PROPOSAL OF RECONNAISSANCE SURVEY (G-4 STAGE) FOR IRON, MANGANESE AND ASSOCIATED MINERALS IN JAULI-SAILWARA BLOCK (33.8 SQ. KM) DISTRICT- JABALPUR, MADHYA PRADESH

COMMODITY: IRON, MANGANESE AND ASSOCIATED MINERALS

BY

MINERAL EXPLORATION & CONSULTANCY LIMITED

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SEMINARY HILLS

PLACE: NAGPUR

DATE: 10.10.2024

GENERAL INFORMATION ABOUT THE BLOCK

	Features	Details
	Block ID	JAULI-SAILWARA G-4 BLOCK
	Exploration Agency	Mineral Exploration and Consultancy Limited (MECL)
	Commodity	Iron, Manganese and Associated Minerals
	Mineral Belt	The area belongs to the Agori Formation of Mahakoshal Group of rocks. Mineralisation of Iron is occurring in the area is associated with the soft laminated Hematite ore and Banded Iron Formation (BIF) while Manganese is associated with BIF and Phyllites.
	Completion period with entire Time schedule to complete the project	Time Line for Exploration work with Drilling is 12 months.
	Objectives	The block area falls in the vicinity of old quarries, pits and few lease hold area for Iron and Manganese. The presence of supporting lithologies for Iron and Manganese mineralization viz. the soft laminated Hematite ore, Banded Iron Formation (BIF) and Phyllites encourages taking up the G4 Exploration in the area. Field investigation done by MECL has indicated occurrence of Iron mineralization in soft laminated Hematite Ore within the proposed block. On the basis of these evidences of mineralization, the present exploration program has been formulated to fulfill the following objectives. i) To carry out Geological & Structural mapping on 1:12,500 scale for demarcation of Iron and Manganese bearing host rock for the mineralization with the structural features to identify the surface manifestations and lateral & vertical disposition of the mineralized zones. ii) To collect bedrock samples, channel samples and trench samples & to analyze for Iron & Manganese for further course of Exploration program. iii) Trenching will be done to prove the vertical and lateral extension of the mineralization.

		iv) If phase-I exploration data will give anomoulous values,10 Nos. of boreholes shall be drilled to prove the mineralization for 1st level. v) To estimate Reconnaissance Resources (334) along as per UNFC norms and Minerals (Evidence of Mineral Content) Rules-2015 at G-4 level.
	Whether the work will be carried out by the proposed agency or through outsourcing and details thereof. Components to be outsourced and name of the outsource agency	Work will be carried out by the proposed agency (MECL).
	Number of Geoscientists	Nos. of Geoscientists: 2 (1Field + 1HQ)
	Expected Field days(Geology, Surveyor)	Geologist Party days:120 field + 60 HQ
		Survey Party days : 15

1.	**Location**	
	Longitude-Latitude	Refer Block Description
	Villages	Jauli, Sailwara, Gidurha, Bhandra, Khitaula etc.
	Tehsil/Taluk	Sihora
	District	Jabalpur
	State	Madhya Pradesh
2.	**Area (hectares/ square kilometres)**	
	Block Area	33.8 sq km
	Forest Area	No Reserve Forest falls in the Block area, However, Block Partially falls in Forest Area termed as Dense Mixed Jungle in the Toposheet. No Eco Sensitive Zone and No wildlife Sanctuary.
	Government Land Area	Data not available
	Charagaha	Data not available
	Private Land Area	Part of the area is private cultivated land
	Study of DSS	Area Not Inviolate
3.	**Accessibility**	
	Nearest Rail Head	Sihora Road of West-Central Main Railway line falls in the 20 km North-West of the Proposed block. While Gosalpur Railway station falls in 18 km of WNW direction from the block.
	Road	The proposed block is well connected through

		NH-45 from Jabalpur by travelling around 67 Km via Tilsani, Baghraji. While, the block can be reached by travelling around 25 Km from Sihora via Kumhi Satdhara road.
	Airport	Jabalpur in SW Direction, about 67 km from the block area
4.	**Hydrography**	
	Local Surface Drainage Pattern (Channels)	The drainage pattern in the block is dendritic. General flow direction of the area is towards North and NE within the proposed block. A major Nala flows from the central part of the block towards northern direction.
	Rivers/ Streams	Sonthi Nadi flowing West to East in the south of the block, Hiran Nadi in the east of the block flowing in South to North direction etc. Both of these Nadi are outside of the Proposed block.
5.	**Climate**	
	Mean Annual Rainfall	Average annual rainfall is 1200 mm. The climate of the area is mainly tropical with clearly defined dry and rainy seasons. The humidity is generally low except during the monsoons.
	Temperatures (December-January) (Minimum) Temperatures (May-June) (Maximum)	Minimum temperatures 10°C Maximum temperatures up to 45°C
6.	**Topography**	
	ToposheetNumber	64A/03 & 64 A/07
	Morphology of the Area	The topography in the proposed block is undulating indicating an overall slope towards North.
7.	**Availability of baseline geoscience data**	
	Geological Map (1:50K/25K)	Bhukosh (1:50,000)
	Geochemical Map	-
	Geophysical Map (Aeromagnetic, ground geophysical, Regional as well as local scale GP maps)	
8.	**Justification for taking up Reconnaissance Survey/ Regional Exploration**	i) The area belongs to the Mahakoshal Group which is well known for various mineral resources including Iron and Manganese. ii) Mineralisation of Iron is occurring in and around the area associated with Banded Iron Formation (BIF) and Soft laminated Hematite Ore while Manganese is associated with BIF and Phyllites.

		iii) The block area falls in the vicinity of old quarries, pits and few lease hold area for Iron and Manganese . iv) MECL has conducted field visit in the proposed block. During geological traverses, MECL has observed BIF, Soft laminated Hematite Ore, Specularite ore and Phyllites at several places, collected 8 nos. of samples and analyzed them in MECL Chemical Lab. 4 Nos. of samples are showing Fe ≥35% ranging from 39.60 to 50.96 %. v) Based on the mineralization evidences of Iron in and around the block, the present Reconnaissance Survey exploration program at G-4 level has been prepared. Geological mapping, surface sampling and trenching will be helpful in assessing the lithology, lateral and vertical disposition of the mineralized zones alongwith the grade of the ore etc. vi) The Exploration will be useful in estimating th Reconnaissance Resources of iron, manganese and associated minerals in the block area. Geological mapping and Geochemical sampling of BRS/Channel/Chip Sample/ Trenching and the drilling of scout boreholes will be helpful in assessing the disposition and grade of mineralization. vii) The Reconnaissance Survey (G4) will eventually help in planning of detailed exploration program (incase upgraded to G-3 level) which in turn will facilitate the state Government for auction of block.

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1.0.0 INTRODUCTION

1.1.0 PREAMBLE

1.1.1 Hematite and magnetite are the most important iron ores in India. About 79% hematite ore deposits are found in the Eastern Sector (Assam, Bihar, Chhattisgarh, Madhya Pradesh, Jharkhand, Odisha & Uttar Pradesh) while about 93% magnetite ore deposits occur in Southern Sector (Andhra Pradesh, Goa, Karnataka, Kerala & Tamil Nadu), (Indian Mineral Year Book, IBM-2020). Karnataka alone contributes 72% of magnetite deposit in India. Out of these, hematite is considered to be the superior because of its higher grade. Indian deposits of hematite belong to the Precambrian Iron Ore Series and the ore is within banded iron ore formations occurring as massive, laminated, friable and also in powdery form (Indian Mineral Year Book, IBM-2020).

1.1.2 Iron and Manganese are integral part of steel production and crucial for a nation's industrial growth. Found widely in the Earth's crust, they have been vital since the Iron Age. India, rich in iron ore deposits, holds a strong position in global markets, with potential expansion into the Middle East and Europe. Mechanization of iron ore mining is essential for increased production and cost reduction, following the successful models from leading producers. Beneficiation of low-grade iron ore is a viable prospect, creating export opportunities and jobs.

1.1.3 Detailed exploration is needed to uncover untapped iron ore resources, including Banded Iron Formations like BHQ/Jasper and BMQ. The increasing demand for iron-manganese in India can be met through exploration of new deposits. The MMDR Amendment Act, 2015, introduced an auction system for mineral concessions, with manganese requiring state-led prospecting before auctioning.

1.1.4 On the other hand, increasing demand of manganese in the country in recent years can be eased with the exploration of new manganese deposits of economic importance.

1.1.5 The Mahakoshal Supracrustal belt is known for its mineral potentiality for Iron, Manganese, Gold, Graphite, base metals and Dolomite /Limestone. MECL has conducted desktop studies with the help of the available geoscience data and found the area in and around Jabalpur district is known for Iron and Manganese mining. MECL in association with DMG, Madhya Pradesh has looked up for the freehold area for investigation of Iron and Manganese and associated minerals around the explored Iron and Manganese blocks in Jabalpur, Jabalpur, Sidhi etc districts of Madhya Pradesh.

1.1.6 Subsequently, after receipt of consent from DMG, Madhya Pradesh, MECL has also conducted the field work to prove the presence of Iron and associated mineralization in the area. This has paved the way for the formulation of proposal for reconnaissance (G4) survey for Iron, Manganese and associated minerals in the Jauli-Sailwara Block, District Jabalpur of Madhya Pradesh. This exploration proposal is submitted to NMET for discussion, aims to assess iron, manganese and associated mineral deposits in the area.

