PROPOSAL FOR PRELIMINARY (G-3) EXPLORATION FOR IRON AND BAUXITE ORE IN AMOCH-CHHAPRA BLOCK, DISTRICT- JABALPUR & KATNI, MADHYA PRADESH

COMMODITY: IRON & BAUXITE

BY

MINERAL EXPLORATION AND CONSULTANCY LIMITED
DR. BABASAHAB AMBEDKAR BHAWAN
SEMINARY HILLS
NAGPUR (MH)

PLACE: NAGPUR
DATE: 02.05.2024

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

	Features	Details
	Block ID	AMOCH ï CHHAPRA BLOK
	Exploration Agency	Mineral Exploration And Consultancy Limited (MECL)
	Commodity	Iron & Bauxite
	Mineral Belt	Mahakoshal
	Completion period with entire Time schedule to complete the project	11 months
	Objectives	1. To check the lateral and depth continuity of Iron and Bauxite ore by systematic drilling up to 50m depth. 2. To estimate preliminary mineral resource (333) and grade for Iron and bauxite ore as per UNFC and MEMC- 2015. 3. To facilitate the State government to auction the block as a mining lease.
	Whether the work will be carried out by the proposed agency or through outsourcing	Work will be carried out by the proposed agency (MECL).
	Name/Number of Geoscientists	Two no. Geoscientists
	Expected Field days	Geologist Party days:120 days at field 60 days at HQ
1.	**Location**	
	Block boundary corner points	
	Villages	Amoch, Chhapra
	Tehsil/Taluk	Sihora

Cardinal Points	Easting	Northing	Latitude	Longitude
A	416353.203	2608185.871	23° 34' 55.106" N	80° 10' 48.897" E
B	417247.387	2607101.093	23° 34' 20" N	80° 11' 20.659" E
C	418361.606	2607783.755	23° 34' 42.4" N	80° 11' 59.828" E
D	419798.529	2607079.965	23° 34' 19.775" N	80° 12' 50.655" E
E	420536.592	2607368.743	23° 34' 29.296" N	80° 13' 16.635" E
F	419250.648	2609276.798	23° 35' 31.107" N	80° 12' 30.9" E

	District	Jabalpur & Katni
	State	Madhya Pradesh
2.	**Area**	
	Block Area	4.86 Sq. Km.
	Forest Area	Part of Amoch Reserve Forest
	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	Sihora Road (10 Km)
	Road	The area can be accessed via National Highway 7, State Highway 48
	Airport	Jabalpur in SW Direction (50 km)
4.	**Hydrography**	
	Local Surface Drainage Pattern (Channels)	Small seasonal nalas originating from ENE-WSW running hill ranges flow through the plains in a north to north-west direction.
5.	**Climate**	
	Mean Annual Rainfall	The annual average rainfall recorded is about 1560 mm
	Temperatures (December) (Minimum) Temperatures (June) (Maximum)	Minimum temperatures $5^{O}C$. Maximum temperatures up to $46^{O}C$.
6.	**Topography**	
	Toposheet Number	64A/02
	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 411 metres from the MSL and the highest ridge top has the maximum elevation of 510 meters above the MSL.
7.	**Availability of baseline geosciences data**	
	Geological Map (1:50K/25K)	Geological map on 1:12500 scale (Source: MECL)

	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. The area belongs to the Mahakoshal Group which is well known for various mineral resources including Iron, Bauxite & Gold. 2. Mineralisation of Iron is occurring around the area associated with Banded Iron Formation (BIF) while Manganese is associated with BIF and Phyllites. Occurrence of PGE and Au in laterite has been reported by GSI. 3. Several active Mines of Iron and Bauxite are there in the close vicinity of the block including an exploration block of NMDC in south of the proposed block for Fe-Mn. 4. During reconnaissance survey (G4), MECL has delineated this Amoch-Chhapra sub-block within Salaiya block. Aluminous laterite with intermixed with bauxite is reported in this block, having maximum 51.25% Fe and 47.14% Al_2O_3. 5. MECL, further recommended for systematic drilling in this block to upgrade in G3 level and resource in inferred category may be established. 6. Establishing the extent and depth continuity of the iron and alumina-rich laterite along with inferred resources (333) would enable the state government to auction the block, providing a Mining License (ML) for both iron and bauxite ore.

PROPOSAL FOR PRILIMINARY (G-3) EXPLORATION FOR IRON AND BAUXITE ORE IN AMOCH-CHHAPRA BLOCK, DISTRICT- JABALPUR & KATNI, MADHYA PRADESH

1.1.0 INTRODUCTION

1.1.1 The significance of bauxite and iron in the industrial landscape cannot be overstated. Bauxite, as the primary source of aluminum, fuels a multitude of industries worldwide, from transportation to construction, owing to its versatile properties and extensive applications. Meanwhile, iron, a fundamental component of steel, stands as the cornerstone of industrialization, driving economic growth and development since ancient times.

1.1.2 India, endowed with rich reserves of both bauxite and iron ore, occupies a pivotal position in the global mineral market. Its strategic location, coupled with abundant resources, presents immense opportunities for further exploration, development, and utilization of these vital minerals. However, despite India's substantial mineral wealth, there exist untapped potentials and challenges that necessitate comprehensive strategies and interventions.

1.1.3 This proposal aims to delineate a holistic approach towards the exploration, extraction, beneficiation, and utilization of bauxite and iron resources in India. By addressing technological advancements, market dynamics, environmental considerations, and policy frameworks, this proposal endeavors to optimize the contribution of these minerals to India's economic prosperity while ensuring sustainability and inclusivity in the mineral resource sector.

