PROPOSAL FOR PRILIMINARY (G-3) EXPLORATION FOR IRON AND MANGANESE ORE IN SILPUNJI BLOCK OF JAMDA-KOIRA VALLEY IRON ORE BELT, DISTRICT- WEST SINGBHUM, JHARKHAND

COMMODITY: IRON & MANGANESE

BY

MINERAL EXPLORATION AND CONSULTANCY LIMITED
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NAGPUR (MH)

PLACE: NAGPUR
DATE: 19.12.2023

Summary of the Block for G3 Level Exploration
GENERAL INFORMATION ABOUT THE BLOCK

<table>
<tr><td></td><td>Features</td><td>Details</td></tr>
<tr><td></td><td>Block ID</td><td>SILPUNJI BLOCK</td></tr>
<tr><td></td><td>Exploration Agency</td><td>Mineral Exploration And Consultancy Limited (MECL)</td></tr>
<tr><td></td><td>Commodity</td><td>Iron & Manganese</td></tr>
<tr><td></td><td>Mineral Belt</td><td>Jamda – Koira Iron ore belt</td></tr>
<tr><td></td><td>Completion period with entire Time schedule to complete the project</td><td>12 months</td></tr>
<tr><td></td><td>Objectives</td><td>1. To check the lateral and depth continuity of Iron and manganese ore by systematic drilling up to 100m depth.
2. To estimate preliminary mineral resource (333) and grade for Iron and manganese ore as per UNFC and MEMC- 2015.
3. To facilitate the State government to auction the block as a mining lease.</td></tr>
<tr><td></td><td>Whether the work will be carried out by the proposed agency or through outsourcing</td><td>Work will be carried out by the proposed agency (MECL).</td></tr>
<tr><td></td><td>Name/Number of Geoscientists</td><td>Two no. Geoscientists</td></tr>
<tr><td></td><td>Expected Field days</td><td>Geologist Party days:180 days at field
120 days at HQ</td></tr>
<tr><td>1.</td><td>Location</td><td></td></tr>
<tr><td></td><td>Block boundary corner points</td><td>
<table>
<tr><th rowspan="3">Corner Point</th><th colspan="4">WGS 84</th></tr>
<tr><th colspan="2">DMS</th><th colspan="2">UTM (Zone:45Q)</th></tr>
<tr><th>Longitude</th><th>Latitude</th><th>Easting</th><th>Northing</th></tr>
<tr><td>A</td><td>85^0 25' 50.88'' E</td><td>22^0 13' 36.06'' N</td><td>338270.87</td><td>2458756.79</td></tr>
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<tr><td>C</td><td>85^0 26' 31.70'' E</td><td>22^0 11' 33.13'' N</td><td>339400.00</td><td>2454963.70</td></tr>
<tr><td>D</td><td>85^0 25' 33.43'' E</td><td>22^0 11' 32.96'' N</td><td>337731.72</td><td>2454975.75</td></tr>
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<tr><td></td><td>Villages</td><td>KhasJamda, Silpunji, Kantoria, Lipunga</td></tr>
<tr><td></td><td>Tehsil/Taluk</td><td>Noamundi</td></tr>
</table>

	District	West Singhbhum
	State	Jharkhand
2.	**Area**	
	Block Area	4.92 sq.km
	Forest Area	Nuiya Protected Forest, Noamundi Range
	Government Land Area	Data not available
	Charagaha	Data not available
	Private Land Area	Most of the area is forest land
3.	**Accessibility**	
	Nearest Rail Head	Barajamda (10 Km)
	Road	The area is connected by the SH-4 & NH-20 with the state capital of Jharkhand and is at a distance of approximately 225 Km from Ranchi.
	Airport	Ranchi(225 Km)
4.	**Hydrography**	
	Local Surface Drainage Pattern (Channels)	Karo River is the main drainage which flows from southwest to northeast. The major nala is Baitaltanala and other small tributaries of Karo River.
5.	**Climate**	
	Mean Annual Rainfall	The annual average rainfall recorded is about 1420 mm
	Temperatures (December) (Minimum) Temperatures (June) (Maximum)	Minimum temperatures 8^{O}C. Maximum temperatures up to 42^{O}C.
6.	**Topography**	
	Toposheet Number	73F/8
	Morphology of the Area	The terrain of the block has rugged topography, comprising high undulating flat topped hillocks, v-shaped valleys, sinuous water bodies. The lowest valley floors at an altitude of 365 metres from the MSL and the highest ridge top has the maximum elevation of 495 meters above the MSL.
7.	**Availability of baseline geosciences data**	
	Geological Map (1:50K/25K)	Geological map on 1:50000 scale (Source: Bhukosh)

	Geochemical Map	NGCM Map (Source: Bhukosh)
	Geophysical Map (Aeromagnetic, ground geophysical, Regional as well as local scale GP maps)	Gravity and Magnetic Map (Source: Bhukosh)
8.	**Justification for taking up G3 level Exploration**	1. In view of MMDR Amendment Act and Mineral Auction Rule 2015, DMG Jharkhand requested MECL to take up the further exploration in this block. DMG, Jharkhand has requested MECL to take up exploration work under NMET fund. 2. The Phase- I of the G3 level exploration have delineated the iron ore bodies and analytical results are very encouraging. 3. The Phase- II of the G3 level exploration involves drilling of 10 nos. of systematic boreholes up to a depth of 100m, which enables to estimate resource and grade of iron ore bodies and eventually lead State Government to auction the block.

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1.1.0 INTRODUCTION

1.1.1 Iron, the metal of common man has its use in every sphere of life. Since the IRON AGE 800 BC and there on it forms the backbone of the industrial growth of a nation. The stage of growth in iron and steel industry of a nation is a measure of its economic status among the world communities. With a total of about 22.487 billion tonnes of Iron ore resource, India is among the few leading iron ore producing countries of the world. India has about one-fourth of the total resources of the world. Haematite and Magnetite are the most important iron ore minerals in India. Haematite ore forms about 83% of the iron ore reserves of the country and rest is the magnetitic& limonitic ores. Odisha alone produces 40% of the total iron ore production of the country (99.61m tonnes in 2016-17) followed by Karnataka (14%) and Jharkhand (11%) respectively as per Indian Minerals Year Book-2017, of IBM.

1.1.2 Iron and manganese is an important mineral used in steel making. Steel industry requires a huge quantity of raw materials. Manganese is an essential constituent of majority of steels. It combines the twin benefits of selectively low price with outstanding technical usage. As per NMI database based on UNFC system, the total reserves/resources of haematite as on 1.4.2015 has been estimated at 22,487 million tonnes of which 5,422 million tonnes (24%) are under 'Reserves' category and the balance 17,065 million tonnes (76%) are under 'Remaining Resources' category. The total resources of manganese ore in the country as per UNFC system as on 01.04.2010 (NMI) are placed at 430 million tonnes. Out of these, 142 million tonnes are categorized as reserves and balance belongs to resource category. Due to limited availability of high grade (+44% Mn) manganese ore resources in the country; BF grade (30-35% Mn) manganese ore have to be upgraded to produce high grade concentrate for ferromanganese making. The overall grade of the manganese ore resources in the country is in the range of 30-35% Mn.

1.1.3 The National Steel Policy 2017, has proposed a target of 300 million tonnes of steel production by 2030 and increase of per-capita steel consumption to 160 kg by 2030-31. This target has to be achieved amidst other compulsion of export demands, there is little choice but to develop and enhance the new Iron ore deposits by exploration.

1.1.4 The Singhbhum-Bonai-Keonjhar Iron Ore Belt of the Eastern India has been extensively studied and investigated by geologists since 1930. The Banded Iron Formation and associated volcano-sedimentary sequence of Iron Ore Group of Bonai-Keonjhar belt, North Odisha, received attention of geoscientists and mining agencies since then. Geological Survey of India has been carrying Iron ore exploration work in this belt since 1980’s. In addition, several Iron ore bodies also occur within the synclinal valley. The present proposed exploration of MECL is based on the mineralization identified during

phase-I work which involves Geological Mapping, Surface Geophysical Survey and collection of bed rock samples.

2.1.0 BACKGROUND INFORMATION

2.1.1 The Govt. of India enacted the MMDR Amendment Act, 2015 duly introducing the system of auction for allocation of Mineral Concessions. Bauxite, Iron Ore, Manganese and Limestone have been categorized in the Fourth Schedule which needs prospecting and exploration by the State Govt. before auctioning of the Blocks.

2.1.2 On enactment of MMDR Amendment Act-2015, Minerals (Evidence of Mineral Contents) Rule-2015 and Mineral Auction Rule-2015, Govt. of India directed State Governments to speed up the exploration work for different mineral commodities in their respective states.

2.1.3 As per the suggestion of Secretory of Mines, Govt. of India, State Government of Jharkhand notified MECL as exploration agency to carry out detailed geological exploration in the state of Jharkhand, considering the low progress of preparedness of blocks for auction. An MOU was signed between Department of Industry, Mines and Geology (DIMG), Government of Jharkhand and Mineral Exploration Corporation Limited (MECL) on 01.11.2017 for exploration of various mineral blocks by MECL in the state of Jharkhand.

2.1.4 Geological Survey of India had carried out G-4 level exploration in Silpunji-Kantoria area during F.S.P 2010-2012 and recommended detail mapping and drilling to establish the deposit and its lateral extent. DIMG, Government of Jharkhand requested MECL to take up further exploration work of iron and manganese in two blocks i.e. Bokna and Silpunji in West Singhbhum District, Jharkhand State and provided information required for preparation of exploration proposals pertaining to these blocks vide letter no Bhu-Ni-Anve-70/2017/824 dated 21.06.2018.

2.1.5 Accordingly MECL prepared the proposal for G-3 level exploration for iron and manganese in Silpunji Block, West Singhbhum District, Jharkhand and put up for approval for preliminary (G-3 level) exploration for iron and manganese ore in 16th& 18th meeting of Technical cum Cost Committee of NMET (TCC). The committee discussed the proposal and suggested some changes. As per the suggestion, MECL has modified the proposal and submitted the revised proposal for G3 level exploration of Iron & Manganese ore in Silpunji block in the 19th TCC of NMET.

2.1.6 The committee of the 19th TCC of NMET has clarified that the present proposal will be treated as Phase- I of the proposed G3 level exploration which includes geophysical survey, pitting/trenching and geological mapping in 1:4000 scale. An interim report has to be submitted after completion of Phase- I work based on which the subsequent drill holes will be planned.

2.1.7 Accordingly, the Phase- I of the G3 level exploration work comprising geophysical survey and geological mapping commenced in the month of September 2021. MECL has completed the Phase- I components and submitted the interim report in July 2021. The interim report has been reviewed in the 34th TCC and TCC recognized that the analytical results are encouraging. The committee noted the achievement and advised to submit detailed borehole plan suitable for G2 level exploration.

2.1.8 In view of the nature of the deposit, i.e. irregularly shaped lensoidal bodies, proposal was formulated as Phase-II of the G3 level exploration that comprises exploratory drilling which is in accordance with the MMDR and MEMC amended up to 2021 and had been presented before the 51st TCC of NMET. After detailed deliberations, the committee opined that the GM block has been handed over to Government of Jharkhand for auction, hence cannot be considered for G3 level exploration.

2.1.9 During the Auction Review meeting held on December 15, 2023, chaired by the Secretary of Mines, Government of India, the focus was directed towards the auction status of the Silpunji block. It was deliberated that the block cannot be successfully auctioned due to inadequate resource availability. To address this, the Secretary of Mines proposed an upgradation for the Silpunji block to G3 level with an emphasis on the drilling component. Subsequently, on 16.12.2023, MECL and DMG, Jharkhand convened a meeting where the State Government recommended MECL to formulate a G3 level exploration proposal encompassing the promising region within the Silpunji block. This proposal would entail 10 exploratory boreholes to elevate the block to G3 level, aligning with the state's goal of auctioning the block within a year.

2.1.10 Accordingly, MECL has formulated G3 level exploratory proposal with 10 drill holes in accordance with the MMDR and MEMC amended up to 2021.