1.2.0 LOCATION AND ACCESSIBILITY

1.2.1 The block is located in the Jabalpur district of Madhya Pradesh. The proposed block is well connected through NH-45 from Jabalpur by travelling around 67 Km via Tilsani, Baghraji. While, the block can be reached by travelling around 25 Km from Sihora via Kumhi Satdhara road. Sihora Road of West-Central Main Railway line falls in the 20 km North-West of the Proposed block. While Gosalpur Railway station falls in 18 km of WNW direction from the block. The nearest airport Jabalpur, is 67 km away from the block in SW direction. The area falls in Survey of India Toposheet No. 64A/03 & 64 A/07.

1.3.0 PHYSIOGRAPHY & DRAINAGE

1.3.1 The topography in the proposed block is undulating indicating an overall slope towards North.

1.3.2 The drainage pattern in the block is dendritic. General flow direction of the area is towards North and NE within the proposed block. A major Nala flows from the central part of the block towards northern direction.

1.3.3 Sonthi Nadi flows west to east in the south of the block. Hiran Nadi in the east of the block is flowing in south to north direction etc. Both of these Nadi are outside of the proposed block.

1.4.0 CLIMATE

1.4.1 Average annual rainfall is 1200 mm. The climate of the area is mainly tropical with clearly defined dry and rainy seasons. The humidity is generally low except during the monsoons.

1.5.0 FLORA FAUNA

The block falls in the vicinity of Budhari Reserve Forest. Main flora of the area are Mangoes, Neem (Margosa), Tendu, Mahua, Palas, Pipal, Barakar and Sagaun and main fauna are boars, Cheetal, Sambar, Rabbits, Snakes and Foxes. Large size scorpians are commonly found here which are almost jet black to brownish black in colour.

1.6.0 REGIONAL GEOLOGY

1.6.1 The central part of the Indian Precambrian Shield is characterized by the presence of two separate crustal provinces; the Northern Crustal Province, which includes the Bundelkhand region, and the Southern Crustal Province, known as Bastar Cratonic Region. The Northern Crustal Province is divided into the Bundelkhand cratonic area and a more extensive zone of accretion to its south, following an ENE–WSW trend, recognized as the Central Indian Tectonic Zone (CITZ).

1.6.2 The Southern Crustal Province i. e. Bastar Crustal Province is characterised by the widely dispersed older Supracrustals, including the Sukma Group and its corresponding units, which reveal an Archean cratonic nucleus. Regional deformation and metamorphism have occurred in these Supracrustals, along with the presence of a

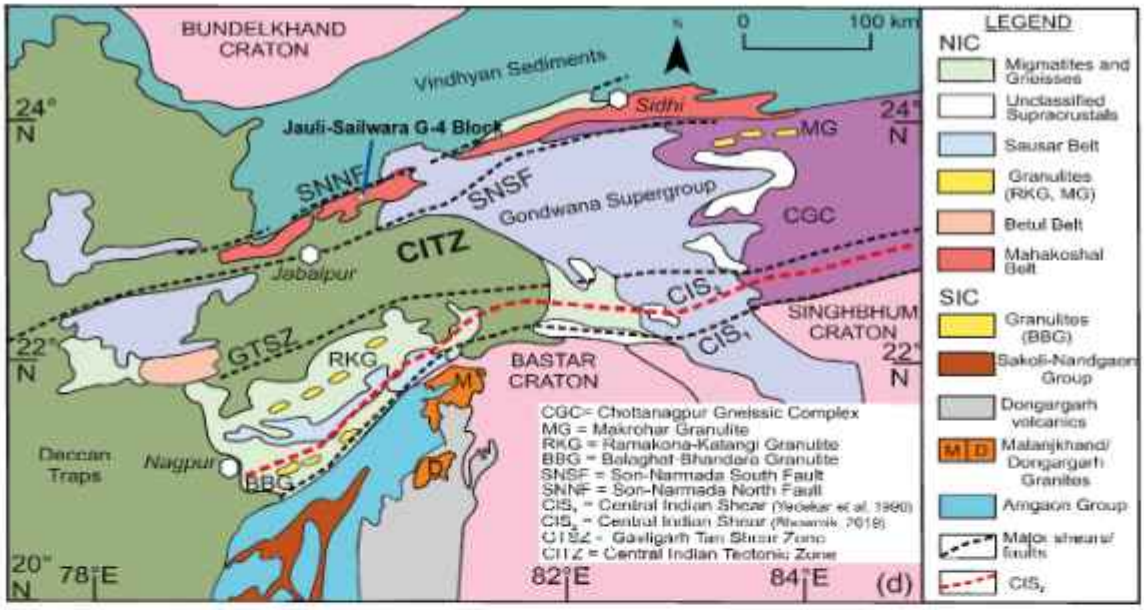
tonalite-trondhjemite-granodiorite (TTG) crust that is older than 3.0 billion years. Younger Supracrustals from the Neo-Archean to Meso-Proterozoic are also found in this region; they are arranged into distinct north-south trending volcanosedimentary belts. The intrusion of newer granitic rocks into the older and more recent Supracrustals further shapes the geological landscape.

1.6.3 The Bundelkhand Crustal Province is characterized by a semicircular granite-gneiss massif, represents the Archean cratonic nucleus (> 3.0 Ga). There are many earlier supracrustal enclaves on this massif. Covering the southern and southeast edges of the Bundelkhand massif is the Paleo- to Meso-Proterozoic Bijawar Group, which is mainly made up of volcanic rocks and metasediments. The Gwalior Group is a different metasedimentary block located in the northern region of the Bundelkhand massif. It is thought to be temporally equal to the Bijawar Group. The Indo-Gangetic alluvial cover delineates the Bundelkhand massif's northern boundary. There is an unconformable overlay of Vindhyan sediments in the Bundelkhand craton's western, southeastern, and southern regions. At the current exposure level, this overlay significantly separates it from the Mahakoshal belt of the Central Indian Tectonic Zone (CITZ), which is located to the south, and the Precambrian rocks (BGC-Aravalli-Delhi) of Western India. This geological setting outlines the complex history and stratigraphic relationships within the Bundelkhand Crustal Province.

1.6.4 The Son–Narmada North Fault (SNNF) in the north and the Central Indian Shear (CIS) in the south define the Central Indian Tectonic Zone (CITZ), formerly called as the Satpura Province in early literature (Roy and Hanuma Prasad, 2003). Several Proterozoic mobile belts (< 2.5 Ga) with syn to post-kinematic K-rich granitic bodies and locally recognized TTG (tonalite-trondhjemite-granodiorite) members are embedded in primarily undifferentiated gneiss within the CITZ. The Precambrian basement is not exposed in this area, since the Vindhyan Gondwana and the Deccan Trap rocks cover a large portion of it. In spite of this, three separate supracrustal belts with differing ages are counted—the Betul (> 1.55–0.85 Ga), the Sausar (1.1–0.95 Ga), and the Mahakoshal (2.2–1.8 Ga). These belts go north to south and are separated by shear zones that are brittle-ductile or ductile. Numerous brittle–ductile to ductile shear zones can be found in the CITZ; two prominent examples are the Son–

Narmada South Fault (SNSF), which delineates the southern boundary of the Mahakoshal belt, and the Son–Narmada North Fault (SNNF), which runs along the northern contact of the Mahakoshal belt with the Vindyans.

1.6.5 The Mahakoshal supracrustal band extends roughly 600 km from the southwest of Jabalpur, Madhya Pradesh, to the Palamau district in Jharkhand. It is oriented in an ENE–WSW to E–W orientation. It keeps its breadth constant at roughly 20 km, encompassing an area of about 9000 sq km. This belt is defined as an asymmetric rift basin that is fault-controlled, with the northern and southern boundaries being marked, respectively, by the Son–Narmada South Fault (SNSF) and Son–Narmada North Fault (SNNF). The proposed exploration block namely Jauli-Sailwara G-4 block falls within this Mahakoshal belt. Geological Map of CITZ showing the proposed Jauli-SailwaraG-4 block within Mahakoshal belt is presented as Text Figure- 1.1.



Text Figure 1.1 Geological map of the CITZ (modified after Deshmukh et al. 2017; Bhowmik, 2019) showing the location of proposed Jauli-Sailwara (G4 stage) block, Sidhi, Madhya Pradesh

1.6.6 The Vindhyan Supergroup borders the Mahakoshal band to the north, with the exception of a small portion in the Sidhi region where a linear belt of basement

(Archean) gneissic complex intervenes. Proterozoic granitic intrusive are widely distributed throughout the southern edge of the belt. In some places, they are seen contrasting with rocks from the Gondwana Supergroup, with the notable Son–Narmada South Fault running across them.

1.6.7 The Mahakoshal Group comprises various rock types, with predominant meta-sediments such as quartzite, pelites, carbonates, greywacke, and banded iron formation (BIF). Additionally, there are subordinate metabasalt and ultramafic rocks, along with infrequent occurrences of acid tuffs, intrusive mafic dyke swarms, and granitoids. Occasional intrusions of albite with alkaline affinity, as well as reported carbonatite (?) add to the geological diversity.

