilities will be extended similar to the existing project of NMDC in consultation with State Government.	NIL

5.2.1.8: Efforts Made to Promote Education & Knowledge Based Initiatives		
Number of Beneficiaries		**Number of Beneficiaries**
NMDC is giving its effort in a large scale to promote Education & knowledge of the local communities of the nearby villages, Facilities will be extended similar to the existing project of NMDC in consultation with State Government.	50	NIL

5.2.1.9: Communication Facilities Provided to Local Communities	
Number of Beneficiaries : 100	**Number of Beneficiaries**
Communication Facilities for the local communities will be extended similar to the existing project of NMDC .	NIL

5.2.1.10: Any Other Steps Taken for Improving the Socio-Economic Standard of Local Communities		
Number of Beneficiaries		**Number of Beneficiaries**
Facilities will be extended similar to the existing project of NMDC in consultation with State Government.	50	NIL

5.2.1.11: Adoption of ODF		
Number of Toilets Built inside the Lease Area: NIL	**Number of Toilets Built outside the Lease Area:** 2	**Number of Beneficiaries**
Facilities will be extended similar to the existing project of NMDC in consultation with State Government.	Facilities will be extended similar to the existing project of NMDC in consultation with State Government.	Facilities will be extended similar to the existing project of NMDC in consultation with State Government. अनुमोदित / Approved
5.2.1.12: Awareness Program among Mine Workers for Swatchata		
Number of Swatchata Programmes proposed:		**Number of Swatchata Programmes Held:**
ONE		NIL
5.2.1.13: Efforts for green energy		
Total energy consumption (KWh)	**Green energy consumption (% of total)**	
400 KVA (Appx. Demand) is proposed. Total energy consumption can be given once Mining operations started.	It can be given once Mining operations started.	
5.2.1.14: Water & recycled use		
Total water consumption (KLD)	**Water recycled (% of total)**	
1000	No proposal to recycle during the 1st five years of mining.	

5.3: REHABILITATION & RESETTLEMENT OF AFFECTED PERSONS

Particular	Year 1	Year 2	Year 3	Year 4	Year 5	Remarks
Proposed Number of Project Affected Persons (PAP)	Detail proposal will be furnished after fresh EIA study	Detail proposal will be furnished after fresh EIA study	Detail proposal will be furnished after fresh EIA study	Detail proposal will be furnished after fresh EIA study	Detail proposal will be furnished after fresh EIA study	Detail proposal will be furnished after fresh EIA study
Proposed Number of Person for Alternate Arrangement for Sustainable Livelihood	Detail proposal will be furnished after fresh EIA study	Detail proposal will be furnished after fresh EIA study	Detail proposal will be furnished after fresh EIA study	Detail proposal will be furnished after fresh EIA study	Detail proposal will be furnished after fresh EIA study	Detail proposal will be furnished after fresh EIA study
Proposed Number of Person for Skill Training	Detail proposal will be furnished after fresh EIA study	Detail proposal will be furnished after fresh EIA study	Detail proposal will be furnished after fresh EIA study	Detail proposal will be furnished after fresh EIA study	Detail proposal will be furnished after fresh EIA study	Detail proposal will be furnished after fresh EIA study
Proposed Number of Person Likely to get Direct Employment	Detail proposal will be furnished after fresh EIA study	Detail proposal will be furnished after fresh EIA study	Detail proposal will be furnished after fresh EIA study	Detail proposal will be furnished after fresh EIA study	Detail proposal will be furnished after fresh EIA study	Detail proposal will be furnished after fresh EIA study
Proposed Number of Person Likely to get Indirect Employment	Detail proposal will be furnished after fresh EIA study	Detail proposal will be furnished after fresh EIA study	Detail proposal will be furnished after fresh EIA study	Detail proposal will be furnished after fresh EIA study	Detail proposal will be furnished after fresh EIA study	Detail proposal will be furnished after fresh EIA study
Proposed Project Affected Families Skilled and Absorbed	Detail proposal will be furnished after fresh EIA study	Detail proposal will be furnished after fresh EIA study	Detail proposal will be furnished after fresh EIA study	Detail proposal will be furnished after fresh EIA study	Detail proposal will be furnished after fresh EIA study	Detail proposal will be furnished after fresh EIA study

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Proposed Number of Project Affected Families	Detail proposal will be furnished after fresh EIA study	Detail proposal will be furnished after fresh EIA study	Detail proposal will be furnished after fresh EIA study	Detail proposal will be furnished after fresh EIA study	Detail proposal will be furnished after fresh EIA study	Detail proposal will be furnished after fresh EIA study

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CHAPTER – 6

PROGRESSIVE MINE CLOUSER PLAN

Chapter 6: PROGRESSIVE MINE CLOSURE PLAN

6.1: STATUS OF LAND

Total Area Degraded					Total mined out area Reclaimed and Rehabilitated			Other Areas Reclaimed and Rehabilitated	
Total area under excavation in the lease		Area under Dumps (in hect)	Area under utility services (in hect)	Area under Stack yards (in hect)	Mined out Area Reclaimed but not rehabilitated (in hect)	Mined out Area fully Rehabilitated from Reclaimed area (in hect)	Area under Water Reservoir considered Rehabilitated (in hect)	Stabilized Waste dump Rehabilitated (in hect)	Virgin area under Green Belt (in hect)
Area under mining operation	Mined Out area in the lease								
0	0	0	14.441	0	0	0	0	0	0

6.2: PROGRESSIVE RECLAMATION AND REHABILITATION

6.2.1: Backfilling

Quantity of Waste / Fill Material Available at Site (m^3)	0
Availability of Top Soil for Spreading (m^3)	0
Spread Area (m^2)	0

Year Wise Proposal

Sr No	Year	Pit ID	Area (m^2)	Top RL	Bottom RL	Estimated Expenditure (INR)
1	Year 1	North				No backfilling proposed
2	Year 2	North				No backfilling proposed
3	Year 3	North				No backfilling proposed
4	Year 4	North				No backfilling proposed
5	Year 5	North				No backfilling proposed

6.2.2: Water Reservoir

Water Reservoir		Remarks
Average Rainfall of The Area (mm)	25000	
Proposed Area under Water Storage	N/A	20.04 Ha at the end of the life of the Mine

6.2.2.1: Preparations for Ground Water Recharging

6.2.2.1.1: Drilling Holes		6.2.2.1.2: Preparation of Course Gravel Bed	
Year	**Proposed no of Holes to be Drilled**	**Year**	**Proposed Area of Bed (LxW)**
Year 1	N/A	Year 1	N/A
Year 2	N/A	Year 2	N/A
Year 3	N/A	Year 3	N/A
Year 4	N/A	Year 4	N/A
Year 5	N/A	Year 5	N/A

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Please specify, if others

6.2.2.2: Protective measures (Please specify running meter)

6.2.2.2.1: Fencing				
Year	**Proposed Fencing Length (m)**	**Co-ordinates from**	**Co-ordinates to**	**Remarks**
Year 1	2543	523009:2067939	521842:2070670	Outer-fencing
Year 1	3678	523043:2066622	522997:2070263	Inner-fencing
Year 2	2543	521843:2070670	521175:2068787	Outer-fencing
Year 2	3678	522996:2070263	521184:2069150	Inner-fencing
Year 3	2531	521175:2068787	523051:2066608	Outer-fencing
Year 3	3678	521184:2069150	523043:2066622	Inner-fencing
Year 4	Nil	Nil		
Year 5	Nil	Nil		

6.2.2.2.2: Retaining Wall				
Year	**Proposed Wall Length (m)**	**Co-ordinates from**	**Co-ordinates to**	**Remarks**
Year 1	226	522457: 2069521	522403:2069737	Below Dump-1
Year 1	899	521571:2069921	521965:2070550	Below dump-2
Year 2				
Year 3				
Year 4				
Year 5				

6.2.2.2.3: Garland Drains			
Year	**Proposed Bund Length (m)**	**Co-ordinates from**	**Co-ordinates to**
Year 1	234	522459:2069518	522403:2069741
Year 1	906	521569:2069920	521968:2070552
Year 2	Nil		
Year 3	Nil		
Year 4	Nil		
Year 5	Nil		