1.1.4 Bauxite, a key source of aluminum production, is predominantly comprised of minerals like gibbsite, boehmite, and diaspore. Its classification varies according to commercial applications such as abrasives, cement, and metallurgy. India boasts a significant position in the global aluminum industry, maintaining consistent production capacity at 41.00 lakh tonnes annually. However, bauxite production witnessed a 10% decrease in 2017-18 compared to the previous year. Bauxite is a complex mixture, containing hydrated aluminum oxides, hydroxides, clay minerals, and other insoluble minerals. The country's bauxite reserves as of 1.4.2015 stood at 3,896 million tonnes, with the majority being metallurgical grade. Odisha holds the largest share of resources at 51%, followed by Andhra Pradesh, Gujarat, Madhya Pradesh, Maharashtra, and Madhya Pradesh & Chhattisgarh.

1.1.5 Iron, a fundamental metal since the Iron Age, remains integral to industrial growth and economic development. India, with vast iron ore resources totaling approximately 22.487 billion tonnes, ranks among the world's leading producers. Hematite and magnetite are the primary iron ore minerals, with hematite dominating reserves at 83%. Odisha leads national production with 40%, followed by Karnataka (14%) and Madhya Pradesh (11%). The National Steel Policy 2017 aims for 300 million tonnes of steel production by 2030

and a per-capita steel consumption of 160 kg by 2030-31. Achieving these targets amidst export demands necessitates the development of new iron ore deposits through exploration efforts.

2.1.0 BACKGROUND INFORMATION

2.1.1 The Mahakosal 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 Sihora of Jabalpur district is known for Iron, Bauxite and Manganese mining. This paved the way for the formulation of proposal for reconnaissance (G4) survey for Iron, Manganese and associated minerals in the Salaiya Block, Madhya Pradesh, spanning Jabalpur, Katni, and Umaria districts. This exploration proposal has been submitted to 50th TCC of NMET for discussion, aims to assess iron and associated mineral deposits, contributing to India's minerals sector and economic growth.

2.1.2 The 50th TCC of NMET approved Reconnaissance Survey (G4) in Salaiya block, Madhya Pradesh and received approval from Executive Committee (EC) of NMET on April 3, 2023. This comprehensive survey, encompassing iron, manganese and associated minerals, was conducted from 20th June, 2023 to 19th October, 2023. After review in 63rd TCC of NMET, the FGR (Final Geological Report) has been submitted in March, 2024.

2.1.3 In the FGR of Reconnaissance Survey (G4) in Salaiya block, two significant laterite bodies with respect to iron and bauxite ore deposit have been identified viz. Amoch-Chhapra Sub block and Majhauli Sub block. It was recommended to take up systematic drilling in these two blocks to estimate resource so that state government can auction through issuing Mining Lease (ML).

2.1.4 Out of these two recommended sub-blocks, w.r.t iron and bauxite deposits, Preliminary Exploration (G3) proposal of Amoch-chhapra block, with 400m drilling in 8 boreholes, has been proposed in 65th TCC of NMET.

3.1.0 LOCATION AND ACCESSIBILITY

3.1.1 The Amoch-Chhapra Block encompasses the region delineated in Survey of India Toposheet No. 64A/02, spanning an area of 4.86 square kilometers. This geographical expanse spans across portions of two districts, namely Jabalpur & Katni within the state of Madhya Pradesh. The study area conveniently located approximately 40km from Jabalpur on NH-7 and around 60km from Katni, also accessible via NH-7. The Sihora Road Railway Station, situated approximately 10km from the block, serves as the nearest rail link. The Jabalpur airport is the closest air transportation hub.

CARDINAL POINT COORDINATE OF AMOCH-CHHAPRA BLOCK, DISTRICT: JABALPUR & KATNI, MADHYA PRADESH (G-3 LEVEL)

Cardinal Points	Easting	Northing	Latitude	Longitude
A	416353.203	2608185.871	23° 34' 55.106" N	80° 10' 48.897" E
B	417247.387	2607101.093	23° 34' 20" N	80° 11' 20.659" E
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4.1.0 PHYSIOGRAPHY, DRAINAGE AND CLIMATE

4.1.1 The Amoch-Chhapra block and its surroundings present a diverse topography, characterized by a generally flat terrain with monotonous soil cover. To the south, ENE-WSE trending hill ranges, reaching a maximum height of 510m above MSL, are covered by the Amoch-Chiulapani reserve forests. The terrain becomes uneven north of Amoch, transitioning into a hilly area with long ridges trending ENE-WSW, alternating with valleys and nalas along the margins. The minimum elevation is 411m above M.S.L. To the sleemnabad part, the topography is undulatory, marked by ENE-WSW trending hillocks, with flat terrain mostly covered by dolomite & phyllite.

4.1.2 The Amoch-Chhapra block and its surroundings features a diverse drainage pattern influenced by both structure and lithology. Small seasonal nalas originating from ENE-WSW running hill ranges flow through the plains in a north to north-west direction, feeding either small rivers or large tanks common in the region. The rectilinear and joint-controlled flow characterizes nalas from ridges, while flat terrains exhibit sub-parallel to trellis-type drainage. In this area 3rd order Silpuri nala flows south to join Narmada river system. Also minor canals originating from local reservoirs/ water bodies in this area made for irrigation purpose.

4.1.3 The study area is characterized by a subtropical climate, marked by distinct seasonal variations. Winters are relatively cool, with temperatures dropping to as low as 5°C, while summers can be hot and semi-dry, reaching up to 46°C. The region experiences an average annual rainfall of about 1560 mm, with the monsoon active from July to September, contributing significantly to the precipitation.