1.6.8 The supracrustal assemblages were divided into three formations by Roy and Devrajan (2000). Basaltic volcanic rocks dominate the lowest portion of the belt that is exposed in the northern region. They are accompanied by minor volcanic and shallow marine deposits. Pre-rift shallow marine intertidal to shelf-slope facies sedimentation features are indicated by this sediment association. A period of restricted rifting and emplacement of simple volcanic rocks with arc affinities ensued after this. Sediments with moderate to deeper water conditions, such as BIF, are situated on top of these formations.

1.6.9 Based on lithological features, Nair et al. (1995) divided the Mahakoshal formation into three formations, which is remarkably similar to the arrangement suggested by Roy and Devrajan (2000). A volcanic assemblage including basic and ultrabasic lavas along with related dykes and ultrabasic plugs makes up the lowest Chitrangi Formation. This formation, which is situated in the anticlinal valleys in the northern half of the belt, is composed of calc-chlorite schist, pillow metabasalt, epidiorite, agglomerate, and peridotitic lava in the lower layers, with small andesitic lavas in the upper lava pile.

1.6.10 The middle formation, known as Sleemanabad Formation or the Agori Formation, is composed of clastic and non-clastic sediments with minor volcanics; it also includes

lenticular bodies of dolomite and impure marble, banded hematite quartzite, banded magnetite quartzite, jasperite, and quartzite. This formation is mostly located in the northern half of the basin along the limbs of anticlines; it has ridges of quartzite and BHQ/BMQ trending ENE-WSW, which extends across the basin as lenticular bands. Depositional structures such as load casts, bedding, and color banding are observed in the BHQ/BMQ.

1.6.11 Banded Iron Formations (BIF) is found with gradational intercalation with marbles and other components throughout the Agori Formation. The BIF is sparsely bedded and forms long linear ridges. Bands of brecciated quartzite/jasper evolve from a transition to chert and cherty quartzite along the strike. The BHQ/BMQ exhibits depositional structures such as color banding, bedding and load casts.

1.6.12 In the southern portion of the belt, the Parsoi Formation which is the youngest lithounit in the Mahakoshal Group is developed in a wide synclinorium. Tuffaceous phyllites with feldspathic quartzite band intercalations are its defining feature. There are sedimentary features such as graded bedding, current bedding, convolute laminations, and slump structures, and certain phyllites are carbonaceous. Parallel to the fold axes, there is a notable intrusion of quartz veins in the Parsoi Formation.

1.6.13 The regional stratigraphic sequence of Mahakoshal Group alongwith the litho units exposed in the region is illustrated in Table 1.1 (After Nair et. al, 1995). Regional geological map alongwith the Proposed Jauli-Sailwara G-4 block is given in PLATE-II.

Table No. 1.1

Regional stratigraphic succession of Mahakoshal Group, after Nair et. al. (1995)

Group	Formation	Litho units
MAHAKOSHAL GROUP	Vindhyan Supergroup and Jungel Group of Sediments	
	Uncomformable and Faulted Contact	

Group	Formation	Litho units
	Intrusives	Dunite, gabbro, dolerite, quartz- porphyry and quartz veins, syenite and associated alkaline dykes, carbonatites, barite veins and lamprophyres/ trachytes and associated Intrusives. Barambaba granite and equivalents.
	Parsoi Formation	Tuffaceous and carbonaceous phyllites, feldspathic quartzite and conglomerate, tuffaceous phyllites with metabasalt intercalations.
	Agori Formation or Sleemanabad Formation	Banded hematite/magnetite quartzite and jasperiod with associated tuffs and ash beds. Impure marble, dolomite and inter- bedded calc-chlorite schist with occasional metabasalt lenses, conglomerate.
	Chitrangi Formation	Basic and ultrabasic plugs and dykes including periodtite and serpentinite, Agglomerates, metabasalt and peridotitic pillow lava.
Sidhi Gneissic complex (Basement)		Gneissic complex with associated mafic, ultramafic rocks and metasediments

1.7.0 REGIONAL STRUCTURE

1.7.1 Diastrophic Structures

Two major faults, the Son–Narmada South Fault (SNSF) in the south and the Son–Narmada North Fault (SNNF) in the north, encircle the Mahakoshal belt. Over the course of the Mahakoshal orogeny and later eras, these substantial faults have repeatedly been active again. There is evidence of multiple periods of deformation (D1, D2, and D3) in the rocks of the Mahakoshal Group. The belt has extended in an ENE–WSW direction as a result of the combined effects of these, of which D1 and D2 are the most intense.

1.7.2 The geometry of D1 and D2 folds indicates a predominant flattening type of strain in response to north-south compression. As flattening progressed, a distinct ductile shear

zone developed along the southern margin of the belt, coinciding with the SNSF. This shear zone exhibits a reverse slip movement with a direction towards the north.

1.7.3 The overall structural framework of the Mahakoshal belt is represented by a series of upright to slightly overturned folds on southerly dipping axial planes and the folds developed during the initial stage of deformation were refolded into nearly vertical to reclined folds during the course of the progressive deformation, especially in the vicinity of the shear zones. According to Roy and Bandyopadhyay (1990), the Supracrustal rocks of the Mahakoshal belt have been involved in folding of at least three generations (D1, D2 & D3) and the present day ENE-WSW disposition of the belt is due to the development of D1 and D2 structures. The shear zone rocks include part of the Mahakoshal Supracrustals and the granitoids occurring further on the southern margin. The mylonitic foliation within the shear zone is parallel to the schistosity of the dominant folds (D1) and sheath like folds are found in the mylonites. The North to NNW sub-horizontal shortening across a large terrain of the deformed rocks and a shearing movement superimposed over the regional strain along the steep southerly dipping slip/shear planes represented by slip faults (Abhinaba Roy and M. K. Devarajan).

1.7.4 The regional strike of the Mahakoshal Group of rocks is ENE-WSW to East-West with dips ranging from 55° to 80° towards SSE to south. Presence of isoclinal folds, asymmetrical folds and cross folds, reflect the deformational events. The earliest recognized folding which has generated tight, isoclinal, reclined folds with sub vertical axial planes is represented by a closure at Pan Umariya village located at south west of the Imaliya village. The pervasive foliation in the volcano sedimentary sequence, which strikes in ENE-WSW direction was generated during this deformation, is seen in this part of the Mahakoshal belt. The plunge of the folds is towards SSE. The second event of the deformation has developed folds with sub vertical axial planes with axis plunging very gently either ENE or WSW. Both of these events have developed folds which are co-axial but one has a gentle plunge whereas the other has steep plunge of axis. Topography in this part is also

representing ENE-WSW trending alternate hills and valleys. The third event, which has NNW-SSE axial trend with open warps where cross faults are present, has caused discontinuity or gap in these ridges. This particular activity is most important in the Mahakoshal belt for localization of mineralization.

1.7.5 The above mentioned diastrophic structures like foliation, mesoscopic and minor folds, are reflecting the deformational history of the Supracrustals in the present area. In the central part of Mahakoshal belt, fold closures of the major folds as such are not well preserved, however, some of the F2 fold closures seen in the central part are at Pan Umariya, Sihora and Tindni which also represent the large scale folds of the Mahakoshal belt. The map scale folds and minor folds have varying plunges which are either plane cylindrical or non-planar and non-cylindrical, tight to isoclinal, upright to reclined folds. These may overall represent sheath geometry. These are seen in the Sarda area (23°28'31":80°08'41", 64A/3) in the central part of the Mahakoshal belt (Singhai and Keshava Prasad, 1997-98). Plunge in the minor fold of Tindni closure, which is plane, cylindrical, upright to reclined fold, varies from 15° to 80° both towards ENE and WSW as observed in this part of the Mahakoshal belt. Such variations have been attributed to inhomogeneous nature of the strata in the area (Roy and Bandyopadhyay, 1990).

1.7.6 **Non Diastrophic Structures**

1.7.7 The non-diastrophic structures and planar features like bedding is represented by compositional layering within the BIF, colour banding in the chert and jasper bands and alternate silica rich and mica rich layers within the metapelites of the Mahakoshal belt. The colour banding in the dolomite and chert, which is a dominant unit in this part, is exhibited by light to dark greyish tone and pink to pinkish & purple impurities in chert bands. Intercalations of phyllites within the dolomite and calcareous intercalations in argillaceous rocks are reflecting the depositional characters. Thin sedimentary units, which are of arenaceous nature, are also found in the calcareous and argillaceous rocks. The variation in grain size, fineness and coarseness are characteristic of these units. Presence of intra-formational conglomerate and its

gradation towards coarseness or fineness is indicative of its depositional nature. In this part, the regional stratification is ENE-WSW to WNW-ESE with sub vertical dips varying from 70° to 80° due south. Meta basaltic flows, which occur in Shahdar and Madhana area up to east of Pan Umaria show flow structures like vesicles filled with secondary materials or minerals. Flows may contain Pahaehoe like features and these may have development of pillow structure as has been suspected form the north eastern part of Dungaria in Sleemanabad area.

1.8.0 GEOLOGY OF THE BLOCK

1.8.1 The proposed Jauli-Sailwara G-4 block is the part of the Mahakoshal greenstone belt comprising of the supracrustal metavolcanic and meta sedimentary sequences and rocks of the Agori Formation of Mahakoshal Group and later silt and laterites. Prominent lithologies present in the block are phyllites, dolomite, laterite and silt. BIF and soft laminated ore are found to be present at places.