6.2.3: Green Belt Development

6.2.3.1: Cumulative work done (up to end of previous block of five years)				
Sl No	Total Expenditure Incurred up to Last Year (INR)	Area Covered (Ha)	Number of Plants	Survival Rate (%)
1	N/A	N/A	N/A	N/A

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6.2.3.2: Year Wise Proposal						
Sr. No.	Year	Green Belt Location (s)	Area Proposed to be Covered (Ha)	Number of Plants Proposed	Expected Survival Rate (%)	Estimated Expenditure (INR)
1	Year 1	Safety Zone	1.248	3000	85	312000
2	Year 2	Safety Zone	1.81	4500	85	497750
3	Year 2	Gap Plantation	12.08	11500	85	3322000
4	Year 3	Safety Zone (Gap Plantation)	1.81	2000	85	547525
5	Year 3	Dump Plantation at Dump-1	1.672	2500	85	505780
6	Year 3	Gap Plantation	12.08	11500	85	3654200
7	Year 4	Safety Zone (Gap Plantation)	1.81	2000	85	602277.5
8	Year 4	Gap Plantation (Other than safety zone)	12.08	11500	85	4019620
9	Year 5	Safety Zone (Gap Plantation)	1.81	2000	85	662505
10	Year 5	Gap Plantation (Other than safety zone)	12.08	11500	85	4421582

6.2.4: Use of shallow pits

6.2.4.1: Cumulative work done (upto end of previous block of five years)				
Sr No	Pit ID	Work Done	Area covered (m²)	Total Expenditure Incurred (up to last five-year block) (INR)
1	N/A	N/A	N/A	N/A

6.2.4.2: Year Wise Proposal									
Sr No	Year	Pit ID	Total Area (Ha)	Area Proposed for Crops (Ha)	Suitable Crops	Area Proposed for Grass (Ha)	Total Proposed Expenditure (INR)	Location (s)	Remarks
1					N/A				

6.2.5: Pisciculture

6.2.5.1: Total Expenditure incurred as on Date (INR)	N/A

6.2.5.2: Cumulative work done as on Date			
Sr No	Pit ID	Area (m²)	Expenditure (INR)
N/A	N/A	N/A	N/A

6.2.5.3: Year Wise Proposal				
Sr No	Year	Pit ID	Area (m²)	Estimated Expenditure (INR)
N/A				

6.2.5.4: Source of Water for Pisciculture	N/A
6.2.5.5: Whether the quality of water has been assessed & found to be suitable for Pisciculture	

6.2.6: Recreational Facility

6.2.6.1: Total Expenditure Incurred (up to last five-year block) (INR)	N/A

6.2.6.2: Cumulative work done as on Date			
Sr No	Pit ID	Area (m²)	Expenditure (INR)
N/A			

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6.2.6.3: Year Wise Proposal					
Sr No	Year	Type of Recreational Facility	Area Covered (Ha)	Location	Estimated Expenditure (INR)
1	Year 1	N/A			
2	Year 2	N/A			
3	Year 3	N/A			
4	Year 4	N/A			
5	Year 5	N/A			

6.2.7: Dump Area Stabilization & Development

Sr No	Year	Dump ID	No of Terraces	Avg. Height of Terraces (m)	Length of Toe Wall (m)	Length of Garland Drain (m)	Area Stabilized (Ha)	Method of Stabilization	Estimated Expenditure (INR)	No of Check Dams	Methods of Stabilisation	Year
1		D1	1	20	226	234	1.7		3400000	2	Geo-Textile	3rd Year

6.2.8: Other Form of Reclaiming the Area

6.2.8.1: Cumulative work done as on Date		
Sr No	Total Expenditure incurred as on Date (INR)	Work Done
1	N/A	N/A

6.2.8.2: Year Wise Proposal			
Sr No	Year	Work Proposals	Estimated Expenditure (INR)
1	Year 1	N/A	
2	Year 2	N/A	
3	Year 3	N/A	
4	Year 4	N/A	
5	Year 5	N/A	

6.2.9: Top Soil Management

6.2.9.1: Cummulative Work Done as on Date				
Sl. No.	**Top Soil Generated** (m^3)	**Top Soil Utilized** (m^3)	**Topsoil Stored** (m^3)	**Total expenditure incurred as on date (₹)**
1				N/A

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6.2.9.2: Year Wise Proposal				
Year	**Topsoil Generated** (m^3) **(A)**	**Topsoil Utilized** (m^3) **(B)**	**Topsoil Stored** (m^3) **(A-B)**	**Estimated Expenditure** (INR)
Year 1			0	N/A
Year 2			0	N/A
Year 3			0	N/A
Year 4			0	N/A
Year 5			0	N/A

6.2.10: Tailings Dam Management

Year	Yearly generation of Tailing (m^3) **(A)**	Total capacity of Tailing Pond (m^3)	Measures Proposed for Periodic Desilting	Yearly Utilization of Tailing (m^3) **(B)**	Disposal of Tailing-to-Tailing Pond (m^3) **(A-B)**	Tailing Dam Design	Structural Stability Studies
Year 1		No Tailings is proposed to be produced during the year			0	N/A	N/A
Year 2		No Tailings is proposed to be produced during the year			0	N/A	N/A
Year 3		No Tailings is proposed to be produced during the year			0	N/A	N/A
Year 4		No Tailings is proposed to be produced during the year			0	N/A	N/A
Year 5		No Tailings is proposed to be produced during the year			0	N/A	N/A

ACID MINE DRAINAGE

YEAR 1

Acid Mine Drainage: Not Applicable

Anticipated Impact:

(Impact on Surface Water Bodies / Groundwater Table Regime / Streams / Lake / Springs due to Mining, to be Assessed from Hydro-geological StudyGive details about impact on vegetation)

Not Applicable

Mitigation Measure

(Possibilities of Rain Water Harvesting & Artificial Recharge with in the Mining Lease)

Not Applicable

YEAR 2

Acid Mine Drainage: Not Applicable

Anticipated Impact:

(Impact on Surface Water Bodies / Groundwater Table Regime / Streams / Lake / Springs due to Mining, to be Assessed from Hydro-geological StudyGive details about impact on vegetation)

Not Applicable

Mitigation Measure

(Possibilities of Rain Water Harvesting & Artificial Recharge with in the Mining Lease)

Not Applicable

YEAR 3

Acid Mine Drainage: Not Applicable

Anticipated Impact:

(Impact on Surface Water Bodies / Groundwater Table Regime / Streams / Lake / Springs due to Mining, to be Assessed from Hydro-geological StudyGive details about impact on vegetation)

Not Applicable

Mitigation Measure

(Possibilities of Rain Water Harvesting & Artificial Recharge with in the Mining Lease)

Not Applicable

YEAR 4

Acid Mine Drainage: Not Applicable

Anticipated Impact:

(Impact on Surface Water Bodies / Groundwater Table Regime / Streams / Lake / Springs due to Mining, to be Assessed from Hydro-geological StudyGive details about impact on vegetation)

Not Applicable

Mitigation Measure

(Possibilities of Rain Water Harvesting & Artificial Recharge with in the Mining Lease)

Not Applicable

YEAR 5

Acid Mine Drainage: Not Applicable

Anticipated Impact:

(Impact on Surface Water Bodies / Groundwater Table Regime / Streams / Lake / Springs due to Mining, to be Assessed from Hydro-geological StudyGive details about impact on vegetation)

Not Applicable

Mitigation Measure

(Possibilities of Rain Water Harvesting & Artificial Recharge with in the Mining Lease)

Not Applicable

6.2.11 Land use and Use of Lease area at the Expiry of Lease Period (Conceptual Stage)

Total Area Degraded				Non-Degraded area	Total mined out area Reclaimed and Rehabilitated			Other Areas Reclaimed and Rehabilitated				
Mined Out area in the lease	Area under Dumps (in hect)	Area under the Tailing Dam	Area under utility services (in hect)	Area undisturbed /virgin	Mined out Area Reclaimed but not rehabilitated (in hect)	Mined out Area fully Rehabilitated from Reclaimed area (in	Area under Water Reservoir considered Rehabilitated (in hect)	Stabilized 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)	Area under utility services not rehabilitated (hect)
164.63	74.07	0	81.27	326.626	1.84	142.75	20.04	74.07	326.626	54.371	0	26.899

