

**PROPOSAL FOR PRELIMINARY (G-3) EXPLORATION FOR TUNGSTEN AND TIN ORE IN
MURARA BLOCK, DISTRICT- NIWARI, MADHYA PRADESH
(PART OF TOPOSHEET NO. 54K/15)**

COMMODITY: TUNGSTEN AND TIN

**BY
MINERAL EXPLORATION AND CONSULTANCY LIMITED
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SEMINARY HILLS
NAGPUR (MH)**

**PLACE: NAGPUR
DATE: 18.06.2024**

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

	Features	Details																	
	Block ID	MURARA BLOK																	
	Exploration Agency	Mineral Exploration and Consultancy Limited (MECL)																	
	Commodity	TUNGSTEN & TIN																	
	Mineral Belt	Bundelkhand Gneissic Complex																	
	Completion period with entire Time schedule to complete the project	12 months																	
	Objectives	1.To check the lateral and depth continuity of Tungsten and Tin ore by systematic drilling up to 200mRL. 2.To estimate preliminary mineral resource (333) and grade for Tungsten and Tin ore as per UNFC and MEMC- 2015. 3.To facilitate the government to auction the block.																	
	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:150 days at field 40 days at HQ																	
1.	Location																		
	Block boundary corner points	<table border="1"> <thead> <tr> <th rowspan="2">Cardinal Points</th><th colspan="2">UTM(m)</th></tr> <tr> <th>Easting</th><th>Northing</th></tr> </thead> <tbody> <tr> <td>A</td><td>282697.5765</td><td>2808297.7096</td></tr> <tr> <td>B</td><td>283314.8700</td><td>2807813.7404</td></tr> <tr> <td>C</td><td>281468.3828</td><td>2806011.4341</td></tr> <tr> <td>D</td><td>280982.8292</td><td>2806448.3252</td></tr> </tbody> </table>	Cardinal Points	UTM(m)		Easting	Northing	A	282697.5765	2808297.7096	B	283314.8700	2807813.7404	C	281468.3828	2806011.4341	D	280982.8292	2806448.3252
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	Villages	Murara																	
	Tehsil/Taluk	Niwari																	
	District	Niwari																	
	State	Madhya Pradesh																	
2.	Area																		
	Block Area	1.82 Sq. Km.																	
	Forest Area	None																	

	Government Land Area	Data not available
	Charagaha	Data not available
	Private Land Area	Most of the area is private land
3.	Accessibility	
	Nearest Rail Head	Niwari (about 2 Km)
	Road	The area can be accessed via National Highway 39 (NH 39) passes through the Northern portion of the block from Jhansi towards Chhatarpur city.
	Airport	Gwalior, Madhya Pradesh about 147 km distance
4.	Hydrography	
	Local Surface Drainage Pattern (Channels)	The topography is undulatory plain with isolated hills rising abruptly and form steep and nearly inaccessible scarps. The elevation of the study area ranges from 238m to 283m above mean sea level. Minor seasonal streams originating from NE-SW running hill range flow through the plains in a south to south-west direction.
5.	Climate	
	Mean Annual Rainfall	The mean annual rainfall recorded is about 910 mm
	Temperatures (December) (Minimum) Temperatures (June) (Maximum)	Minimum temperatures 6 ^o C. Maximum temperatures up to 48 ^o C.
6.	Topography	
	Toposheet Number	54K/15
	Morphology of the Area	The study area forms part of Bundelkhand plateau. Low dissected hills and valley of structural origin, pediment and pediplain of denudational origin. The block area is characterized by long serrated ridges of quartz reefs.
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), Chemical analysis of Tarichar Khurd block (MECL)

	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 Bundelkhand Gneissic Complex which is well known/interesting area for the mineral search for various minerals including Tungsten & Tin. 2. S.P. Nim of Geological Survey of India had found Tungsten (W) in quartz samples of the area and recommended that Quartz reefs of BGC, have quite promising concentration of tungsten and can be searched for tungsten deposits. 3. During reconnaissance survey (G4), MECL has delineated this Murara sub-block within Tarichar Khurd block. Quartz reef near Murara village has reported tungsten (W) value up to 529.28ppm in bed rock samples. 4. MECL, further recommended for systematic drilling in this block to upgrade in G3 level and resource in inferred category may be established. 5. Considering the tungsten potentiality during mid-term review of Tarichar khurd block in 58th TCC and Final review in 64th TCC of NMET the committee recommended MECL to take up G3 stage proposal for tungsten (W) in the block in both the meetings. 6. Establishing the extent and depth continuity of the Tungsten rich quartz reef along with inferred resources (333) would enable the state government to auction the block, providing a Mining License (ML) for tungsten ore.

PROPOSAL FOR PRELIMINARY (G-3) EXPLORATION FOR TUNGSTEN AND TIN ORE IN MURARA BLOCK, DISTRICT- NIWARI, MADHYA PRADESH

1.1.0 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 substancesö 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.

2.1.0 BACKGROUND INFORMATION

- 2.1.1 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 Preliminary Exploration(G-3). Keeping in view Preliminary Exploration(G-3) level proposal is been prepared for NMET funding and execution.

- 2.1.2 S.P. Nim of GSI in the **Report on Reconnoitry survey of quartz reefs in bundelkhand granitoid complex** for use as abrasive/refractory minerals in parts of southern Uttar Pradesh (Item No. MIP/NR/UP/2000/003) **has recommended that Quartz reefs of BGC, have quite promising concentration of tungsten and can be searched for tungsten deposits.** Feasibility of exploitation for tungsten can be determined by detailed investigation.
- 2.1.3 The final geological report of Reconnaissance Survey (G4) of Tarichar Khurd block has been submitted in April, 2024. In the block two quartz reefs have given high value in the bed rock samples, one is situated near Devendrapura village which has given tungsten (W) value up to 444.62ppm and also scheelite has been identified under short-wave UV rays near the high value sample's location, another is situated near the Murara village which has given tungsten (W) value up to 529.28ppm. In the report it is, therefore, recommended that detailed investigation for tungsten(W) may be undertaken in these two-quartz reef with detailed (1:4000 scale) geological mapping, scout drilling and detailed sampling to increase the understanding of the disposition of tungsten mineralisation both in strike and depth wise. Other quartz reefs of the block may be taken up further on the basis of outcome of these two reefs.
- 2.1.4 The Geological mapping and analytical data of surface samples of Tarichar khurd block (G-4) were technically reviewed in 58th TCC of NMET held on 30th October, 31st October and 01st November, 2023. The committee found that encouraging values of tungsten(W) were reported from the area. The committee recommended to prepare a G3 stage item for Tungsten (W) in the area by carrying out UV lamp survey. MECL done work accordingly.
- 2.1.5 Further in the 64th Technical-cum-Cost Committee (TCC) meeting held on 25th, 29th & 30th April, 2024, the committee reviewed the work done after 58th TCC and peer reviewed Geological report of the Tarichar Khurd(G-4) block. In this meeting the committee again recommended MECL to take up G3 stage proposal for tungsten (W) in the block.
- 2.1.6 Considering the recommendations of the outcome of the previous works in the area, potentiality of the quartz reef, geological set up of the area and recommendations of NMET committee, Preliminary Exploration (G3) proposal of Murara block, with 985m drilling in 10 boreholes, has been proposed in 66th TCC of NMET to take up systematic drilling in the block to estimate resource so that government can auction the block.

3.1.0 LOCATION AND ACCESSIBILITY

- 3.1.1 Murara block covers an area of 1.82 Sq. Km and falls in the Survey of India Topo-sheet no. 54K/15 of the Niwari District, Madhya Pradesh. The block is about 30km distance

from the Jhansi city of Uttar Pradesh and District Headquarter Niwari is situated at south west of the block about 2 km from the block. The National Highway 39 (NH 39) passes through the northern portion of the block from Jhansi towards Chattarpur city.

- 3.1.2 The nearest railway station is Niwari, Madhya Pradesh which is about 2km. from the southern boundary of the block and rail head is Jhansi (Virangana Lakshmibai Railway Station) about 30km. from the block. The nearest airport is Gwalior, Madhya Pradesh which is about 147 km distance.