1.8.2 The topography of the area varies according to the litho-units. BIF and ferruginous ore is present in the ridges while the alleys are mostly occupied by the phyllites. The area exhibits rugged topography with a series of hills/ridges and intervening valleys. The general trend of the rocks is ENE-WSW with moderate to steep dip dominantly towards southern direction. The tentative srtratigraphic sequence of litho units exposed in the Block area (After GSI) is given in Table 1.2.

Table 1.2
Stratigraphic sequence of the ,Jauli-Sailwara G-4 Block
(After GSI)

Group	Formation	Lithounits	Age
Quaternary		Silt	Late Cenozoic
		Laterite	
Mahakoshal	Sleemanabad Formation / Agori Formation	Phyllites	Palaeoproterozoic
		Carbonates, Dolomite	
		Quartzite/ Ferruginous quartzite/ BHQ	
----- Base Not Exposed -----			

1.9.0 MINERAL POTENTIALITY BASED ON GEOLOGY AND GROUND GEOCHEMISTRY

1.9.1 Iron and Manganese mineralization associated with the Early Proterozoic aged Mahakoshal Group of rocks has been present in the area marked by the presence of BIF and Mn bearing Phyllites etc. Previous agencies have also observed the presence of Iron and Manganese and several old working pits are present in the area. Banded Hematite Jasper (BHJ) in the area occurs mainly as a simultaneous layering of hematite and jasper. Hematite is in dark reddish-black colored and Jasper is in dark pinkish colored. Banded Hematite Quartzite (BHQ) is present in the area with an alternate layering of hematite and quartz bands. Hematite layer is having a dark reddish black colour and quartz is white in colour.

1.9.2 Phyllites are exposed in the moderate to low lying areas. In general, it represents low-grade metamorphic activities. At places, they are grey to yellow in colour but near the contact of manganese body, they are in whitish or greyish in colour. As far as a mineral constituent of manganese ore is concerned, psilomelane and pyrolusite are the dominant manganese bearing minerals in the area. Psilomelane is greyish in colour with a brownish tint and occurs as finely crystalline aggregate and colloidal form. It is strongly anisotropic with high bireflectance due to variable hardness. Pyrolusite shows greyish coloured with blueish tint and occurs as fine grains colloidal and stalactitic forms. It has also very high anisotropism and reflectance.

2.0.0 PREVIOUS WORK

2.1.0 The southern limit of Mahakoshal Group has been a matter of debate as most of the mappers had shown granite, granite gneiss, schist and metamorphics occurring to the south as basement for Mahakoshal Group. In the "Field Workshop" on Mahakoshal Group (10 &11 April 2004), it was well established that most of the granites are of intrusive nature and the enclaves of schist/phyllite within them are part of Mahakoshal Group.

2.2.0 The F.R. Mallet & Huges in 1833 surveyed the parts of Jabalpur District and identified iron ore deposits associated with BIF and laterites in the area. He

mentioned the presence of iron ore bands of varying thickness in the area. Earlier workers (Fermor, 1990; Krishnan, 1939) have described these gneisses and metasedimentary rocks equivalent to Dharwar Group of rocks.

2.3.0 Then, G.R. Rao of the DGM, MP in 1959, examined this area and referred the iron ore reserve to be low to medium grade. S.S. Mishra of the DGM, MP in 1961 established that the iron ore bands continue has vast continuation in the area.

2.4.0 Sharma R.K. (1962 - 63) and Tiwari R.K (1964- 65) mapped in and around the area and has shown banded quartzite, dolomite, phyllite and epidiorite as unclassified unit. In the basin clastic sediments were deposited first, followed by chemogenic sediments; the chert and dolomites and the intermittently basic lavas.

2.5.0 Fahim Md. And Kumar Rajesh (1985-86) has studied the Geomorphology and quaternary geology of parts of Hiran sub-basin in Jabalpur District of Madhya Pradesh. An area of 1100 Sq.km. is covered by systematic geomorphological and Quaternary geological mapping on 1:63,360 and 1:50,000 scale (Plate I & II) partially aided by air photo interpretation. Out of 1100 Sq. km., an area of 875 Sq. km. has been covered on 1:63,360 scale in the main Hiran valley, in parts of toposheet Nos. 64A/2, A/3, A/6 and A/7 and an area of 225 sq. km. has been covered on 1:50,000 scale in the Pariat catchment, a tributary of the Hiran river, in parts of toposheet Nos. 55M/15, & M/16. In addition, an area of 225 sq. km. lying in the eastern parts of toposheet No. 64A/2, eastern and southern part of toposheet No. 64A/7 has been covered by means of reconnaissance traverses aided by air photo studies. Photo interpretation map of the area falling in toposheet No. 64A/3 and A/7 is prepared by Sri A. A. Khan, Geologist (Sr.), G.S.I. Nagpur and is used in the last stages of field work.

2.6.0 Subsequent compilation of Quadrangle Geological Map (QGM) by GSI has shown these rocks as unclassified Mahakoshal and older granite gneisses. Previous exploration was conducted by Geological Survey of India, Jabalpur at G4 stage

having titled "Investigation for Iron Ore in Sihora and Gosalpur area in Jabalpur district" during FSP 2015-2017.

2.7.0 Active Mines and Exploration blocks of Iron and Manganese are there in the close vicinity of the block.

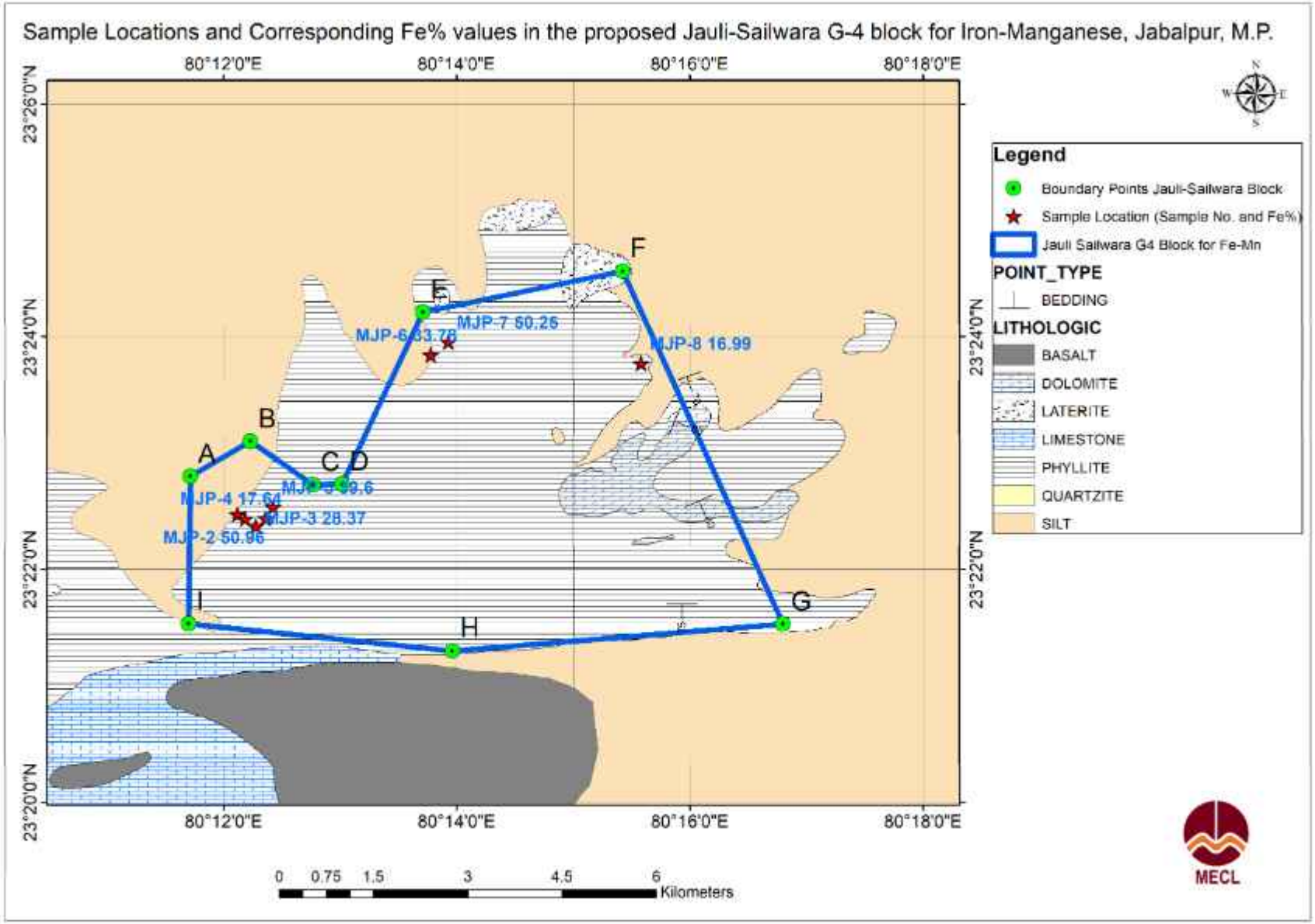
3.0.0 FIELD VISIT BY MECL

3.1.0 MECL has conducted field visit in the proposed block. During geological traverses, our team has observed BIF, Soft laminated Hematite Ore, Specularite ore and Phyllites at several places. At several places, old working for iron was also observed which were exploited in the past. A total of 8 no. of BRS/Chip samples were collected from the block area and were analyzed in MECL Chemical Lab. Out of them, 4 Nos. of samples are showing Fe ≥35% ranging from 39.60 to 50.96 %. The analytical results and details of Samples analyzed are mentioned below in table 3.1:

Table 3.1 – Details of the samples collected alongwith analysis results in Jauli Sailwara Proposed G-4 block for Iron-Manganese, District-Jabalpur, Madhya Pradesh

Sl. No.	Sample No.	Easting (m)	Northing (m)	Nearby Villages	Sample Description	Analysis Results				
						Total Fe%	Total Mn%	SiO_2 %	Al_2O_3 %	P_2O_5 %
1	MJP-1	418439	2585209	Gidurha	Soft Laminated ore, Specularite	46.44	1.45	25.31	6.86	0.09
2	MJP-2	418553	2585138	Gidurha	Soft Laminated ore, Hematite	50.96	0.75	24.24	2.94	1.03
3	MJP-3	418710	2585020	Gidurha	Enriched BHJ	28.37	1.81	39.77	8.89	0.12
4	MJP-4	418853	2585146	Gidurha	BHJ	17.64	1.17	70.19	0.84	0.44
5	MJP-5	418961	2585319	Jauli	Soft Laminated ore intercalated with Phyllite	39.60	1.63	21.55	15.09	0.11
6	MJP-6	421277	2587724	Khitaula	Limonitic ore	33.78	0.59	38.26	2.56	0.08
7	MJP-7	421535	2587928	Khitaula	Soft Laminated ore, Hematite	50.25	0.92	19.68	1.93	0.30
8	MJP-8	424350	2587570	Jauli	Limonitised BIF	16.99	0.23	67.85	1.61	0.14

3.2.0 Location of the sample collected from the mineralization area in the Proposed Jauli-Sailwara G-4 -Block for Iron-Manganese is shown in Text Figure- 3.1



Text Figure 3.1 Sample locations and corresponding Fe% values in the proposed Jauli-Sailwara G-4 block for Iron and Manganese, Jabalpur, M.P.

Photo 3.1. Soft Laminated ore, Specularite present near Gidurha village. Sample location-MJP-01

Photo 3.2. Soft Laminated ore, Hematite present near Gidurha village. Sample location-MJP-02

Photo 3.3. Limonitic ore present near Khitaula village. Sample location-MJP-06

Photo 3.4.Soft Laminated ore intercalated with Phyllite near Jauli-Gidurha village. Sample location-MJP-05

Photo 3.5. Soft Laminated ore, Hematite near Khitaula village. Sample location-MJP-07

4.0.0 BLOCK DESCRIPTION

The proposed G-4 block for Iron, Manganese and associated minerals falls in Survey of India Toposheet No. 64A/03 & 64 A/07 and covers an area of 33.8 sq km in and around villages of Jauli, Sailwara, Gidurha, Bhandra, Khitaula etc. in Jabalpur District, Madhya Pradesh. The block location is given in **PLATE-I.** The Co-ordinates of the corner points of the block area both geodetic and UTM are given in **Table No.-4.1**

Table 4.1Block Boundary Co-ordinates of Jauli-Sailwara Block for Iron-Manganese, District-Jabalpur, Madhya Pradesh (Toposheet No. 64A/03 & 64 A/07) : Area- 33.8 sq km				
Points	DD MM SS		UTM (ZONE-44N)	
	Latitude	Longitude	Easting (m)	Northing (m)
A	23° 22' 47.984" N	80° 11' 42.722" E	417753.7502	2585815.401
B	23° 23' 6.075" N	80° 12' 13.801" E	418639.0849	2586366.868
C	23° 22' 43.639" N	80° 12' 45.933" E	419547.4845	2585671.901
D	23° 22' 44.024" N	80° 13' 0.844" E	419970.8495	2585681.423
E	23° 24' 12.724" N	80° 13' 42.574" E	421170.1075	2588402.884
F	23° 24' 33.819" N	80° 15' 25.428" E	424092.8059	2589036.297
G	23° 21' 31.810" N	80° 16' 47.946" E	426406.9163	2583427.062
H	23° 21' 18.014" N	80° 13' 57.766" E	421572.7509	2583027.654
I	23° 21' 31.995" N	80° 11' 41.992" E	417719.9932	2583478.589

5.0.0 PLANNED METHODOLOGY

In accordance to the objective set for Reconnaissance Survey (G-4) of the block, the exploration programme is proposed. Accordingly, the following scheme of exploration is formulated in order to achieve the objectives. The details of different activities to be carried out are presented in subsequent paragraphs.

5.1.0 GEOLOGICAL MAPPING

Geological mapping will be done in the entire 33.8 sq km area on 1:12,500 scale. Different lithologies encountered during Geological mapping will be mapped with their contact and structural features. Surface manifestations of the ore bodies available along with their surface disposition will be marked on map. BIF and phyllites, the target lithologies for Fe and Mn in the area, shall be mapped in relation with lithologies of Mahakoshal Group of rocks.

5.2.0 SURVEYING:

During exploratory drilling of scout boreholes, fixation and determination of reduced level and co-ordinates of the boreholes will be undertaken by DGPS/ Total station.

5.3.0 SURFACE GEOCHEMICAL SAMPLING (BED ROCK/CHANNEL/CHIP SAMPLE):

During the course of Geochemical Sampling the bed rock /channel/chip samples shall be collected from the outcrops.

5.4.0 EXPLORATORY MINING (TRENCHING)

5.4.1 Trenching (Excavation) shall be carried out in the potential zones identified based on the results of geological mapping and geochemical sampling. A provision of trenching/pitting of 200 cubic meters has been planned. Trenching work will be carried out by cutting trenches of 1m width and up to 2m depth in the area to expose the BIF and Mn bearing phyllites. Locations of pits/trenches on ground will be decided by field geologist based on field observations. Trench will be geologically mapped thoroughly.

5.5.0 BED ROCK/CHANNEL SAMPLE AND TRENCH SAMPLES:

5.5.1 A total of 200 no of primary, 20 no of external check and Bedrock/Channel/Chip samples will be collected. Sample taken will be analyzed for Total Fe, Total Mn, Al_2O_3,CaO, SiO_2, P, S and Acid insolubles. A total of 22 Nos. (20 Primary + 2 Check) of selective samples may be collected from BIF and analyzed for Au by fire Assay method.

5.5.2 A total of 180 no of primary, 18 no of external check and trench samples will be collected. Sample taken will be analyzed for Total Fe, Total Mn, Al_2O_3,CaO, SiO_2 , P, S and Acid insolubles. A total of 22 Nos. (20 Primary + 2 Check) of selective samples may be collected from BIF and analyzed for Au by fire Assay method.

Note: Sample analysis for Gold will be done from the powdered samples of -100mesh. Other sample analysis will be done from the powdered samples of -200mesh.

5.6.0 CORE DRILLING:

5.6.1 Based on Geological mapping, geochemical studies and trenching (Excavation), the extension of the mineralized zones (ore bodies) will be marked. To find out the

potentiality of mineralized zones in strike & dip direction, 10 Nos of scout boreholes involving 500m of drilling will be carried out for first level of intersection of mineralized zones.

5.7.0 DRILL CORE LOGGING:

5.7.1 The borehole cores would be logged systematically. Details of the litho units, colour, structural feature, texture, mineralization, % recovery of core, rock quality designation (RQD) etc. would be recorded.

5.8.0 DRILL CORE SAMPLING:

5.8.1 The mineralized (Iron and Manganese) part of drill core will be sampled as Primary sample. The length of each sample will be kept 1.00 m within the ore zone depending upon the thickness of particular type of manganese ore and its physical character. The primary core samples will be analyzed for Total Fe, Total Mn, Al_2O_3, CaO, SiO_2, P, S and Acid insolubles. The cores of rocks 3m immediate on footwall and 3m immediate on hanging wall of mineralized zones would be sampled at 1.0 m interval, as far as possible, depending upon the intensity of mineralization, change in lithology and core recovery etc.

5.8.2 A total of 400 no primary, 40 no of External Check and samples shall be generated from the mineralized zones to be intersected in the boreholes. Samples will be analyzed for Total Fe, Total Mn, Al_2O_3,CaO, SiO_2 , P, S and Acid insolubles. 10% of Primary samples will be sent as External Check Samples to NABL External Labs. A total of 22 Nos. (20 Primary + 2 Check) of selective samples may be collected from BIF and analyzed for Au by fire Assay method.

Note: Sample analysis for Gold will be done from the powdered samples of -100mesh. Other sample analysis will be done from the powdered samples of -200mesh.

5.9.0 COMPOSITE SAMPLE ANALYSIS

5.9.1 Total 40 Nos of composite samples will be analyzed for Total Fe, Total Mn, Al_2O_3,CaO, SiO_2 , P, S and Acid insolubles.

5.10.0 WHOLE ROCK ANALYSIS:

5.10.1 Whole Rock analysis for SiO_2, Al_2O_3, Fe_2O_3, TiO_2, MnO, CaO, Na_2O, K_2O+H_2O, MgO, P_2O_5, CO_2, S and LOI will be carried out on 10 Nos samples to check the rock types, their variation in chemical composition.

5.11.0 PETROLOGICAL & MINERALOGICAL STUDIES:

5.11.1 During the course of Geological mapping and core logging, 10 samples from various litho units from surface, Pit/Trench/Channels and lithounits intersected in boreholes will be studied for petrography and 10 samples from mineralized zones will be studied for the ore mineral assemblages and their distribution, alteration, enrichment etc in polished sections.