3.1.0 LOCATION AND ACCESSIBILITY

3.1.1 Silpunji block falls in the Survey of India Topo-sheet no. 73F/8 and forms the part of the West Singhbhum District, Jharkhand. The nearest railway station is Bara Jamda of South-Eastern Railway which is 140 Km from Jamshedpur and 10 Km from the block. The area is connected by the SH-4 & NH-20 with the state capital of Jharkhand and is at a distance of approximately 225 Km from Ranchi. The famous Noamundi mine is situated 12 km east of Jamda. It is well connected by metalled road with Chaibasa, the district headquarter of West Singhbhum. The interior parts of the area are approachable by a network of Kachcha (unmetalled) road.The location plan of the block is shown in Plate- I.

CARDINAL POINT COORDINATE OF SILPUNJI BLOCK, DISTRICT: WEST SINGHBHUM, JHARKHAND (G-3 LEVEL)

Corner Point	WGS 84			
	DMS		UTM (Zone:45Q)	
	Longitude	Latitude	Easting	Northing
A	85^0 25' 50.88" E	22^0 13' 36.06" N	338270.87	2458756.79

B	85^0 26' 31.67" E	22^0 13' 36.07" N	339438.87	2458744.73
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4.1.0 PHYSIOGRAPHY, DRAINAGE AND CLIMATE

4.1.1 The terrain of the block has rugged topography, comprising high undulating flat topped hillocks, v-shaped valleys, sinuous water bodies. The lowest valley floors at an altitude of 365 metres from the MSL and the highest ridge top has the maximum elevation of 495 meters above the MSL.

4.1.2 Karo River is the main drainage which flows from southwest to northeast. The major nala is Baitaltanala and other small tributaries of Karo River. The streams and rivers in the area together form a dendritic to sub-dendritic drainage pattern. The present investigation area is lying in Nuiya Protected forest, Noamundi Range which covers approximately 80% area of the block.

4.1.3 The climate of the area is humid to sub-tropical. The area experiences extreme summer and winter with heavy rainfalls during the monsoon season confined to the months from June to August and September with average annual rainfall of 2000 mm. The winter season is reasonably cold with the minimum temperature going down to 3° to 4°C and average temperature of 16°C. During summer the temperature goes up to 38° - 40° C with average temperature of 30°-32°C. The Noamundi and its surrounding areas receive the maximum rainfall in Jharkhand and rightly called as “Cherapunji of Jharkhand” with average annual rainfall of 200cm.

5.1.0 PREVIOUS WORK

5.1.1 BIF, the host rocks of iron ore deposits of Jharkhand and Odisha were reported and their systematic study was undertaken during late thirties (Jones, 1934; Dunn, 1935). The sedimentological analysis of BIF was, however, initiated by Mukhopadhyay and Chanda (1972). They were either preceded or followed by a large number of workers such as Chakraborty&Taron (1968), Acharya et.al. (1964), Banerjee (1974), Majumdar&Chakraborty (1977 & 1979). The aspects of structure and tectonics were studied by Saha et.al and their findings are presented in the Saha et.al (1984), Saha& Ray (1984) and also in other publications by Sarkar&Saha (1977), Sarkar&Chakraborty (1982), Acharya (1984) and Iyengar and Murthy (1982).

5.1.2 Iyenger and AnandAlwar (1965), Iyengar and Banerjee (1964), Banerjee (1974), Iyenger and Murthy (1982) and Chakaraborty and Majumdar (1986) opined that BIF-bearing supracrustals belong to two stratigraphic units, the older one typified by the Gorumahisani-Badampahar Group and the younger one typified by the Bonai-Kendujhar sequence (Noamundi Group of Banerji, 1974).

5.1.3 Banerji, A. K. (1974) suggested that the Noamundi iron ore basin, Gorumahisani-Badampahar basins and Daiteri-Pala Lahara in the south have evolved in independent cycle of deformation, metamorphism and igneous activity and have been welded to the fabric of the Singhbhum granite platform. Rai et, al. (1980) emphasing on the sedimentological features of the Iron Ore Group have reported numerous short crested, discontinuous sub parallel linear markings which are similar to primary current lineation described by Allen (1968). Scour and fill structures similar to micro-channeling and grooving have been reported both from Tomka-Daiteri (Majumdar and Chakraborty, 1977) and from Jamda-Koira valley (Rai et al, 1980).

5.1.4 Recent works by the GSI (Mazumdar, S.K, 1996) alludes to the possibility of distinguishing two horizons in the Iron Ore Group (IOG) one, an iron ore bearing lower horizon prominently developed in the southern part between Singhbhum and Bonai and non-iron ore bearing horizon to its north and well developed west of the Bonai Granite. The eastern boundary of the iron ore basin from Noamundi southwards is faulted. Further NE, the IOG is overlain on the east by the Kolhan rock.

5.1.5 Further GSI along with DMG, Jharkhand had carried out G-4 level exploration in Silpunji-Kantoria area during F.S.P 2010-2012 and recommended detail mapping and drilling to establish the deposit and its lateral extent in Silpunji-Kantoria block, West Sighbhum district, Jharkhand.

5.1.6 In the year 2020, MECL had carried out detailed geological mapping and geophysical survey in Silpunji block through NMET funding. From the integrated geological-geophysical study carried out, it appears that iron ore and associated manganese mineralisation present in the form of irregularly shaped lensoidal bodies and has taken place in the southern and central portion of the study area. During Surface Geophysical Survey by Gravity and Magnetic measurements, the geological continuity, orientation, mode of occurrence & depth continuity of the ore body has been confirmed. Information regarding basement has been established. Basement is shallow at the western part of the study area with some shallower intrusions at north. Regional geological trend is confirmed as NE-SW. Depth of basement is 150m-200m. The analytical signal analysis of Bouguer anomaly clearly indicates that the iron ore mineralization has taken place mostly in the southern and central portion of the block in the form of irregularly shaped lensoidal bodies like pockets/lenses and not as continuous body. Moderate intensity of the RTP of Magnetic anomaly along the mineralized zone indicates the paramagnetic characteristics similar to haematitic iron ore body having depth continuity in range of 60m to 130m. However, the anomaly responding to manganese ore (Pyrolusite and Psilomelane) is similar to those of hematite. Therefore, in the study area if any manganese ore is there it will be associated with iron rich bodies.

6.1.0 GEOLOGY OF THE AREA

6.1.1 The Singhbhumcraton of Precambrian age which comprises the huge iron ore deposits of Jharkhand– Odisha region, eastern India, have preserved several geological cycles

ranging from early archean to neo-proterozoic age (Saha 1994). The three major components of Singhbhumcraton are: 1. Older Metamorphic Group (OMG) and Older Metamorphic Tonalite Group (OMTG) which occurs as supracrustals and enclaves within 2. Singhbhum Granite surrounded by 3. Greenstone belts comprising Iron Ore Group. The Precambrian iron ore of Singhbhum–North Odisha region of eastern India occurs as part of the horse-shoe shaped broad synclinorium known as Iron Ore Group (IOG) of rocks that host most important iron ore deposits of India. The Precambrian IOG largely contains BIF in addition to the other volcano-sedimentary rocks (~3.1–3.3 Ga, Sarkar et al 1969), forming a significant portion of the Singhbhum–North OdishaCraton of eastern Indian shield (Saha et al 1984). Structural analysis in the eastern anticline of the horse-shoe synclinorium suggests that the BIF hosting the high grade iron ore bodies are disposed in three linear NNE-SSW trending belts and the major iron ore deposits in the eastern anticline at the present level of erosion are preferentially localized within shallow basinal structures only (Ghosh and Mukhopadhyay 2007). These three basins are: 1. Jamda-Koira valley, 2. Gorumahishani-Badampahar basin and 3. Daitari-Tomka basin.

6.1.2 The area of investigation i.e. Silpunji block lies in the extreme NNE of the eastern limb of Jamda-Koira north plunging asymmetric 'horse-shoe shaped synclinorium'. The Banded Haematite Jasper with iron ore, overlain by Upper Shales with volcanics and underlain by a lower formation of bleached clayey shale/tuff/volcanic forms the Iron Ore Group of Sarkar & Saha (1977) or Koira Group of Murty & Acharya (1975). The above said unit is disposed in the form of a low northerly plunging synclinorium (Jones, 1934). The Lower Shale formation is mainly composed of a number of acidic and basic flows which have altered into bleached clayey shale. The Upper Shale is banded in nature with lenses of green chert, altered tuffs and dolomite beds (Murty & Ghosh 1971).

The litho-stratigraphic succession of the region as worked out by different geoscientists based on field studies is furnished below:

Lithology/ Geological Events	**Chronostratigraphic Units/Group**	**Age**
Quartz Dolerite	Newer Dolerite dyke	C. 2000 Ga
Phyllitic Shale Argilaceous Limestone Basal Sandstone-conglomerate	Kolhan Group	C. 2100-2200 Ga
---------- Unconformity ----------		
Jagannathpur Lava Malangtoli Lava Felsic Plutonism	Dhanjhori Group	C. 2800-2300 Ga
Hornblende bearing alkali feldspar granite	Mayurbhanj Granite	C. 3090 Ga
Pelitic & arenaceousmetasediments with mafic sills	Singhbhum Group	C. 3120-3090 Ga
---------- Unconformity ----------		
SBG-III: Granodiorite to granite	Singhbhum Granite (SBG-B)	C. 3100 Ga
Dunite-Peridotite-Pyroxenite	Gabbro, Anorthosite and Ultramafic suites	C. 3120 Ga

Mafic lava, tuff, acid volcanic, Tuffaceous shale Banded Hematite Jasper and Banded Hematite Quartzite with iron ores, ferruginous chert, local Dolemite and quartzite sandstone	Iron Ore Group	C. ~ 3300-3160 Ga
Granite to granodiorite	Bonai Granite	C. 3100 Ga
Tonalite to granite	Nilgiri Granite	C. 3300 Ga
SBG-II: Granodiorite SBG-I: Tonalite to Granodiorite	Singhbhum Granite (SBG-A)	C. 3380 Ga
Folding and metamorphism of OMG and OMTG		C. 3400-3500 Ga
Biotite (Hornblende) Tonalite Gneiss Trondhjemite / Granodiorite	Older Metamorphic Tonalite Gneiss (OMTG)	C. 3775 Ga
Pelitic schist, quartzite, para-amphibolite,ortho-amphibolite	Older Metamorphic Group (OMG)	C. 4000 Ga

6.1.3 The major litho-units of the study area is following the regional trend i.e. NE-SW. Hence, field traverses were taken perpendicular to regional strike, to encounter variation of litho-units and its inter-relationship in regard of structure. The area includes enriched BHJ bearing quartzite ridge in the southern-central part having SW-NE trend, along with small mounds of lateritic ore bodies in the south-east and south-western part. The country rock of the area is phyllitic shale which have been exposed in the central part and the in the valleys. In the northern part, doleritic dyke have been outcropped surrounded by intra-formational conglomerate and sandstone. The iron ore is mainly localized as enriched BHJ within quartzite.

6.1.5 **Phyllitic Shale:** The country rock of the investigated area is light pink to buff yellow colouredphyllitic shale, exposed in the low lands of the area. It is a fine grained rock having shine on the fissility planes (S1) which is parallal to the primary bedding plane (S0). The bedding parallal foliation planes have strike of SSW-NNE with low to moderate dip (20° - 40°) towards WNW. It is mostly composed of sericite/ illite showing parallel alignment under microscope. Feldspar is noted as fine to very fine grains altering to dirty clay minerals. Biotite flakes are seen developing in patches. Opaques are noted as very fine cubic, bladed and anhedral disseminated grains, often showing alignment along the foliation.

Banded Haematite Jasper/Quartzite (BHJ/BHQ): Typical Banded Haematite Jasper (BHJ) bands are present at the southern part of the mapped area, within quartzite bodies. The banding nature is generally defined by alternate appearance of lamination scale steel grey colouredhaematite and red coloured jasper. This banding in the mapped area is structurally disturbed due to multiple phases of deformations. Fracture filled secondary calcitic and silica veins are observed. Three sets of joint plane are there. At places, BHJ/BHQ is cherty in nature, whereas in some places, haematitic bands are thick, continuous resulting in enriched banded haematitic jasper which has been mined extensively. Under microscope, Quartz occurs as fine anhedral to euhedral grains showing tight 120˚ contacts in areas which refer to a crystallization process took place at a near static environment. Opaques (hematite) occur as coarse patches, medium to

coarse blades and as fine to very fine segregations. Jasper is noted as fine to coarse subrounded and bladed clasts and as thin bands in areas. Ferruginous matter is seen present as very fine amorphous matter and as reddish stains.

