

**PROPOSAL FOR RECONNAISSANCE SURVEY (G-4 STAGE)
FOR TUNGSTEN, TIN AND BASE METALS IN DATIA-BIJAPUR BLOCK
(152.33 SQ.KM AREA)
DISTRICTS- DATIA AND SHIVPURI, MADHYA PRADESH
(PART OF TOPOSHEET NO. 54K/6)**

COMMODITY: TUNGSTEN, TIN & BASE METALS

BY

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PLACE: NAGPUR

DATE: FEB 2022

SUMMARY OF THE BLOCK FOR RECONNAISSANCE SURVEY (G-4 STAGE)
GENERAL INFORMATION ABOUT THE BLOCK

Features	Details
Block ID	DATIA-BIJAPUR
Exploration Agency	Mineral Exploration Corporation Limited (MECL)
Commodity	TUNGSTEN TIN AND BASE METALS
Mineral Belt	Proposed area forms the western fringe of Bundelkhand Gneissic complex with indication of Tungsten and Tin mineralization which are essentially confined to the contacts of TTG and quartzites and with medium to fine grained granites. sulphide mineralization forms sparse dissemination in the quartz vein with dominance of pyrite and minor amount of chalcopyrite, covellite, bornite and galena
Completion period with entire Time schedule to complete the project	15 Months
Objectives	Based on NGCM carried out of GSI during F.S 1996-97, it was reported tungsten anomaly of 500-775 ppm in the proposed area and two copper anomalies of 775 and 945 ppm, Pb anomaly of 665 ppm. Further, based on the evaluation of previous work, the present exploration program has been formulated to fulfil the following objectives. i) To collect surface (Bedrock/soil/stream sediment) samples & analyze for W, Sn, Mo, Cu, Pb & Zn for further course of Exploration program. ii) In case, collected surface/bedrock/stream sediment samples giving positive results, channels/trenches will be made and sample for expose the mineralization. then based on the results of sampling, 5 Nos. scout boreholes shall be drilled which in turn will decide the future course of Exploration program at G-3/G-2 category of UNFC. iii) To estimate reconnaissance W, Sn, Mo, Cu, Pb & Zn., resources along with accessory elements 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.
Name/Number of Geoscientists	Nos. of Geoscientists: 2
Expected Field days (Geology, Geophysics, surveyor)	Geologist Party days: 180
	Survey Party days: 240

1.	Location					
	Latitude - Longitude	S No	Geographic co-ordinate WGS-84		UTM ZONE 44N	
			Longitude	Latitude	Easting	Northing
		A	78°15'12.897"	25°39'34.435"	224289.1837	2840846.612
		B	78°21'33.823"	25°43'22.595"	235058.00	2847653.00
		C	78°24'31.747"	25°35'18.466"	239727.7479	2832653.049
		D	78°16'37.070"	25°35'5.506"	226464.2125	2832519.689
	Villages	Jigna, Pistura, Govindpur, Chhata, Kua Tiwari, Bebapur, datia, and Bilhari khurd				
	Tehsil/Taluk	Narwar & Karera, Tehsil				
	District	Datia & Shivpuri				
	State	Madhya Pradesh				
2.	Area (hectares/ square kilometres)					
	Block Area	1523.3 ha / 152.33 sq.km				
	Forest Area	The block co-ordinates were subjected in the Decision Support System (DSS) of Forest department, Ministry of Environment, Forest and Climate Change (MOEFCC). It has been found that the block area is under “not inviolate”. (Go)-Non-Forest area.				
	Government Land Area (Bilanam)	Data not available				
	Charagaha	Data not available				
	Private Land Area	Part of the area is private, cultivated land				
3.	Accessibility					
	Nearest Rail Head	Datia 5km				
	Road	NH 44 passes near the block connecting Datia & Jhansi				
	Airport	Gwalior 50km				
4.	Hydrography					
	Local Surface Drainage Pattern (Channels)	The dendritic drainage.				
	Rivers/ Streams					
5.	Climate					
	Mean Annual Rainfall	Average annual rainfall is 852 mm				
	Temperatures (December) (Minimum)	Minimum temperatures 7.1°C (Jan),				
	Temperatures (June) (Maximum)	Maximum temperatures up to 42.1°C (May)				
6.	Topography					
	Toposheet Number	54 K/06				
	Morphology of the Area	Area has undulatory topography with inselbergs of residual hills and narrow serrated ridges of quartz reefs. Proposed area has ground has a top elevation has 350msl and lowest elevation 200msl.				
7.	Availability of baseline geoscience data					
	Geological Map (1:50K/25K)	Bhukosh Geological Map (downloaded from GSI portal) of Study area (1:100000 scale)				
	Geochemical Map	Available				
	Geophysical Map (Aeromagnetic, ground geophysical, Regional as well as local scale GP maps)	Not Available				
8.	Justification for taking up Reconnaissance Survey/ Regional Exploration	i) NGCM carried out of GSI during F.S 1996-97, it was reported tungsten anomaly of 500-775 ppm in the proposed area and two copper anomalies of 775 and 945 ppm, Pb anomaly of 665 ppm.				

		ii) The Exploration will be helpful in estimation of reconnaissance resources (334) of Tungsten, Tin, copper, Lead & Zinc and other accessory minerals in block area. iii) The Reconnaissance Survey (G4) will eventually help in planning for General exploration program (in case upgraded to G-3/G-2 level) or which in turn will facilitate the state Government for auction of block at G-4 level exploration under composite license.
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**PROPOSAL OF RECONNAISSANCE SURVEY (G-4 STAGE) FOR TUNGSTEN, TIN AND
BASE METALS IN DATIA-BIJAPUR BLOCK (152.33 SQ.KM AREA)
DISTRICTS- DATIA AND SHIVPURI, MADHYA PRADESH**