**CARDINAL POINT COORDINATE OF MURARA BLOCK, DISTRICT:
MADHYA PRADESH, MADHYA PRADESH (G-3 LEVEL)**

Cardinal Points	UTM(m)	
	Easting	Northing
A	282697.5765	2808297.7096
B	283314.8700	2807813.7404
C	281468.3828	2806011.4341
D	280982.8292	2806448.3252

4.1.0 PHYSIOGRAPHY, DRAINAGE AND CLIMATE

- 4.1.1 The study area forms part of Bundelkhand plateau. The topography is undulatory plain with isolated hills rising abruptly and form steep and nearly inaccessible scarps. The block area is characterized by long serrated ridges of quartz reefs ranging in NE-SW direction. The elevation of the study area ranges from 238m to 283m above mean sea level. Minor seasonal streams originating from NE-SW running hill range flow through the plains in a south to south-west direction. Low dissected hills and valley of structural origin, pediment and pediplain of denudational origin.
- 4.1.2 The study area experiences a hot and semi-humid to semi-arid (during summers) climate. Being on a rocky plateau, the study area experiences extreme temperatures. Minimum temperatures vary from around 6°C to 12°C during winters and maximum temperatures vary from 42°C to 48°C during summers. Generally, the hottest days are in May and the coldest days in December or January. Spring arrives by the end of February and is a short-lived phase of transition. Summer begins by April.
- 4.1.3 The monsoon begins in third week of June (although this is variable year to year), while the monsoon rains gradually weaken in September and end before the last week of September and winter from October to January. The mean annual rainfall recorded is about 910 mm. Violent local squalls of short duration are sometimes generated in summer. The cloud of dust can be so thick that it becomes dark even during the day.

5.1.0 PREVIOUS WORK

- 5.1.1 The Bundelkhand area is referred by Medlicott (1859) who mapped in various parts of the present Madhya Pradesh between 1860 and 1869. Oldham (1859), Hacket (1870) and Mallet (1868) mapped the granite and gneissic rocks of Bundelkhand province as Bundelkhand Granite. The word 'Bundelkhand Gneiss' was coined by Dr. A. M. Heron (1935), who considered it as the oldest rock of Archaean age and correlated it with Banded Gneissic Complex and Berach Granite of Rajasthan.
- 5.1.2 Gurusiddappa et al. (1984-85), reported specks, stringers and thin veinlets of pyrite, chalcopyrite, covellite along the joints and minor fracture planes within the grey-gneisses. Indications of specks and stringers of pyrite and chalcopyrite with stains have been reported within the medium-grained pink rock. The authors also reported diaspore and pyrophyllites occurring in the form of pocket deposits along quartz reefs trending northeast with fracture plane within metasedimentary rocks along these reefs cutting across. Few pockets of kaolin occur within the area due to alteration of feldspars.
- 5.1.3 Large scale mapping and base metal exploration for an area of 600 sq.km of Bundelkhand granitic terrain in Gwalior district were carried out by Chellani and Chakraborty (2001). The chemical analysis of chip samples collected across shear zones/ lineaments at regular intervals indicate a relatively good mineralisation near Lakhnauti but poor mineralisation near Barera, Bilua, Antri and Aniti. Large scale geological mapping and analysis of channel samples collected from 800m long, 4-6m wide NNE-SSW trending shear zone revealed average copper assay value of 2100 ppm average assay width of 2.49m. The maximum value of copper mineralisation was 5625 ppm. Vikash Kumar Suman and Asrar Ahmad (2015-16) reported the presence of specks of sulphide near Sokra village during STM. Large scale mapping on 1:12,500 scale was carried out in parts of Gatholi Kalan, Dongra Khurd, Pyasa, Kusmar, Baron, Gona, Uldana Kalan and Saidpur areas. The pyrophyllite was observed within the groundmass of quartz-sericite-pyrophyllite schist affected by hydrothermal activity due to the intrusion of quartz veins.
- 5.1.4 During the F.S. 2016-2018, GSI carried out Application of Hyperspectral / Multispectral Remote Sensing techniques to prepare Alteration / Mineralized Zone in Tikamgarh and Jhansi Districts of Madhya Pradesh and Uttar Pradesh respectively. Sulphide and carbonate minerals, such as pyrite, chalcopyrite, azurite and malachite respectively, have been identified during the field work near Laron, Murara, Parara, Kumarpura, Sakera and Baron.

- 5.1.5 S.P. Nim of Geological Survey of India, during Annual Programme 2000-2001, worked in the region and in his report (February 2004) titled 'Report on Reconnoitry Survey of Quartz Reefs in Bundelkhand Granitoid Complex for use as Abrasive/Refractory Minerals in parts of Southern Uttar Pradesh (Item No. MIP/NR/UP/2000/003)' had found Tungsten (W) in quartz samples and recommended that Quartz reefs of BGC, have quite promising concentration of tungsten and can be searched for tungsten deposits.
- 5.1.6 MECL in the year 2022 had carried out Reconnaissance Survey (G-4) for copper, lead, zinc and gold in Laron block, District: Jhansi, State: Uttar Pradesh, which is situated about 30 km distance from the Tarichar Khurd block and observed/reported that the integrated studies of Previous works, Gravity and Magnetic Survey, Geological Mapping, Geochemical sampling and analytical results of surface samples in Laron block were not encouraging for Copper, Lead, Zinc and Gold mineralisation.
- 5.1.7 Mineral Exploration and Consultancy Limited (MECL) has carried out G4 level exploration, with mapping, bed rock, stream sediment and channel sampling, in Tarichar Khurd block and delineated area as potential for Tungsten and Tin deposit. Tungsten(W) mineralisation is associated with quartz reefs of the block along the complete strike length of the exposed quartz reefs. The quartz reef situated near Devendrapura village has given W value up to 444.62ppm and also scheelite has been identified under short-wave UV rays near the high value sample's location. Thus, in the study area, a total of 153 nos. of bed rock, 16 nos. of stream sediment and 25 no. of channel samples have been analysed for tungsten, in which W concentration ranges from 1.34 to 529.28ppm.

6.1.0 GEOLOGY OF THE AREA

- 6.1.1 The study area at central part of the Archaean Bundelkhand granite-gneissic complex (3.59 Ga; Saha et al., 2015) comprises granitoid varieties in different shades of colour such as porphyritic and non-porphyritic coarse grained pink granite, medium to fine grained granite with small to large enclaves of older metamorphics/supracrustals. Other important lithounits of study area are linear bodies of quartz reef which from prominent geomorphic features with positive relief in the study area. Supracrustal enclaves are part of green stone belt represented by volcano-sedimentary sequence.
- 6.1.2 The late phase of igneous activity is manifested by the intrusion of very large bodies of quartz reef. The quartz reefs are prominent in the area and form long ridges. Their outcrop pattern varies from lenticular to elongated ridges with multiple branching at the places. The quartz reefs in the mapped area show NNE-SSW to NE-SW general trend. In this quartz reef we also found the patches of highly crushed and brecciated silicified masses of dark chocolate colored. In these crushed masses the network of milky quartz veins is absent instead we found clast and fragment of milky quartz which indicate later phase brecciation by which network of milky quartz veins get crushed and fragmented. In

this quartz reef we observed very good cross- cut relationship between at least two generation of quartz veins in the older veins. Conspicuous solution structure such as comb structure is also well developed. At many places, iron encrustations have also been found.

- 6.1.3 To establish the stratigraphy, a regional geological map at a scale of 1:50000, in conjunction with the Bhukosh Map of Niwari and Jhansi district by G.S.I., have been meticulously considered. The litho-stratigraphic sequence of the Tarichar Khurd block

	Soil/Alluvium
Intrusives	Quartz vein, Dolerite dyke, Quartz reefs, Carbonatite veinlets.
Bundelkhand Granite	Fine grained pink granite, Medium grained granite, Coarse grained pink granite, Coarse grained pink porphyritic granite, Coarse grained grey granite.
Newer Metamorphic Group	Banded Iron Formation (BIF)
Older Metamorphics	Amphibolites, Granodiorite/ Micro-granodiorite

Murara block is carved out is depicted in the table below.

Stratigraphic Sequence of the Tarichar khurd block(G-4)

7.1.0 LITHOUNITS

Various lithounits exposed in the block area and described in the following paragraphs

7.1.1 BUNDELKHAND GRANITE

- (1) The Bundelkhand massif is majorly occupied by a large plutonic complex of a batholithic dimension known as Bundelkhand granite. The emplacement of younger Bundelkhand granitoids is suggested to be resultant of collision related tectonics during the Neoproterozoic period (Mondal et al., 2002).

- (2) In the area mainly coarse-grained porphyritic granite, medium grained granite and fine-grained granite are prominently exposed. The coarse-grained porphyritic granite has the maximum aerial extent. In the block majority of the granite are pinkish in colour and at few places small outcrops of grey granites are exposed.