Quartzite: Quartzites are exposed in the west and north of Kantoria and have the longitudinal extent in the NNE-SSW direction. It has strike continuity for approximate 2.0-2.5 km and the width of 100-200 meters. The color varies from white to light yellow and is massive, hard and compact. When observed under hand lense the rock shows typical vitreous luster and fused grain boundary. Matrix is essentially made up of very fine sub-angular quartz grains. Fine to medium anhedral to euhedral, elongated and lenticular quartz grains are seen disseminate. Medium to moderately coarse grained clusters are noted in pockets.

Sandstone: It is white to yellow coloured, fine to medium grained fairly well to well sorted mature sandstone formed as terrigenous detrital material carried by water deposited in continental shelves or slopes. It is mostly exposed in the NW part of the mapped area, associated with intra-formational conglomerate. Under microscope, Quartz occurs as fine to medium subrounded grains showing optical strain in areas. Rock fragments are present as fine subrounded to subangular grains composed of very fine quartz/ cherty aggregates. Feldspar is seen present as fine to medium subhedral and subangular grains, mostly orthoclase in nature. Ferruginous matter occurs as very fine to fine reddish cement along the clast contacts. Sericite and clay minerals are present as very fine flaky grains and particles in accessories. At places, the sandstone is brown to buff coloured enriched in ferruginous cement. In this Ferruginous sandstone, the quartz grains are medium to coarse grained, sub angular anhedral, poor to moderately sorted, suspended in the ferruginous cement. At places, generally at the top of this ferruginous sandstone, encrustations of manganese associates, in form of botryoidalpsilomelane and fibrous pyrolusite can be seen, which have been mined too.

Intra-formational Conglomerate: It is a clast supported polymictic conglomerate exposed at the SW part associated with BHJ and in the North central part. Pebble to cobble size clasts of sub-angular to angular, poorly sorted haematite, jasper, BHJ/BHQ, quartzite found embedded within gritty ferruginous matrix. The texture depicts a low transportation to in-situ deposition took place over a short period of time. At places, the accumulation of haematite is so enriched that it is also referred as iron ore, hence, being mined extensively. Under microscope, Opaque clasts are prismatic, bladed, lenticular and anhedral patchy in shape. Ferruginous cement is mostly associated with chertclasts and also seen present as cement, at places. Clayey patches are noted in areas and also observed as very fine particles in accessories.

Dolerite Dyke: Mafic volcanics constitute an important part of Iron ore group. The doleritic dykes intruded the country rock phyllite, trending in NE-SW direction. The dark green coloured medium grained rock consists of altered pyroxene occurs as subhedral prismatic to anhedral patchy grains. Amphibole (Tremolite) and epidote occurs in

patches and imparts the green colour. At some places, a crude schistosity is observed which depicts a low grade metamorphic event.

Iron Ore: Various types of Iron ore have been recognized in the investigated area. These litho units, belongs to iron ore group, are termed as 'ore' based on visual estimation only. Banded Iron Formations (BIF), of Iron ore group, are at places enriched in iron to form these ore bodies. Based on the enrichment of haematite and impurities like silica in BIFs, different ore types can be recognized. One such type is Soft shaley iron ore, where, upon selective removal of silica due to weathering, the BIF became rich in iron and develops a shaley nature. At some instances, the haematitic bands in BHJ/BHQ become considerably thick due to prolonged and static favourable conditions, giving rise to Massive haematitic iron ore. It exhibits three sets of cleavage planes. The enrichment of haematite in BHJ/BHQ may be accompanied with silicification, which results in to a Siliceous iron ore. Lateritic iron ore is seen on the top and slopes of the hillocks. The color of the lithounit varies from yellowish to earthy brown. The fragments of haematite are randomly oriented and size varies from pebble to silt size. At places, it also shows massive character. There are some un-mapable rich in iron litho units seen as gravel to pebble size massive haematite embedded in soil that may be referred as Float iron ore. These are also mined extensively in the investigating area along with the other ore types.

7.1.0 OBJECTIVE OF THE PROPOSED EXPLORATION PROGRAMME

The present exploration programme has been formulated to fulfill the following objectives:

7.1.1 To prove the lateral and depth continuity of Iron and manganese ore identified during G4 work by proposing systematic drilling up to 100m depth

7.1.2 To estimate preliminary mineral resource (333) and grade for Iron and manganese ore as per UNFC and MEMC- 2015

7.1.3 To facilitate the state government of Jharkhand to auction the block as a mining lease.

8.1.0 PROPOSED SCHEME OF EXPLORATION

8.1.1 In accordance with the objectives set for G-3 level exploration in Silpunji Block, the exploration programme is proposed to carry out systematic drilling, core sampling, and other associated geological and laboratory work. The exploration shall be carried out as per Mineral (Evidence & Mineral Contents) Rule -2015, Mineral Auction Rule-2015 and MMDR Amendment Act-2015. The details of different activities to be carried out are presented in subsequent paragraphs.

8.1.2 **Topographic Survey:** The triangulation network would be laid down in the block area with the help of DGPS & Total Station and the same would be tied up with the GTS triangulation station present in the nearby area. Topographical survey will be carried out

in the block area in which G-3 stage of exploration is to be carried out. All the surface features will be picked up and marked on a map on1: 4000 scale. The entire area will be covered by doing contouring at 2m interval. The block boundary will be surveyed by DGPS & total station in WGS-84 Datum for demarcation of Block Boundary points and ancillary area to facilitate the State Governments for auctioning of the Block.

8.1.3 **Core Drilling:** The present exploration scheme is prepared by proposing 11 nos. of vertical boreholes based on the geophysical survey and geological mapping carried out in first phase of the G3 level exploration programme in Silpunji block. As the nature of the ore body here is discontinuous and lensoidal type, the vertical boreholes are planned to establish the depth persistence. The boreholes will be closed judicially by the field geologist, after complete intersection of the iron ore body. The proposed location & depth of the borehole is tentative and the final decision regarding taking up borehole, borehole location and closing of borehole will be ascertained by field geologist. Tentative location and depth of borehole have been provided. Proposed Borehole parameters are tentative and may vary subject to the geological and drilling conditions in the study area.

8.1.4 **Core Logging:** Geological core logging will be carried out systematically by recording carefully the minute details and physical/lithological characters of the rock formations including colour, core recovery, grain size, weathered zone, texture, banding, mineralogical composition, micro-structural/structural details, lithological variations along with visual estimate in respect of iron ore in boreholes.

8.1.5 **Core Sampling:** For preparation of samples, the borehole core will be splitted into two equal halves by using core splitter. One half will be powdered to (-) 100 mesh size and the other half will be kept for future studies. The powdered material will be mixed thoroughly and about 100 gram of samples will be taken for chemical analysis by successive coning and quartering as primary samples and rest of the material (-100 mesh size) will be kept as duplicate half for future reference. It will generate about 1000 Nos. primary samples and 50 Nos Internal Check samples (5% of Primary samples). In addition to this, 10% of primary samples i.e. 100 nos External Check samples will be prepared as External Check samples that will be sent to an NABL Lab for analysis. Composite samples will be prepared borehole wise based on the analytical results of primary sample at every 8m interval (8m bench height). Composite samples shall be prepared from the entire borehole in which iron-manganese ore will be intersected. This will generate about 100 nos. of composite samples. Each primary sample should be marked at every 1m length in case of continuance of similar mineralogical composition down the borehole. The sample length towards the floor marked by non-ore zone needs also to be adjusted as per variations of the litho-units. Even if the floor is distinctly differentiated by the presence of non-mineralized zone, at least two nos. samples after the iron ore zone need to be drawn to mark the floor of the iron ore zone decisively.

8.1.6 **Chemical Analysis:** All the primary samples and check samples will be analyzed for 8 radicals (Fe, Mn, SiO_2, Al_2O_3, TiO_2, P_2O_5, S & V_2O_5). About 15% of primary samples will be sent to NABL external laboratory as check samples for analysis of 8 radicals (Fe, Mn,

SiO_2, Al_2O_3 , TiO_2, P_2O_5, S & V_2O_5). Around 120 composite samples will be analyzed for 8 radicals (Fe, Mn, SiO_2, Al_2O_3 , TiO_2, P_2O_5, S & V_2O_5).

8.1.7 **Determination of specific gravity:** To calculate the resource, volume of the ore body need to be multiplied with a density factor. Hence, 10 nos. of samples will be drawn from the iron ore for determination of specific gravity.

9.1.0 QUANTUM OF WORK

9.1.1 The following quantum of work has been proposed for G3 level exploration for Iron-manganese ore in Silpunji block:

Sl. No.	ITEMS OF WORK	UNIT	Proposed Quantum for Silpunji Block
			G3
1	Topographic Survey (2m contour interval)	Sq. Km	4.92
2	Borehole fixation and Block boundary DGPS Survey	Nos.	18 (10 Bhs + 6 Boundary points + 2 base stations)
3	Drilling (Core)	m.	1000 (10 Bhs)
4	Primary Sample (Core) for 8 radicals (Fe, Mn, SiO_2, Al_2O_3 , TiO_2, P_2O_5, S & V_2O_5)	Nos.	1000
5	Check Sample for 8 radicals (Fe, Mn, SiO_2, Al_2O_3 , TiO_2, P_2O_5, S & V_2O_5)	Nos.	150
6	Composite Sample (Core) for 8 radicals (Fe, Mn, SiO_2, Al_2O_3 , TiO_2, P_2O_5, S & V_2O_5)	Nos.	100
7	Specific Gravity determination	Nos.	10
8	**Exploration Report [As per Mineral (Evidence of Mineral Contents) Rule-2015] /UNFC**	Nos.	1

10.1.0 TIME SCHEDULE AND COST ESTIMATES

10.1.1 The proposed exploration programme is planned in such a way that all the activities like, camp setting, drilling, core logging, sampling, associated geological work and laboratory work will be completed within 9 months' time. Report writing will take 4 months' time with 1 month overlapping with laboratory analysis. Thus, the total duration of the project for completion of the above exploration will be 12 months from the date of commencement of the project.

SCHEDULED TIME FOR G-3 LEVEL EXPLORATION (PHASE- II) OF IRON AND MANGANESE ORE IN JAMDA-KOIRA VALLEY IRONORE BELT IN SILPUNJI BLOCK, DISTRICT-WEST SINGBHUM, JHARKHAND													
S.No.	Activities	MONTHS											
		1	2	3	4	5	6	7	8	9	10	11	12
1	Camp setting												
3	Core drilling (2 rig)												
4	Geologist days (Field)												
5	Sampling days, core sampling												
6	Camp winding												
7	Laboratory studies												
8	Geologist days (HQ)												
9	Report writing/ Peer review												
*** Commencement of project will be reckoned from the day the exploration acreage is available along with all statutory clearances**													
***Time loss on account of monsoon/agricultural activity/forest clearance/ local law & order problems will be addition to above time line.**													

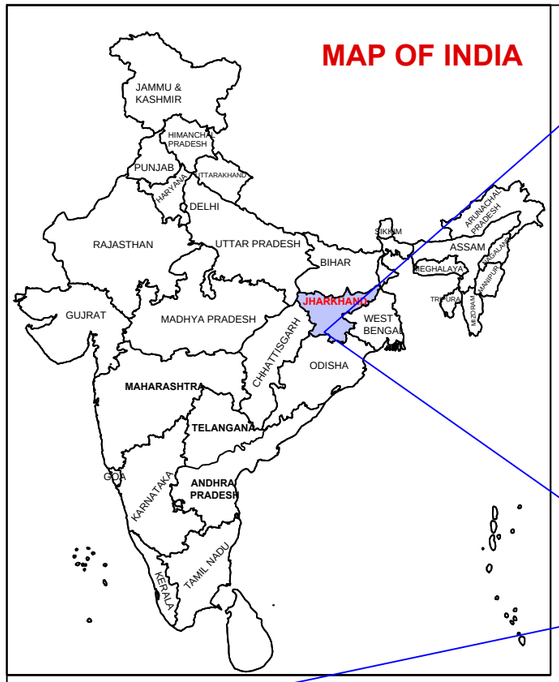
10.1.2 Cost has been estimated based on actual schedule of rates mandated in the circular OM No. 61/1/2018/NMET dated 31st March 2020 for NMET funded Projects. The total estimated cost is Rs. 282.97 Lakhs. The summary of cost estimates for this G3 level exploration is given below:

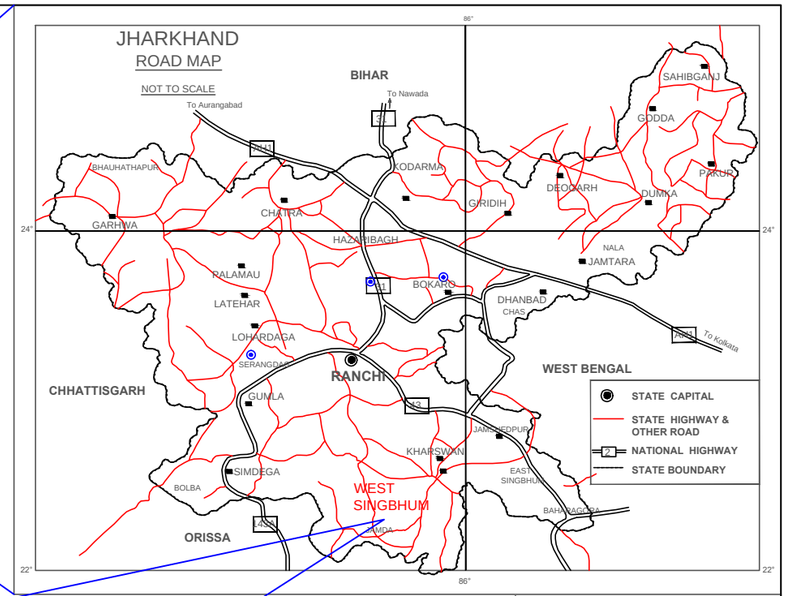
Summary of Cost Estimates

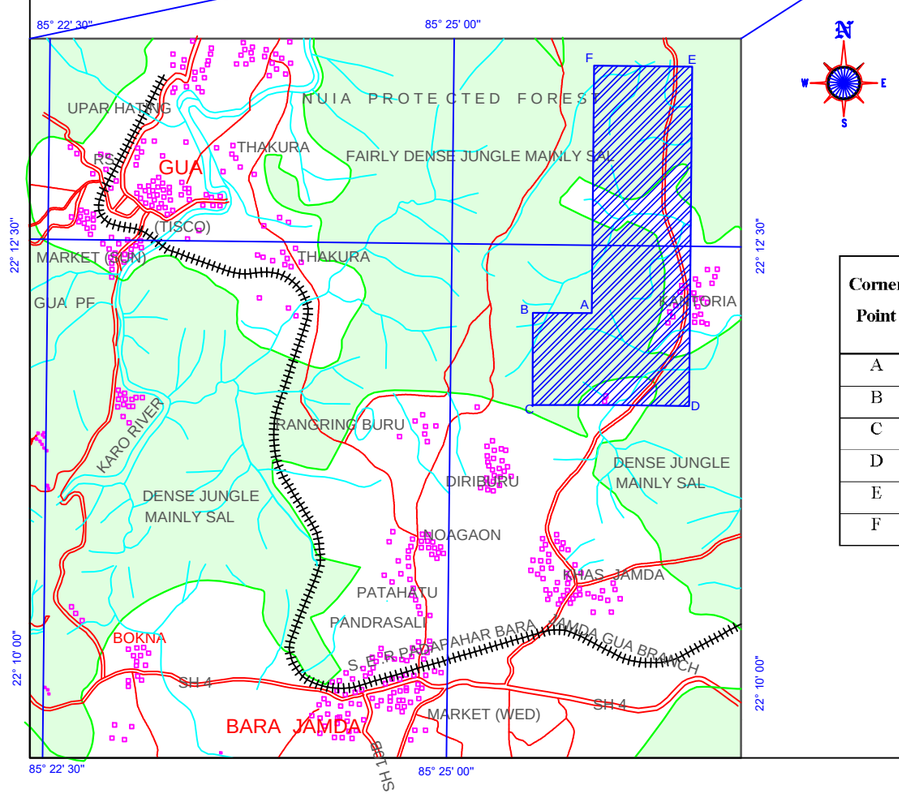
Sl. No.	Item	Total Estimated Cost (Rs.)
1	Geologist mandays Core logging, sampling	3,574,440
2	Drilling	14,941,400
3	Labrotary studies	5,266,050
4	Geologist at HQ	1,080,000
	Sub Total (1 to 4)	24,861,890
5	Exploration Report Preparation	750,000
6	Proposal Preparation	497,238
7	Peer review charges	30,000
8	Sub Total (1 to 8)	26,139,128
9	GST 18%	4,705,043
	Total:	**30,844,171**
	Say Rs. In Lakh	**308.44**

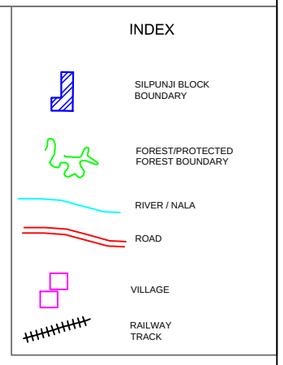
Enclosures:

- Location Map of the proposed block
- Regional Geological map showing proposed block
- Geological & borehole location Map
- Cost Sheet









Corner Point	Datum-WGS 84			
	Geographic (DMS)		UTM (Zone:45Q)	
	Longitude	Latitude	Easting	Northing
A	85^0 25' 50.91" E	22^0 12' 05.64" N	338243.32	2455972.54
B	85^0 25' 33.07" E	22^0 12' 05.47" N	337728.52	2455974.82
C	85^0 25' 33.43" E	22^0 11' 32.96" N	337730.80	2454974.83
D	85^0 26' 31.70" E	22^0 11' 33.13" N	339400.50	2454963.74
E	85^0 26' 31.67" E	22^0 13' 36.07" N	339440.88	2458746.69
F	85^0 25' 50.88" E	22^0 13' 36.06" N	338271.12	2458756.04