1.0.0 Introduction

- 1.1.1 Tungsten, also known as wolfram, is a very rare dense lustrous greyish-white to steel grey metal with unique properties. It has highest melting point and has highest tensile strength at temperatures above 1650⁰C and lowest coefficient of expansion of any pure metal. Tungsten does not occur freely in nature as metal, the most important tungsten minerals are Scheelite (CaWO₄), Stozlite (PbWO₄) and Wolframite, which is a solid solution or a mixture or both of the isomorphous substances ferrous tungstate (Fe WO₄) and Manganous tungstate (Mn WO₄). All primary tungsten deposits are associated with granitic intrusions or with medium-to high grade metamorphic rocks. Tungsten deposits are usually located in orogenic belt resulting from subduction related collision plates.
- 1.1.2 The total reserves/resources of tungsten ore in the country, as per NMI data, based on UNFC system, as on 1.04.2015 have been estimated at 87.39 million tonnes with WO₃ content of 142,094 tonnes. All these resources are placed under 'remaining resources' category. Following states have their share in descending order Karnataka, Rajasthan, Andhra Pradesh and Maharashtra.
- 1.1.3 Tin (Sn) is the scarce element having an incidence of 2ppm in the earth's crust. Pure tin is a silvery-white metal which is soft and malleable. It does not occur naturally as metal. By far, the most important tin mineral is cassiterite (SnO₂), which, in its purest form contains 78.6% tin. The less common tin ore is stannite (Cu₂ SnFeS₄). Tin is now used mostly for tin plating, soldering special alloys and in making bronze.
- 1.1.4 Tin occurs in primary as well as secondary (alluvial or placer) forms. Occurrences of tin in primary as well as secondary forms have been reported from Bihar, Chhattisgarh, Haryana, Himachal Pradesh, Jammu & Kashmir, Karnataka, Odisha, Rajasthan and West Bengal. The total reserves/resources of tin ore in the country as per NMI data, based on UNFC system, as on 1.4.2015 are placed at 83.73 million tonnes containing about 1,02,413 tonnes metal which are placed under remaining resources.
- 1.1.5 Copper with its unique physical, mechanical and electrical properties, has played a vital role in the industrial growth of a nation. In India, around 75% of demand is met through imports. The increasing demand of copper metal in the country could be eased with the exploration of new copper deposits of economic importance. Porphyry copper mineralization occurs in I-type of granites.
- 1.1.6 The total reserves/resources of copper ore as on 1.4.2015 as per NMI database based on UNFC system are estimated at 1.51 billion tonnes. Of these, 207.77 million tonnes (13.74%) fall under 'Reserves category' while the balance 1.30 billion tonnes (86.25%) are 'Remaining resources' category.

1.2.0 Background

- 1.2.1 Exploration for strategic, critical, precious, rare earths and PGE are given top priority by Govt. of India, after amendment of MMDR act 2015. Keeping in view, the present proposal is being put up for Reconnaissance Survey. Keeping in view Reconnaissance survey (G-4) level proposal is been prepared for NMET funding and execution.

1.3.0 Location and Accessibility

1.3.1 The block is located in Karera, Narwar Tehsil of Shivpuri district and Datia Tehsil of Datia District, Madhya Pradesh. The nearby railway station is Datia which falls within the block. The nearest airport is at Gwalior, which is away at about 50 Km. The area falls in Survey of India Toposheet No.54 K/06.

1.4.0 Physiography

1.4.1 Proposed block is located in the western fringe of the Bundelkhand Gneissic Complex and has undulatory topography with inselbergs of residual hills and narrow serrated ridges of quartz reefs. The pediplain and numerous lithological controlled hills and ridges are abundant. The highest elevation of the area is 335 m in western part of Datia town and lowest elevation is 200m which falls in NW corner of the proposed block.

1.4.2 The drainage pattern in the area is of dendritic type. Drainage system falls under Ganga basin. The regional slope of the area is towards north and northeast and so most of the river flows towards north and northeast. The area is mainly drained by tributaries of the Sind and Mauhar Rivers. These are Sukhan, Kasna, Karondi, Gardhar, Tundhar, Sonya, Somia, Aunrha and Parron in TS No. 54K/06

2.0.0 Regional Geology

2.0.1 The area is part of Bundelkhand gneissic complex (which covers about 26000 sq.km in Uttar Pradesh and Madhya Pradesh). BGC, is a highly deformed granite–greenstone terrane (ultramafics, amphibolites, fuchsite quartzites, banded iron formation, schists, marble and calc–silicates and Tonalite–Trondhjemite–Granodiorite (TTG) rocks) profusely intruded by undeformed granitoids (Basu, 1986; Sharma, 1998). The craton is separated from the Bastar and Singhbhum Cratons by the Narmada–Son lineament in the south and from Aravalli's by the Great Boundary Fault (GBF) in the west. It is bounded to the north-east by the Mesoproterozoic-aged Vindhyan Basin and Phanerozoic alluvium and to the south by the northern edge of the Deccan Traps volcanic rocks. The present proposed area of investigation lies in the northern fringe of Bundelkhand craton. Regional stratigraphic succession is given as below **Table I.A.** and regional geological map with the proposed Block is given in **PLATE-II.**

Table I.A
Regional Stratigraphic sequence of (After GSI, 2013)

LITHOLOGY	FORMATION	GROUP	SRPER GROUP	AGE
Alluvium				
Laterite & bauxite				
Purple sandstone, quartzite sandstone. Basal polymictic conglomerate (Clasts of Quartz and Jasper).	Sumen sandstone	Kaimur	Vindhyan	Mesoproterozoic
Unconformity				
Grey shale, greenish shale, alternate bands of gritty sandstone. Intra formational polymictic conglomerate	Dhala	Semiri		Mesoproterozoic
Collapse Breccia, Felsic volcanics & tuff	Mohar	Mohar Cauldron Assemblage		Paleo to Mesoproterozoic

LITHOLOGY	FORMATION	GROUP	SRPER GROUP	AGE
Mafic dykes, aplite, pegmatite Quartz reefs fine grained pink Nayakhera Granite and medium grained grey to pink granite	Intrusive	Bundelkhand Gneissic Complex		Early to Late Archean
Volcano sedimentary sequence (dacite-andesite with calc silicate inter-bands, rhyolite /micro granite)				
Tonalite trondhjemite granodioritic gneiss (TTG Suites)		Bundelkhand Gneissic Complex		Late Archean

 Present proposed area.

2.1.0 Geology of the Block

2.1.1 Proposed area has flat topography with isolated hills (in central part) and narrow ridges (in south eastern part). Its flat terrain with thin veneer of granitic soil lithologically the area is occupied by Bundelkhand granitoids and Chambal alluvium, details of the rock types occurring in the proposed block is as follows.

2.1.2 Tonalite- Trondhjemite Gneiss (TTG): Tonalite - Trondhjemite Gneiss (TTG) are the oldest rocks exposed in this area. They occur as enclaves and linear bodies of various dimensions within younger granites.

2.1.2.1 TTG, are exposed as isolated enclaves of variable dimensions which have been reported in and around villages Jigna, Udgawaon, Sinora, Bijaupur, Haltai, Bebapur and Baroni Khurd. Dimensions vary from a few m to 2.5km.