7.1.2 QUARTZ REEFS

- (1) One of the most outstanding features of the Bundelkhand Craton is the occurrence of NE-SW trending giant quartz reefs, which occur as large linear hills/ridges rising sharply above the ground over the basement gneisses and granitoids and form prominent physiographic features. Formation of these reefs is considered to be the outcome of tectonically controlled hydrothermal activity along vertical to sub vertical shear zones that formed in response to extensional tectonics at 2.1-2.0 Ga (Pati et al., 2007; Bhattacharya and Singh, op cit).
- (2) In the area major quartz reefs are also trending in NE-SW direction almost in all portions of the block. The quartz reefs are of various colours viz. milky to dull white, buff, greenish, greyish and jasper varieties of quartz are also seen. Dull white, milky white and pinkish white or reddish white or buff colour quartz are common. No pattern is discernible in the disposition of different colours of quartz. These quartz reefs have sharp contact with the granitic rocks of BGC and contact is generally covered by scree/debris/soil. Secondary quartz veins in the quartz reefs are frequently seen. At places, quartz reefs exhibit deep red ferruginous coating on the quartz crystals, which suggests that ferruginous solution activity has taken place in the quartz reef.
- (3) Quartz reefs generally show pinching and swelling nature along the strike and also die out probably due to soil cover in between the exposures of reefs. Brecciation and shattering are commonly noted in the reefs and these have undergone polyphase deformation represented by lineaments, faults, different set of secondary quartz veins, different sets of quartz reef. Secondary quartz veins, composed of white quartz, are frequently observed in the quartz reefs.

8.1.0 OBJECTIVE OF THE PROPOSED EXPLORATION PROGRAMME

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

- 8.1.1 To prove the lateral and depth continuity of Tungsten identified during G-4 work by proposing geological & structural mapping on 1:4000 scale and systematic drilling up to average borehole depth of 98.50 m at 200mRL.
- 8.1.2 To estimate preliminary mineral resource (333) and grade for Tungsten and Tin ore as per UNFC and MEMC- 2015.
- 8.1.3 To facilitate the government to auction the block.

9.1.0 PROPOSED SCHEME OF EXPLORATION

- 9.1.1 In accordance with the objectives set for G-3 level exploration in Murara 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.
- 9.1.2 **Geological Mapping:** Geological mapping will be done in the entire 1.82 sq km area on 1:4000 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.
- 9.1.3 **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 on 1:4000 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.
- 9.1.4 **Core Drilling:** The present exploration scheme is prepared by proposing 10 nos. of inclined boreholes based on the geological mapping, bed rock and channel sampling carried out in the G4 level exploration programme. The boreholes will be closed judiciously by the field geologist, after complete intersection of the quartz reef 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.

Details of Proposed Boreholes

BH-NO.	SECTION No.	AZIMUTH (°)	INCLINATION ANGLE (°)	PROPOSED DEPTH (m)	INTERSECTION LEVEL (mRL)
PBH-01	S1-S1'	N 59 W	50	70	200
PBH-02	S2-S2'	N 59 W	50	80	200
PBH-03	S3-S3'	N 59 W	50	100	200
PBH-04	S4-S4'	N 59 W	50	120	200

PBH-05	S5-S5'	N 59 W	50	95	200
PBH-06	S6-S6'	N 59 W	50	90	200
PBH-07	S7-S7'	N 59 W	50	120	200
PBH-08	S8-S8'	N 59 W	50	100	200
PBH-09	S9-S9'	N 59 W	50	115	200
PBH-10	S10-S10'	N 59 W	50	95	200
Total meterage				985.00	

- 9.1.5 **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 and under short wave UV light in respect of tungsten ore in boreholes.
- 9.1.6 **Core Sampling:** For preparation of samples, the borehole core will be split ted into two equal halves by using core splitter. One half will be powdered to (-) 200 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 (-200 mesh size) will be kept as duplicate half for future reference. It will generate about 400 Nos. primary samples and 60 nos. check samples (10%External and 5% Internal check of Primary samples). The sample length towards the floor marked by non-mineralised zone also needs 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 3 nos. samples before and after the quartz reef need to be drawn to mark the floor of the quartz reef decisively.
- 9.1.7 **Chemical Analysis:** All the primary samples and check samples will be analyzed for 5 radicals (Sn, W, Cu, Pb & Zn) which may be variable as per indication of other mineralisation. About 10% of primary samples will be sent to NABL external laboratory and 5% in MECL laboratory as check samples for analysis of 5 radicals (Sn, W, Cu, Pb & Zn).
- 9.1.8 **Petrological & Mineralogical Studies:**
During the course of Geological mapping and core logging, 20 nos. samples from various litho units from surface and intersected in boreholes will be studied for petrography (10 nos.) and mineralized (10nos.) zones will be studied for the ore mineral assemblages and their distribution, alteration, enrichment etc. in polished sections.

- 9.1.9 **Specific Gravity:** Twenty samples from drill core of mineralised quartz reef from the boreholes will be subjected to specific gravity determination at MECL petrology laboratory by Walker steel yard balance method. This will be used for resource estimation.

10.1.0 QUANTUM OF WORK

- 10.1.1 The following quantum of work has been proposed for G3 level exploration for Tungsten & Tin ore in Murara block:

Sl. No.	ITEMS OF WORK	UNIT	Proposed Quantum for Murara Block
			G3
1	Geological Mapping (1:4000 scale)	Sq. Km	1.82
2	Topographic Survey (2m contour interval)	Sq. Km	1.82
3	Borehole fixation and Block boundary DGPS Survey	Nos.	14 (10 Bhs + 4 Boundary points)
4	Drilling (Core)	m.	985 (10 Bhs)
5	Primary Sample (Core) for 5 radicals (Sn, W, Cu, Pb & Zn) by AAS method	Nos.	400
6	Check Samples (15%) for for 5 radicals (Sn, W, Cu, Pb & Zn) by AAS method	Nos.	60
7	Petrography (10) and Mineragraphy (10)	Nos.	20
8	Specific Gravity	Nos.	20
9	Exploration Report [As per Mineral (Evidence of Mineral Contents) Rule-2015] /UNFC	Nos.	1

10.2.0 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 10 months time. Report writing will take 4 months time with 2 month overlapping with laboratory analysis. Thus, the total duration of the project for completion of the above exploration will be 12 months from the date of commencement of the project. Review will be done after 7 months.

SCHEDULED TIME FOR G-3 LEVEL EXPLORATION OF TUNGSTEN AND TIN ORE IN MURARA BLOCK, DISTRICT- NIWARI, MADHYA PRADESH													
S.No.	Activities	MONTHS											
		1	2	3	4	5	6	7	8	9	10	11	12
1	Camp setting								R e v i e w				
2	Core drilling (2 rig)												
3	Geologist days (Field)												
4	Sampling days, core sampling												
5	Camp winding												
6	Laboratory studies												
7	Geologist days (HQ)												
8	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. 250.45 Lakhs. The summary of cost estimates for this G3 level exploration is given below:

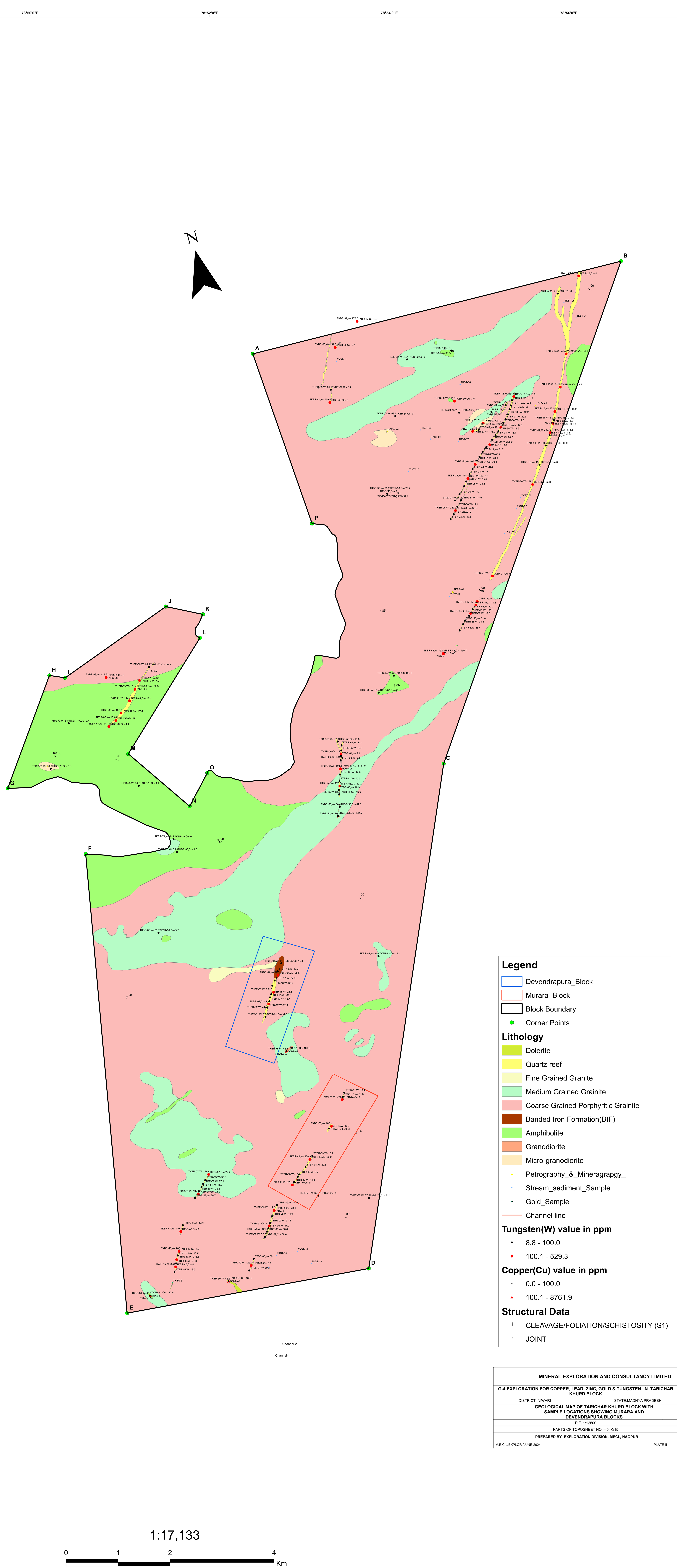
Summary of Cost Estimates

Sl. No.	Item	Total Estimated Cost (Rs.)
1	Geologist mandays Core logging, sampling	2,837,520
2	Excavation	0
3	Drilling	15,176,000
4	Labrotary studies	1,308,520
5	Geologist at HQ	360,000
	Sub Total (1 to 5)	19,682,040
6	Exploration Report Preparation	750,000
7	Proposal Preparation	393,641
8	Peer review charges	30,000
9	Sub Total (1 to 8)	20,855,681
10	GST 18%	3,754,023
	Total:	24,609,703

	Say Rs. In Lakh	246.10
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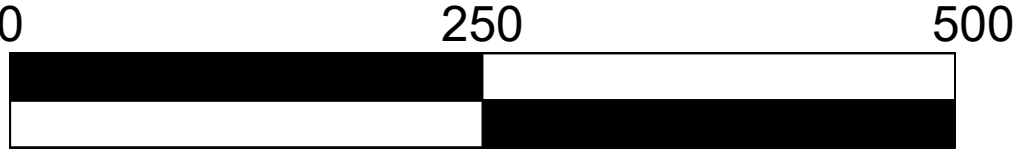
Enclosures:

- 1- Location Map of the proposed block
- 2- Geological map of Tarichar Khurd Block(G-4) showing proposed block (G-3)
- 3- Topo geological map with sections and borehole location
- 4- Geological cross sections- Plate-IVA, B & C
- 5- Cost Sheet





SCALE



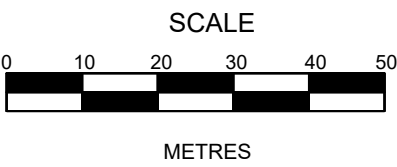
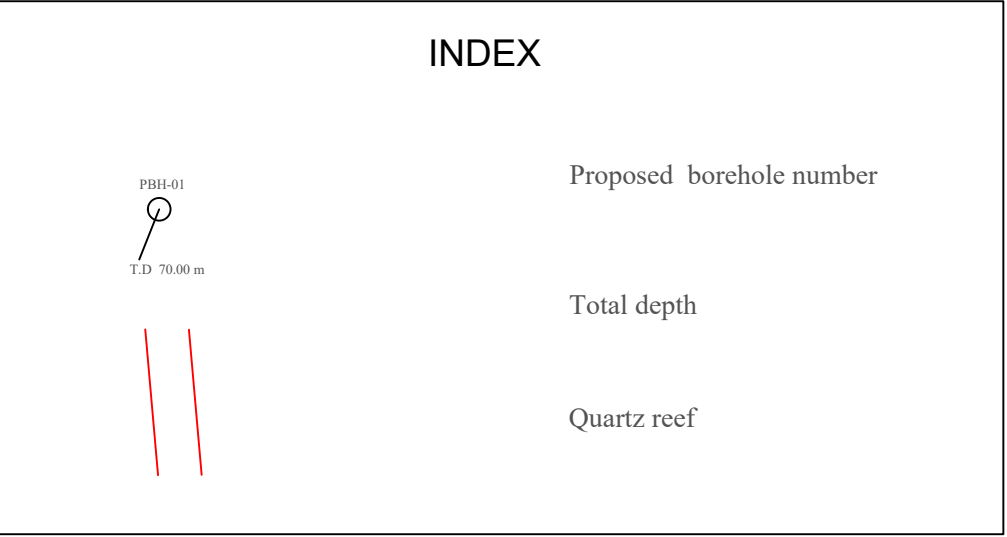
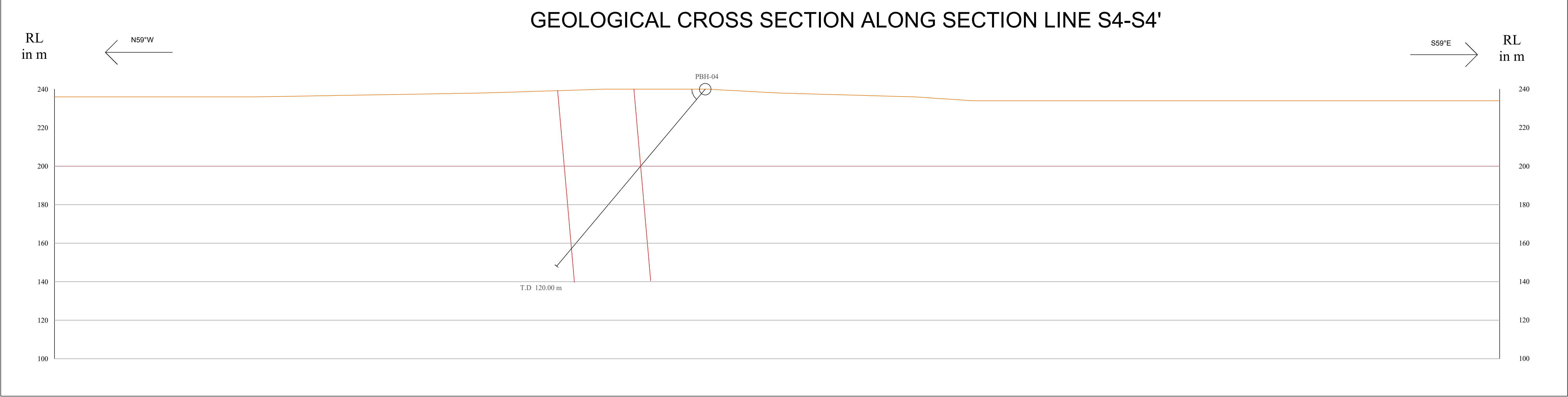
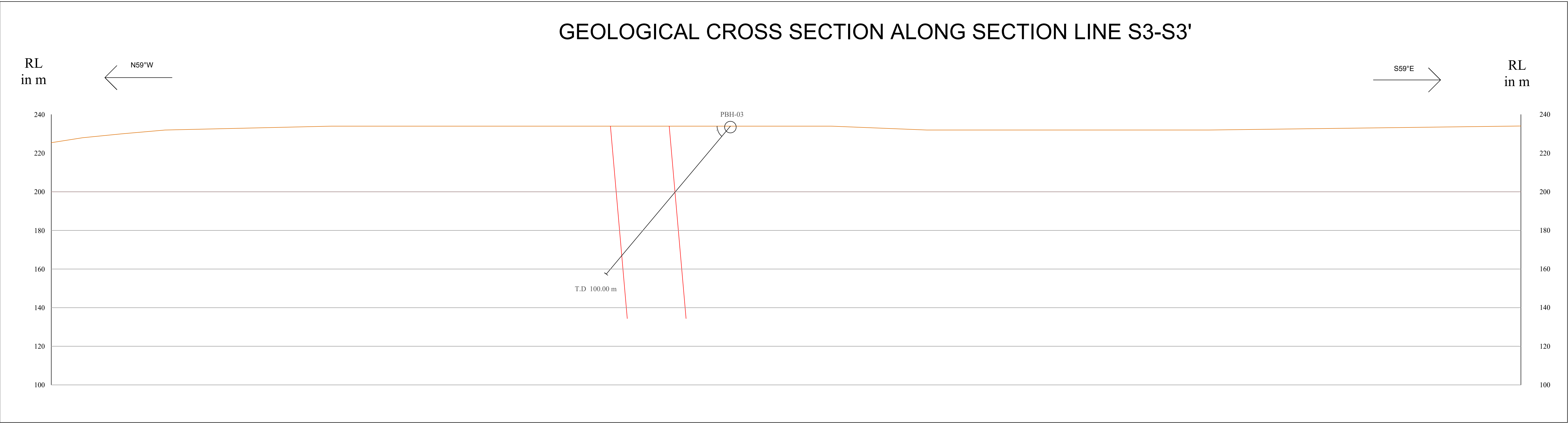
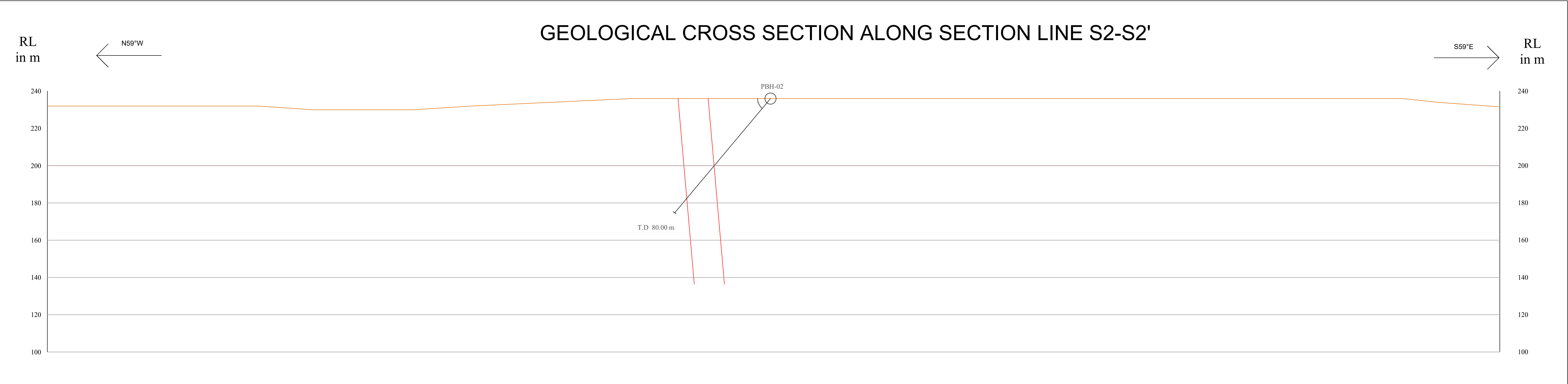
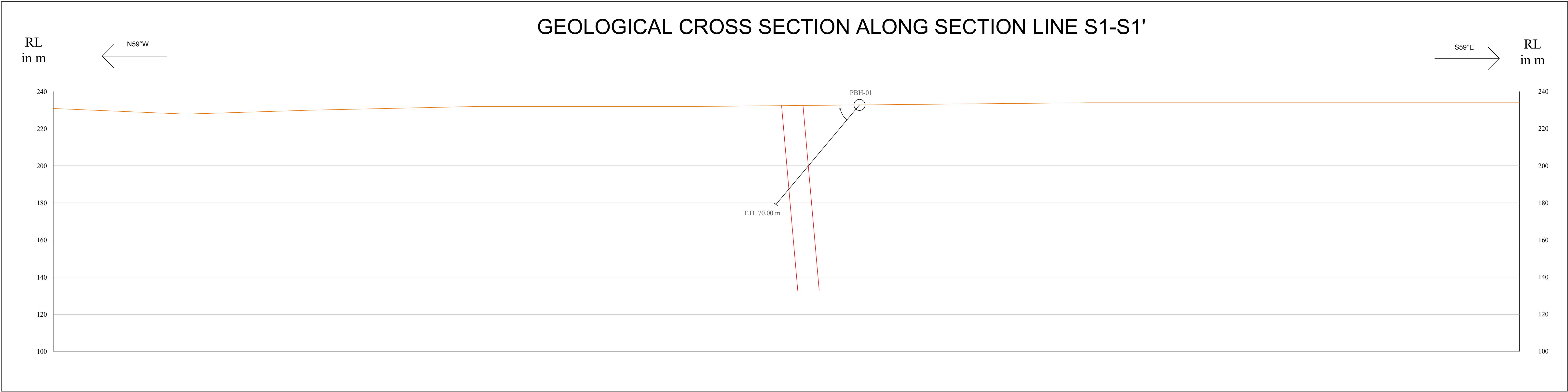
METRES