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CHAPTER – 7

FINANCIAL ASSURANCE/ PERFORMANCE SURETY

Chapter 7: FINANCIAL ASSURANCE/ PERFORMANCE SURETY (AREA PUT TO USE)

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YEAR 1-5 (Separate form for each year as below)

Consolidated View of Financial Assurance

Sl. No.	Particular	Area put to use at Start of Year (ha) (A)*	Additional Requirement (ha) (B)*	Total (ha) (C = A + B)
1	Area under Mining	0	19.889	19.889
2	Topsoil stacking	0	0	0
3	Overburden/Waste Dumping	0	15.599	15.599
4	Mineral Storage	0	1	1
5	Infrastructure (Workshop, Administrative Building etc.)	5.318	45.892	51.21
6	Roads	9.123	9.988	19.111
7	Railways	0	0	0
8	Tailing Pond	0	0	0
9	Effluent Treatment Plant	0	0.1	0.1
10	Mineral Separation Plant	0	0.16	0.16
11	Township Area	0	0	0
12	Explosive Magazine Area	0	15.37	15.37
13	Others to Specify (Green belt-Safety zone Area)	0	8.488	8.488
Total		**14.441**	**116.486**	**130.927**

○ Financial Assurance	● Performance surety

FINANCIAL ASSURANCE

Category A Mining Lease

Total Area Proposed to be put to use in hect (Year 1 to 5)	Amount of Bank Guarantee (Lac INR)	Valid till (dd/mm/yyyy)	Upload copy of Bank Guarantee
	0		Not Applicable

Category B Mining Lease

Total Area Proposed to be put to use in hect (Year 1 to 5)	Amount of Bank Guarantee (Lac INR)	Valid till (dd/mm/yyyy)	Upload copy of Bank Guarantee
	0		Not Applicable

PERFORMANCE SECURITY

Lease Category (A/B)	Total Resources in tonnes for calculation of Performance Surety*	Existing Performance surety amount in Rs	Valid till (dd/mm/yyyy)	Upload copy of existing Performance Security
				Will submit after Lease Deed Execution

क्षेत्रीय खान नियंत्रक,
Regional Controller of Mines
भारतीय खान ब्यूरो, रायपुर
Indian Bureau of Mines, Raipur

CHAPTER – 8

REVIEW OF PREVIOUS PROPOSALS

Chapter 8: REVIEW OF PREVIOUS PROPOSALS

(Not applicable for fresh grant)-Not Applicable

8.1: GENERAL-Not Applicable

8.1.1: Lease Area Utilisation

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Sl. No.	Type of land use (in ha)	Area at the beginning of the proposal period	Area proposed under activity	Actual Area utilized in the proposal period	Deviation	Reasons for deviation
1	Mining					
2	Mineral storage					
3	Mineral Beneficiation plant					
4	Township					
5	Tailing Pond					
6	Railways					
7	Roads					
8	Infrastructure (Workshop, administrative building etc.)					
9	OB/waste dump					
10	Top soil preservation					
11	Others					
12	Total area put to use					
13	Excavated area reclaimed					
14	Waste dump area reclaimed					
15	Undisturbed Area					
	Total					

8.1.2: SDF and CSR Expenditures

Activity	Proposals		Achievement	Deviation	Reasons for deviation
Total expenditure incurred for implementation of SDF at mine level including - Environment Protection - CSR & other welfare activities in peripheral area *(Explanation: Expenditure is not over and above the statutory levies imposed by the Government; However, THIS EXCLUDES CONTRIBUTION TO DMF & NMET and is over and above the statutory levies imposed by the Government.)*	10% of Royalty (a)	Total Expenditure for SDF implementation (b)			
CSR (Corporate Social Responsibility) spending at the mine level in Proposal Period (as per Companies Act, 2013 or otherwise)					

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8.2: Technical Details-Not Applicable

8.2.1: Exploration

Particulars	Proposals	Achievement	Deviation	Reasons for deviation
Number of Boreholes/ Pits/ Trenches				
Boreholes Meterage (If Boreholes selected in first row) (m)				
Grid				
G Axis upgradation during Proposal Period as per guidelines of MEMC Rule 2015)				
Area converted under G1 from G2/G3				

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8.2.2: Mine Development (Opencast/ Underground/ Both/ Dump Mining)

Particulars	Proposed	Actual	Deviation	Reasons for deviation
8.2.2.1: Generation of Ore/Waste While Development				
Ore				
Waste				
Generated Waste while ROM recovery				
Dumping Site (For Surface)				
Removal of waste/ over burden in cubic meters				
Generated Waste while ROM recovery				
Dumping site of waste/ overburden				
8.2.2.2: Excavation				
Lateral extent				
Vertical extent				

8.2.3: Mining operation: Dump Mining (Dump Id)

Particulars	Proposals	Achievement	Deviation	Reasons for deviation
Handling of Material				
Waste Generated post recovery				
Dumping site for waste				

8.2.4: Zero Waste Mining

Particulars	Proposals	Achievement	Deviation	Reasons for deviation
Alternative use / Disposal of Waste Generated (excluding top soil)				

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8.2.5: Backfilling

Particulars	Proposals	Achievement	Deviation	Reasons for deviation
Site (Co-ordinates)				
Area				
Depth				
Volume Backfilled (CuM)				
Backfilled Area available for Reclamation and Rehabilitation				
Backfilled Area Reclaimed and Rehabilitated				
Balance Backfilled Area				

8.2.6: Production of Mineral(s):

Particulars	Proposals	Achievement	Deviation	Reasons for deviation
8.2.6.1: ROM				
Opencast				
8.2.6.2: Cleaned Ore				
Opencast				
Dump Mining				
Recovery from Mineral Rejects or Tailings				
Total				

8.2.7: Handling of Mineral Rejects/ Sub-Grade

Particulars	Proposals	Achievement	Deviation	Reasons for deviation
Generation of mineral rejects				
Opencast				
Dump mining				
Other recovery				

Stacking of mineral rejects/ sub-grade mineral (Select Dump Id)			
Blending of mineral reject / sub-grade			

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8.2.8: Environment Compliances

Particulars	Proposals	Achievement	Deviation	Reasons for deviation
8.2.8.1: Top soil				
Generation				
Utilization				
Stacking (Dump Id)				
Reclamation				
Rehabilitation				
8.2.8.2: Afforestation (Dumps/Benches/Backfilled Area etc.)				
Year 1				
Year 2				
Year 3				
Year 4				
Year 5				
8.2.8.3: Afforestation (Green Belt)				
Year 1				
Year 2				
Year 3				
Year 4				
Year 5				
Construction of check dams				
Construction of garland drains				
Construction of retaining walls				
8.2.8.4: Tailings				
Generation				
Utilization (Autofill from production)				
Disposal				

8.3: Socio-Economic Review-Not Applicable

8.3.1: Rehabilitation & Resettlement for Project Affected People

Particulars	Proposals	Actual	Deviation	Reasons for deviation
No. of Project Affected People (PAP)				अनुमोदित / Approved
% of PAP for whom alternate arrangements made for sustained livelihood				
% of project affected families given employment				
% of project affected families who have been skilled by the lessee and absorbed (% of total employment given to affected families)				

8.3.2: Grievance Redressal

Grievances Received	Year 1	Year 2	Year 3	Year 4	Year 5
Grievances Redressed	Year 1	Year 2	Year 3	Year 4	Year 5

8.3.3: Welfare and socio-economic development programs for local communities

8.3.3.1: Support for Drinking Water & Agriculture					
No. of Water Storage Tanks constructed	Year 1	Year 2	Year 3	Year 4	Year 5
Drinking Water Facilities provided (Bore wells/ Pumps etc.)	Year 1	Year 2	Year 3	Year 4	Year 5
Irrigation Support provided (Canals/ Pumps etc.)	Year 1	Year 2	Year 3	Year 4	Year 5
No. of Water tanks De-silted	Year 1	Year 2	Year 3	Year 4	Year 5
Water Treatment facilities provided (A/NA)	Year 1	Year 2	Year 3	Year 4	Year 5
Amount of Water treated (in kL) (if selected A in above)	Year 1	Year 2	Year 3	Year 4	Year 5
8.3.3.2: Support to Health & Medical Services					
No. of persons identified from Occupational health diseases	Year 1	Year 2	Year 3	Year 4	Year 5