5.1.0 PREVIOUS WORK

5.1.1 The earliest significant survey dates back to 1833 when F.R. Mallet & Hughes conducted a comprehensive examination of the Jabalpur District. Their findings identified iron ore deposits associated with Banded Iron Formation (BIF) and laterites, noting variations in the thickness of iron ore bands.

5.1.2 In the mid-1960s, geologists from the Directorate of Geology and Mining (DGM) in Madhya Pradesh conducted a survey, mapping, and preliminary estimation of iron ore deposits around Sihora in the Jabalpur district.

5.1.3 In field season 1969-71, Choudhary & Natarajan (GSI) has reported occurrence of Platinum and silver (150 gm/ton) in lithomearge of bauxite of the dhangawan area, which falls within Amoch-Chhapra block. Subsequently, during 1995-96, GSI carried out geochemical sampling for PGE, Au, Ag and base metals in various litho units of the dhangawan area. The laterite/bauxite samples of some old queries have analyzed up to 0.19 ppm Au.

5.1.4 In 1983, Jha and Gurusiddappa conducted a detailed study of the Mahakoshal Group in the Sihora - Majhauli area. Their findings included the occurrence of BIF, phyllite, and a lateritic cap over the supracrustals, hosting several iron ore pockets.

5.1.5 Singhai and Prasad, during field session 1997-98, conducted specialized thematic mapping around Sihora and Majhauli area and expressed possibilities of Iron ore in BHC, classified as protore and recommended for small scale mining.

5.1.6 Mineral Exploration and Consultancy Limited (MECL) has carried out G4 level exploration, with mapping and channel sampling, in Salaiya block and delineated this Amoch-Chhapra area as potential block for iron and bauxite deposit. A total of 104 nos. of samples have been collected, of which 35 samples are having >35% Fe content (IBM threshold) and 34 samples have >30% Al_2O_3 content (IBM threshold). The average iron content in laterites was 42.26%, reaching a maximum of 51.25%, while the average alumina content stood at 34.82%, with a maximum of 47.14%, based on IBM threshold values.

6.1.0 GEOLOGY OF THE AREA

6.1.1 The Amoch-Chhapra block falls within the Mahakoshal supracrustal belt, an ENEï WSW to Eï W-oriented structure stretching approximately 600 km from southwest Jabalpur to Palamau district. It covers 110.56 sq km across Jabalpur, Katni, and Umaria in Madhya Pradesh. The Mahakoshal Group includes meta-sediments, metabasalt, ultramafic rocks, acid volcanic tuffs, mafic dykes, and granitoids. Nair et al. categorized it into Chitrangi, Agori (Sleemnabad), and Parsoi Formations. The Agori (Sleemnabad) Formation comprises clastic and non-clastic sediments, featuring Banded Iron Formations (BIF) with BHQ/BMQ and ridges trending ENE-WSW. The BIF transitions to chert and brecciated quartzite/jasper along the strike.

6.1.2 The study area within the Mahakoshal Group reveals distinct geological features of Agori (Sleemnabad) formation. Supracrustals are distributed around Chhapra, Amoch, Nimas, Sleemnabad, and Mahagwan, with intervening spaces covered by Quaternary alluvial deposits or laterite. Prominent ferruginous quartzite ridges, in the north of the study area, transit into cherty quartzite, brecciated quartzite, and banded quartzite jasper with

Manganese. Dolomite mines are present north of the ridges, covered by laterite. The tops and slopes of the ferruginous ridges are covered by a substantial layer of laterite, presenting a diverse color spectrum from yellow to greyish-white, transitioning to light to dark brown with increasing ferruginous content. Moving south, phyllite exposures and metabasalt occurrences are observed, forming discontinuous hillocks. The Amoch area displays a supracrustal sequence, featuring quartzite/chert bands, dolomite, phyllite (manganiferous in some areas), and banded quartzite chert/jasper. The sedimentary sequence indicates continuous deposition without unconformities.

6.1.3 Iron ore is closely associated with specific BIF formations (BHJ/BHC, phyllites, and laterites) in the study area. Residual concentration processes contribute to high-grade red oxide deposits. Laterite capping acts protectively, influencing ore localization. Variable hematite forms impact economic viability, with iron content ranging from 12% to 51% Fe.

6.1.4 Bauxite mineralization is favored by lateritic environments, observed in the northern part. Pisolitic bauxite forms through lateritic weathering. Underlying rock composition, including phyllite and BHJ/BHQ formations, affects bauxite characteristics. Highly weathered basic rocks contribute to bauxite in Majhauli Khalari. Rich ferruginous content may challenge economic viability, yet ongoing mining indicates interest.

6.1.5 **Common rock types**

Metasedimentary litho-units encompass both clastic and non-clastic compositions. The clastic components consist of Quartzite, Phyllite, and BIF, while the non-clastic components are primarily dolomite with minor occurrences of cherts.

Cherty Quartzite/ Ferruginous quartzite/ Banded Quartzite Jasper: The banded quartzite in the area displays yellow to greyish-white colors, often featuring patches of red jasper. As the ferruginous content increases, the quartzite transitions to light to dark brown hues. These quartzites form parallel bands, constituting prominent ridges in the region, occasionally associated with conglomerates. The outcrops are bouldery and lack of penetrative structures. Manganese encrustations within vugs are observed at some locations and iron-rich laterite occurs as float in specific areas. The quartzite outcrops are generally oriented in an ENE-WSW direction. Some portions of the quartzite show ferruginous characteristics and may be brecciated. Secondary calcite/carbonate infillings are present within vugs. In slopes, the ferruginous quartzite tends to exhibit moderate lateritization. The brecciated segments, being more ferruginous, often contain hematite fragments.