2.1.2.2 Megascopically these gneisses are medium grained, bluish grey to grey in colour and hard, compact and fresh. They are mainly composed of grey feldspar, quartz, biotite and hornblende. The gneissosity of the rock is poor to moderately developed and marked by alternate quartzo-feldspathic and mafic bands. The gneissosity exhibits foliation, which is marked by preferred orientation of feldspar and mafic minerals generally biotite flakes and hornblende laths. These rocks are associated with syntectonic pegmatite veins, which show good development of pygmatic folds at places.

2.1.2.3 Thin section studied from the tonalite gneiss exposed in the study area show porphyritic texture with phenocrysts of plagioclase, albite, big flakes of biotite and hornblende within groundmass of quartz, perthite, hornblende and biotite.

2.1.2.4 Tungsten presence was analyzed in these TTG, whose values vary from 500-700 ppm at TTG exposures falling near the villages Dang Karera, Jigna, Bilhari, Kalothra, Chhata, Salaya and Bebapur.

2.1.3 Granodiorite Gneiss

2.1.3.1 These rocks are mainly exposed in and around Datia, Kali Pahari, Dang Karera. Isolated enclaves are exposed at Margawan village.

2.1.3.2 Megascopically the rock is light grey in colour and medium grained. It is mainly composed of phenocrysts of grey feldspar, biotite and quartz. Occasionally phenocrysts up to 4 cm in length are also noticed in the rock. The foliation of the rock is marked by preferred orientation of feldspar phenocrysts and biotite.

2.1.3.3 granodiorite gneiss exposed east of Margawan comprises plagioclase, microcline-perthite, strained quartz and biotite as major mineral constituents with accessory amount of apatite, zircon and opaques. The plagioclase laths are randomly oriented and most of them are saussuritized. Their composition varies from oligoclase to andesine and a few laths contain euhedral crystals of apatite.

2.1.4 Porphyritic Granite:

2.1.4.1 This rock type is most wide spread in the area, they are well exposed in and around Baroni Khurd, Laraita, Bhagor, Nauner. Isolated exposures of these rocks are noticed within TTG suits near Chirula, Imlia, NW of Datia and NW & SE of Jigna villages.

2.1.4.2 These rocks are pink, pinkish grey and grey in colour, medium to coarse grained porphyritic. The colour of the rock depends upon feldspar they contain. Pink granite is mainly composed of pink feldspar, quartz, biotite and epidote, while the grey granite mainly comprises of grey feldspar, quartz and biotite, they have gradational contact with each other.

2.1.4.3 Pink and grey granite exposed near Baroni khurd locality comprises phenocrysts of sassuritised plagioclase, microcline and perthite set within groundmass of recrystallized quartz, plagioclase, chlorite, epidote, clino-zoisite, apatite and zircon. The zircon grains often show zoning and occur as inclusions in microcline, plagioclase and perthite. The perthite sometimes shows marginal granulation due to deformation.

2.1.5 Leucocratic fine-grained granite

2.1.5.1 This granite shows intrusive relationship with gneisses and older (pink and grey medium grained) granites, which indicate that the granite is a younger phase of the parent magma of Bundelkhand massif. It is well exposed around Parasari and SE of Baroni Khurd. Alternate bands of this granite together with pegmatite, gneisses and granite are observed along Baroni Khurd and Khoren area.

2.1.5.2 The rock exposed in Baroni area shows that the rock is almost equi-granular, fine to medium grained and composed of microcline, oligoclase, quartz and biotite as the main constituent minerals with subordinate amount of chlorite, epidote, clino-zoisite, sphene and opaques. The microcline is the dominating feldspars and present mostly in the form of perthite

2.1.6 Pegmatite and Quartz Veins

2.1.6.1 Numerous veins and veinlets of pegmatite and quartz intruding other formations have been reported. The pegmatite bodies are composed of quartzo-feldspathic material. These bodies have a width of about 2m. alternate layers of pegmatite, aplite, gneiss and granite are noticed around Baroni Khurd and east of Khoren

2.1.6.2 Malachite stains and sulphide specks including pyrite, chalcopyrite and galena are observed in the pegmatite bodies in area west of Pitsura, Govindpura, Kamthara and Kurthara.

2.1.7 Alluvium:

2.1.7.1 Alluvium covers the northern part of the area, which is formed due to the deposition of the sediments by paleo river system. It is yellowish, greyish, brownish coloured with kankar at some places and clayey sediments.

2.2.0 Previous Work

2.2.1 Medlicott (1869) had given the first geological account of Bundelkhand massif area described schist and banded Iron formations in Baraita in south western part of the massif.

2.2.2 The study area is falling in Survey of India topo-sheet 54 K/06 and 54 K.10.

2.2.2.1 Previous work done in topo-sheet 54 K/06

2.2.2.2 Area was mapped on 1:50000 scale by Shri. P.K.Pandey & V.P.Gaur in F.S. 1997-98; S.K.Srivastava, K.V.Nambiar and V.P.Gaur in F.S. 1988-89 and on 1:25000 by R.N.Srivastava, P.K.Pandey and S.Ray in F.S. 1996-97

2.2.2.3 Upadhyay and Mishra (1989) had carried out systematic geological & geomorphological mapping in a part of sind sub-basin of the ganga basin with special reference to the

quaternary sediments in Bhind & Datia districts of Madhya Pradesh and reported a large thickness of Quaternary rests unconformably on the sandstones of Gwalior Group.

- 2.2.2.4 Srivastava et al., (1997) states that, the oldest rock recorded in the study area are the enclaves of biotite gneisses and the amphibole gneisses and talc schist, tremolite-actinolite schists. They inferred that the granites have been emplaced within gneisses and migmatites and on the basis of field relation have identified two distinct suits 1) the medium grained porphyritic biotite granite and 2) the fine grained leuco granite.
- 2.2.2.5 Chellani & Hansda, (1997) had investigated for locating the potential commercial granite deposits in parts of Datia district, Madhya Pradesh (Toposheet No.54K/5, 6, 9 and 10). They reported that the area has plenty of exposures of granite but most of them do not have requisite qualities and quantity of a commercially viable granite deposit.
- 2.2.2.6 Srivastav et al., (1999) have carried out Specialized Thematic Mapping of Bundelkhand Gneissic Complex in parts of Datia and Shivpuri Districts (Toposheet Nos 54K/2,3,6,7&10) of Madhya Pradesh. They have noted the occurrence of Tonalite-Trondhjemite-Granodiorite Gneiss (TTG Suite) and rhyolite/micro-granite as enclaves of variable dimensions within medium grained porphyritic granite and have also mentioned that fine-grained leucogranite is the youngest phase cutting across the medium grained porphyritic granite.
- 2.2.2.7 Rajak & Suman (2012-13) had carried out Specialized Thematic Mapping on 1:25k of Bundelkhand Gneissic Complex and associated rocks in Dabra-Hinotia-Sitapur area (Toposheet Nos 54K/05 & 06), in parts of Datia, Gwalior and Shivpuri Districts, Madhya Pradesh. They have stated that the oldest rock exposed in the area is granodiorite gneiss occurring as enclaves of variable dimension within alkali feldspar granite.