No. of Health Camps/ Medicine Camps Organized	Year 1	Year 2	Year 3	Year 4	Year 5
8.3.3.3: Support to Skill development & Education					
Vocational Training Provided/ Support Provided					
No. of employees undergone Vocational training	Year 1	Year 2	Year 3	Year 4	Year 5
No. of other persons undergone Vocational training	Year 1	Year 2	Year 3	Year 4	Year 5
Number of Literacy & Education Camps held/ Supported	Year 1	Year 2	Year 3	Year 4	Year 5
8.3.3.4: Support to Transportation Services & Infrastructure					
Expenditure on Transportation Services & Infrastructure	Year 1	Year 2	Year 3	Year 4	Year 5
Road development (m) in the peripheral area (not lease area)	Year 1	Year 2	Year 3	Year 4	Year 5
No. of Public transport support provided (Ambulance/Buses/ School Vans etc)	Year 1	Year 2	Year 3	Year 4	Year 5
8.3.3.5: Swatchata Programs: Creating/providing sanitation and healthy condition in and around the mine area					
Adoption of ODF within mining lease area					
No. of Toilets built in the Lease Area	Year 1	Year 2	Year 3	Year 4	Year 5
Adoption of ODF in nearby villages					
No. Of Toilets built in the villages	Year 1	Year 2	Year 3	Year 4	Year 5
Provision for greenage recreational facility (Within Lease Area/ Outside)					
Recreational Area Type (Picnic Spot/ tracks/Park Etc)	Year 1	Year 2	Year 3	Year 4	Year 5
Area covered (For within Lease Area only)	Year 1	Year 2	Year 3	Year 4	Year 5
Awareness program among Mine workers for Swatchata					
No. of Swatchchta Programmes held	Year 1	Year 2	Year 3	Year 4	Year 5

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CHAPTER – 9

IMPACT ASSESSMENT

Chapter 9: IMPACT ASSESSMENT

(For fresh grant)

9.1: BASELINE INFORMATION

Whether Area falls under Forest*	Yes
Whether Area falls under Wildlife Sanctuary*	No
Whether Area falls under Coastal Regulation Zone (CRZ)*	No
Whether Area falls under Defence Land*	No
Any Other Clearance (specify)*	No

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Any Significant Objections from any Agency Involved in Stakeholder's Consultation.

No

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9.2: ENVIRONMENT PARAMETERS

9.2.1: Environment Monitoring

Monitoring Activities

9.2.1.1: Ambient Air Quality	
Core Zone (Quarterly Monitoring Planned) *	Yes
Buffer Zone (Quarterly Monitoring Planned) *	Yes

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9.2.1.2: Water Quality	
Core Zone (Quarterly Monitoring Planned) *	Yes
Buffer Zone (Quarterly Monitoring Planned) *	Yes

9.2.1.3: Noise Level	
Core Zone (Quarterly Monitoring Planned) *	Yes
Buffer Zone (Quarterly Monitoring Planned) *	Yes

9.3: IMPACT ASSESSMENT

9.3.2: Land Environment

9.3.2.1: BASE / PRESENT STATUS	
Pre-Mining Use	**AREA** (Ha)
Barren / Waste land with small bushes & shrubs	
Land under Agriculture / Crops	
Land covered with Plants	
Land under Grass Cover	
Land under Public Infrastructure / Utilities (water bodies, roads, railways, electric lines, telephone lines etc.)	9.123
Land under Habitation	
Land under Monuments & places of Historical Importance	
Degraded by Pits & Excavation	
Degraded by Dumps & Material Staking	
Covered under Mine Infrastructure (plants, shades, buildings etc.)	5.318
Land under Forest	632.155
Historically, Culturally & Ecologically Important Places	
Any Other, please specify below	
Date of Observation	

9.3.2.2: ANTICIPATED IMPACT	
Post Mining Use	**AREA** (Ha)
Degradation by Excavation (Insitu)	94.11
Degradation by Excavation (Float Ore)	70.52
Degradation by Dumps & Material Staking	74.07
Covered under Plants, Shades & Buildings	65.9
Covered by Roads & Approaches	
Any Other, please specify below	
Covered under Environmental Protection, improvement and EMP Works	241.642
Covered under Explosive Magazine & Safety	15.37
Tree fern Area not to be diverted	76.496
Safety Zone along the ML Boundary	8.488

9.3.2.3: Mitigation Measures

9.3.2.3.1: Backfilling

No Backfilling is proposed for 1st Five Years Mining Plan Period. However, backfilling will be done from 14th years onwards in the North Block after exhaust of reserve in North Block. North pit will be exhausted first and then south block will be exhausted.

9.3.2.3.2: Area proposed to be covered by Plantation in Backfilled Area

No Backfilling is proposed for 1st Five Years Mining Plan Period. However, backfilling will be done from 14th years onwards. North pit will be exhausted first and then south block will be exhausted. Accordingly, Backfilling will be started at North Block after exhaust of reserve in North Pit. After completion of backfilling at North Block, Plantation will be carried on in North pit. However, Plantation in benches of South Block will be started once the top benches are developed to UPL position during excavation. As there is no backfilling is proposed during the 1st five years and hence no plantation is proposed in the same period.

9.3.2.3.3: Proposed Area under Agriculture

Not Applicable

9.3.2.3.4: Proposed Area to be converted to Grazing Land

Not Applicable

9.3.2.3.5: Ground Water Recharging

Not Applicable

9.3.2.3.6: Green Belt Development

The area proposed for green belt development includes the area under safety zone all along the mine lease boundary.Out of 8.488 ha. of Safety zone area .It is proposed for 3.058 Ha. all along the mine lease boundary will be planted with native species at a rate of 2500 plants per Hect in the 1st year(1.248 Ha.) and second year(1.81 Ha.) . Rest 5.43 Ha of Safety zone area will be planted @ 1000 plants per ha. of 1.81 Ha. each year in the successive 3rd year, 4th year and 5th year . Plantation in the Dump No.-1 is proposed in the 3rd year of 1.672 Ha.@ 1500 plants per Ha. Gap plantation in the remaining area is proposed @ 1000 plants per ha. of a total area of 48.38 Ha.in the 2nd year (12.08 Ha.), 3rd Year (12.08 Ha.), 4th Year (12.08 Ha.), and 5th Year (12.08 Ha.). It is proposed for plantation of 63945 saplings. in the 1st five years for a total area of 58.48 Ha. The details of proposed plantation is depicted below:

Table of Green belt development for first five years within Mining Lease

Sl. No.	Details	1st Year		2nd Year		3rd Year		4th Year		5th Year	
		Area (Ha)	No of Sap-lings	Area (Ha)	No of Sap-lings	Area (Ha)	No of Sap-lings	Area (Ha)	No of Sap-lings	Area (Ha)	No of Sap-lings
1	Safety Zone Plantation (including 5.43 Ha. as Gap Plantation inside the Safety Zone Area during 3rd yr, 4th yr and 5th yr)	1.248	3000	1.81	4500	1.81	2000	1.81	2000	1.81	2000
2	Dump Plantation					1.672	2500				
3	Gap Plantation			12.08	11500	12.08	11500	12.08	11500	12.08	11500
	Total	**1.248**	**3000**	**13.89**	**16000**	**15.562**	**16000**	**13.89**	**13500**	**13.89**	**13500**

9.3.2.3.7: Agriculture

The Area falls in reserve forest area. No human settlements. There is no agriculture.