INDEX

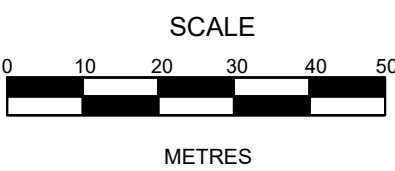
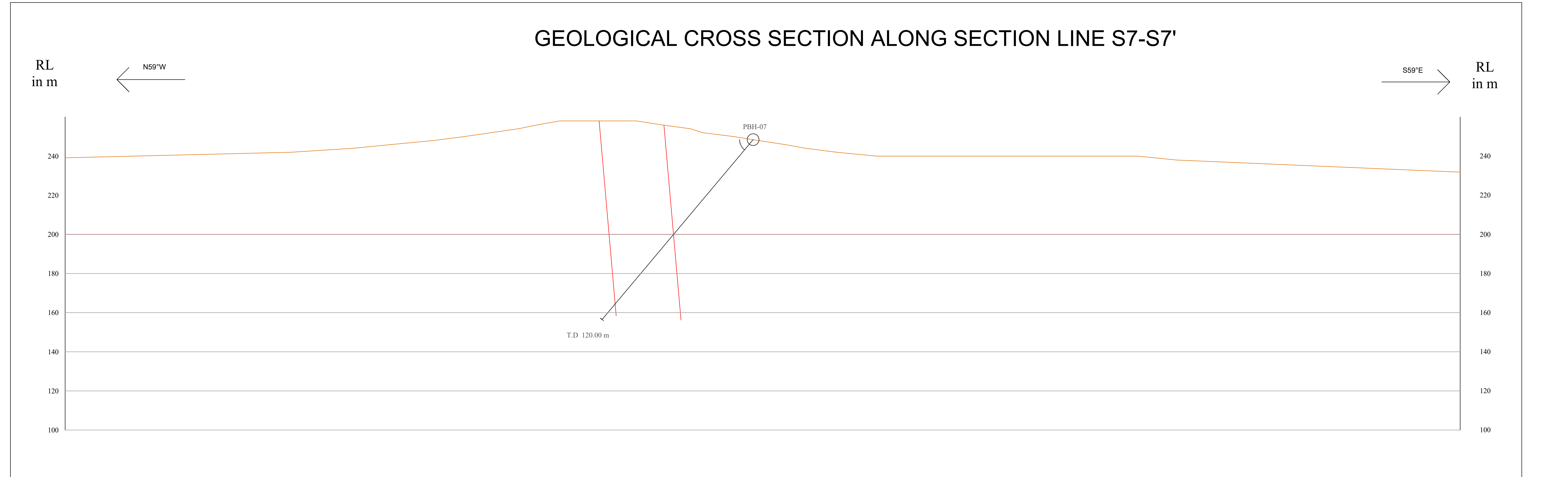
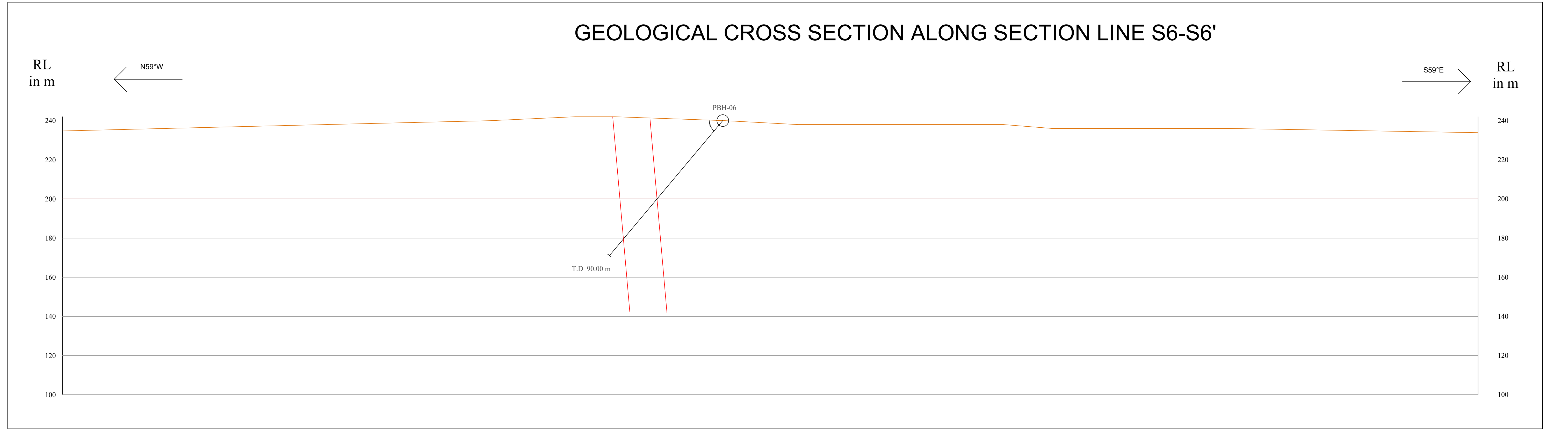
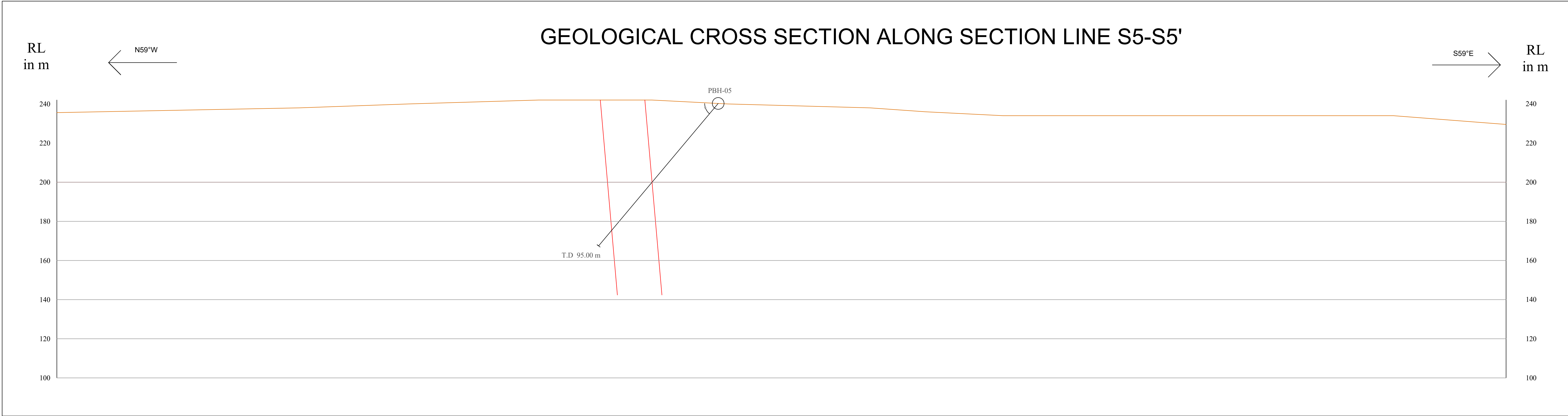
- Proposed borehole
- Contour
- Projected quartz reef
- Section line