3.0.0 **Mineral Potentiality based on geology NGCM and NGPM etc.**

- 3.1.0 Hayden (1911-12) and Gargawa (1912) studied structure and mineral occurrences of the Bundelkhand area. Roy-Choudhary (1955) examined several mineral occurrences in Gwalior area and dealt them in publication in "Mineral Occurrences of Madhya Pradesh". The lead occurrences near Kurol was investigated by S.K. Shrivastava (1959), and other lead and copper occurrences in Shivpuri and Gwalior districts by G.V. Rao (1968) and M.Ramakrishan (1970). The reassessment of sulphide mineralization in Lakhnauti-Kurol area of Gwalior district was carried out by S.A. Faruqi (1977-78) and S.K.Chellani and U.Chakraborty (1990).
- 3.1.1 They revealed that the sulphide mineralization forms sparse dissemination in the quartz vein with dominance of pyrite and minor amount of chalcopyrite, covellite, bornite and galena.
- 3.1.2 During F.S 1996-97, Regional geochemical sampling involving bedrock and stream sediment sampling was carried out for locating anomalous zones of base metals and other associated minerals like nickel, cobalt and gold if any for an area of 1000 sq.km. 840 bedrock and 20 no stream sediment samples were collected and analyzed for copper, lead, zinc, cobalt, chromium and silver mineralization. The analysis showed presence of anomalous values of copper
 - 3.1.2.1 Copper content in quartz reefs exposed near Pitsura recorded as 945 ppm
 - 3.1.2.2 In pegmatite vein exposed south of Govindpura as 775 ppm
 - 3.1.2.3 The lead content recorded as 625 ppm in the pegmatite vein exposed near Kamthara
 - 3.1.2.4 The lead content recorded as 310 ppm in aplitic vein exposed near Karapuram on Datia-Jhansi Road
 - 3.1.2.5 Trace element analysis has recorded presence of tungsten from 500-700 PPM at Jigna, Chhata, Bilhari Khurd and Bebapur.
 - 3.1.2.6 During FS 2014-15 the geochemical sampling had been carried out in toposheet no.54K/06 & 54K/10 on 1:50,000 scale. A total of 800 representative stream sediment/

slope wash samples from 1 km x 1 km cell, along with 10 nos. each of soil-regolith and stream water samples at 5' x 5' grid were collected. Tin occurrences are recorded in the vicinity of the NE-SW quartz reefs. Elemental analysis of Sn (Tin) in the proposed block varies from 1.75 to 6.66ppm and it was recommended to explore in detail for tin mineralization.

3.1.2.7 Multisensor airborne geophysical surveys with GSI Twin Otter aircraft was carried out during the period 2000-2001 over the Bundelkhand craton covering an area of about 5590 sq km, covering part of toposheets no 54K/6, 7, 9, 10, 13, 14 & 15. The proposed block area is not part of this geophysical survey, hence there is no conclusive geophysical data for this area.

3.1.2.8 Locations of anomalies are given in Block Geological plan as Plate III

4.0.0 Scope of Proposed Exploration

4.1.0 The Reconnaissance survey at G-4 stage exploration program proposed comprises, Geological mapping (1:12,500 scale), Surface Geochemical sampling (Bedrock/Channel, Soil, Stream sediment), Pitting/Trenching, Geophysical survey, drilling of 5 Nos of scout boreholes involving about 500m drilling along with associated survey, chemical analysis, physical analysis and Report preparation.

5.0.0 Block Description

5.1.0 The proposed G-4 block for copper falls in Survey of India Toposheet No. 54 K/06 and covers an area of 152.33 sq. km in and around villages Jigna, Pitsura, Govindpur, Chhata, Kua Tiwari, Bebapur, Datia and Bilhari khurd of Datia & Shivpuri District, State 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.-III.A**.

Block Corner points	UTM Zone-44 (m)		Geographic Co-ordinate WGS-84	
	Easting (m)	Northing (m)	LATITUDE	LONGITUDE
A	224289.1837	2840846.612	25° 39' 34.435"	78° 15' 12.827"
B	235058.000	2847653.000	25° 43' 22.595"	78° 21' 33.823"
C	239727.7479	2832653.049	25° 35' 18.466"	78° 24' 31.747"
D	226469.2125	2832519.689	25° 35' 05.506"	78° 16' 37.070"

6.0.0 Planned Methodology

The Exploration shall be carried out as per Minerals (Evidence of Mineral Content) Rule-2015. 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:

6.1.0 Geological Mapping

Geological mapping will be done in the entire 152.33 sq km area on 1:12,500 scale. Rock types, their contact, structural features will be mapped. Surface manifestations of the ore bodies available along with their surface disposition will be marked on map.

6.2.0 Geophysical Survey

6.2.1 Geophysical Survey is proposed to know the geology and geological settings of the area, variation of gravity and magnetic properties of the rock. So regional Geophysical Surveys

consisting of SP and Gravity have been planned to carry out in total proposed area. The survey has been planned in a grid pattern for 8–20-line km. The Approximate time period to conduct the survey will be around 4.5 months (4 months for acquiring data and 15 days for processing and interpretation).

6.3.0 **Geochemical Sampling**

6.3.1 **Surface Sampling (Bed Rock/ Channel/ Soil Sample/ Stream Sediment):** During the course of Geological mapping the Bed rock/Channel samples shall be collected from the outcrops along with soil and stream sediment samples. A total 200 primary samples will be collected for assay for W, Sn, Mo, Cu, Pb, Ta & Zn element analysis by AAS for surface samples. Total 30 Nos Check samples (5% internal + 10% External) will be analyzed for assay for W, Sn, Mo, Cu, Pb & Zn element analysis by AAS for surface samples. 30 primary samples will be collected for Ag & Ag which will analyzed by fire assay method with 5 no check samples for the same.