Phyllite: exposures of phyllite are visible in the road section of Dhagawan and north of Hathwai village. Primary banding is rarely observed in these rocks, with only an ENE-WSW trending pervasive foliation present. Garnets are sporadically noticed in these phyllites. The rock is light to dark grey in color, fine-grained, and schistose. It exhibits two different generations of quartz veins, with the first being syngenetic and forming

along with the phyllitic deformation. This generation creates alternate phyllite and quartz bands. The second generation quartz vein is post-deformation and fills fractures/joints. Shearing is evident in the phyllite, manifesting as the development of phyllitic fish and augen-shaped primary quartz. The sense of shearing is sinistral, and a crude crenulation has formed due to this shearing. The attitude of the phyllitic plane strikes at 70° with a 50° dip towards the south. In some areas, the phyllites undergo significant silicification and gradually transition into argillaceous quartzite. Thin quartzite bands are intercalated within the phyllite, and various basic intrusives traverse the rocks as sills.

Laterite: Extensive laterite cover dominates the central and southern parts of the mapped area, particularly around the east of Amoch and north of Mahagwan village. Additionally, laterite capping is evident on a low-lying ridge near Majholi and Khalari villages, along with several mounds in the east of Dundi village. The laterite displays a spectrum of colors ranging from yellow to brick-red. Various types of laterites, including massive/laminated, concretionary, vermicular, and vesicular, are observed, showcasing inhomogeneity and density. Thin coatings of Fe/Al oxides and hydroxides are visible in the vesicles or voids. Laterite formations are commonly found alongside banded quartzite jasper at the slopes.

In naked-eye observations, goethite and hematite are discernible, indicating high iron content. Alumina concentration is notable in and around Majholi village. These laterites contain lumps of platy or biscuity hematite, cemented by a minimal ferruginous matrix. The parent rock for these laterites is identified as Banded Hematite Chert (BHC). In specific locations, such as west of Amoch and around Majholi village, yellow ochre pockets are visible in these laterites, commercially exploited for their valuable content. It is plausible that the laterite formation was not uniform but rather pocket-type.

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 bauxite identified during G4 work by proposing systematic drilling up to 50m depth

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

7.1.3 To facilitate the state government of Madhya Pradesh 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 Amoch-Chhapra 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 **Pitting:** Exploratory excavation to be carried out up to 2m depth by digging 1m X 1m pits, to check the depth continuity in the low lying area or at the slopes of the lateritic mounds. A total of 20 cu.m excavation to be carried out. This will help the field geologist to judicially plan the location of subsequent boreholes.

8.1.4 **Core Drilling:** The present exploration scheme is prepared by proposing 8 nos. of vertical boreholes based on the geological mapping and channel sampling carried out in the G4 level exploration programme. 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.

8.1.5 **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.

8.1.6 **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 400 Nos. primary samples and 40 Nos External Check samples (10% of Primary samples). 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 10% 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 20 nos. of primary samples will be collected from laterite/bauxite core and will be analyzed for Cu, Pb, Zn, Ni, Co & Au by AAS method. Further, 5 samples will be collected from lithomearge for analysis of PGE by ICP-MS method.

8.1.7 **Determination of Bulk Density:** To calculate the resource, volume of the ore body need to be multiplied with a density factor. Hence, Bulk density will be determined from 5 nos. pits (1m X 1m X 1m) in iron/bauxite ore for determination of Bulk Density.

9.1.0 QUANTUM OF WORK

9.1.1 The following quantum of work has been proposed for G3 level exploration for Iron & bauxite ore in Amoch-Chhapra block:

Sl. No.	ITEMS OF WORK	UNIT	Proposed Quantum for Amoch-Chhapra Block
1	Geological Mapping (1:4000 scale)	Sq. Km	4.86
2	Topographic Survey (2m contour interval)	Sq. Km	4.86
3	Borehole fixation and Block boundary DGPS Survey	Nos.	14 (8 Bhs + 6 Boundary points)
4	Excavation (Pitting)	Cu.m	20
5	Drilling (Core)	m.	400 (8 Bhs)
6	Primary Sample (Core/Pit) for Cu, Pb, Zn, Ni, Co & Au by AAS method	Nos.	20
7	Primary Sample (Core) for 8 radicals (Fe, Mn, SiO_2, Al_2O_3 , TiO_2, P_2O_5, S & V_2O_5) by XRF technique	Nos.	400
8	Check Sample for 8 radicals (Fe, Mn, SiO_2, Al_2O_3 , TiO_2, P_2O_5, S & V_2O_5) by XRF technique	Nos.	40
9	Primary Sample for PGE by ICP-MS method		5
10	Bulk Density	Nos.	5
11	**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, mapping, pitting, drilling, core logging, sampling, associated geological work and laboratory work will be completed within 8 monthsôtime. Report writing will take 4 monthsôtime with 1 month overlapping with laboratory analysis. Thus, the total duration of the project for completion of the above exploration will be 11 months from the date of commencement of the project. Review will be done after 6 months.

SCHEDULED TIME FOR G-3 LEVEL EXPLORATION OF IRON AND BAUXITE ORE IN AMOCH - CHHAPRA BLOCK, DISTRICT- JABALPUR & KATNI, MADHYA PRADESH													
S.No.	Activities	MONTHS											
		1	2	3	4	5	6		7	8	9	10	11
1	Camp setting												
2	Trenching												
3	Core drilling (1 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.													