MINERAL EXPLORATION CORPORATION LIMITED

LOCATION MAP

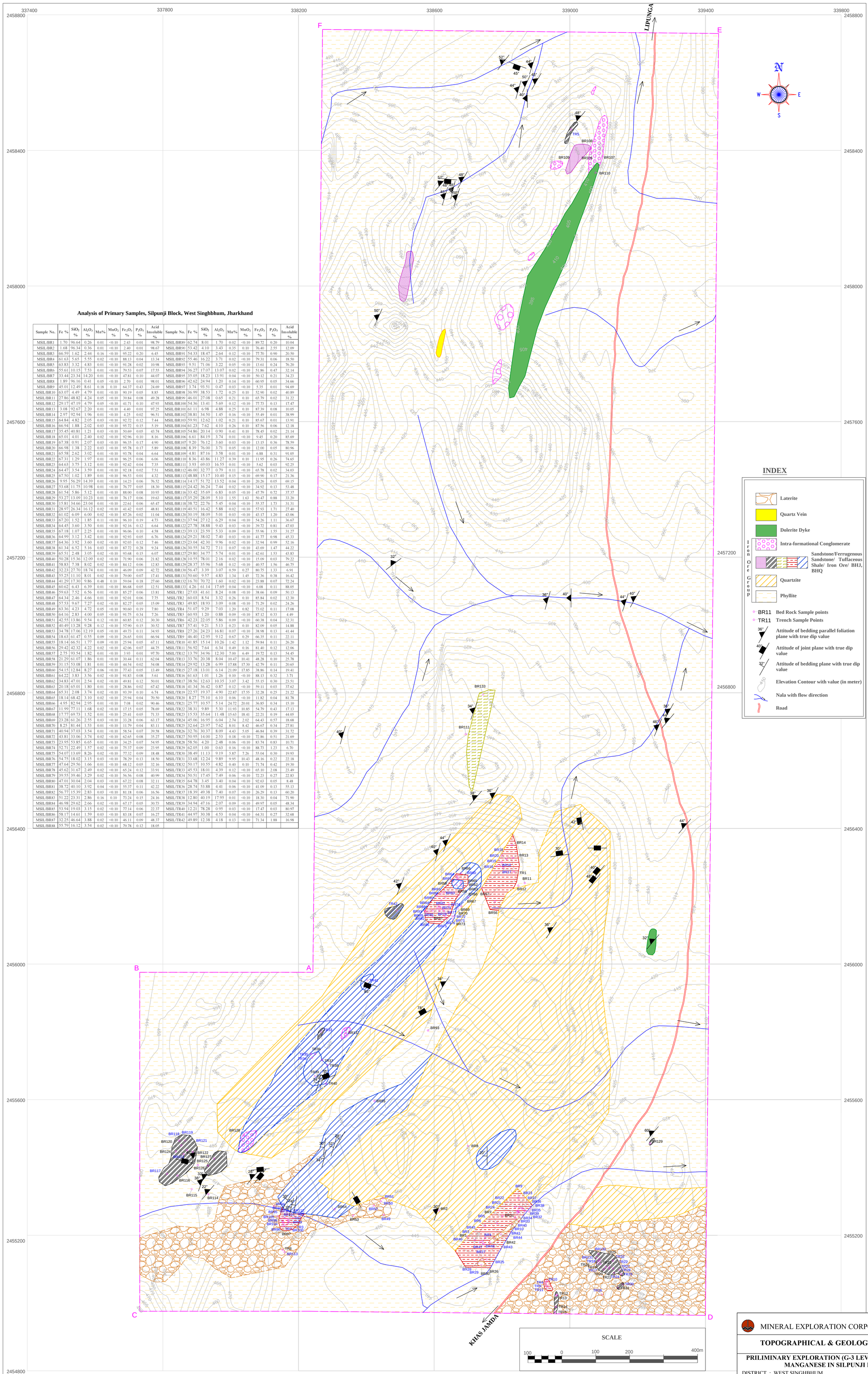
SILPUNJI IRON-MANGANESE BLOCK

DISTRICT : WEST SINGHBHUM | STATE : JHARKHAND

PLATE- I

Analysis of Primary Samples, Silpunji Block, West Singhbhum, Jharkhand

Sample No.	Fe %	SiO_2 %	Al_2O_3 %	Mn%	MnO_2 %	Fe_2O_3 %	P_2O_5 %	Acid Insoluble %	Sample No.	Fe %	SiO_2 %	Al_2O_3 %	Mn%	MnO_2 %	Fe_2O_3 %	P_2O_5 %	Acid Insoluble %
MSIL/BR1	1.70	96.64	0.26	0.01	<0.10	2.43	0.01	98.79	MSIL/BR89	62.74	8.01	1.70	0.02	<0.10	89.72	0.20	10.04
MSIL/BR2	1.68	96.34	0.36	0.01	<0.10	2.40	0.01	98.67	MSIL/BR90	53.42	4.10	3.43	0.35	0.10	76.40	2.55	12.09
MSIL/BR3	66.59	1.62	2.44	0.16	<0.10	95.22	0.20	6.45	MSIL/BR91	54.33	18.47	2.64	0.12	<0.10	77.70	0.90	20.50
MSIL/BR4	61.63	5.65	5.55	0.02	<0.10	88.13	0.04	13.34	MSIL/BR92	55.46	16.22	3.71	0.02	<0.10	79.31	0.06	18.50
MSIL/BR5	63.83	3.32	4.83	0.01	<0.10	91.28	0.02	10.98	MSIL/BR93	9.51	71.06	3.22	0.05	<0.10	13.61	0.24	76.20
MSIL/BR6	55.61	10.15	7.53	0.01	<0.10	79.53	0.07	17.55	MSIL/BR94	36.27	17.07	13.07	0.02	<0.10	51.86	0.47	32.14
MSIL/BR7	33.44	23.34	14.20	0.01	<0.10	47.81	0.10	44.07	MSIL/BR95	35.05	18.23	13.91	0.04	<0.10	50.12	0.21	34.23
MSIL/BR8	1.89	96.16	0.41	0.05	<0.10	2.70	0.01	98.01	MSIL/BR96	42.62	24.94	1.20	0.14	<0.10	60.95	0.05	34.66
MSIL/BR9	45.01	12.49	8.61	0.18	0.10	64.37	0.43	24.69	MSIL/BR97	3.74	93.51	0.47	0.03	<0.10	5.35	0.01	94.69
MSIL/BR10	63.07	4.49	4.79	0.01	<0.10	90.19	0.05	8.85	MSIL/BR98	36.99	38.53	1.72	0.25	0.10	52.90	0.02	40.89
MSIL/BR11	27.86	48.82	4.24	0.05	<0.10	39.84	0.08	49.28	MSIL/BR99	46.01	27.08	0.65	0.21	0.10	65.79	0.02	31.22
MSIL/BR12	29.17	47.19	4.79	0.05	<0.10	41.71	0.10	47.93	MSIL/BR100	54.36	13.41	5.69	0.12	<0.10	77.73	0.13	17.47
MSIL/BR13	3.08	92.67	2.20	0.01	<0.10	4.40	0.01	97.25	MSIL/BR101	61.11	6.98	4.88	0.25	0.10	87.39	0.08	10.05
MSIL/BR14	2.97	92.94	1.96	0.01	<0.10	4.25	0.02	96.51	MSIL/BR102	38.81	34.50	1.45	0.16	<0.10	55.49	0.01	38.99
MSIL/BR15	64.84	4.82	2.05	0.03	<0.10	92.72	0.12	7.44	MSIL/BR103	59.91	12.62	1.02	0.21	0.10	85.67	0.01	13.91
MSIL/BR16	66.94	1.88	2.02	0.03	<0.10	95.72	0.15	5.19	MSIL/BR104	61.23	7.62	4.10	0.26	0.10	87.56	0.06	12.18
MSIL/BR17	35.45	40.81	1.21	0.03	<0.10	50.69	0.05	43.74	MSIL/BR105	54.86	20.14	0.90	0.41	0.10	78.45	0.02	21.14
MSIL/BR18	65.01	4.01	2.40	0.02	<0.10	92.96	0.10	8.16	MSIL/BR106	6.61	84.19	3.74	0.01	<0.10	9.45	0.20	85.69
MSIL/BR19	67.38	0.91	2.07	0.03	<0.10	96.35	0.17	4.90	MSIL/BR107	9.20	76.12	3.60	0.03	<0.10	13.15	0.36	78.59
MSIL/BR20	66.98	1.38	2.22	0.03	<0.10	95.78	0.17	5.89	MSIL/BR108	8.39	76.00	3.71	0.05	<0.10	12.00	0.05	80.96
MSIL/BR21	65.58	2.62	3.02	0.01	<0.10	93.78	0.04	6.64	MSIL/BR109	4.81	87.16	3.58	0.01	<0.10	6.88	0.31	91.05
MSIL/BR22	67.31	1.29	1.97	0.01	<0.10	96.25	0.06	6.06	MSIL/BR110	8.36	43.86	11.27	0.39	0.10	11.95	0.26	74.65
MSIL/BR23	64.63	3.75	3.12	0.01	<0.10	92.42	0.04	7.35	MSIL/BR111	3.93	69.03	16.55	0.01	<0.10	5.62	0.03	92.25
MSIL/BR24	64.47	3.54	3.59	0.01	<0.10	92.18	0.02	7.51	MSIL/BR112	46.00	32.77	0.79	0.11	<0.10	65.78	0.02	34.03
MSIL/BR25	67.50	1.02	1.89	0.01	<0.10	96.53	0.01	4.32	MSIL/BR113	48.88	15.17	10.40	0.15	<0.10	69.90	0.17	21.36
MSIL/BR26	9.95	56.29	14.39	0.01	<0.10	14.23	0.06	76.52	MSIL/BR114	14.17	51.72	13.52	0.04	<0.10	20.26	0.05	69.15
MSIL/BR27	53.68	11.75	10.98	0.01	<0.10	76.77	0.05	18.30	MSIL/BR115	24.42	36.24	7.44	0.02	<0.10	34.92	0.13	53.48
MSIL/BR28	61.54	5.86	5.12	0.01	<0.10	88.00	0.08	10.93	MSIL/BR116	33.42	35.69	6.83	0.05	<0.10	47.79	0.72	37.37
MSIL/BR29	53.27	13.09	10.23	0.01	<0.10	76.17	0.06	19.63	MSIL/BR117	35.29	28.09	5.10	1.55	1.63	50.47	0.88	33.20
MSIL/BR30	15.81	34.66	23.04	0.01	<0.10	22.61	0.06	65.47	MSIL/BR118	38.72	22.76	5.45	0.04	<0.10	55.37	1.73	31.31
MSIL/BR31	28.97	26.34	16.12	0.02	<0.10	41.42	0.05	48.81	MSIL/BR119	40.51	16.42	5.88	0.02	<0.10	57.93	1.71	27.40
MSIL/BR32	61.02	6.09	6.00	0.02	<0.10	87.26	0.02	11.04	MSIL/BR120	30.19	38.09	5.01	0.03	<0.10	43.17	1.20	43.06
MSIL/BR33	67.20	1.52	1.85	0.11	<0.10	96.10	0.19	4.73	MSIL/BR121	37.94	27.12	6.29	0.04	<0.10	54.26	1.11	36.67
MSIL/BR34	64.45	3.60	3.50	0.01	<0.10	92.16	0.12	6.64	MSIL/BR122	27.78	38.88	9.43	0.03	<0.10	39.72	0.81	47.03
MSIL/BR35	67.18	1.07	2.25	0.01	<0.10	96.06	0.10	4.58	MSIL/BR123	39.13	23.59	5.33	0.09	<0.10	55.96	1.55	31.27
MSIL/BR36	64.99	3.12	3.42	0.01	<0.10	92.93	0.05	6.76	MSIL/BR124	29.21	38.02	7.40	0.03	<0.10	41.77	0.98	45.33
MSIL/BR37	64.36	3.92	3.60	0.02	<0.10	92.03	0.12	7.46	MSIL/BR125	23.04	42.30	9.96	0.02	<0.10	32.94	0.99	52.16
MSIL/BR38	61.34	6.52	5.16	0.03	<0.10	87.72	0.28	9.24	MSIL/BR126	30.55	34.72	7.11	0.07	<0.10	43.69	1.47	44.22
MSIL/BR39	65.51	2.48	3.05	0.02	<0.10	93.68	0.15	6.07	MSIL/BR127	29.80	34.77	5.74	0.01	<0.10	42.61	1.53	43.83
MSIL/BR40	50.28	15.36	12.09	0.02	<0.10	71.90	0.06	21.82	MSIL/BR128	10.55	78.01	2.16	0.02	<0.10	15.09	0.03	79.22
MSIL/BR41	58.83	7.38	8.02	0.02	<0.10	84.12	0.06	12.83	MSIL/BR129	28.37	35.96	5.68	0.12	<0.10	40.57	1.56	46.75
MSIL/BR42	32.23	27.70	18.74	0.01	<0.10	46.09	0.09	42.72	MSIL/BR130	56.47	3.39	3.07	0.59	0.27	80.75	1.33	6.91
MSIL/BR43	55.25	11.10	8.01	0.02	<0.10	79.00	0.07	17.41	MSIL/BR131	50.60	9.57	4.83	1.34	1.45	72.36	0.38	16.42
MSIL/BR44	41.29	17.30	9.86	0.48	0.10	59.04	0.18	27.60	MSIL/BR132	16.70	70.72	1.60	0.02	<0.10	23.88	0.07	72.24
MSIL/BR45	60.62	6.43	6.39	0.01	<0.10	86.68	0.05	12.51	MSIL/BR133	4.26	61.14	17.69	0.04	<0.10	6.08	0.11	88.05
MSIL/BR46	59.63	7.52	6.56	0.01	<0.10	85.27	0.06	13.81	MSIL/TR1	27.03	41.61	8.24	0.08	<0.10	38.66	0.09	50.13
MSIL/BR47	64.34	2.46	4.66	0.01	<0.10	92.01	0.06	7.75	MSIL/TR2	60.03	8.54	3.32	0.26	0.10	85.84	0.02	12.30
MSIL/BR48	57.53	9.67	7.27	0.02	<0.10	82.27	0.05	15.09	MSIL/TR3	49.85	18.93	3.09	0.08	<0.10	71.29	0.02	24.26
MSIL/BR49	63.36	4.23	4.72	0.05	<0.10	90.60	0.19	7.80	MSIL/TR4	51.07	9.29	7.03	1.20	0.82	73.02	0.11	17.08
MSIL/BR50	64.16	2.83	4.00	0.05	<0.10	91.75	0.34	7.26	MSIL/TR5	60.93	1.20	0.88	0.09	<0.10	87.12	0.33	4.49
MSIL/BR51	42.55	13.86	9.54	0.12	<0.10	60.85	0.12	30.30	MSIL/TR6	42.23	22.05	5.86	0.09	<0.10	60.38	0.04	32.31
MSIL/BR52	40.49	13.28	9.28	0.12	<0.10	57.90	0.15	30.52	MSIL/TR7	57.41	9.21	5.13	0.23	0.10	82.09	0.05	14.88
MSIL/BR53	34.78	17.06	12.19	0.05	<0.10	49.73	0.11	34.93	MSIL/TR8	27.26	24.23	16.81	0.07	<0.10	38.98	0.13	41.44
MSIL/BR54	18.63	61.47	0.55	0.09	<0.10	26.65	0.01	66.94	MSIL/TR9	46.40	12.95	9.12	0.67	0.29	66.35	0.11	22.11
MSIL/BR55	18.14	66.51	1.77	0.09	<0.10	25.94	0.05	67.11	MSIL/TR10	41.85	15.14	10.26	1.42	1.12	59.84	0.11	26.20
MSIL/BR56	29.42	42.32	4.22	0.02	<0.10	42.06	0.07	44.75	MSIL/TR11	56.92	7.64	6.34	0.49	0.16	81.40	0.12	12.06
MSIL/BR57	2.75	93.54	1.82	0.01	<0.10	3.93	0.01	97.70	MSIL/TR12	13.79	34.96	12.30	7.00	6.49	19.72	0.11	54.45
MSIL/BR58	21.29	61.07	1.86	0.01	<0.10	30.44	0.11	62.04	MSIL/TR13	33.76	20.38	8.04	10.47	10.41	48.28	0.10	25.78
MSIL/BR59	31.15	53.08	1.81	0.01	<0.10	44.54	0.02	54.08	MSIL/TR14	29.92	13.28	6.99	17.88	17.30	42.79	0.11	20.65
MSIL/BR60	54.15	12.84	8.27	0.06	<0.10	77.43	0.05	13.49	MSIL/TR15	27.18	13.01	6.14	21.09	17.85	38.86	0.14	19.41
MSIL/BR61	64.22	3.83	3.56	0.02	<0.10	91.83	0.08	5.61	MSIL/TR16	61.63	1.01	1.26	0.10	<0.10	88.13	0.32	3.71
MSIL/BR62	34.83	47.01	2.54	0.02	<0.10	49.81	0.12	50.01	MSIL/TR17	38.56	12.63	10.35	3.07	3.42	55.15	0.30	23.51
MSIL/BR63	20.18	65.01	1.80	0.01	<0.10	28.86	0.02	67.42	MSIL/TR18	41.34	36.42	0.87	0.12	<0.10	59.11	0.03	37.62
MSIL/BR64	65.31	2.08	3.74	0.02	<0.10	93.39	0.10	6.74	MSIL/TR19	22.57	19.37	4.90	22.87	17.55	32.28	0.25	21.22
MSIL/BR65	18.14	68.42	3.10	0.02	<0.10	25.94	0.04	70.50	MSIL/TR20	8.27	75.10	6.10	0.06	<0.10	11.82	0.04	81.78
MSIL/BR66	4.95	82.94	2.95	0.01	<0.10	7.08	0.02	90.46	MSIL/TR21	25.77	10.57	5.14	24.72	20.01	36.85	0.34	15.10
MSIL/BR67	11.99	77.11	1.68	0.02	<0.10	17.15	0.05	78.69	MSIL/TR22	38.31	9.89	5.30	11.93	10.85	54.79	0.43	17.13
MSIL/BR68	17.77	69.73	1.52	0.01	<0.10	25.41	0.05	71.33	MSIL/TR23	15.53	35.64	11.48	15.63	18.41	22.21	0.19	44.05
MSIL/BR69	23.28	61.26	2.55	0.03	<0.10	33.28	0.06	63.17	MSIL/TR24	45.06	16.95	6.04	2.74	2.02	64.43	0.57	18.68
MSIL/BR70	8.25	81.44	1.53	0.01	<0.10	11.79	0.04	83.11	MSIL/TR25	32.64	23.97	7.62	8.01	8.42	46.67	0.34	27.81
MSIL/BR71	40.94	37.03	3.54	0.01	<0.10	58.54	0.07	39.58	MSIL/TR26	32.76	30.37	8.09	4.43	5.05	46.84	0.39	31.72
MSIL/BR72	43.81	33.06	3.74	0.02	<0.10	62.65	0.08	35.27	MSIL/TR27	50.95	14.00	2.53	0.18	<0.10	72.86	0.51	21.69
MSIL/BR73	23.95	53.85	6.65	0.01	<0.10	34.25	0.07	54.95	MSIL/TR28	58.56	4.20	2.48	0.06	<0.10	83.74	0.83	10.71
MSIL/BR74	52.71	22.49	1.57	0.02	<0.10	75.37	0.09	23.95	MSIL/TR29	62.05	1.00	0.63	0.16	<0.10	88.73	1.23	6.70
MSIL/BR75	54.07	13.69	8.26	0.02	<0.10	77.32	0.09	18.48	MSIL/TR30	38.49	11.13	9.19	5.87	7.26	55.04	0.30	19.93
MSIL/BR76	54.75	18.02	3.15	0.03	<0.10	78.29	0.13	18.50	MSIL/TR31	33.68	12.24	9.89	9.95	10.43	48.16	0.22	22.18
MSIL/BR77	47.64	29.56	1.66	0.01	<0.10	68.12	0.05	32.16	MSIL/TR32	50.17	10.55	4.82	0.40	0.10	71.74	0.42	19.30
MSIL/BR78	45.62	31.67	2.49	0.02	<0.10	65.24	0.12	33.91	MSIL/TR33	45.53	18.01	4.39	0.12	<0.10	65.10	2.08	23.49
MSIL/BR79	39.55	39.46	3.29	0.02	<0.10	56.56	0.08	40.99	MSIL/TR34	50.51	17.45	7.49	0.06	<0.10	72.23	0.27	22.83
MSIL/BR80	47.01	30.04	2.04	0.03	<0.10	67.22	0.08	32.11	MSIL/TR35	64.78	3.45	3.40	0.04	<0.10	92.63	0.05	8.48
MSIL/BR81	38.72	40.10	3.92	0.04	<0.10	55.37	0.11	42.22	MSIL/TR36	28.74	53.88	4.41	0.06	<0.10	41.09	0.13	55.13
MSIL/BR82	56.77	15.39	2.83	0.03	<0.10	81.18	0.06	16.56	MSIL/TR37	18.39	49.38	7.40	0.07	<0.10	26.29	0.13	60.20
MSIL/BR83	51.22	23.31	2.86	0.16	0.10	73.24	0.15	24.16	MSIL/TR38	12.80	40.19	17.95	0.01	<0.10	18.30	0.04	71.90
MSIL/BR84	46.98	29.62	2.66	0.02	<0.10	67.17	0.05	30.73	MSIL/TR39	34.94	47.16	2.07	0.09	<0.10	49.97	0.05	48.34
MSIL/BR85	53.94	19.03	3.15	0.02	<0.10	77.14	0.06	22.37	MSIL/TR40	12.21	78.28	0.95	0.03	<0.10	17.47	0.03	80.97
MSIL/BR86	58.17	14.61	1.59	0.03	<0.10	83.18	0.07	16.27	MSIL/TR41	44.97	30.38	4.53	0.04	<0.10	64.31	0.27	32.68
MSIL/BR87	32.25	46.64	3.88	0.02	<0.10	46.11	0.09	48.37	MSIL/TR42	49.89	12.38	4.18	0.13	<0.10	71.34	1.88	16.98
MSIL/BR88	55.79	16.12	3.54	0.02	<0.10	79.78	0.12	18.05									