 MINERAL EXPLORATION AND CONSULTANCY LIMITED (Formerly Mineral Exploration Corporation Limited)		
TOPO GEOLOGICAL MAP OF MURARA BLOCK		
District Niwari, Madhya Pradesh		
RF. 1:4,000		
PROCESSED AT : NON-COAL GR CELL, MECL, NAGPUR		
MECL/EXPL./JUNE-2024	PLATE NO.- III	3

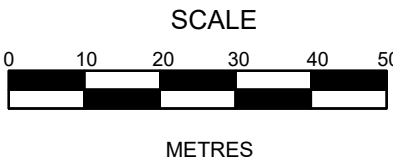
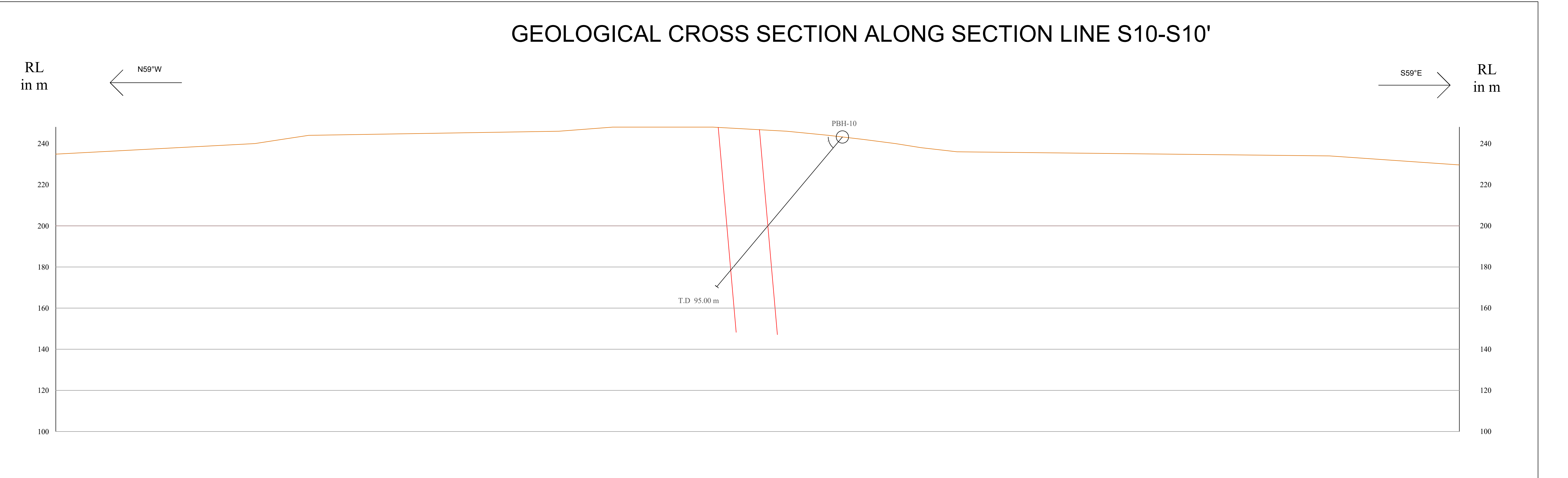
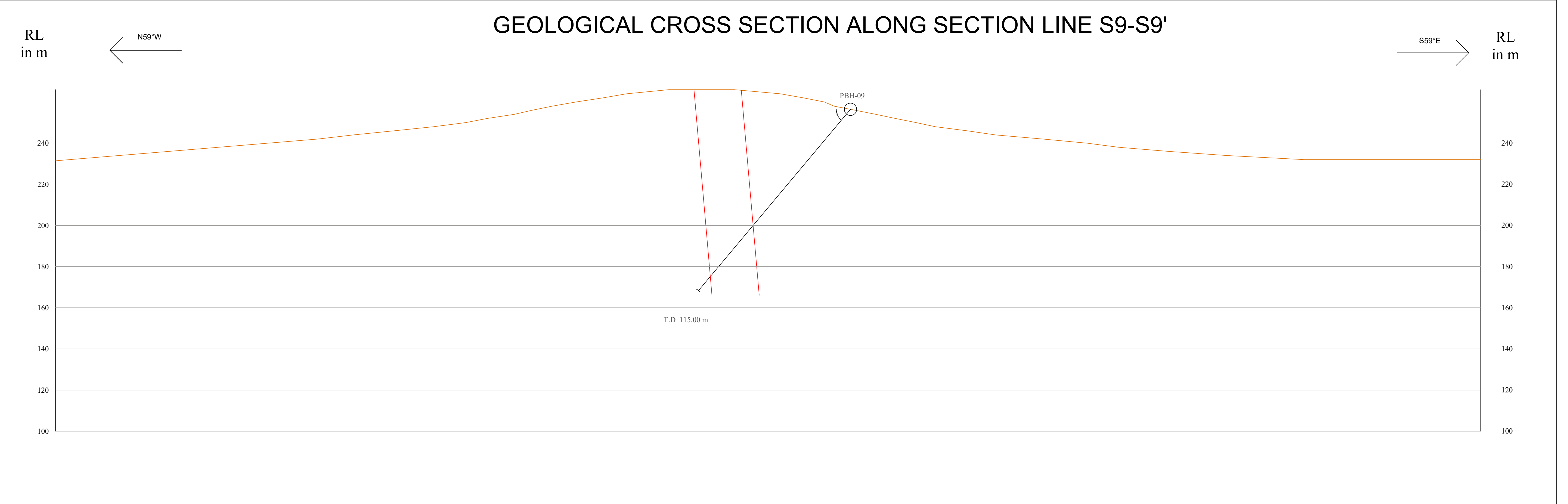
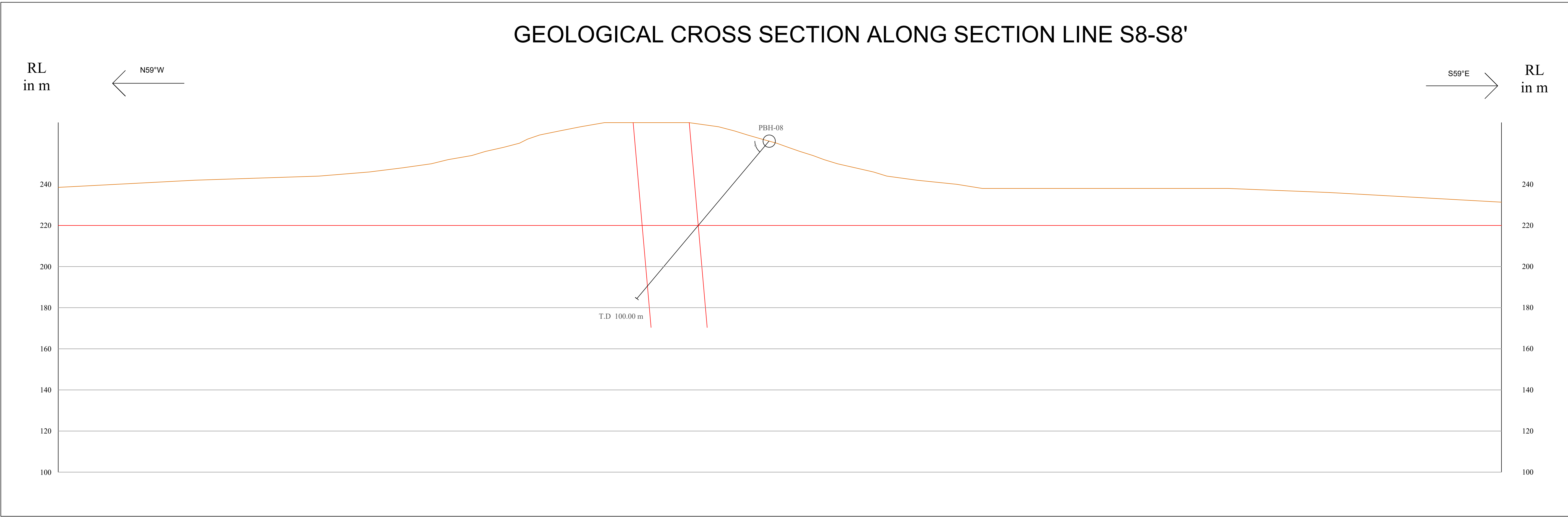