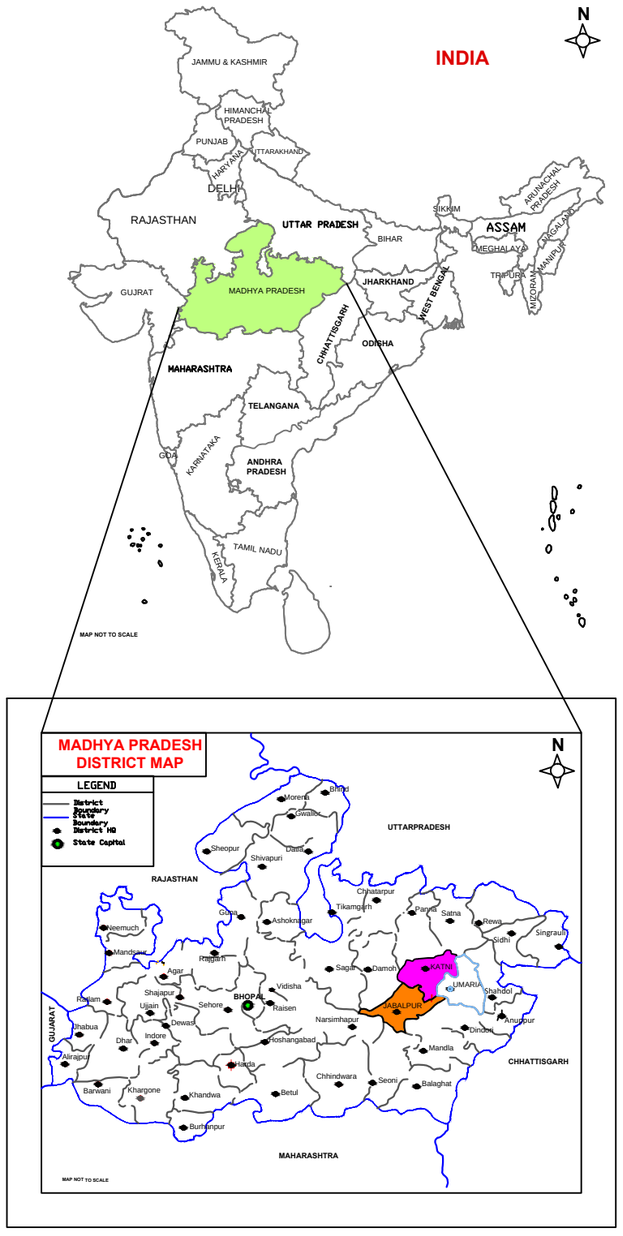
10.1.2 Cost has been estimated based on actual schedule of rates mandated in the circular OM No. 61/1/2018/NMET dated 31st March 2020 for NMET funded Projects. The total estimated cost is Rs. 150.44 Lakhs. The summary of cost estimates for this G3 level exploration is given below:

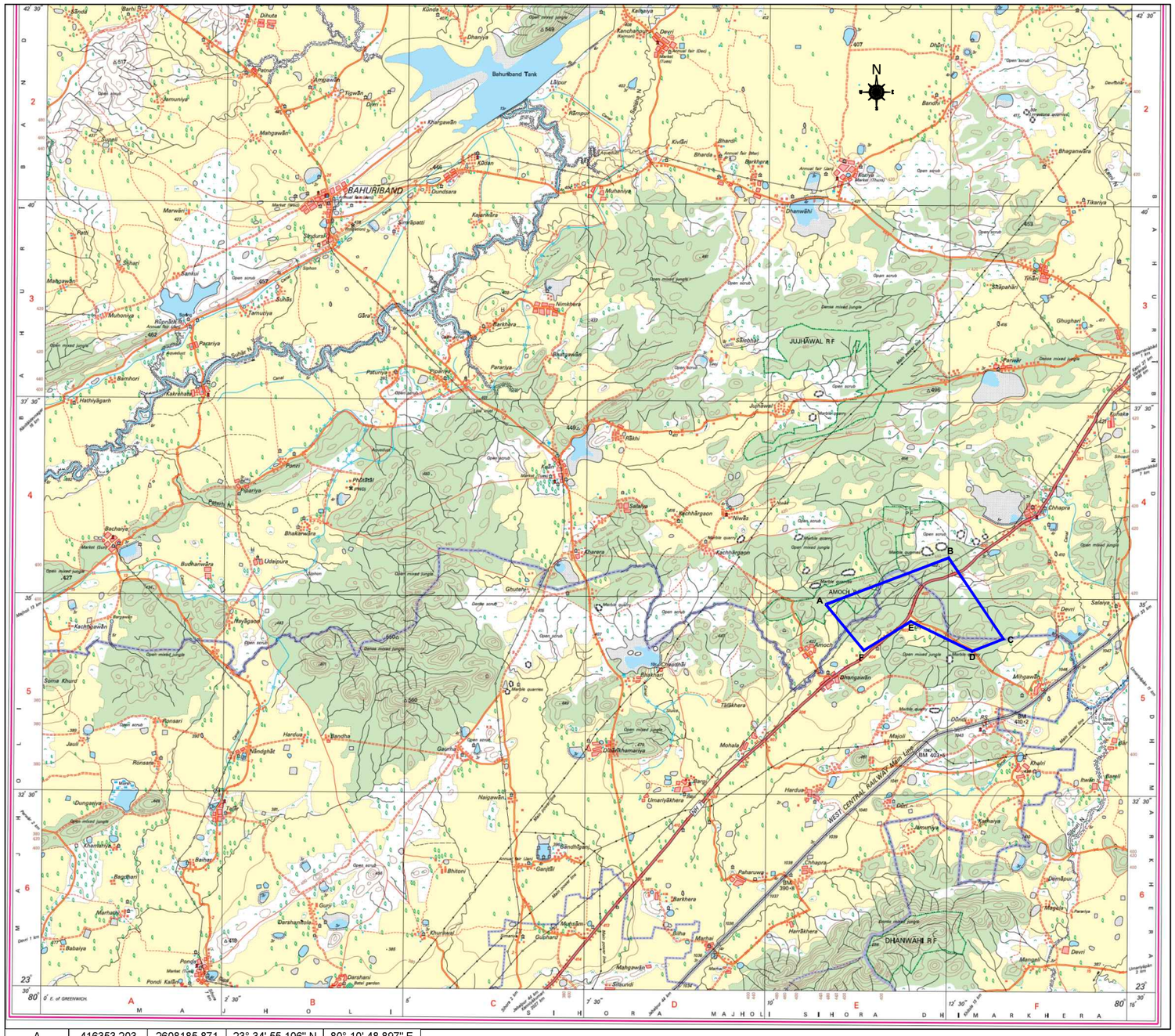
Summary of Cost Estimates

Sl. No.	Item	Total Estimated Cost (Rs.)
1	Geologist mandays Core logging, sampling	2,446,200
2	Excavation	76,000
3	Drilling	6,573,000
4	Labrotary studies	1,981,520
5	Geologist at HQ	810,000
	Sub Total (1 to 4)	11,886,720
5	Exploration Report Preparation	594,336
6	Proposal Preparation	237,734
7	Peer review charges	30,000
8	Sub Total (1 to 8)	12,748,790
9	GST 18%	2,294,782
	Total:	**15,043,573**
	Say Rs. In Lakh	**150.44**

Enclosures:

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





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D	419798.529	2607079.965	23° 34' 19.775" N	80° 12' 50.655" E
E	420536.592	2607368.743	23° 34' 29.296" N	80° 13' 16.635" E
F	419250.648	2609276.798	23° 35' 31.107" N	80° 12' 30.9" E

PROPOSED BLOCK BOUNDARY

MINERAL EXPLORATION & CONSULTANCY LIMITED

LOCATION MAP

PRELIMINARY EXPLORATION (G3 STAGE) FOR IRON & BAUXITE IN AMOCH–CHHAPRA BLOCK (4.86 Sq.Km)

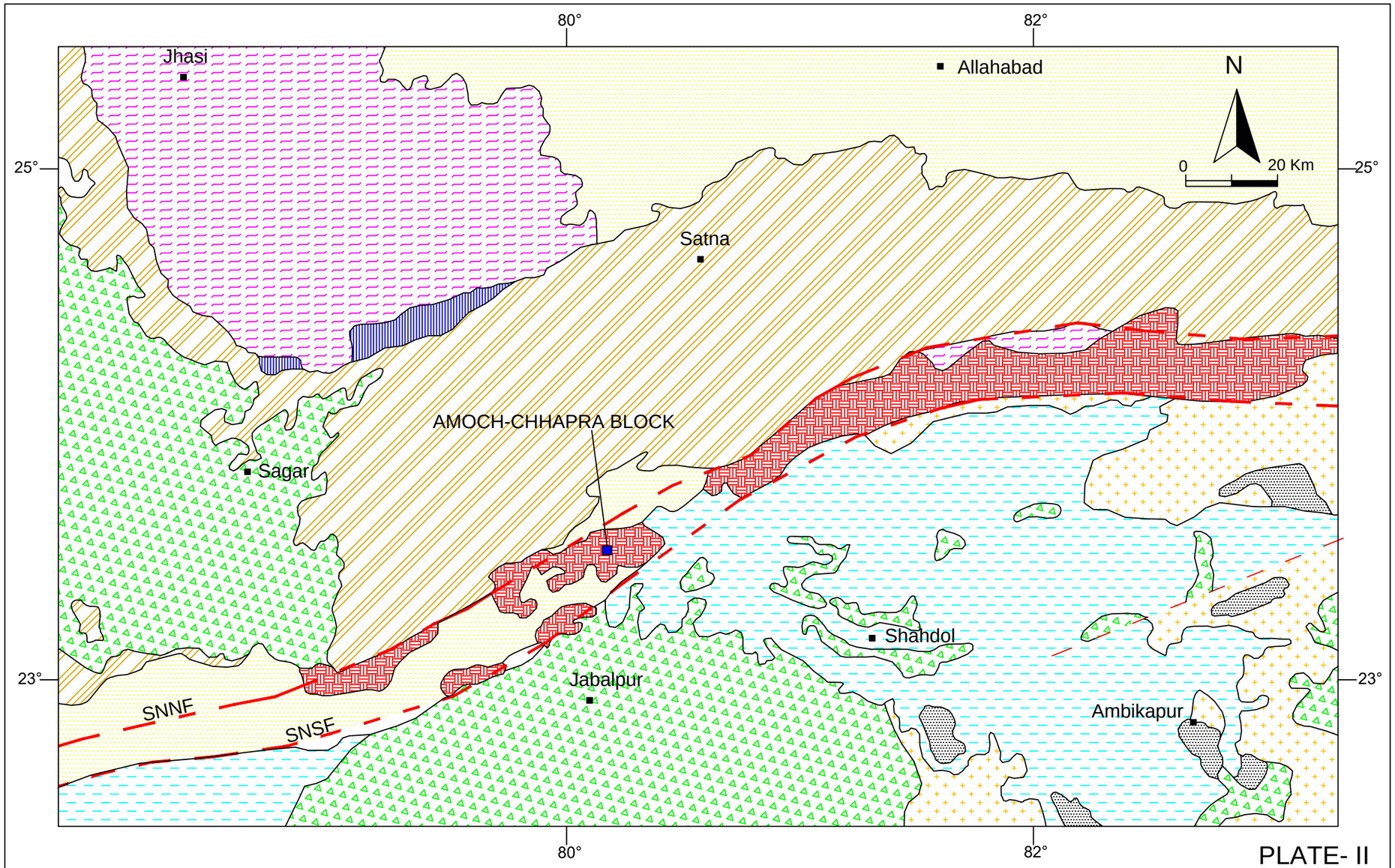
DISTRICT : JABALPUR & KATNI | STATE : MADHYA PRADESH