MINERAL EXPLORATION CORPORATION LIMITED

TOPOGRAPHICAL & GEOLOGICAL MAP

PRILIMINARY EXPLORATION (G-3 LEVEL) FOR IRON AND MANGANESE IN SILPUNJI BLOCK

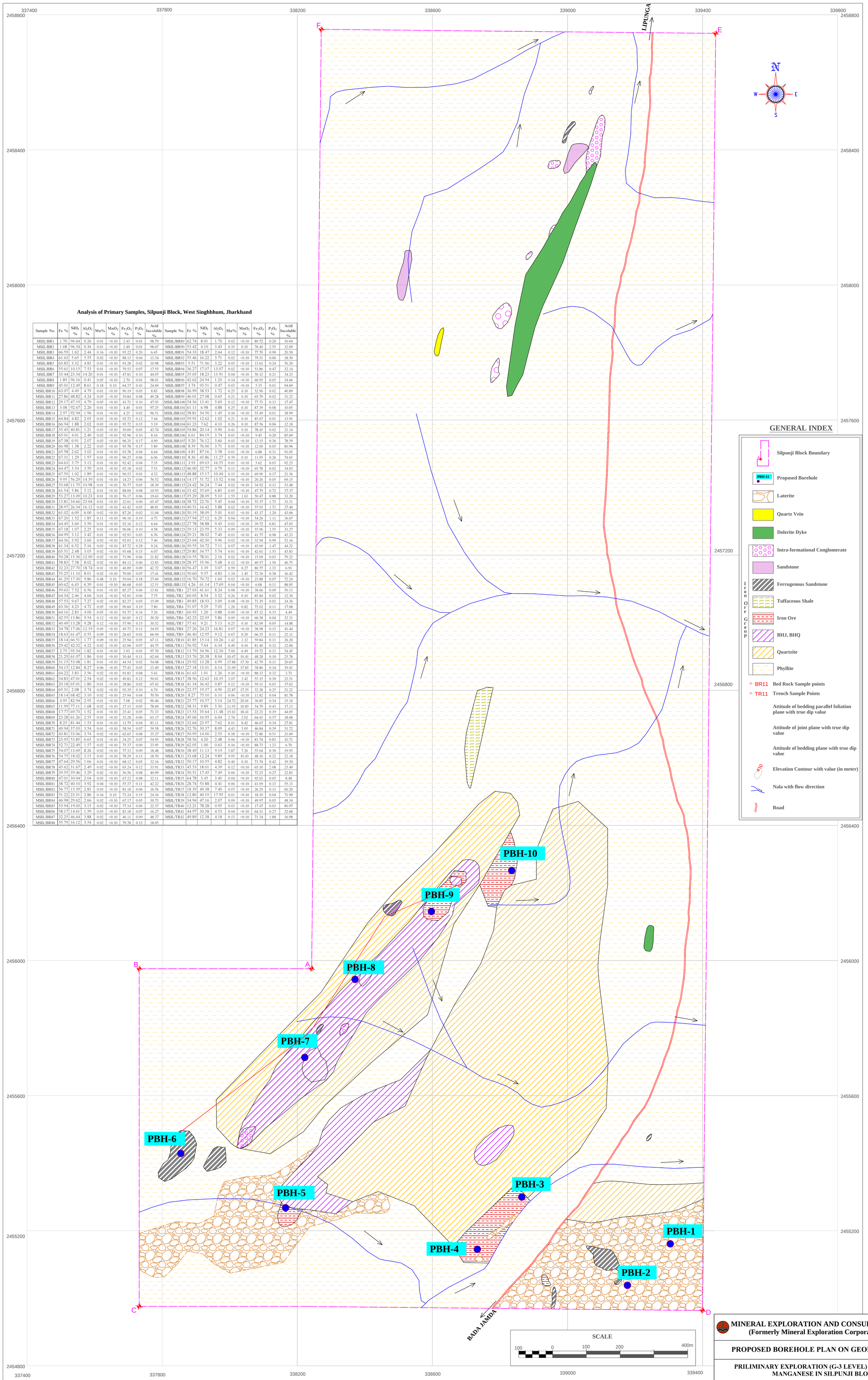
DISTRICT : WEST SINGHBHUM STATE : JHARKHAND