6.4.0 **Surveying:** Geological traverses, geological features and location of surface samples will be marked with hand held GPS. During exploratory drilling of scout borehole, fixation and determination of reduced level and co-ordinates of the boreholes only will be undertaken by DGPS/ Total station. The anomalous zone demarcated on the basis of Geological mapping and Geo-chemical sampling where drilling will be carried out can be surveyed on topographic plan in 1:5000 and contour map will be prepared at 2m contour interval.

6.5.0 **Exploratory Mining (Trenching/Pitting)**

Shallow trenching/pitting (Excavation) shall be carried out in the potential zones identified based on the results of Geological Mapping and Geochemical Sampling. A provision of shallow trenching/pitting of 100 cubic meter is kept. Pitting shall be done for correlation of mineralized zones on surface up to a depth of 1-2 m after removal of soil/weathered column in the area. Locations of pits/trenches on ground will be decided by field geologist based on field observations. A provision of 100 Nos of primary & 15 Nos check (5% internal+10% External) trench/pit samples is kept for analysis of assay for W, Sn, Mo, Cu, Pb, Ta & Zn element analysis by AAS for Trench samples and 10no of primary samples will be analyzed for Ag & Ag by fire assay method with 2 no as check samples. The trench /pit walls will be mapped on 1:200 scale. Thus, a total of 100 cu m of shallow trenching/pitting work along with associated geological & laboratory studies have to be carried out.

6.6.0 **Core Drilling:**

Based on Geological mapping, Geochemical studies, pitting and trenching, the extension of the mineralized zones (ore bodies) will be marked. To find out the potentiality of mineralized zones in strike & dip, a few no of scout boreholes involving 500m of drilling will be carried out for shallow level intersection of mineralized zones.

6.6.1 **Drill Core Logging:**

The drill core will be logged for rock types, structural features, textures, intersection of ore zones, types of mineralization and occurrence of various ore minerals. The logging for determination of Rock quality determination (RQD) will also be undertaken.

6.6.2 Drill Core Sampling:

During geological logging of drill core, mineralized zone will be marked on basis of concentration and lithology. Total 100 Nos of primary and check 15 Nos (5% Internal Check+10% External Check) samples will be analyzed for W, Sn, Mo, Cu, Pb, Ta & Zn assay and 10no of primary samples will be analyzed for Ag & Ag by fire assay method with 2 no as check samples. 15 Nos of composite samples will be analyzed for W, Sn, Mo, Cu, Pb & Zn.

6.7.0 Petrological & Mineralogical Studies:

During the course of Geological mapping and core logging 60 samples from various litho units from surface and intersected in boreholes will be studied for petrography and mineralized zones will be studied for the ore mineral assemblages and their distribution, alteration, enrichment etc in polished sections.

7.0.0 Nature Quantum and Target

7.0.1 Details of the particular, Quantum and the targets are tabulated in **Table No.-IV.A.**

Table No-IV. A
Envisaged Quantum of proposed work in Chalima Block

Sl. No.	Item of Work	Unit	Target
1	Geological Mapping (on 1:12,500 Scale)	Sq km	152.33
2	Topographical Survey* (on 1:12,500 Scale in potential Zone Areas)	Sq km	As per requirement
	Bore Hole Fixation* (Scout Boreholes)	Nos	5 Nos
	RL & Coordinate Determination & Boundary points demarcation*	Nos	10 N0s
3	Geochemical Sampling (Taken up in Anomalous areas) a) Bed rock sampling/channel sampling b) Soil sampling c) Stream sediment sampling	Nos.	200 +30 Nos 30 + 5 (Ag& Au)
4	Exploratory Mining Excavation (Trenching/Pitting)	Cu. m.	100 Cu m
5	Geophysical Survey SP & Magnetic Method (8-20 Line km)	Line km	8 - 20
6	Drilling (coring)*	m	500m
7	Geological work a) Geological Core Logging, Sample Preparation etc.*	m	500m
8	Laboratory Studies i) Surface Sampling/Soil/Stream (Primary samples) a) For W, Sn, Mo, Cu, Pb, Ta & Zn element analysis by AAS for surface samples b) Au by Fire assay	Nos	200Nos 30 Nos
	ii) Check samples (5% Internal + 10% External)) a) For W, Sn, Mo, Cu, Pb, Ta & Zn element analysis by AAS for surface samples b) Au by Fire assay	Nos	30 Nos 05 Nos

Sl. No.	Item of Work	Unit	Target
	v) Trench Primary & Check Samples (5%Internal+10%External)		
	a) For W, Sn, Mo, Cu, Pb, Ta & Zn element analysis by AAS for surface samples	Nos	100 + 15Nos
	b) Au by Fire assay	Nos	10 + 2 Nos
	vi) Drill Core (Primary + check) Samples*		
	a) For W, Sn, Mo, Cu, Pb, Ta & Zn	Nos	100 +15 Nos
	b) Au by Fire assay	Nos	10 + 2 Nos.
9	Petrological Samples (Surface & BH Core Samples)		
	a) Preparation of Thin Section	Nos	10 Nos
	b) Study of Thin Section	Nos	10 Nos
	c) Whole rock analysis	Nos	10 Nos
10	Mineragraphic Studies (Surface & BH Core Samples)		
	a) Preparation of Polished Section	Nos	10 Nos
	b) study of Polished Section	Nos	10 Nos
	c) Digital photomicrograph of thin polished section	Nos	10 Nos
11	Report Preparation (Digital format)	Nos.	01 Nos
* The 2nd Level of work to be decided after review of Geological Mapping & Geochemical Sampling and Trenching.			

8.0.0 Manpower Deployment

Manpower deployment List will be provided later.