PART OF TOPOSHEET NO:–64A/02 | NOT TO SCALE

Prepared by :
Survey & map section
Exploration Division, MECL, Nagpur

MECL/CHQ/EXPLORATION/MAY–2024 | PLATE NO. I | 1

Regional Geological Map of Amoch-Chhapra block, Dist- Jabalpur & Katni, Madhya Pradesh



Alluvium
Deccan Trap
Gondwana Supergroup
Vindhyan Supergroup
Unclassified Supracrustal
Bijawar Group
Younger Granitoids
Bundelkhand Granite-gneiss complex
Mahakoshal Group

SNNF= Son-Narmada North Fault
SNSF= Son-Narmada South Fault

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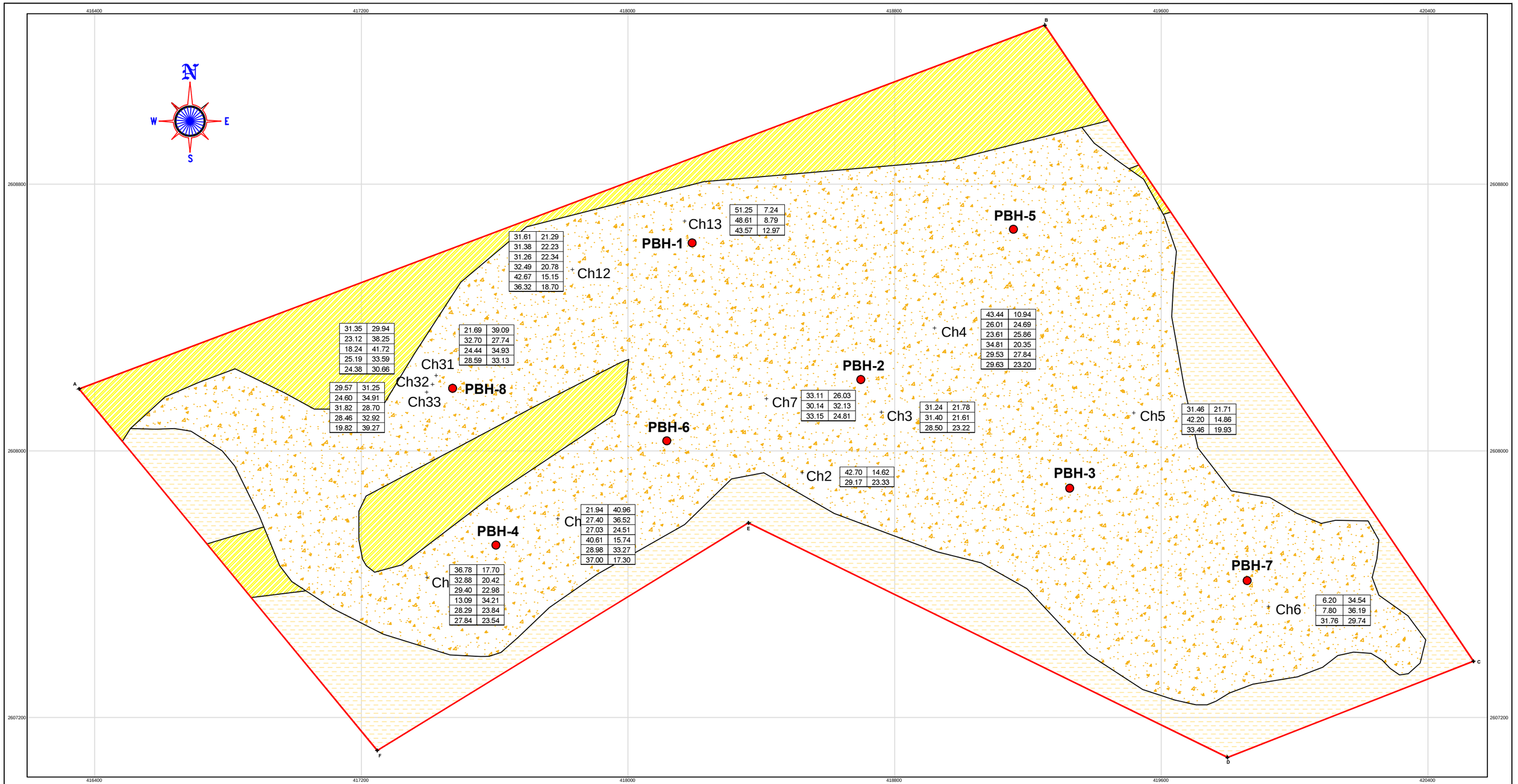
Govt. of India, A Miniratna PSE