 MINERAL EXPLORATION AND CONSULTANCY LIMITED (Formerly Mineral Exploration Corporation Limited)		
GEOLOGICAL CROSS SECTION ALONG SECTION LINES S1-S1', S2-S2', S3-S3' AND S4-S4'		
Murara Block (G3) District Niyam, Madhya Pradesh RF: 1:1000		
PROCESSED AT: NON-COAL GR CELL, MECL, NAGPUR		
MECL/EXPL./JUNE-2024	PLATE NO.- IV-A	4



INDEX	
	Proposed borehole number
	Total depth
	Quartz reef

 MINERAL EXPLORATION AND CONSULTANCY LIMITED (Formerly Mineral Exploration Corporation Limited)		
GEOLOGICAL CROSS SECTION ALONG SECTION LINES S5-S5', S6-S6' AND S7-S7'		
Murara Block (G3) District Narmad, Madhya Pradesh		
RF. 1:1000		
PROCESSED AT : NON-COAL GR CELL, MECL, NAGPUR		
MECL/EXPL/JUNE-2024	PLATE NO.- IV-B	5



INDEX	
	Proposed borehole number
	Total depth
	Quartz reef

MINERAL EXPLORATION AND CONSULTANCY LIMITED (Formerly Mineral Exploration Corporation Limited)		
GEOLOGICAL CROSS SECTION ALONG SECTION LINES S8-S8', S9-S9' AND S10-S10'		
Murara Block (G3) District Niwari, Madhya Pradesh		
RF. 1:1000		
PROCESSED AT : NON-COAL GR CELL, MECL, NAGPUR		
MECL/EXPL./JUNE-2024	PLATE NO.- IV-C	6

ESTIMATED COST FOR PRILIMINARY (G-3) LEVEL EXPLORATION OF TUNGSTEN AND TIN ORE IN MURARA BLOCK, DISTRICT-NIWARI, MADHYA PRADESH Total Area - 1.82 Sq. Km; Drilling- 985.00m, Completion Time - 12 Months, Review: after 7 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	150	16,50,000	
1.2	Unskilled Labour (Field) (2 workers per geologist)	per worker	5.7	522	300	1,56,600	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	15	2,88,000	Boreholes 10 Nos. + Block Boundary 04 Nos.
Sub-Total 1						28,37,520	
2.0	Excavation						
2.1	Pitting	Cu.m	2.1.2	-	0	-	
Sub-Total 2						-	
3.0	Drilling						
3.1	Drilling -Very hard rock (up to 300m)	m	2.2.1.5a	12,650	985	1,24,60,250	
3.2	Land / Crop Compansation (in case the BH falls in agreeecultural Land)	per BH	5.6	20,000	10	2,00,000	As per actual
3.3	Construction of concrete Pillar (12"x12"x30")	per borehole	2.2.7a	2,000	10	20,000	
3.4	Transportation of Drill Rig & Truck associated per drill (for 2 rig)	Km	2.2.8	36	3200	1,15,200	1600 Km to and fro for one rig
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	2	64,400	
3.9	Drill Core Preservation	per m	5.3	1,590	985	15,66,150	
Sub-Total 2						1,51,76,000	
4.0	Laboratory Studies						
4.1	Primary + Check Sample - 5 radicals viz. (Sn, W, Cu, Pb & Zn) by AAS method	per sample	4.1.7a	2,506	460	11,52,760	
4.2	Preparation of thin section	per sample	4.3.1	2,353	10	23,530	
4.3	Complete petrographic study report	per sample	4.3.4	4,232	10	42,320	
4.4	Preparation of polish section	per sample	4.3.2	1,549	10	15,490	
4.5	Complete mineragraphic study report	per sample	4.3.4	4,232	10	42,320	
4.6	Specific gravity of rock	per sample	4.8.1	1,605	20	32,100	
Sub-Total 3						13,08,520	
5.0	Geologist man days (1 No.) for geological map & Report (HQ)	days	1.2	9,000	40	3,60,000	
Total (1.0 to 5.0)						1,96,82,040	
5.0	Preparation of Exploration Proposal	Nos	5.1	2% of the cost or Rs. 5.0 lakh - whichever is lower	1	3,93,641	EA has to submit the Hard Copies and the soft copy of the final proposal along with Maps and Plan as suggested by the TCC- NMET in its meeting while clearing the proposal

6.0	Geological Report Preparation	Nos	5.2	For the projects having cost exceeding Rs. 150 Lakhs but less than Rs. 150 Lakhs: A Minimum of Rs.7.5 lakhs or 3% of the value of work whichever is more and Rs. 3000/- per each additional copy.	1	7,50,000.00	EA has to submit the final Geological Report in Hard Copies (5 Nos) and the soft copy to NMET.
7.0	Report Peer Review Charges	lumpsum	As per EC decision		1	30,000	
Total Estimated Cost without GST						2,08,55,681	
Provision for GST (18%)						37,54,023	GST will be reimburse as per actual and as per notified prescribed rate
Total Estimated Cost with GST						2,46,09,703	
Say Rs. in Lakhs						246.10	
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.							