9.3.3: AIR ENVIRONMENT

9.3.3.1: Climate & Meteorology (Please provide average of 10 years)

Temperature (°C) *		Relative Humidity (%) *	Average Rainfall (mm) *
Maximum	40	20 to 98.1	2590
Minimum	8		

9.3.3.2: Air Quality Details for Base line Information / Present Status

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Sr. No.	Station Name	Season	PM10 (µg/m3)	PM10 Excess (µg/m3)2	PM2.5 (µg/m3)	PM2.5 Excess (µg/m3)2	SO_2 Value (µg/m3)	SO_2 Excess (µg/m3)	NO_x Value (µg/m3)	NO_x Excess (µg/m3)	Date of Obser-vation	Action
1	Mining Area	Mon-soon	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	Mining Area	Winter	45.8	64.4	21.3	26.6	9.4	13.1	10.7	15.8	1.2.2015	

9.3.3.3: Impact Assessment & Mitigation Measures

9.3.3.3.1: Anticipated Impact

(Give details on Prediction of fugitive dust emissions due to mining activities, crushing & cleaning plants, loading & unloading, transportation by rail, road or conveyor)

The potential sources of air pollution arising from the proposed mining operations at Bailadila Deposit 4 mine are drilling, blasting, crushing, overburden waste rock dumps, haul roads, exhaust fumes of internal combustion engines fitted on trucks dumpers, dozers, motor graders (HEMM) etc., combusting of domestic fuel oil and transportation of ore in the vicinity. The other anticipated impacts are likely on surface water quality, change of land use pattern, Increase of noise levels during construction and operations phases.

9.3.3.3.2: Mitigation Measure

(Give details on measures to reduce the emissions of pollutants during mining, loading, unloading, transportation, drilling, blasting, crushing etc. to maintain the air quality)

Air Quality: The dust suppression measures will be practiced by suppressing the dust with movable water tankers of 28 kl capacity in the mine haul roads, loading points, unloading points, transportation roads and crushing areas.During drilling operation sharp bits will be used and wet drilling system will be practised . Mist water spray systems will be introduced at primary, secondary crushers. DSS will be introduced at all transfer points. There is no proposal for Fixed Water sprinkling system all along the haul roads during the 1st five years of the Mining Plan period as more development works will be done during this period. During the 1st five year of production, the top benches will be knock off from top. Hence, Fixed water sprinkling system all along the haul road will be adopted after 1st five years of the Mining Plan period.

9.3.4: WATER ENVIRONMENT

9.3.4.1: RAIN WATER

9.3.4.1.1: Base / Present Status

(Details of Rivers, Springs, Lakes, Reservoirs & Drains up to First Order in Study Area)

The area receives heavy rain fall during monsoon. Rainfall on the hill top is about 3500 mm while at the foot hills is about 2500 mm. Humidity is very high during monsoons. Weather is stormy during rainy season. The proposed mining operations are not expected to have any adverse effect on the rainfall pattern of the area. There are no nallahs in Deposit- 4 mining lease area. However, there are small streams originate from the north eastern slope of this hill and formed as Galli Nalla and Sankini Nalla. A number of natural rainwater drainage courses cross the ridges and meet one of the above streams. The eastern slopes drain through streams, which flow towards north east to Sankini river. Drainage in between the eastern and western ridges is through two streams flowing in opposite direction, Galli Nalla towards south and Sankini Nalla towards north. Sankini Nalla cuts across the eastern ridge near Jhirka village & flows down east and north east and becomes the Sankini river. This joins with Dankani river near Dantewada and becomes Dantewada river which ultimately flows through west and joins Indravati river and the Indravati river is a tributary of Godavari. Galli Nalla joining Talperu river and finally merges into river Godavari. There are other perennial streams flowing from the Bailadila hills and the entire region is a part of Godavari Basin. The western slopes drain through Mari Nadi, Berudi Nadi and other streams to river Indravati, which joins Godavari River near Bhopalpatnam in the downstream.

9.3.4.1.2: Anticipated Impact

(Impact on Surface Water Bodies / Groundwater Table Regime / Streams / Lake / Springs due to Mining, to be Assessed from Hydro-geological StudyGive details about impact on vegetation)

The heavy rainwater causes soil erosion in the mining lease area. During the monsoon season, the surface runoff carries silt and soil along with it and may cause more turbidity of the nearby water bodies. The heavy rainfall may also hamper the mining operations. The fog conditions prevail during the rainy season causes accidents due to poor visibility.

9.3.4.1.3: Mitigation Measure

(Possibilities of Rain Water Harvesting & Artificial Recharge with in the Mining Lease)

Number of check dams and check bunds will be constructed on water course. 5 no.s check dams and 9 no.s check bunds are proposed. Every year before onset of the monsoon de-silting of Check dam & Check bunds will be done to arrest the overflow of the silt. Regular water sampling is proposed to be carried out every year during winter period, pre-monsoon period, monsoon period and post monsoon period. Two waste dumps envisaged in the mine will be protected using toe wall, buttress wall at the bottom of the waste dumps. At suitable places geo-textile will be used for waste dump stabilization. Garland drains will be made to channelize the surface run off into the series of check dams / bunds. It is proposed to prepare channels beside haul roads for controlled passage of rain water wash offs.

9.3.4.2: WATER BODY

9.3.4.2.1: Base / Present Status

(Water Bodies Existing & Water Bodies likely to be created due to Mining Activities & their Water Holding Capacity)

There are no nallahs in Deposit- 4 mining lease area. However, there are small streams originate from the north eastern slope of this hill and formed as Galli Nalla and Sankini Nalla. A number of natural rainwater drainage courses cross the ridges and meet one of the above streams.

9.3.4.2.2: Anticipated Impact

(Ingress of Sea Water, Particularly for Mining Projects in Coastal Areas)

No anticipated impacts to the water bodies / small nallas. The nallas will be protected from all mining activities.

9.3.4.2.3: Mitigation Measure

(Steps to Minimize Impact on Water Table if Mining Intercepts Groundwater Regime)

Number of check dams and check bunds will be constructed on nallas. Number of check dams and check bunds are proposed for protection of the water course from siltation. Every year before onset of the monsoon de-silting of Check dam & Check bunds will be done to arrest the overflow of the silt. Regular water sampling is proposed to be carried out every year during winter period, pre-monsoon period, monsoon period and post monsoon period.

9.3.4.3: WATER BALANCE

9.3.4.3.1: Base / Present Status

(Water Balance (Withdrawal of Surface Water & Release of Mine Drainage Water) Water Requirement & Waste Water Generation from various Activities of Mine, Including Beneficiation)

Two perennial water sources are identified in the area viz. (a) Sankini nallah at EL. (+) 1025.00 at Hill-top and (b) Nerli nallah at EL. (+) 450.00 at Foot-Hill. Other near-by source of water in the area is the discharge of Shankini nalla (to which other streams are merged) near Shadhar junction between Dantewada and Bhansi. Shankini Nallah:- The downstream water from Shankini nallah can be one source of water for Dep. 4 operations both at Hill-Top and at Screening Plant partly. This water can be tapped by providing pick-up weir on downstream side of nallah and distributed by pumping to Mines, both Primary and Secondary Crushing plants, Service Centre, Fire suppression system for downhill conveyor and other infrastructures at Hill-Top of Dep. 4. Accordingly, water storage reservoirs of sufficient capacities with Filter house shall be constructed at Hill-Top and near Screening Plant area. Nerli Nallah: This nallah is 4 Kms approx. away from Bhansi. The water from this nallah can be tapped by providing pick-up weir

on downstream side of nallah and distributed by pumping to Screening Plant (partly), Loading Plant, Township, Administration building, Guest house and other infrastructures is proposed at Bhansi. The total water requirement for Deposit 4 at full rated capacity is 20000 m3/day (approx..) and 4500 m3/day in wet and dry operations respectively.

9.3.4.3.2: Anticipated Impact

(Impact of Water Drawl on Surface & Groundwater Resources Impact on Surface & Groundwater Quality due to Discharges from Mining, Tailings Pond, Workshop, Township, & Leach ate from Solid Waste Dumps etc)

The anticipated impact is generation of waste water from domestic usage and service centre due to washing of vehicle etc. If the waste water is not treated properly may impact adversely the environment. The waste water discharge into nearby water bodies without treatment may pollute the surface and ground water.

9.3.4.3.3: Mitigation Measure

(Construction of Check Dams, Sedimentation Ponds, Settling Tanks, Retaining Walls etc. with Design & Site Features for Control of run-off Mine Water Treatment for Meeting the Prescribed Standard Waste Water Treatment for Township Sewage, Workshop(s), Tailing Pond Overflow etc)

The waste water generate from domestic usage will be routed into sewage treatment plant (STP) proposed for construction exclusively for treatment of domestic waste water. The treated water from sewage treatment plant will be used for green belt generation and plantation purpose. The effluents generate from service centre and auto work shop will be treated in effluent treatment plant (ETP)proposed exclusively for trade effluents. The grated water shall be utilised for green belt near plant premises.