Block Name	Cardinal Points	Easting	Northing	Latitude	Longitude
Amoch-Chhapra Block	A	416353.203	2608185.871	23° 34' 55.106" N	80° 10' 48.897" E
	B	417247.387	2607101.093	23° 34' 20" N	80° 11' 20.659" E
	C	418361.606	2607783.755	23° 34' 42.4" N	80° 11' 59.828" E
	D	419798.529	2607079.965	23° 34' 19.775" N	80° 12' 50.655" E
	E	420536.592	2607368.743	23° 34' 29.296" N	80° 13' 16.635" E
	F	419250.649	2609276.798	23° 35' 31.107" N	80° 12' 30.9" E

Laterite/ Aluminous Laterite/ Bauxite
Ferruginous Quartzite
Phyllite

PBH-1 Proposed borehole location

Amoch-Chhapra block (4.86 Sq. Km)

+Ch11

Fe%	Al_2O_3%
36.78	17.70
32.88	20.42
29.40	22.98
13.09	34.21
28.29	23.84
27.84	23.54

Location of channel samples drawn during G4 level exploration along with assay values of Fe and Al_2O_3

SCALE
100 0 100 200 400m

मिनरल एक्सप्लोरेशन एंड कंसल्टेंसी लिमिटेड
(पूर्व में मिनरल एक्सप्लोरेशन कारपोरेशन लिमिटेड)
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ESTIMATED COST FOR G-3 LEVEL EXPLORATION OF IRON AND BAUXITE ORE IN AMOCH-CHHAPRA BLOCK, DISTRICT-JABALPUR & KATNI, MADHYA PRADESH
Total Area - 4.86 Sq. Km; Drilling- 400.00m, Completion Time - 11 Months, Review: after 6 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 (Field) man days for core logging/mapping/ Sampling/topographic survey	days	1.3	11,000	120	13,20,000	
1.2	Unskilled Labour (Field) (2 workers per geologist)	per worker	5.7	522	240	1,25,280	Amount will be reimburse as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higher
1.3	Survey Party Days for topographic survey	days	1.6.1a	8300	30	2,49,000	
1.4	Unskilled Labour (Survey) (4 workers per Surveyer)	Days	5.7	522	120	62,640	Amount will be reimburse as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higher
1.5	Sampling man days - Sampler (core sample,) Labour charge not included	day	1.5.2	5,100	60	3,06,000	
1.6	4 labours/ party (Rs 431/day/labour) (As per rates of Central Labour Commissioner) for sampling work	day	5.7	522	240	1,25,280	Amount will be reimburse as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higher
1.7	Determination of co-ordinates and Reduced Level (RL) of boreholes by DGPS including boundary corner points.	Nos.	1.6.2	19200	14	2,68,800	Boreholes 05 Nos. + Block Boundary 04 Nos.
Sub-Total 1						**24,57,000**	
2.0	**Excavation**						
2.1	Pitting	Cu.m	2.1.2	3,800	20	76,000	
Sub-Total 2						**76,000**	
3.0	**Drilling**						
3.1	Drilling -Very hard rock (up to 300m)	m	2.2.1.5a	12,650	400	50,60,000	
3.2	Land / Crop Compansation (in case the BH falls in agreecultural Land)	per BH	5.6	20,000	8	1,60,000	Asper actual
3.3	Construction of concrete Pillar (12"x12"x30")	per borehole	2.2.7a	2,000	8	16,000	
3.4	Transportation of Drill Rig & Truck associated per drill (for 2 rig)	Km	2.2.8	36	350	12,600	1600 Km to and fro for one rig
3.5	Monthly Accomodation Charges for drilling Camp (up to 2 Rigs)	month	2.2.9	50,000	5	2,50,000	
3.6	Drilling Camp Setting Cost	Nos	2.2.9a	2,50,000	1	2,50,000	
3.7	Drilling Camp Winding up Cost	Nos	2.2.9b	2,50,000	1	2,50,000	
3.8	Road Making (Rugged-Hilly Terrain)	Km	2.2.10b	32,200	5	1,61,000	
3.9	Drill Core Preservation	per m	5.3	1,590	260	4,13,400	
Sub-Total 2						**65,73,000**	
4.0	**Laboratory Studies**						
4.1	Primary + Check Sample - 8 radicals viz. Fe, Mn, Al_2O_3, SiO_2, TiO_2, P_2O_5, S & LOI by XRF technique	per sample	4.1.15a	4,200	440	18,48,000	
4.2	Primary sample for Cu, Pb, Zn, Ni, Co & Au by AAS method	per sample	4.1.7a	2,841	20	56,820	
4.3	Primary sample for PGE by ICP-MS	per sample	4.1.5d	11,800	5	59,000	
4.4	Bulk Density determination	per sample	4.1	3,540	5	17,700	
Sub-Total 3						**19,81,520**	
5.0	**Geologist man days (1 No.) for geological map & Report (HQ)**	days	1.2	9,000	90	**8,10,000**	

Total (1.0 to 5.0)						**1,18,97,520**	
5.0	**Preparation of Exploration Proposal**	Nos	5.1	2% of the cost or Rs. 5.0 lakh - whichever is lower	1	**2,37,950**	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. 50 Lakhs but less than Rs. 150 Lakhs: A Minimum of Rs.2.5 lakhs or 5% of the value of work whichever is more and Rs. 3000/- per each additional copy.	1	**5,94,876.00**	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						**1,27,60,346**	
Provision for GST (18%)						**22,96,862**	GST will be reimburse as per actual and as per notified prescribed rate
Total Estimated Cost with GST						**1,50,57,209**	
					Say Rs. in Lakhs	**150.57**	

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.