9.0.0 Break-up of Expenditure

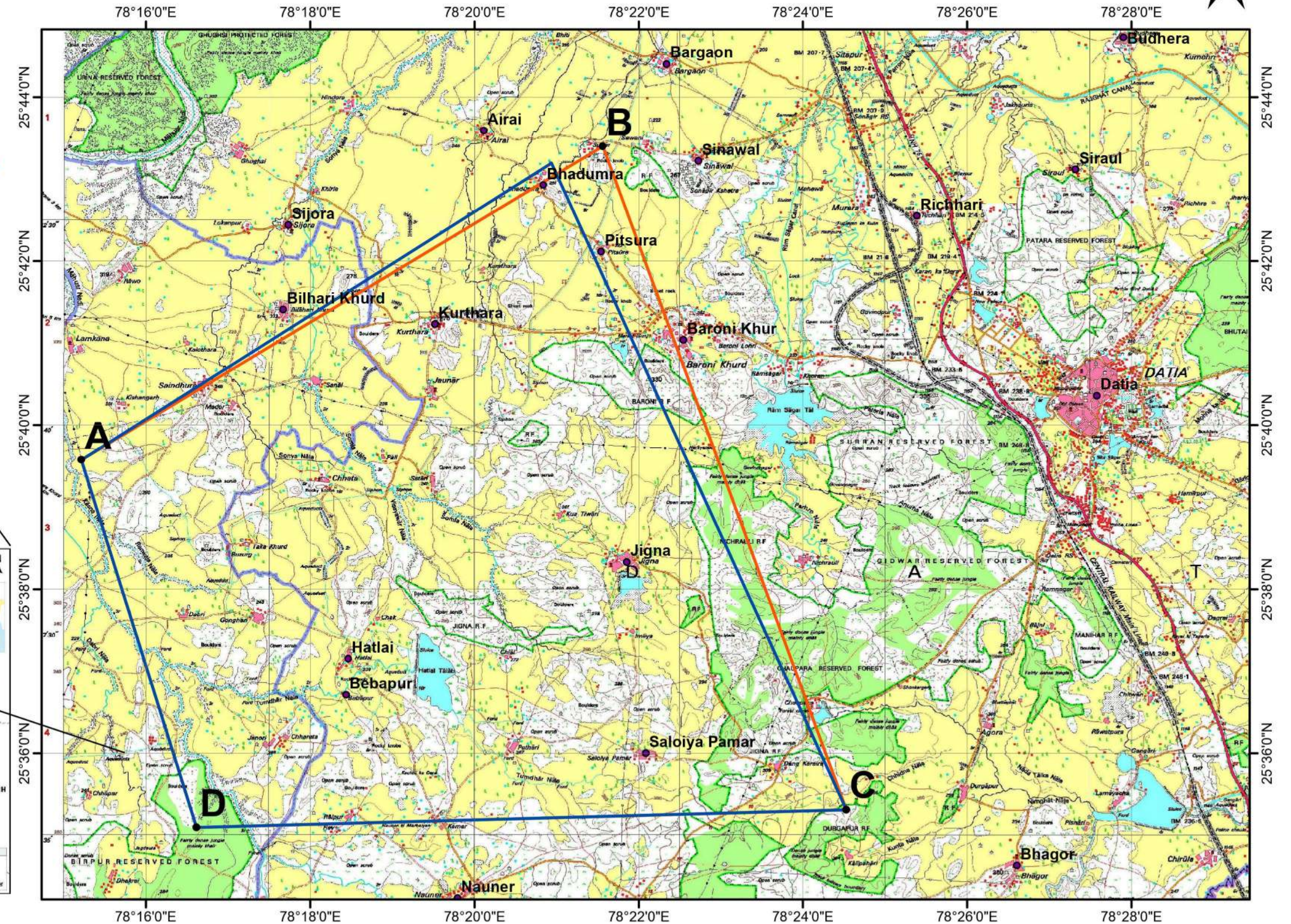
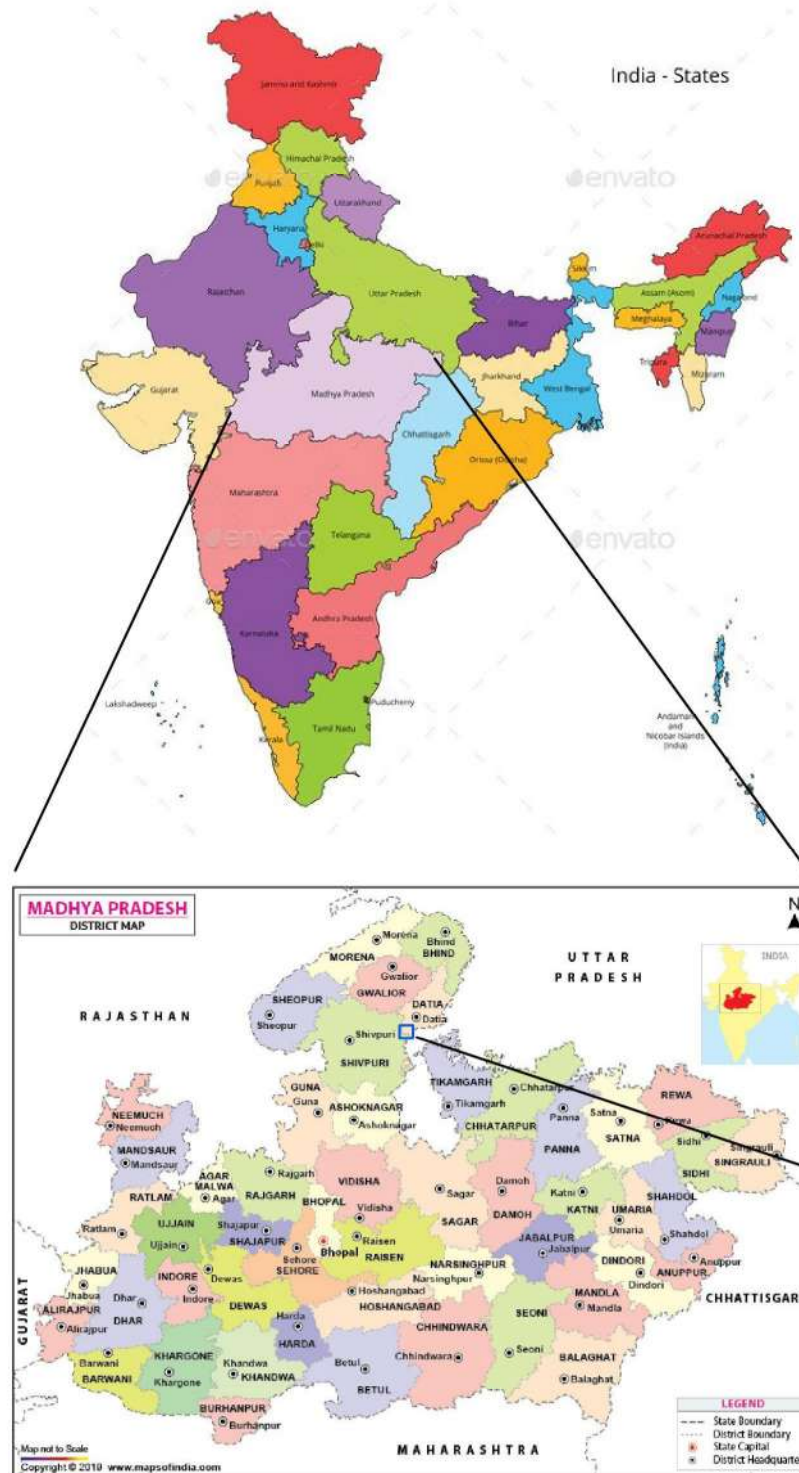
Tentative Cost has been estimated based on Schedule of Charges (SoC) of projects funded by National Mineral Exploration Trust (NMET) w.e.f. 01/04/2020. The total estimated cost is Rs. **183.23 Lakh**. The summary of tentative cost estimates for Reconnaissance Survey (G-4 Level) is given in **Table No.-VI. A** and details of tentative cost estimates is given in **Table No.-VI.B**. Tentative Time schedule/action plan for proposed Reconnaissance Survey (G-4) is given in **Table No. VI-C. Table No-VI. A**