5.12.0 TRACE ELEMENT STUDIES:

5.12.1 Trace A total of 20 nos. of primary samples for will be analyzed for 34 elements including Sc, Ti, V, Cr, Co, Ni, Cu, Zn, Ga, Ge, As, Sr, Y, Zr, Nb, Mo, Sn, Ba, La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Ta, W

5.13.0 NATURE QUANTUM AND TARGET

5.13.1 Details of the particular, Quantum and the targets are tabulated in **Table No.-5.1.**

Table No-5.1
Envisaged Quantum of proposed work in Jauli-Sailwara G-4 Block

Sl. No.	Item of Work	Unit	Proposed Quantum of work
1	Geological Mapping (on 1:12,500 Scale)	sq km	33.8
2	Survey Work		
	i) Bore Hole Fixation, RL & Coordinate Determination by DGPS	Nos	10
3	Trenching	cu m	200
4	Core Drilling (15 Scout Boreholes x 50.0 m)	m	500.00
5	Sample Preparation & Chemical Analysis		
A.	Primary samples for Iron-Manganese (Bedrock/Channel /Trench/Core Samples)		
	i) Primary samples for Total Fe, Total Mn, Al_2O_3,CaO, SiO_2 , P, S and Acid insolubles	Nos.	200+180+400=780 (Surface+Trench+BH)
B.	Primary samples for Gold etc (Bedrock/Channel /Trench/Core Samples)		
	i) Primary samples for Au by fire Assay	Nos.	20+20+20=60 (Surface+Trench+BH)
C.	Composite Samples for Iron-Manganese for Total Fe, Total Mn, Al_2O_3,CaO, SiO_2 , P, S and Acid insolubles	Nos.	40
6	Trace Elements Studies (34 Elements)	Nos.	20
7	Whole Rock Analysis		
	For SiO_2, Al_2O_3, Fe_2O_3, TiO_2, MnO, CaO, Na_2O, K_2O+H_2O, MgO, P_2O_5, CO_2, S and LOI.	Nos	10
8	Petrographic Studies	Nos	10
9	Mineragraphic Studies	Nos	10
10	Report Preparation (Digital format)	Nos.	1

6.0.0 MANPOWER DEPLOYMENT

Manpower deployment List will be provided later.

7.0.0 BREAK-UP OF EXPENDITURE

Tentative Cost has been estimated based on Schedule of Charges (SoC) of projects funded by National Mineral Exploration Trust (NMET) w.e.f. 01/04/2020. The total estimated cost is Rs. **205.88 Lakh**. The summary of tentative cost estimates for

Reconnaissance Survey (G-4 Level) is given in **Table No.-7.1** and details of tentative cost estimates are given in **Table No.–7.2**. Tentative Time schedule/action plan for proposed Reconnaissance Survey (G-4) Block is given in **Table No. 7.3.**

Table No-7.1
Summary of Tentative Cost Estimates for Reconnaissance Survey (G-4 Level) Exploration in Jauli-Sailwara Block, District-Jabalpur, Madhya Pradesh

Sl. No.	Item	Total
1	Geological Work	**3,225,488**
2	Pitting & Trenching	**666,000**
3	Laboratory Studies	**4,208,130**
4	Drilling	**8,242,680**
	Sub total	**16,342,298**
4	Report	**750,000**
5	Peer Review	**30,000**
6	Proposal Prepration	**326,845.96**
	Total	**17,449,144**
7	GST (18%)	**3,140,845.91**
Total cost including 18% GST		**20,589,990**
SAY, in Lakhs		**205.90**

Table 7.2

Estimated cost for Reconnaissance survey (G4) for Iron, Manganese and associated minerals in Jauli-Sailwara Block, District: Jabalpur, State: Madhya Pradesh.
[Block area- 33.8 sq. km; Schedule timeline- 12 months]

S. No.	Item of Work	Unit	Rates as per NMET SoC 2020-21		Estimated Cost of the Proposal		Remarks
			SoC-Item -Sl No.	Rates as per SoC	Qty.	Amount (Rs)	
A	**GEOLOGICAL WORK (1:12,500 scale)**						
i	Charges for one Geologist- Field	day	1.2	11,000	150	1,650,000	
ii	Charges for one Geologist per- HQ	day	1.2	9,000	60	540,000	
iii	2 labours/ party (Rs 522/day/labour) (As per rates of Central Labour Commissioner)	day	5.7	522	300	156,600	Amount will be reimburse as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higher
iv	Core Sampling -1 Samplers Labour charge not included	day	1.5.2	5,100	122	622,200	
v	4 labours/ party (Rs 522/day/labour) (As per rates of Central Labour Commissioner)	day	5.7	526	488	256,688	Amount will be reimburse as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higher
					Sub Total- A	**3,225,488**	
B	**PITTING AND TRENCHING**						
i	Trenching	Cu m	2.1.1	3330	200	666,000	
					Sub Total- B	**666,000**	
C	**LABORATORY STUDIES**						
1	**Chemical Analysis**						
i	**Primary & Check samples for Iron-Manganese BRS/Chip/Channel/Trench/BH samples)**						
	a. Primary Samples for Total Fe, Total Mn, Al_2O_3, CaO, SiO_2, P, S and Acid insolubles	Nos	4.1.15a	4,200	780	3,276,000	Surface Samples-200, Trench Samples-180, BH Samples-400
	b. External (10%) Check samples forTotal Fe, Total Mn, Al2O3, CaO, SiO2, P, S and Acid insolubles	Nos	4.1.15a	4,200	78	327,600	(20+18+40)
ii	**Primary & Check samples for gold (BRS/Channel/Trench/Core)**						
	a. Primary Samples for Au by Fire Assay	Nos	4.1.5a	2,380	60	142,800	Selective samples from contact of dolomite & BIF (Surface Samples-20, Trench Samples-20, BH Samples-20
	b.External Check (10%) samples for Au by Fire Assay	Nos	4.1.5a	2,380	6	14,280	
iii	**Trace element study (34 Elements)**	Nos	4.1.14	7,731	10	77,310	
iv	**Composite Sample analysis** for Total Fe, Total Mn, Al2O3, CaO, SiO2, P, S and Acid insolubles	Nos.	4.1.15a	4,200	40	168,000	
2	**Physical,Petrological, Mineralogical Studies**						
i	Preparation of thin section	Nos	4.3.1	2,353	10	23,530	
ii	Complete petrographic study report	Nos	4.3.4	4,232	10	42,320	
iii	Preparation of polished section	Nos	4.3.2	1,549	10	15,490	
iv	Complete mineragraphic study report	Nos	4.3.4	4,232	10	42,320	
v	Digital Photographs	Nos	4.3.7	280	10	2,800	
vi	Whole Rock Analysis (Major oxide and additional trace elements)	Nos	4.1.15a & b	7,568	10	75,680	
					Sub Total- C	**4,208,130**	
D	**DRILLING**						
i	Drilling upto 300m (very Hard Rock) (1 rigs)	m	2.2.1.4a	12,650	500	6,325,000	
ii	Land / Crop Compansation	per BH	5.6	20,000	10	200,000	Amount will be reimburse as per actuals or max. Rs. 20000 per BH with certification from local authorities
iii	Construction of concrete Pillar (12"x12"x30")	per borehole	2.2.7a	2,000	10	20,000	
iv	Transportation of Drill Rig & Truck associated per drill	Km	2.2.8	36	680	24,480	Certification in this regard is required to be provided (Nagpur to Jauli village- 340 km)
v	Monthly Accomodation Charges for drilling Camp (up to 2 Rigs)	month	2.2.9	50,000	4	200,000	
vi	Drilling Camp Setting Cost	Nos	2.2.9a	250,000	1	250,000	
vii	Drilling Camp Winding up Cost	Nos	2.2.9b	250,000	1	250,000	
viii	Approach Road Making (Flat Terrain)	Km	2.2.10a	22,020	5	110,100	Road Making will be considered as per the requirement and Road Making Charges will be reimbursed for max. 4 km.
ix	Bore Hole Fixation and determination of co-ordinates & Reduced Level of the boreholes and by DGPS	Nos	1.6.2	19,200	11	211,200	*10 Boreholes and 1 base station
x	One complete borehole plus mineralised cores of all the remaining Bhs	m	5.3	1,590	410	651,900	This amount will be reimbursed after successful delivery of the cores to concerned libraries/authorities
					Sub Total- D	**8,242,680**	
E					**Total A to D**	**16,342,298**	
F	**Geological Report Preparation**		**5.2**	For the projects having cost exceeding Rs. 150 lakhs but less than 300 lakhs - A minimum of Rs. 7.5 lakhs or 3% of the value of work whichever is more		**750,000**	Reimbursement will be made after submission of the final Geological Report in Hard Copies (5 Nos) and the soft copy to NMET.
G	**Peer review Charges**		**As per EC decision**			**30,000**	
H	**Preparation of Exploration Proposal**	**5 Hard copies with a soft copy**	**5.1**	2% of the Cost or Rs. 5.0 Lakhs whichever is lower		**326,846**	
I	**Total Estimated Cost without GST**					**17,449,144**	
J	**Provision for GST (18% of I)**					**3,140,846**	GST will be reimburse as per actual and as per notified prescribed rate
K	**Total Estimated Cost with GST**					**20,589,990**	
				or Say Rs. In Lakhs		**205.90**	
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 execusion of the project by NEA on its own, a Certifiate regarding non outsourcing of any component/project is required.						