9.3.5: NOISE

9.3.5.1: Critical Locations Identified within Lease Area

The critical locations of the noise are identified based on source, loudness and period of exposure. The critical locations within mining lease area identified are:

1) Area due to Drilling and Blasting activity

2) Excavation of ore

3) Transportation of ore from mining phase to Primary crusher

4) primary, secondary and tertiary Crusher

5) screening

6) Loading Area

9.3.5.2: Give Detail About Prediction of Noise Level by using Mathematical Modelling at Different Locations Identified

The noise generation from the mine will be from various sources, which will be originating from various locations within the mine. For the purpose of noise dispersion, it is assumed that all the noise generating sources from the mine as one source. The dispersion of this noise is computed by using the model. Mathematical Model for Sound Wave Propagation During Operation: - Major noise sources as cumulative noise source has been identified. For convenience of the contours, 100 m grid scale is chosen for the immediate impact of the nearby villages from the mine. The centre of the central part is taken as centre (0,0) for calculating the co-ordinates of noise generating sources within the mining area. An attempt has been made to predict the noise levels at the boundary of the mining site. Coordinates X and Y are taken as input to the model is correlated with grid size and scale (1:100 m). Thus, the centre of the proposed mining area is defined as (0,0) coordinates. The input to the model has been taken as the cumulative noise generating sources. The model results are represented through contours in Figure-9.1

9.3.5.3: Measures to Minimize the Impact on Receiving Environment

Noise Mitigation Measures – Mining Operations and Associated Activities: - The noise level control measures at various stages of the mining are as following:

1. Proper and timely maintenance of mining machinery.

2. Deep hole blasting will be restricted to day time hours only.

3. Operator cabins of dumpers and shovels will be air conditioned.

4. Noise levels will be controlled by using optimum explosive charge per hole and milli second delay detonators and proper stemming to prevent blow out of holes

5. The crushers in the mine will be completely enclosed in a covered building to minimize sound propagation.

6.Use of rubber / panel coated screens in screening plant

7. Rubber lining at transfer points of conveyors.

8.Developing greenbelt on the sides of conveyor, crushing plant screening plant and loading plant.

9. Blasting shall be 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.

10. No trunk line of detonating fuse shall be used on surface (even if detonating fuse is used as trunk line with cord relays, then it will be covered with clay properly).

11. Primary blasts shall be designed such that boulder generation will be minimum

12. Secondary blasting shall be avoided.

13. Explosives shall be blasted into confined stage or optimum stemming column shall be maintained for holes during charging of hole.

14. Blasting shall be done only during afternoon hours when temperature inversions are not likely to be there and air density is less.

15. Blast of optimum size shall be taken to keep noise level of blasting within 130 dB(A).

16. No blasting shall be done when the sky is cloudy because cloud cover can cause reflection of pressure wave back to the ground at some distance from blast

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17. Non-electric down-the-hole detonators shall be used thus reducing noise level during blasting operation

18. Speed of moving dumpers and other vehicles running in the mine will be limited to moderate speed (25 km/hr) to prevent undue noise as per DGMS circulars enforcing safety standards.

9.3.5.4: Noise Details for Base / Present Status

Noise Standards *			
Area Code	Category of Area	Limits in dB(A)Leq	
		Day Time	Night Time
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential Area	55	45
D	Silence Area	50	40

Note:

1. Day time reckoned in between 6.00 am to 9.00p.m
2. Night time reckoned in between 9.00 p.m.to 6:00am
3. Silence zone is defined as areas up to 100 meter around such premises as Hospitals, Educational institutes and Courts. The Silence zones are to be declared by the competent Authority
4. Mixed categories of areas should be declared as "one of the four above mentioned categories" by the Competent Authority and the corresponding standards shall be applied.

Sl. No.	Station Name	Season	Type of Area	Noise At Day Time:	Excess Noise At Day	Noise At Night Time:	Excess Noise at Night	Date of Observation	Action
1	Mining Lease Area	winter	Forest Land	48.1	0	44.9	0	1.12.2015	
2	Proposed Screening Plant Area	winter	Forest Land	47.8	0	44.2	0	1.12.2015	

3	Bhansi Railway Station	winter	Railway Land	54.5	0	51.5	0	1.12.2015	
4	Kameli Village	winter	Private Land	46.1	0	43.1	0	1.12.2015	
5	Durli Village	winter	Private Land	45.7	0	42.7	0	1.12.2015	
6	Deposit-5 Mine	winter	Forest Land	61.5	0	57.6	0	1.12.2015	
7	Timinar Village	winter	Private Land	45.1	0	42.2	0	1.12.2015	
8	Hiroli Village	winter	Private Land	44.6	0	41.5	0	1.12.2015	

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9.3.5.5: Impact Assessment & Mitigation Measures

9.3.5.5.1: Anticipated Impact

With the mining operations, due to the deployment of machinery, drilling and blasting for mine development, excavation, transportation and crushing of iron ore and men, it is imperative that noise levels would increase.

(1) The drilling operations in the proposed mine will be carried out by using 150/200 mm Dia rotary drills. The typical Noise levels due to drilling at 1 m distance will be about 85–90 dB (A).

(2) The noise levels during blasting operations will be in the range of 110-130 dB (A) at 300 m distance from the blast site. Blasting will be carried out maximum three times per week between 12 pm to 3 pm.

(3) Typical noise levels generated during excavation, loading and transportation activities of the mining activities anticipated in the rage of 75 dB to 90 dB. The equivalent noise level generated due to crushing activities will be about 86 dB(A)which is below 8 hr exposure limit of 90 dB (A). The equivalent noise level generated in screening plant will be about 91 dB (A), which is above 8 hr exposure limit of 90 dB (A). The equivalent noise level generated due to loading plant activity will be about 75 dB(A).

9.3.5.5.2: Mitigation Measure

Noise Mitigation Measures – Mining Operations and Associated Activities: - The noise level control measures at various stages of the mining are as following:

1. Proper and timely maintenance of mining machinery.

2. Deep hole blasting will be restricted to day time hours only.

3. Operator cabins of dumpers and shovels will be air conditioned.

4. Noise levels will be controlled by using optimum explosive charge per hole and milli second delay detonators and proper stemming to prevent blow out of holes

5. The crushers in the mine will be completely enclosed in a covered building to minimize sound propagation.

6.Use of rubber / panel coated screens in screening plant 7. Rubber lining at transfer points of conveyors.

8.Developing greenbelt on the sides of conveyor, crushing plant screening plant and loading plant.

9. Blasting shall be 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.

10. No trunk line of detonating fuse shall be used on surface (even if detonating fuse is used as trunk line with cord relays, then it will be covered with clay properly).

11. Primary blasts shall be designed such that boulder generation will be minimum

12. Secondary blasting shall be avoided.

13. Explosives shall be blasted into confined stage or optimum stemming column shall be maintained for holes during charging of hole. 1

4. Blasting shall be done only during afternoon hours when temperature inversions are not likely to be there and air density is less. 1

5. Blast of optimum size shall be taken to keep noise level of blasting within 130 dB(A).

16. No blasting shall be done when the sky is cloudy because cloud cover can cause reflection of pressure wave back to the ground at some distance from blast

17. Non-electric down-the-hole detonators shall be used thus reducing noise level during blasting operation

18. Speed of moving dumpers and other vehicles running in the mine will be limited to moderate speed (25 km/hr) to prevent undue noise as per DGMS circulars enforcing safety standards.

9.3.6: VIBRATION

9.3.6.1: Vibration Details for Base / Present Status

Sl. No.	Station Name	Season	Distance from the Blasting Site (m)	Peak Particle Velocity (mm/s)	Air Over Pressure (DB)	Frequency (Hz)	Date of Observation
							Mining operations not commenced

9.3.6.2: Impact Assessment & Mitigation Measures

9.3.6.2.1: Anticipated Impact

(Give details on impact of vibrations including damage to materials/structures due to blasting)

When an explosive charge is fired in a hole, stress waves propagate radically in all directions and cause the rock particles to oscillate. This oscillation is felt as ground vibration. The mining operations using deep hole drilling and blasting using ordinary detonators are bound to produce ground vibrations. Depending on levels of stresses produced from wave motion, ground vibration can cause damage to building structure and to nearby residence by causing dynamic stresses that exceed the strength of building material so the level of ground vibration include by blasting need to be controlled.