R.F. - 1 : 4000

PLATE No.: III

Analysis of Primary Samples, Silpunji Block, West Singhbhum, Jharkhand

Sample No.	Fe %	SiO_2 %	Al_2O_3 %	Mn%	MnO_2 %	Fe_2O_3 %	P_2O_5 %	Acid Insoluble %
MSIL/BR1	1.70	96.64	0.26	0.01	<0.10	2.43	0.01	98.79
MSIL/BR2	1.68	96.34	0.36	0.01	<0.10	2.40	0.01	98.67
MSIL/BR3	66.59	1.62	2.44	0.16	<0.10	95.22	0.20	6.45
MSIL/BR4	61.63	5.65	5.55	0.02	<0.10	88.13	0.04	13.34
MSIL/BR5	63.83	3.32	4.83	0.01	<0.10	91.28	0.02	10.98
MSIL/BR6	55.61	10.15	7.53	0.01	<0.10	79.53	0.07	17.55
MSIL/BR7	33.44	23.34	14.20	0.01	<0.10	47.81	0.10	44.07
MSIL/BR8	1.89	96.16	0.41	0.05	<0.10	2.70	0.01	98.01
MSIL/BR9	45.01	12.49	8.61	0.18	0.10	64.37	0.43	24.69
MSIL/BR10	63.07	4.49	4.79	0.01	<0.10	90.19	0.05	8.85
MSIL/BR11	27.86	48.82	4.24	0.05	<0.10	39.84	0.08	49.28
MSIL/BR12	29.17	47.19	4.79	0.05	<0.10	41.71	0.10	47.93
MSIL/BR13	3.08	92.67	2.20	0.01	<0.10	4.40	0.01	97.25
MSIL/BR14	2.97	92.94	1.96	0.01	<0.10	4.25	0.02	96.51
MSIL/BR15	64.84	4.82	2.05	0.03	<0.10	92.72	0.12	7.44
MSIL/BR16	66.94	1.88	2.02	0.03	<0.10	95.72	0.15	5.19
MSIL/BR17	35.45	40.81	1.21	0.03	<0.10	50.69	0.05	43.74
MSIL/BR18	65.01	4.01	2.40	0.02	<0.10	92.96	0.10	8.16
MSIL/BR19	67.38	0.91	2.07	0.03	<0.10	96.35	0.17	4.90
MSIL/BR20	66.98	1.38	2.22	0.03	<0.10	95.78	0.17	5.89
MSIL/BR21	65.58	2.62	3.02	0.01	<0.10	93.78	0.04	6.64
MSIL/BR22	67.31	1.29	1.97	0.01	<0.10	96.25	0.06	6.06
MSIL/BR23	64.63	3.75	3.12	0.01	<0.10	92.42	0.04	7.35
MSIL/BR24	64.47	3.54	3.59	0.01	<0.10	92.18	0.02	7.51
MSIL/BR25	67.50	1.02	1.89	0.01	<0.10	96.53	0.01	4.32
MSIL/BR26	9.95	56.29	14.39	0.01	<0.10	14.23	0.06	76.52
MSIL/BR27	53.68	11.75	10.98	0.01	<0.10	76.77	0.05	18.30
MSIL/BR28	61.54	5.86	5.12	0.01	<0.10	88.00	0.08	10.93
MSIL/BR29	53.27	13.09	10.23	0.01	<0.10	76.17	0.06	19.63
MSIL/BR30	15.81	34.66	23.04	0.01	<0.10	22.61	0.06	65.47
MSIL/BR31	28.97	26.34	16.12	0.02	<0.10	41.42	0.05	48.81
MSIL/BR32	61.02	6.09	6.00	0.02	<0.10	87.26	0.02	11.04
MSIL/BR33	67.20	1.52	1.85	0.11	<0.10	96.10	0.19	4.73
MSIL/BR34	64.45	3.60	3.50	0.01	<0.10	92.16	0.12	6.64
MSIL/BR35	67.18	1.07	2.25	0.01	<0.10	96.06	0.10	4.58
MSIL/BR36	64.99	3.12	3.42	0.01	<0.10	92.93	0.05	6.76
MSIL/BR37	64.36	3.92	3.60	0.02	<0.10	92.03	0.12	7.46
MSIL/BR38	61.34	6.52	5.16	0.03	<0.10	87.72	0.28	9.24
MSIL/BR39	65.51	2.48	3.05	0.02	<0.10	93.68	0.15	6.07
MSIL/BR40	50.28	15.36	12.09	0.02	<0.10	71.90	0.06	21.82
MSIL/BR41	58.83	7.38	8.02	0.02	<0.10	84.12	0.06	12.83
MSIL/BR42	32.23	27.70	18.74	0.01	<0.10	46.09	0.09	42.72
MSIL/BR43	55.25	11.10	8.01	0.02	<0.10	79.00	0.07	17.41
MSIL/BR44	41.29	17.30	9.86	0.48	0.10	59.04	0.18	27.60
MSIL/BR45	60.62	6.43	6.39	0.01	<0.10	86.68	0.05	12.51
MSIL/BR46	59.63	7.52	6.56	0.01	<0.10	85.27	0.06	13.81
MSIL/BR47	64.34	2.46	4.66	0.01	<0.10	92.01	0.06	7.75
MSIL/BR48	57.53	9.67	7.27	0.02	<0.10	82.27	0.05	15.09
MSIL/BR49	63.36	4.23	4.72	0.05	<0.10	90.60	0.19	7.80
MSIL/BR50	64.16	2.83	4.00	0.05	<0.10	91.75	0.34	7.26
MSIL/BR51	42.55	13.86	9.54	0.12	<0.10	60.85	0.12	30.30
MSIL/BR52	40.49	13.28	9.28	0.12	<0.10	57.90	0.15	30.52
MSIL/BR53	34.78	17.06	12.19	0.05	<0.10	49.73	0.11	34.93
MSIL/BR54	18.63	61.47	0.55	0.09	<0.10	26.65	0.01	66.94
MSIL/BR55	18.14	66.51	1.77	0.09	<0.10	25.94	0.05	67.11
MSIL/BR56	29.42	42.32	4.22	0.02	<0.10	42.06	0.07	44.75
MSIL/BR57	2.75	93.54	1.82	0.01	<0.10	3.93	0.01	97.70
MSIL/BR58	21.29	61.07	1.86	0.01	<0.10	30.44	0.11	62.04
MSIL/BR59	31.15	53.08	1.81	0.01	<0.10	44.54	0.02	54.08
MSIL/BR60	54.15	12.84	8.27	0.06	<0.10	77.43	0.05	13.49
MSIL/BR61	64.22	3.83	3.56	0.02	<0.10	91.83	0.08	5.61
MSIL/BR62	34.83	47.01	2.54	0.02	<0.10	49.81	0.12	50.01
MSIL/BR63	20.18	65.01	1.80	0.01	<0.10	28.86	0.02	67.42
MSIL/BR64	65.31	2.08	3.74	0.02	<0.10	93.39	0.10	6.74
MSIL/BR65	18.14	68.42	3.10	0.02	<0.10	25.94	0.04	70.50
MSIL/BR66	4.95	82.94	2.95	0.01	<0.10	7.08	0.02	90.46
MSIL/BR67	11.99	77.11	1.68	0.02	<0.10	17.15	0.05	78.69
MSIL/BR68	17.77	69.73	1.52	0.01	<0.10	25.41	0.05	71.33
MSIL/BR69	23.28	61.26	2.55	0.03	<0.10	33.28	0.06	63.17
MSIL/BR70	8.25	81.44	1.53	0.01	<0.10	11.79	0.04	83.11
MSIL/BR71	40.94	37.03	3.54	0.01	<0.10	58.54	0.07	39.58
MSIL/BR72	43.81	33.06	3.74	0.02	<0.10	62.65	0.08	35.27
MSIL/BR73	23.95	53.85	6.65	0.01	<0.10	34.25	0.07	54.95
MSIL/BR74	52.71	22.49	1.57	0.02	<0.10	75.37	0.09	23.95
MSIL/BR75	54.07	13.69	8.26	0.02	<0.10	77.32	0.09	18.48
MSIL/BR76	54.75	18.02	3.15	0.03	<0.10	78.29	0.13	18.50
MSIL/BR77	47.64	29.56	1.66	0.01	<0.10	68.12	0.05	32.16
MSIL/BR78	45.62	31.67	2.49	0.02	<0.10	65.24	0.12	33.91
MSIL/BR79	39.55	39.46	3.29	0.02	<0.10	56.56	0.08	40.99
MSIL/BR80	47.01	30.04	2.04	0.03	<0.10	67.22	0.08	32.11
MSIL/BR81	38.72	40.10	3.92	0.04	<0.10	55.37	0.11	42.22
MSIL/BR82	56.77	15.39	2.83	0.03	<0.10	81.18	0.06	16.56
MSIL/BR83	51.22	23.31	2.86	0.16	0.10	75.24	0.15	24.16
MSIL/BR84	46.98	29.62	2.66	0.02	<0.10	67.17	0.05	30.73
MSIL/BR85	53.94	19.03	3.15	0.02	<0.10	77.14	0.06	22.37
MSIL/BR86	58.17	14.61	1.59	0.03	<0.10	83.18	0.07	16.27
MSIL/BR87	32.25	46.64	3.88	0.02	<0.10	46.11	0.09	48.37
MSIL/BR88	55.79	16.12	3.54	0.02	<0.10	79.78	0.12	18.05
MSIL/BR89	62.74	8.01	1.70	0.02	<0.10	89.72	0.20	10.04
MSIL/BR90	53.42	4.10	3.43	0.35	0.10	76.40	2.55	12.09
MSIL/BR91	54.33	18.47	2.64	0.12	<0.10	77.70	0.90	20.50
MSIL/BR92	55.46	16.22	3.71	0.02	<0.10	79.31	0.06	18.50
MSIL/BR93	9.51	71.06	3.22	0.05	<0.10	13.61	0.24	76.20
MSIL/BR94	36.27	17.07	13.07	0.02	<0.10	51.86	0.47	32.14
MSIL/BR95	35.05	18.23	13.91	0.04	<0.10	50.12	0.21	34.23
MSIL/BR96	42.62	24.94	1.20	0.14	<0.10	60.95	0.05	34.66
MSIL/BR97	3.74	93.51	0.47	0.03	<0.10	5.35	0.01	94.69
MSIL/BR98	36.99	38.53	1.72	0.25	0.10	52.90	0.02	40.89
MSIL/BR99	46.01	27.08	0.65	0.21	0.10	65.79	0.02	31.22
MSIL/BR100	54.36	13.41	5.69	0.12	<0.10	77.73	0.13	17.47
MSIL/BR101	61.11	6.98	4.88	0.25	0.10	87.39	0.08	10.05
MSIL/BR102	38.81	34.50	1.45	0.16	<0.10	55.49	0.01	38.99
MSIL/BR103	59.91	12.62	1.02	0.21	0.10	85.67	0.01	13.91
MSIL/BR104	61.23	7.62	4.10	0.26	0.10	87.56	0.06	12.18
MSIL/BR105	54.86	20.14	0.90	0.41	0.10	78.45	0.02	21.14
MSIL/BR106	6.61	84.19	3.74	0.01	<0.10	9.45	0.20	85.69
MSIL/BR107	9.20	76.12	3.60	0.03	<0.10	13.15	0.36	78.59
MSIL/BR108	8.39	76.00	3.71	0.05	<0.10	12.00	0.05	80.96
MSIL/BR109	4.81	87.16	3.58	0.01	<0.10	6.88	0.31	91.05
MSIL/BR110	8.36	43.86	11.27	0.39	0.10	11.95	0.26	74.65
MSIL/BR111	3.93	69.03	16.55	0.01	<0.10	5.62	0.03	92.25
MSIL/BR112	46.00	32.77	0.79	0.11	<0.10	65.78	0.02	34.03
MSIL/BR113	48.88	15.17	10.40	0.15	<0.10	69.90	0.17	21.36
MSIL/BR114	14.17	51.72	13.52	0.04	<0.10	20.26	0.05	69.15
MSIL/BR115	24.42	36.24	7.44	0.02	<0.10	34.92	0.13	53.48
MSIL/BR116	33.42	35.69	6.83	0.05	<0.10	47.79	0.72	37.37
MSIL/BR117	35.29	28.09	5.10	1.55	1.63	50.47	0.88	33.20
MSIL/BR118	38.72	22.76	5.45	0.04	<0.10	55.37	1.73	31.31
MSIL/BR119	40.51	16.42	5.88	0.02	<0.10	57.93	1.71	27.40
MSIL/BR120	30.19	38.09	5.01	0.03	<0.10	43.17	1.20	43.06
MSIL/BR121	37.94	27.12	6.29	0.04	<0.10	54.26	1.11	36.67
MSIL/BR122	27.78	38.88	9.43	0.03	<0.10	39.72	0.81	47.03
MSIL/BR123	39.13	23.59	5.33	0.09	<0.10	55.96	1.55	31.27
MSIL/BR124	29.21	38.02	7.40	0.03	<0.10	41.77	0.98	45.33
MSIL/BR125	23.04	42.30	9.96	0.02	<0.10	32.94	0.99	52.16
MSIL/BR126	30.55	34.72	7.11	0.07	<0.10	43.69	1.47	44.22
MSIL/BR127	29.80	34.77	5.74	0.01	<0.10	42.61	1.53	43.83
MSIL/BR128	10.55	78.01	2.16	0.02	<0.10	15.09	0.03	79.22
MSIL/BR129	28.37	35.96	5.68	0.12	<0.10	40.57	1.56	46.75
MSIL/BR130	56.47	3.39	3.07	0.59	0.27	80.75	1.33	6.91
MSIL/BR131	50.60	9.57	4.83	1.34	1.45	72.36	0.38	16.42
MSIL/BR132	16.70	70.72	1.60	0.02	<0.10	23.88	0.07	72.24
MSIL/BR133	4.26	61.14	17.69	0.04	<0.10	6.08	0.11	88.05
MSIL/TR1	27.03	41.61	8.24	0.08	<0.10	38.66	0.09	50.13
MSIL/TR2	60.03	8.54	3.32	0.26	0.10	85.84	0.02	12.30
MSIL/TR3	49.85	18.93	3.09	0.08	<0.10	71.29	0.02	24.26
MSIL/TR4	51.07	9.29	7.03	1.20	0.82	73.02	0.11	17.08
MSIL/TR5	60.93	1.20	0.88	0.09	<0.10	87.12	0.33	4.49
MSIL/TR6	42.23	22.05	5.86	0.09	<0.10	60.38	0.04	32.31
MSIL/TR7	57.41	9.21	5.13	0.23	0.10	82.09	0.05	14.88
MSIL/TR8	27.26	24.23	16.81	0.07	<0.10	38.98	0.13	41.44
MSIL/TR9	46.40	12.95	9.12	0.67	0.29	66.35	0.11	22.11
MSIL/TR10	41.85	15.14	10.26	1.42	1.12	59.84	0.11	26.20
MSIL/TR11	56.92	7.64	6.34	0.49	0.16	81.40	0.12	12.06
MSIL/TR12	13.79	34.96	12.30	7.00	6.49	19.72	0.33	54.45
MSIL/TR13	33.76	20.38	8.04	10.47	10.41	48.28	0.10	25.78
MSIL/TR14	29.92	13.28	6.99	17.88	17.30	42.79	0.11	20.65
MSIL/TR15	27.18	13.01	6.14	21.09	17.85	38.86	0.14	19.41
MSIL/TR16	61.63	1.01	1.26	0.10	<0.10	88.13	0.32	3.71
MSIL/TR17	38.56	12.63	10.35	3.07	3.42	55.15	0.30	23.51
MSIL/TR18	41.34	36.42	0.87	0.12	<0.10	59.11	0.03	37.62
MSIL/TR19	22.57	19.37	4.90	22.87	17.55	32.28	0.25	21.22
MSIL/TR20	8.27	75.10	6.10	0.06	<0.10	11.82	0.04	81.78
MSIL/TR21	25.77	10.57	5.14	24.72	20.01	36.85	0.34	15.10
MSIL/TR22	38.31	9.89	5.30	11.93	10.85	54.79	0.43	17.13
MSIL/TR23	15.53	35.64	11.48	15.63	18.41	22.21	0.19	44.05
MSIL/TR24	45.06	16.95	6.04	2.74	2.02	64.43	0.57	18.68
MSIL/TR25	32.64	23.97	7.62	8.01	8.42	46.67	0.34	27.81
MSIL/TR26	32.76	30.37	8.09	4.43	5.05	46.84	0.39	31.72
MSIL/TR27	50.95	14.00	2.53	0.18	<0.10	72.86	0.51	21.69
MSIL/TR28	58.56	4.20	2.48	0.06	<0.10	83.74	0.83	10.71
MSIL/TR29	62.05	1.00	0.63	0.16	<0.10	88.73	1.23	6.70
MSIL/TR30	38.49	11.13	9.19	5.87	7.26	55.04	0.30	19.93
MSIL/TR31	33.68	12.24	9.89	9.95	10.43	48.16	0.22	22.18
MSIL/TR32	50.17	10.55	4.82	0.40	0.10	71.74	0.42	19.30
MSIL/TR33	45.53	18.01	4.39	0.12	<0.10	65.10	2.08	23.49
MSIL/TR34	50.51	17.45	7.49	0.06	<0.10	72.23	0.27	22.83
MSIL/TR35	64.78	3.45	3.40	0.04	<0.10	92.63	0.05	8.48
MSIL/TR36	28.74	53.88	4.41	0.06	<0.10	41.09	0.13	55.13
MSIL/TR37	18.39	49.38	7.40	0.07	<0.10	26.29	0.13	60.20
MSIL/TR38	12.80	40.19	17.95	0.01	<0.10	18.30	0.04	71.90
MSIL/TR39	34.94	47.16	2.07	0.09	<0.10	49.97	0.05	48.34
MSIL/TR40	12.21	78.28	0.95	0.03	<0.10	17.47	0.03	80.97
MSIL/TR41	44.97	30.38	4.53	0.04	<0.10	64.31	0.27	32.68
MSIL/TR42	49.89	12.38	4.18	0.13	<0.10	71.34	1.88	16.98