Table 7.3

Estimated cost for Reconnaissance survey (G4) for Iron, Manganese and associated minerals in Jauli-Sailwara Block, Districts: Jabalpur State: Madhya Pradesh. [Block area- 33.8 sq. km; Schedule timeline- 12 months]														
S. No.	Particulars	Months /Days	1	2	3	4	5	6	Review	7	8	9	10	11	12
1	Camp Setting	months													
2	Geological Mapping	months													
3	Survey days	days													
4	Trenching	cu.m													
5	Drilling (1 rig)	m													
6	Geologist days	days													
7	Sampling days, Core Sampling	days													
8	Camp winding	months													
9	Laboratory Studies	months													
10	Geologist days, HQ	days													
11	Report Writing with Peer	months													

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PLATES:

1. Plate-I: Location Map of the Proposed Jauli-Sailwara block, Distt Jabalpur, State Madhya Pradesh
2. Plate-II: Regional Geological Map with Proposed Jauli-Sailwara block, Distt Jabalpur, State Madhya Pradesh
3. Plate-III: Sample locations and corresponding Fe% values in the proposed Jauli-Sailwara G-4 block, Distt Jabalpur, State Madhya Pradesh.

Sample Locations and Corresponding Fe% values in the proposed Jauli-Sailwara G-4 block for Iron-Manganese, Jabalpur, M.P.

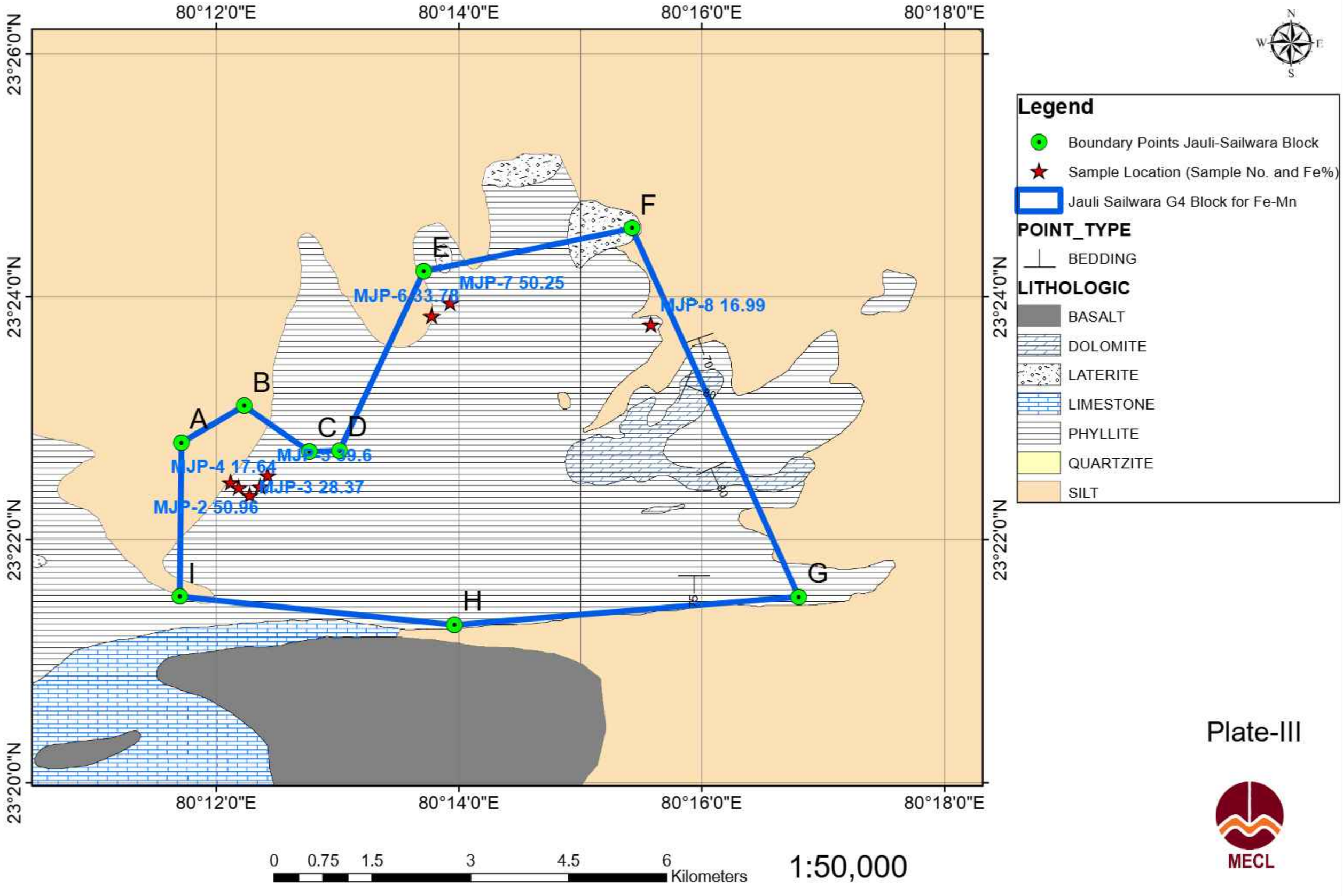
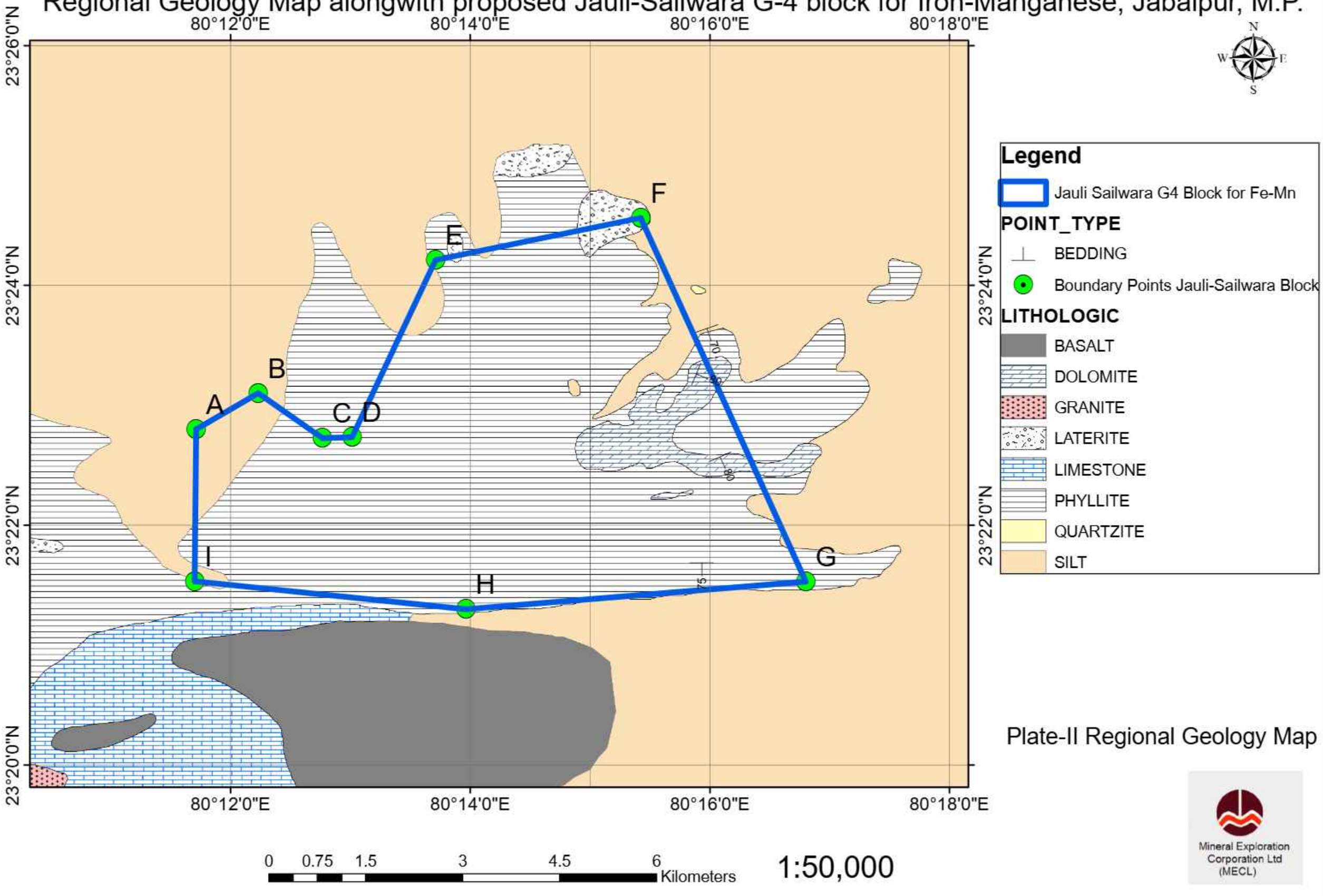


Plate-III

MECL

Regional Geology Map alongwith proposed Jauli-Sailwara G-4 block for Iron-Manganese, Jabalpur, M.P.