Summary of Tentative Cost Estimates for Reconnaissance Survey (G-4 Level) Exploration

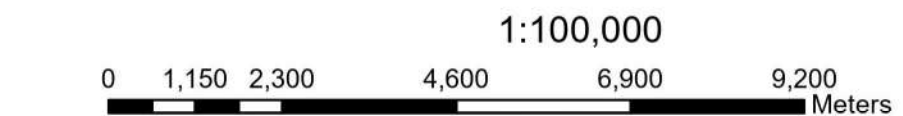
Sl. No.	Item	Total
1	Geological Work	30,88,200.00
2	Pitting & Trenching	3,30,000.00
3	Geophysical Survey	21,03,487.00
4	Drilling	71,87,460.00
5	Laboratory Studies	17,93,640.00
	Sub total	1,45,02,787.00
6	Report	7,25,139.35

Sl. No.	Item	Total
7	Peer Review	10,000.00
8	Proposal Preparation	2,90,055.74
	Total	1,55,27,982.09
9	GST (18%)	27,95,036.78
Total cost including 18% GST		1,83,23,018.87
SAY, in Lakhs		183.23

LOCATION MAP OF DATIA-BIJAPUR BLOCK DIST-DATIA AND SHIVPURI, MADHYA PRADESH, (AREA= 152.33 sq.km.)



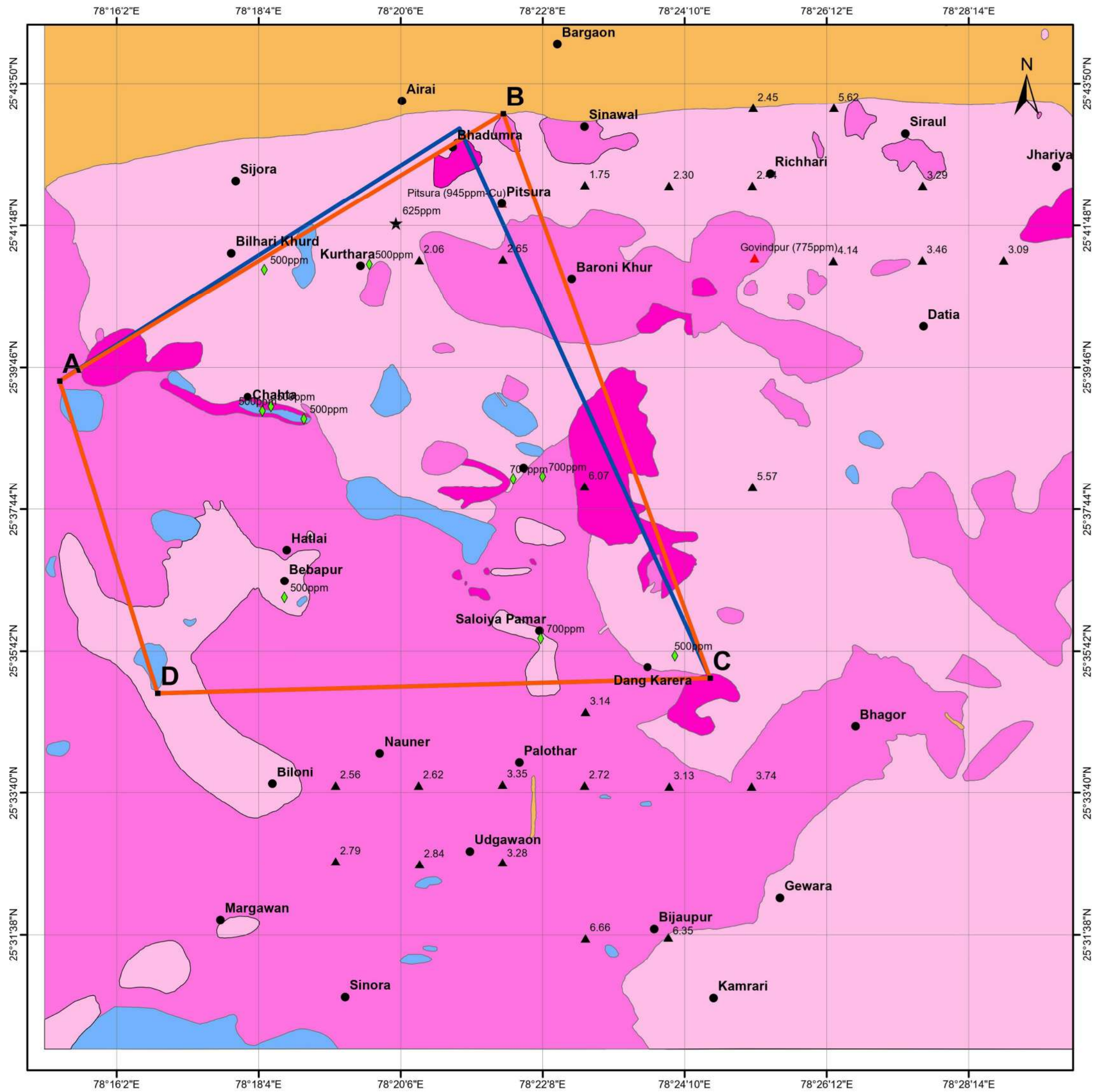
LABEL	Geographic Co-ordinate WGS-84		UTM ZONE 44N	
	LONGITUDE	LATITUDE	EASTING	NORTHING
A	78° 15' 12.827" E	25° 39' 34.435" N	224289.18	2840846.61
B	78° 21' 33.823" E	25° 43' 22.595" N	235058.0000	2847653.00
C	78° 24' 31.747" E	25° 35' 18.466" N	239727.75	2832653.05
D	78° 16' 37.070" E	25° 35' 5.506" N	226469.21	2832519.69