GENERAL INDEX

- Silpunji Block Boundary
- PBH-11 Proposed Borehole
- Laterite
- Quartz Vein
- Dolerite Dyke
- Intra-formational Conglomerate
- Sandstone
- Ferrugenous Sandstone
- Tuffaceous Shale
- Iron Ore
- BHJ, BHQ
- Quartzite
- Phyllite

Iron Ore Group

- BR11 Bed Rock Sample points
- TR11 Trench Sample Points
- Attitude of bedding parallel foliation plane with true dip value
- Attitude of joint plane with true dip value
- Attitude of bedding plane with true dip value
- 410 Elevation Contour with value (in meter)
- Nala with flow direction
- Road

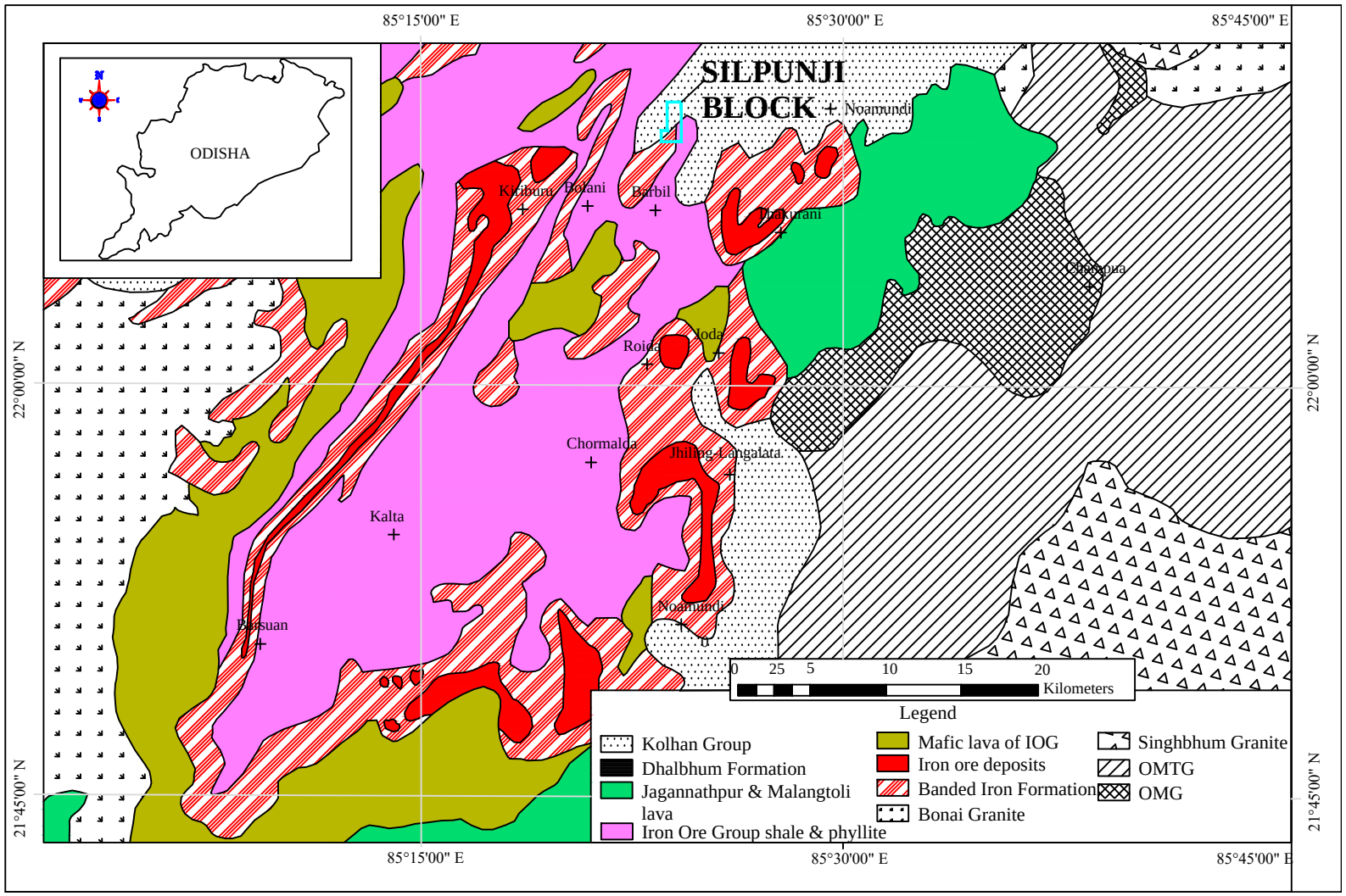
MINERAL EXPLORATION AND CONSULTANCY LIMITED
(Formerly Mineral Exploration Corporation Limited)

PROPOSED BOREHOLE PLAN ON GEOLOGICAL MAP

PRILIMINARY EXPLORATION (G-3 LEVEL) FOR IRON AND MANGANESE IN SILPUNJI BLOCK

DISTRICT : WEST SINGHBHUM STATE : JHARKHAND

R.F. - 1 : 4000


85°15'00" E
85°30'00" E
85°45'00" E
22°00'00" N
21°45'00" N
SILPUNJI
BLOCK
Noamundi
ODISHA
Kiriburu
Bolani
Barbil
Dhakurani
Joda
Roida
Chormalda
Jhilling-Langalata
Kalta
Banjsuan
0 25 5 10 15 20
Kilometers
Legend
Kolhan Group
Dhalbhum Formation
Jagannathpur & Malangtoli lava
Iron Ore Group shale & phyllite
Mafic lava of IOG
Iron ore deposits
Banded Iron Formation
Bonai Granite
Singhbhum Granite
OMTG
OMG

ESTIMATED COST FOR G-3 LEVEL EXPLORATION OF IRON AND MANGANESE ORE IN JAMDA-KOIRA VALLEY IRONORE BELT IN SILPUNJI BLOCK, DISTRICT-WEST SINGBHUM, JHARKHAND

Total Area - 4.92 Sq. Km; Drilling- 1000.00m, Completion Time - 12 Months

Sl. No.	Item of Work	Unit	Rates as per NMET SoC 2020-21		Total Cost of the Project		Remarks
			SoC- Item- S. No.	Rates as per SoC	Qty.	Total Amount (Rs)	
1.0	**Geology & Survey**						
1.1	Geologist man days for core logging (Field)/Sampling	days	1.3	11,000	180	19,80,000	
1.2	Unskilled Labour (Field) (2 workers per geologist)	per worker	5.7	504	360	1,81,440	Amount will be reimburse as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higher
1.3	Sampling man days - Sampler (core sample,) Labour charge not included	day	1.5.2	5,100	150	7,65,000	
1.4	4 labours/ party (Rs 431/day/labour) (As per rates of Central Labour Commissioner) for sampling work	day	5.7	504	600	3,02,400	Amount will be reimburse as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higher
1.5	Determination of co-ordinates and Reduced Level (RL) of boreholes by DGPS including boundary corner points.	Nos.	1.6.2	19200	18	3,45,600	Boreholes 10 Nos. + Block Boundary 06 Nos. + 02 Base Station
Sub-Total 1						**35,74,440**	
2.0	**Drilling**						
2.1	Drilling -Very hard rock (up to 300m)	m	2.2.1.5a	12,650	1000	1,26,50,000	
2.2	Land / Crop Compansation (in case the BH falls in agreecultural Land)	per BH	5.6	20,000	10	2,00,000	
2.3	Construction of concrete Pillar (12"x12"x30")	per borehole	2.2.7a	2,000	10	20,000	
2.4	Transportation of Drill Rig & Truck associated per drill (for 2 rig)	Km	2.2.8	36	3200	1,15,200	1600 Km to and fro for one rig
2.5	Monthly Accomodation Charges for drilling Camp (up to 2 Rigs)	month	2.2.9	50,000	7	3,50,000	
2.6	Drilling Camp Setting Cost	Nos	2.2.9a	2,50,000	2	5,00,000	
2.7	Drilling Camp Winding up Cost	Nos	2.2.9b	2,50,000	2	5,00,000	
2.8	Road Making (Hilly Terrain)	Km	2.2.10a	32,200	5	1,61,000	
2.9	Drill Core Preservation	per m	5.3	1,590	280	4,45,200	
Sub-Total 2						**1,49,41,400**	
3.0	**Laboratory Studies**						
3.1	Primary + Check Sample - 8 radicals viz. Fe, Mn, Al2O3, SiO2, TiO2, P2O5, S & LOI.	per sample	4.1.15a	4,200	1150	48,30,000	
3.2	Chemical Analysis (Composite) for 8 radicals viz. Fe, Mn, Al2O3, SiO2, TiO2, P2O5, S & LOI.	per sample	4.1.15a	4,200	100	4,20,000	
3.3	Sp. Gravity determination	per sample	4.8.1	1,605	10	16,050	
Sub-Total 3						**52,66,050**	
4.0	**Geologist man days (1 No.) for geological map & Report (HQ)**	days	1.2	9,000	120	**10,80,000**	
Total (1.0 to 4.0)						**2,48,61,890**	
5.0	**Preparation of Exploration Proposal**	Nos	5.1	2% of the cost or Rs. 5.0 lakh - whichever is lower	1	**4,97,238**	EA has to submit the Hard Copies and the soft copy of the final proposal along with Maps and Plan as suggested by the TCC- NMET in its meeting while clearing the proposal.
6.0	**Geological Report Preparation**	Nos	5.2	For the projects having cost exceeding Rs. 150 Lakhs but less than Rs. 300 Lakhs: A Minimum of Rs.7.5 lakhs or 3% of the value of work whichever is more and Rs. 3000/- per each additional copy.	1	**7,50,000.00**	EA has to submit the final Geological Report in Hard Copies (5 Nos) and the soft copy to NMET.
7.0	**Report Peer Review Charges**	**lumpsum**	**As per EC decision**		**1**	**30,000**	
Total Estimated Cost without GST						**2,61,39,128**	
Provision for GST (18%)						**47,05,043**	GST will be reimburse as per actual and as per notified prescribed rate
Total Estimated Cost with GST						**3,08,44,171**	
				Say Rs. in Lakhs		**308.44**	

Note -

1. If any part of the project is outsourced, the amount will be reimbursed as per the Paragraph 3 of NMET SoC and Item no. 6 of NMET SoC. In case of execution of the project by EA on its own, a Certificate regarding non outsourcing of any component/project is required.

SCHEDULED TIME FOR G-3 LEVEL EXPLORATION OF IRON AND MANGANESE ORE IN JAMDA-KOIRA VALLEY IRONORE BELT IN SILPUNJI BLOCK, DISTRICT-WEST SINGBHUM, JHARKHAND													
S.No.	Activities	MONTHS											
		1	2	3	4	5	6	7	8	9	10	11	12
1	Camp setting												
3	Core drilling (2 rig)												
4	Geologist days (Field)												
5	Sampling days, core sampling												
6	Camp winding												
7	Laboratory studies												
8	Geologist days (HQ)												
9	Report writing/ Peer review												
* Commencement of project will be reckoned from the day the exploration acreage is available along with all statutory clearan													
*Time loss on account of monsoon/agricultural activity/forest clearance/ local law & order problems will be addition to above t													