Legend

- Jauli Sailwara G4 Block for Fe-Mn

POINT_TYPE

- BEDDING
- Boundary Points Jauli-Sailwara Block

LITHOLOGIC

- BASALT
- DOLOMITE
- GRANITE
- LATERITE
- LIMESTONE
- PHYLLITE
- QUARTZITE
- SILT

Plate-II Regional Geology Map

0 0.75 1.5 3 4.5 6 Kilometers

1:50,000

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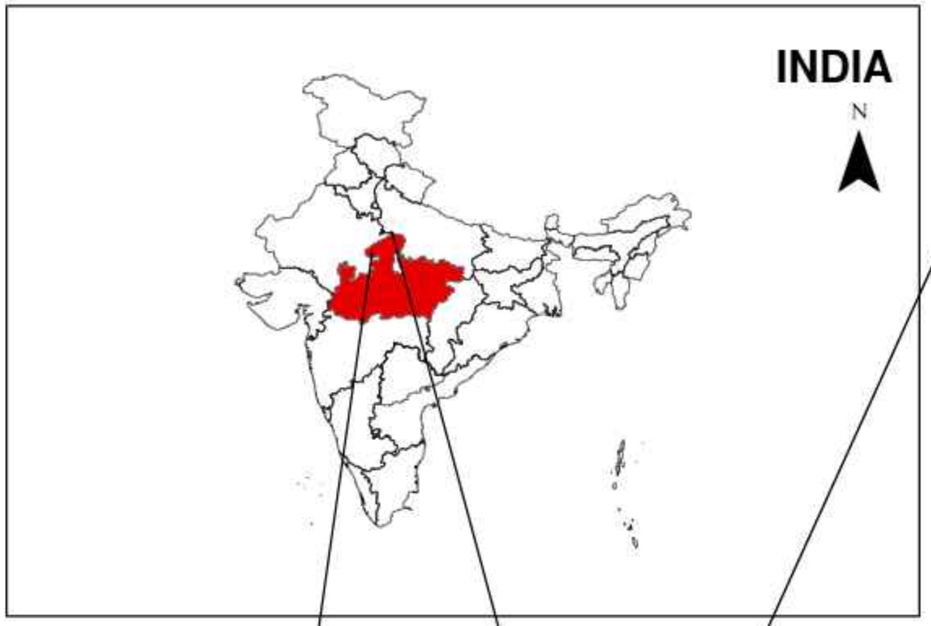
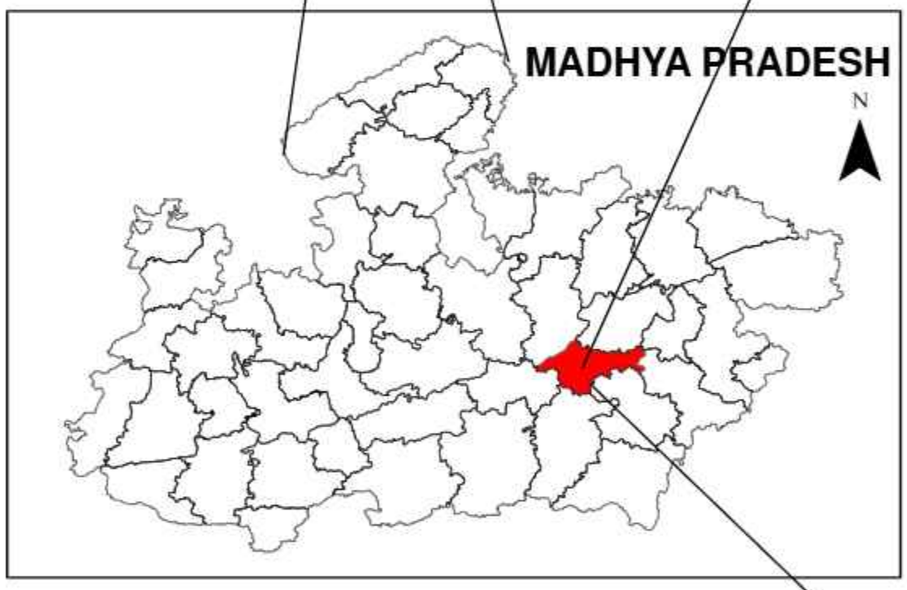
Location Map showing Jauli-Sailwara G-4 block for Iron-Manganese, Jabalpur, M.P.





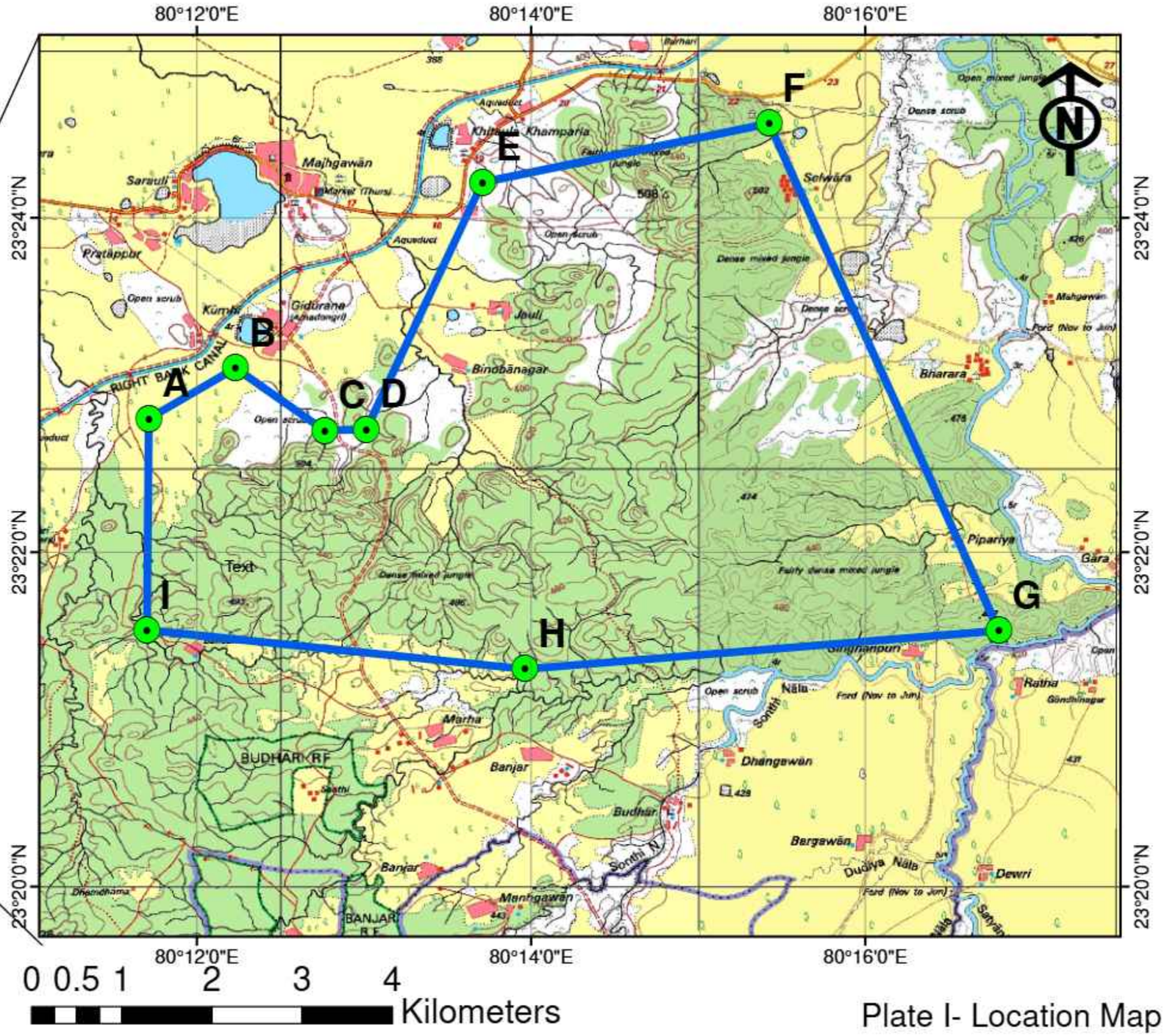


Plate I- Location Map

1:50,000

Block Boundary Co-ordinates of Jauli-Sailwara Block for Iron-Manganese, District-Jabalpur, Madhya Pradesh (Toposheet No. 64A/03 & 64 A/07) : Area- 33.8 sq km

Points	DD MM SS		UTM (ZONE-44N)	
	Lattitude	Longitude	Easting	Northing
A	23° 22' 47.984" N	80° 11' 42.722" E	417753.7502	2585815.401
B	23° 23' 6.075" N	80° 12' 13.801" E	418639.0849	2586366.868
C	23° 22' 43.639" N	80° 12' 45.933" E	419547.4845	2585671.901
D	23° 22' 44.024" N	80° 13' 0.844" E	419970.8495	2585681.423
E	23° 24' 12.724" N	80° 13' 42.574" E	421170.1075	2588402.884
F	23° 24' 33.819" N	80° 15' 25.428" E	424092.8059	2589036.297
G	23° 21' 31.810" N	80° 16' 47.946" E	426406.9163	2583427.062
H	23° 21' 18.014" N	80° 13' 57.766" E	421572.7509	2583027.654
I	23° 21' 31.995" N	80° 11' 41.992" E	417719.9932	2583478.589

Legend

- Boundary Points Jauli-Sailwara Block
- Jauli-Sailwara_Fe-Mn_Block

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