9.3.6.2.2: Mitigation Measure

(Give details on measures for noise abatement including point source & line source)

The ground vibrations shall be controlled by using modern shock tubes with delay non-electric (nonel) detonators. The mitigation measures should be practiced which includes

(i) Usage of non-electric (nonel) detonators.

(ii) Proper blast design.

(iii) Avoiding excess confinement of charges.

(iv) Proper stemming of holes shall always be carried out.

(v) Free face will be kept sufficiently long and care to be taken to ensure that effective burden is not excessive.

(vi) Firing of maximum number of blast holes towards free face shall be carried out.

(vii) Blasting shall be avoided during foggy whether and when wind velocity is more than 25 km/hour.

(viii) Blasting operations shall be carried out only during day time as per mine safety guidelines.

(ix) The burden distance should not exceed 50% of bench height i.e., 6m.

(ix) The spacing to burden distance of 1:5 shall be used owing to the fractured geological formation.

(x) Staggered pattern of blasting shall be adopted(xii)Shorter stemming lengths of less than 2/3rd of burden distance shall be avoided to reduce overloading of holes and also to control fly rock.

(xiii) Maximum number of rows shall be restricted to two since increase in number of rows results in more confinement of charges in the last rows.

(xiv) Number of delays used per blast shall be more so as to reduce charge weight per delay and creation of shock waves. In addition to this, wherever confinement is more, like the corners of the block being blasted, belly holes, etc extra delay shall be provided. Each line of blast holes shall also be divided to blast at two or more different timings by using delays.

(xv) A delay of 8-10 milliseconds shall be adopted, as the strata are medium hard with high frequency of jointing/fracturing.

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(xvi) Blasting operations shall be carried out only during day time as per mine safety guidelines. Good storage qualities and resistance to atmospheric parameters.

9.3.7: SOCIO-ECONOMIC ENVIRONMENT

9.3.7.1: Demographic Profile

Sl. No.	Type of Area	Name of Village	Total Population	Male to Female Ratio	Literacy Rate (%)	Employment Rate (%)
1	village	Bade Bacheli	21435	11071:10354	78	42.43
2	village	Nerli	871	403:468	29.79	45.57
3	village	Padhapur	406	189:217	21.68	72.28
4	village	Dhurli	2068	970:1098	73.2	62.98
5	village	Bhansi	1355	722:643	46.66	51.14
6	village	Hiroli	175	88:88	7.14	76.42
7	village	Edainaar	65	12:29	0	60.34
8	village	Andri	304	157:147	0	39.04

9.3.7.1.1: Anticipated Impact

(Give details about impact on the cropping pattern & crop productivity in the core zone)

Core zone of Deposit-4 is a reserved forest area falls under Bacheli Range under Dantewada Forest Division. No cultivation is practiced thus no impact on crops in the Core zone. The core zone is mostly represented by medium height trees and shrubs. Some of the plant species includes Anogeissus latifolia, Adina cordifolia, Ailanthus excelsa, Buttneria herbacea etc.

9.3.7.1.2: Mitigation Measure

(Give details about compensation for loss of land & crops)

Not Applicable

9.3.7.2: Traditional Skills & Source of Livelihood

9.3.7.2.1: Base / Present Status

(Give details about present status on traditional skills & source of livelihood)

In the study area, as per 2011 census, 12.19% of the population belongs to Scheduled Castes (SC) and 40.76% to Scheduled Tribes (ST). Overall, the data of social stratification reveals that the SC and ST % to population is more than 52%. The SC and ST community are marginalized and they are at considered at low level of social strata and calls for a special attention in Social Impact Management Plan for improving their socio-economic status apart from preservation and protection of their art, culture and traditional rights of livelihood. Total work participation in the project study areas is 40.60% and the non-workers constitute 59.40% of the total population respectively. The distribution of workers by occupation indicates that the non-workers are the predominant population. The main workers to the total workers are 82.48% and the marginal workers constitute to 17.52% to the total workers.

9.3.7.2.2: Anticipated Impact

(Give details about positive & negative impacts on present status of livelihood in the area)

The impact of proposed mine on the civic amenities will be substantial after iron ore extraction from mine lease areas. The basic requirement of the community needs will be strengthened by extending health care, educational facilities developed in the community, providing drinking water to the villages, building/strengthening of existing roads in the area. NMDC will initiate the above amenities either by providing or by improving the facilities in the area, which will help in uplifting the living standards of local communities. The construction of new roads in the project area will enhance the transportation facilities. With improved transportation facilities there is always a scope for development. The communication facilities will improve after the proposed mining operations. The medical facilities would also be available to local people in the surrounding in case of emergencies.

9.3.7.2.3: Mitigation Measure

(Give details about training to locals for employment in the project training for making them self-employable or elsewhere)

Skill development to the unskilled person is being done through Kaushal Vikas Yojana. Need based employment will be generated for the educated children of the region as per rules of the company. Skill development trainings will be conducted to the local villages in the field of bamboo arts, bell metal, tailoring etc.

9.3.7.3: Economic Profile of the Population in Core & Buffer Zone

9.3.7.3.1: Base / Present Status

(Give details about economic profile of the population in core & buffer zone)

The predominant work by villagers under Dantewada District are cultivators and agricultural labourers. As per census 2011, the total agricultural labourers are 1893 no.s house hold industry workers are 134, other workers are 2287 nos.

9.3.7.3.2: Anticipated Impact

(Give details about impact on community resources such as grazing land)

The proposed mining activity is falls in Reserved Forest Area under Bacheli range of Dantewada forest division. The elevation of mining area is about 1200 m above Mean Sea Level (MSL) entire mine lease area is Hilly, rough terrain and undulating topography. No human settlements are available. Further, due to remoteness and approachability of the area, grazing of the area is not possible.

9.3.7.3.3: Mitigation Measure

(Give details about employment opportunities & access to other amenities such as education, health care facilities to be extended to locals, addressing local unemployment, tourism or recreation opportunities, efforts for sustainable development of the local community)

The infrastructure and amenities available in the study area denotes the economic wellbeing of the region. NMDC has taken up Corporate Social Responsibility (CSR) activities even much before the concept was introduced. The beneficiaries are mostly the tribal/ backward section of the society in the proximity of the mines, which are remote locations. The focus areas are education, health, Medicare, drinking water, infrastructure development and self- employment. These services are provided in consultation with the local people and local administration. The CSR activities are not limited to its operational areas alone, but also extended to the periphery of 10 to 12 km. Under the CSR and peripheral development programme all Gram Panchayat villages will get benefit and facilities from the project coming in the periphery of 10 to 12 km. All types of facilities will be provided to the nearby villages by CSR activities. There is always a selection process for employment in the project and a number of factors are considered to select the candidate. Today's environment is a competitive environment. One has to be very alert and aware of the incidents going on in the vicinity of the area to get the employment. NMDC Limited is a public sector undertaking of Government of India. The process of employment is made under the policy and rules of the Government, and in future also it will be continued. When the project comes into operation, the local residents will automatically get indirect employment.

9.3.7.4: Human Settlement in Core & Buffer Zone

9.3.7.4.1: Base / Present Status

(Give details about human settlement in core & buffer zone)

The mining lease area of Deposit-4 falls in Bacheli Forest Range under Dantewada Forest Division. No human settlements are involved in the core area thus no displacement of people are involved from the mining lease area. No private land is involved either in core or buffer zone for the mining activities. Therefore, no displacement of people from core and buffer zone is involved.

9.3.7.4.2: Anticipated Impact

(Give details about any displacement of human settlements during the life of the mine)

No displacement of human settlements involved during the life of the mine.

9.3.7.4.3: Mitigation Measure

(Give details about rehabilitation & resettlement of land ousters & displaced people)

The proposed project site falls in reserved forest land under Bacheli Forest range, Dantewada Forest Division. No human settlements are involved. Therefore, displacement of people, resettlement and rehabilitation of outsees are applicable.