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PLATE NO. I

**GEOLOGICAL MAP OF DATIA-BIJAPUR BLOCK, DISTRICT- DATIA AND SHIVPURI
MADHYA PRADESH (AREA 152.33 sq. km.)**

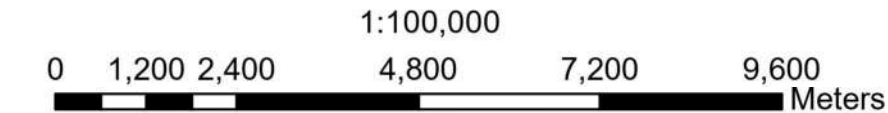


Legend

- ★ lead
- ◆ tungsten
- Village
- ▲ Tin Occurrences
- ▲ Copper Occurrences
- Old Block Boundary
- New Block Boundary

Lithology

- ALLUVIUM
- FINE GRAINED GRANITE
- GRANITE GNEISS
- MEDIUM GRAINED GRANITE
- TONALITE TRONDHJEMITE GNEISS



Note: Values shown are in ppm for Tungsten, Copper, Pb, Tin



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Reconnaissance survey (G4) for Tungsten, Tin and basemetals in Datia-Bijapur block, Districts: Datia and Shivpuri, Madhya Pradesh. [Block area- 152.33 sq. km; Nos. of Borehole- 5; Borehole depth range- upto 100m; Schedule timeline- 18 months]							
S. No.	Item of Work	Unit	Rates as per NMET SoC 2020-21		Estimated Cost of the Proposal		Remarks
			SoC-Item -SI No.	Rates as per SoC	Qty.	Total Amount (Rs)	
A	GEOLOGICAL WORK (1:12,500 scale)						
i	Charges for one Geologist- HQ	day	1.3	9,000	60	5,40,000	
ii	Charges for one Geologist-Field	day	1.3	11,000	180	19,80,000	
iii	Labour (2 Nos) Base rate - Rs.437/-	day	5.7	437	360	1,57,320	Amount will be reimburse as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higher
iv	Charges for one Sampler per day (1 Party) for geochemical, channel and core samples	one sampler per day	1.5.2	5,100	60	3,06,000	
v	Labours (4 Nos) Base rate - Rs. 437/-	day	5.7	437	240	1,04,880	Amount will be reimburse as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higher
					Sub Total- A	30,88,200	
B	PITTING AND TRENCHING^s						
i	Trenching	Cu m	2.1.1	3,300	100	3,30,000	
					Sub Total- B	3,30,000	
C	GEOPHYSICAL SURVEY						
i	SP & Magnetic Method (8-20 Line km)	(8-20 Line km	3.3b	12,92,047	1	12,92,047	Decission will taken after review of geological work
ii	Charges for one Geophysicist per day at field	day	3.18	11,000	30	3,30,000	
iii	Charges for Surveyor	day	1.6.1a	8,300	30	2,49,000	
iv	Labours (4 Nos) Base rate - Rs. 437/-	day	5.7	437	120	52,440	
v	Charges for one Geophysicist per day at HQ	day	3.18	9,000	20	1,80,000	
					Sub Total- C	21,03,487	
D	DRILLING						
i	Drilling up to 300m (Hard Rock)	m	2.2.1.4a	11,500	500	57,50,000	Taken after review of mapping sampling, trenching and geophysical survey work
ii	Borehole deviation Survey by Multishot Camera	m	2.2.6	330	500	1,65,000	
iii	Land / Crop Compansation (in case the BH falls in agricultural Land)	per BH	5.6	20,000	5	1,00,000	Amount will be reimburse as per actuals or max. Rs. 20000 per BH with certification from local authorities
iv	Construction of concrete Pillar (12"x12"x30")	per borehole	2.2.7a	2,000	5	10,000	
v	Transportation of Drill Rig & Truck associated per drill (1 rigs)	Km	2.2.8	36	1,250	45,000	Certification in this regard is required to be provided
vi	Monthly Accomodation Charges for drilling Camp (up to 2 Rigs)	month	2.2.9	50,000	3	1,50,000	
vii	Drilling Camp Setting Cost	Nos	2.2.9a	2,50,000	1	2,50,000	
viii	Drilling Camp Winding up Cost	Nos	2.2.9b	2,50,000	1	2,50,000	
ix	Approach Road Making (Flat Terrain)	Km	2.2.10a	22,020	3	66,060	Road Making will be considered as per the requirement and Road Making Charges will be reimbursed for max. 3 km.
x	DGPS Survey for Block Boundary and BH coordinate & Reduce level with block boundary	per point	1.6.2	19,200	6	1,15,200	
xi	Drill Core Preservation	per m	5.3	1,590	180	2,86,200	This amount will be reimbursed after successful delivery of the cores to concerned libraries/authorities
					Sub Total- D	71,87,460	
E	LABORATORY STUDIES						
1	Chemical Analysis						
I	Primary & Check Samples from Surface outcrop and steam sediments (BRS/Channel samples/Stream Sediments)						
i	Primary samples						
	a. For W, Sn, Mo, Cu, Pb , Zn & Ta	Nos	4.1.7a & b	3,176	200	6,35,200	
	b. For Au by fire assay	Nos	4.1.5a	2,380	30	71,400	
ii	Internal check samples (5%)						

An

Schedule timeline for Reconnaissance survey (G4) for Tungsten, Tin and basemetals in Datia-Bijapur block, Districts: Datia and Shivpuri, Madhya Pradesh.																						
S. No.			1	2	3	4	5	6	Review for Geo-physical Survey	7	8	9	10	Review for Drilling	11	12	13	14	15	16	17	
1	Camp Setting	Months/Days																				
3	Geological Mapping & Sampling	days																				
4	Geophysical Survey	months																				
5	Geophysical Report	days																				
6	Pitting and Trenching	cu.m																				
8	Surface Drilling (1 rigs)	m																				
9	Survey Party days	days																				
10	Geologist Man days	days																				
11	Sampler Man days	days																				
12	Camp Winding	months																				
13	Laboratory Studies	Nos.																				
14	Report Writing with Peer Review	months																				

Note: 1. Commencement of project may be reckoned from the day the exploration acreage is available along with all statutory clearances.
2. Time loss on account of monsoon/agricultural activity/forest clearance/local law & order problem may be additional to above time line.