9.3.7.5: Health Profile of Population in Core & Buffer Zone

9.3.7.5.1: Base / Present Status

(Give details about health profile of population in core & buffer zone)

As per 2011 censes, the type of health facilities available in the study includes, hospitals, dispensaries and clinics. Overall, one primary health centre, one Primary Health Sub Centre, one Maternity and Child Welfare Centre, two Dispensaries, one Veterinary Hospital overall study area. 0-10 km study area the Family welfare Centres, Community health centres, Mobile Health Clinics are nil. Health profile of the local population is poor. to moderate. The most predominate viral disease in the study area is Malaria. People will also suffer from snake bites, anaemia etc.

9.3.7.5.2: Anticipated Impact

(Give details about any adverse impact on the general health condition of the population in core & buffer zone)

As the mine lease boundary is located 3.0 km away from the nearest settlement, no adverse health conditions will be anticipated due to proposed project.

9.3.7.5.3: Mitigation Measure

(Give details about avenues like dispensaries, hospitals, maternity homes if any to be created)

Already the medical facilities and infrastructure created by NMDC for the existing projects. NMDC runs hospital at project sites, in collaboration with M/s Apollo offering free medical treatment not only to staff but to the local communities as well, addressing the needs of an average 90000 out-patients and 9000 inpatients from local tribals every year. NMDC operates 'Hospital on Wheels' (HoW) service in Bailadila Region benefitting about 40000 tribal villages in 45 villages by providing free medi-care facilities at their doorsteps. Under, Health Care for Society, NMDC Constructed Primary Health Centres – 12 Nos. The facilities include Supplementing Medicines, Hospital Equipment, Ambulance to the District Hospital, Jagdalpur and Dantewada. Organizing / Sponsoring for Mega Eye/Health Camps. & Extending Free Mobile Medical Services (RHS) to villagers. Conducting Health Surveys to diagnose paediatric cardiac cases to provide free treatment/surgery at Apollo Hospitals - Hyderabad. Free medical treatment for number of out-patients and inpatients. Detailed preventive measures being undertaken by NMDC Apollo Central Hospital, Bacheli are Weekly visit of doctors to Mines Rural

Villages with Paramedical staff and medicine. The villages covered under rural village Health Service under CSR where in the doctors and paramedical staff visit weekly along with medicines in the project "Ambulance/Hospital on Wheels" are Dugeli, Pina Bacheli-Patel Para, Madhapur, Gamawada, Nerli, Bade Kameli. Providing ambulance for patients to nearest hospital as and when required. The facilities will be further extended.

9.3.7.6: Historically, Culturally & Ecologically Important Places in Core & Buffer Zone

9.3.7.6.1: Base / Present Status

(Give details about historically, culturally & ecologically important places in core & buffer zone)

There is no existence of historical, cultural, monumental and archaeological importance within the study area. The Goddess Danteshwari temple is available which more than 45 km and does not fall within 10 km radius of the project site.

9.3.7.6.2: Anticipated Impact

(Give details about risk profiling)

Not applicable

9.3.7.6.3: Mitigation Measure

(Give details about public health benefits (e.g., clean water to an aboriginal community), measure for safeguard against damage etc.)

The impact of proposed mine on the civic amenities will be substantial after iron ore extraction from mine lease areas. The basic requirement of the community needs will be strengthened further by extending health care, educational facilities developed in the community, providing drinking water to the villages through 2 no. piped group water supply schemes of Nerli & Dhurli, the school buildings/strengthening of existing roads in the area will be further strengthen. NMDC will initiate the above amenities either by providing or by improving the facilities in the area, which will help in uplifting the living standards of local communities under CSR.

****

NMDC-CMDC LIMITED

(A Subsidiary of NMDC Ltd.)

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NCL

CIN : U13100CT2008GOI020711

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CONSENT LETTER FROM THE LESSEE

01. The Mining Plan in respect of Bailadila Iron Ore Deposit-4 Mine over an area of 646.596 Ha, in Bacheli Village, District - Dantewada of Chhattisgarh State submitted under Rule 16(1) of Minerals (Other than Atomic and Hydro Carbon Energy Minerals) Concession Rules, 2016 has been prepared by Qualified Persons (QP) **Dr. Sanjeev Kumar Sinha** and **Mr. R B Pradhan**.

This is to request the Regional Controller of Mines, Indian Bureau of Mines, Raipur, to make any further correspondence regarding any correction of Mining Plan with the said qualified persons at their address given below: -

Dr Sanjeev Kumar Sinha, DGM (Mining)
Resource Planning Department, NMDC Ltd.
Castle Hills, Masab Tank, Hyderabad – 500 028
Ph – 040- 23538713- 21, 23
Fax – 040-23538711
Email: - sinhask@nmdc.co.in

&

Mr. R B Pradhan, Sr. Manager (Mining)
Resource Planning Department, NMDC Ltd.
Castle Hills, Masab Tank, Hyderabad – 500 028
Ph – 040- 23538713- 21, 23
Fax – 040-23538711
Email:- rbpradhan@nmdc.co.in

We hereby undertake that all information as made in the said Mining Plan by the said qualified person be deemed to have been made with our knowledge and consent and shall be acceptable on us and binding in all respects.

02. It is certified that the **CCOM Circular No-2/2010** has been implemented~~/will be implemented and complied within 6 months of authorization of agency by the state government or within 6 months of lease execution (whichever is earlier).~~

03. It is certified that the Progressive Mine Closure plan complies with all statutory rules, Regulations, Orders Made by the Central or State Government, Statutory organization, Court etc. which have been taken into consideration and wherever any specific permission is required the lessee will approach the concerned authorities.

04. "The provisions of Mines Act, Rules and Regulations made there under have been observed in the Mining Plan over an area of 646.596 Ha in Dantewada district in Chhattisgarh state belonging to M/s NMDC- CMDC Limited, and where specific permissions are required, the applicant will approach the D.G.M.S. Further, standards prescribed by D.G.M.S. in respect of miners' health will be strictly implemented".

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05. The information furnished in the Mining Plan/ ~~Final Mine Closure Plan~~ is true and correct to the best of our knowledge and records.

06. It is to undertake that all the measures proposed in this Progressive/ ~~Final~~ Mine Closure Plan will be implemented as proposed.

Place: HYDERABAD

Date: 13/09/2021

Signature

Nominated Owner
(Bailadila Iron Ore Deposit-4)
M/s NMDC-CMDC Limited.

(SOMNATH NANDI)
Director (Technical) &
Production additional charge
NMDC Ltd.

CERTIFICATE FROM QP:

The provisions of the Mineral Conservation and Development Rules 2017 made under Section 18 of the Mines & Minerals (Development & Regulation) Act 1957 have been observed in the preparation of the Mining Plan^/~~Review of Mining Plan^/Modifications~~^ in the Mining Plan/~~Final Mine Closure Plan~~^for **(Bailadila Iron Ore Deposit-4) Mine** over an area of **(646.596 Ha.)**, of M/s **(NMDC-CMDC Limited)**, in **(Bacheli)**, P.O. ***(Bacheli),*** District ***(Dantewada)*** of ***(Chhattisgarh)*** State and whenever specific permissions are required, the applicant will approach the concerned authorities of **Indian Bureau of Mines.** The information furnished in the Mining Plan^/~~Review of Mining Plan^/Modifications~~^ in the Mining Plan/ ~~Final Mine Closure Plan~~^ is true and correct to the best of our knowledge.

Signature		
Name	**Dr. Sanjeev Kumar Sinha**	**Mr. R B Pradhan**
Qualification/ Years of Experience	B.E.(Mining), Ph. D. (Mining) / 22+ Years	B. E. (Mining)/ 14+ Years
Address	DGM (Mining) Resource Planning Department NMDC Ltd, Masab Tank Hyderabad – 500 028 Ph – 040- 23538713- 21, 23/ 8500667319 Fax – 040-23538711 Mobile – 85006 67319 Email: sinhask@nmdc.co.in	Senior Manager (Mining) Resource Planning Department NMDC Ltd, Masab Tank Hyderabad – 500 028 Ph – 040- 23538713- 21, 23/ 9406404938 Fax – 040-23538711 Mobile – 94064 04938 Email: rbpradhan@nmdc.co.in

Place: HYDERABAD

Date: 13/09/2021

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PART - B

ANNEXURES

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PART - C

PLANS & SECTIONS