**PROPOSAL FOR PRELIMINARY (G-3) EXPLORATION FOR TUNGSTEN AND TIN ORE IN
DEVENDRAPURA BLOCK, DISTRICT- NIWARI, MADHYA PRADESH
(PART OF TOPOSHEET NO. 54K/15)**

COMMODITY: TUNGSTEN AND TIN

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

**PLACE: NAGPUR
DATE: 18.06.2024**

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

	Features	Details																	
	Block ID	DEVENDRAPURA BLOK																	
	Exploration Agency	Mineral Exploration and Consultancy Limited (MECL)																	
	Commodity	TUNGSTEN & TIN																	
	Mineral Belt	Bundelkhand Gneissic Complex																	
	Completion period with entire Time schedule to complete the project	12 months																	
	Objectives	1. To check the lateral and depth continuity of Tungsten and Tin ore by systematic drilling up to 180mRL. 2. To estimate preliminary mineral resource (333) and grade for Tungsten and Tin ore as per UNFC and MEMC- 2015. 3. To facilitate the Government to auction the block.																	
	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 40 days at HQ																	
1.	Location																		
	Block boundary corner points	<table border="1"> <thead> <tr> <th rowspan="2">Cardinal Points</th><th colspan="2">UTM(m)</th></tr> <tr> <th>Easting</th><th>Northing</th></tr> </thead> <tbody> <tr> <td>A</td><td>282099.8154</td><td>2811176.5991</td></tr> <tr> <td>B</td><td>283033.8981</td><td>2810696.2218</td></tr> <tr> <td>C</td><td>281673.8395</td><td>2808760.8382</td></tr> <tr> <td>D</td><td>280856.8347</td><td>2809318.3158</td></tr> </tbody> </table>	Cardinal Points	UTM(m)		Easting	Northing	A	282099.8154	2811176.5991	B	283033.8981	2810696.2218	C	281673.8395	2808760.8382	D	280856.8347	2809318.3158
Cardinal Points	UTM(m)																		
	Easting	Northing																	
A	282099.8154	2811176.5991																	
B	283033.8981	2810696.2218																	
C	281673.8395	2808760.8382																	
D	280856.8347	2809318.3158																	
	Villages	Devendrapura																	
	Tehsil/Taluk	Niwari																	
	District	Niwari																	
	State	Madhya Pradesh																	
2.	Area																		
	Block Area	2.336 Sq. Km.																	
	Forest Area	None																	
	Government Land Area	Data not available																	
	Charagaha	Data not available																	

	Private Land Area	Most of the area is private land
3.	Accessibility	
	Nearest Rail Head	Niwari (about 4 Km)
	Road	The area can be accessed via National Highway 39 (NH 39) passes through the Southern portion of the block from Jhansi towards Chhatarpur city.
	Airport	Gwalior, Madhya Pradesh about 147 km distance
4.	Hydrography	
	Local Surface Drainage Pattern (Channels)	The topography is undulatory plain with isolated hills rising abruptly and form steep scarps. The elevation of the study area ranges from 220m to 267m above mean sea level. Minor seasonal streams originating from NE-SW running hill range flow through the plains in a south to south-west direction in the southern portion of the block and in NE direction in the northern portion of the block.
5.	Climate	
	Mean Annual Rainfall	The mean annual rainfall recorded is about 910 mm
	Temperatures (December) (Minimum) Temperatures (June) (Maximum)	Minimum temperatures 6°C. Maximum temperatures up to 48°C.
6.	Topography	
	Toposheet Number	54K/15
	Morphology of the Area	The study area forms part of Bundelkhand plateau. Low dissected hills and valley of structural origin, pediment and pediplain of denudational origin. The block area is characterized by long serrated ridges of quartz reefs.
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), Chemical analysis of Tarichar Khurd block(MECL)
	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 Bundelkhand Gneissic Complex which is well known/interesting area for the mineral search for various minerals including Tungsten & Tin. 2. S.P. Nim of Geological Survey of India had found Tungsten (W) in quartz samples of the area and recommended that Quartz reefs of BGC, have quite promising concentration of tungsten and can be searched for tungsten deposits. 3. During reconnaissance survey (G4), MECL has delineated this Devendrapura sub-block(G3) within Tarichar Khurd block(G4). Quartz reef near Devendrapura village has reported tungsten (W) value up to 444.62ppm in bed rock sample and also scheelite has been identified under short-wave UV rays near the high value sample's location. 4. MECL, further recommended for systematic drilling in this block to upgrade in G3 level and resource in inferred category may be established. 5. Considering the tungsten potentiality during mid-term review of Tarichar khurd block in 58th TCC and Final review in 64th TCC of NMET the committee recommended MECL to take up G3 stage proposal for tungsten (W) in the block in both the meetings. 6. Establishing the extent and depth continuity of the Tungsten rich quartz reef along with inferred resources (333) would enable the state government to auction the block, providing a Mining License (ML) for tungsten ore.
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PROPOSAL FOR PRELIMINARY (G-3) EXPLORATION FOR TUNGSTEN AND TIN ORE IN DEVENDRAPURA BLOCK, DISTRICT- NIWARI, MADHYA PRADESH

1.1.0 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 substancesö 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 earthös 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.

2.1.0 BACKGROUND INFORMATION

- 2.1.1 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 Preliminary Exploration(G-3). Keeping in view Preliminary Exploration(G-3) level proposal is been prepared for NMET funding and execution.
- 2.1.2 S.P. Nim of GSI in the öReport on Reconnoitory survey of quartz reefs in Bundelkhand Granitoid Complex for use as abrasive/refractory minerals in parts of southern Uttar Pradesh (Item No. MIP/NR/UP/2000/003)ö has recommended that Quartz reefs of BGC, have quite promising concentration of tungsten and can be

searched for tungsten deposits. Feasibility of exploitation for tungsten can be determined by detailed investigation.

- 2.1.3 The final geological report of Reconnaissance Survey (G4) of Tarichar Khurd block has been submitted in April, 2024. In the block two quartz reefs have given high value in the bed rock samples, one is situated near Devendrapura village which has given tungsten (W) value up to 444.62ppm and also scheelite has been identified under short-wave UV rays near the high value sample's location, another is situated near the Murara village which has given tungsten (W) value up to 529.28ppm. In the report it is, therefore, recommended that detailed investigation for tungsten(W) may be undertaken in these two-quartz reef with detailed (1:4000scale) geological mapping, scout drilling and detailed sampling to increase the understanding of the disposition of tungsten mineralisation both in strike and depth wise. Other quartz reefs of the block may be taken up further on the basis of outcome of these two reefs.
- 2.1.4 The Geological mapping and analytical data of surface samples of Tarichar khurd block(G-4)were technically reviewed in 58th TCC of NMET held on 30th October, 31st October and 01st November, 2023. The committee found that encouraging values of tungsten(W) were reported from the area. The committee recommended to prepare a G3 stage item for Tungsten (W) in the area by carrying out UV lamp survey. MECL done work accordingly.
- 2.1.5 Further in the 64th Technical-cum-Cost Committee (TCC) meeting held on 25th, 29th & 30th April, 2024, the committee reviewed the work done after 58th TCC and peer reviewed Geological report of the Tarichar Khurd(G-4) block. In this meeting the committee again recommended MECL to take up G3 stage proposal for tungsten (W) in the block.
- 2.1.6 Considering the recommendations of the outcome of the previous works in the area, potentiality of the quartz reef, geological set up of the area and recommendations of NMET committee, Preliminary Exploration (G3) proposal of Devendrapura block, with 520m drilling in 4 boreholes, will be proposed in 66th TCC of NMET to take up systematic drilling in the block to estimate resource so that government can auction the block.

3.1.0 LOCATION AND ACCESSIBILITY

- 3.1.1 Devendrapura block covers an area of 2.336Sq. Km and falls in the Survey of India Topo-sheet no. 54K/15 of the Niwari District, Madhya Pradesh. The block is about 30km distance from the Jhansi city of Uttar Pradesh and District Headquarter Niwari is situated at south west of the block about 3 km from the block. The National Highway 39 (NH 39) passes through the northern portion of the block from Jhansi towards Chhatarpur city.
- 3.1.2 The nearest railway station is Niwari, Madhya Pradesh which is about 3km. from the southern boundary of the block and rail head is Jhansi (Virangana Lakshmi Bai)

Railway Station) about 30km. from the block. The nearest airport is Gwalior, Madhya Pradesh which is about 147 km distance.

**CARDINAL POINT COORDINATE OF DEVENDRAPURA BLOCK,
DISTRICT:MADHYA PRADESH (G-3 LEVEL)**

Cardinal Points	UTM(m)	
	Easting	Northing
A	282099.8154	2811176.5991
B	283033.8981	2810696.2218
C	281673.8395	2808760.8382
D	280856.8347	2809318.3158

4.1.0 PHYSIOGRAPHY, DRAINAGE AND CLIMATE

- 4.1.1 The study area forms part of Bundelkhand plateau. The topography is undulatory plain with isolated hills rising abruptly and form steep scarps. The block area is characterized by long serrated ridges of quartz reefs ranging in NE-SW direction. The elevation of the study area ranges from 220m to 267m above mean sea level. Minor seasonal streams originating from NE-SW running hill range flow through the plains in a south to south-west direction in the southern portion of the block and in NE direction in the northern portion of the block. Low dissected hills and valley of structural origin, pediment and pediplain of denudational origin.
- 4.1.2 The study area experiences a hot and semi-humid to semi-arid (during summers) climate. Being on a rocky plateau, the study area experiences extreme temperatures. Minimum temperatures vary from around 6°C to 12°C during winters and maximum temperatures vary from 42°C to 48°C during summers. Generally, the hottest days are in May and the coldest days in December or January. Spring arrives by the end of February and is a short-lived phase of transition. Summer begins by April.
- 4.1.3 The monsoon begins in third week of June (although this is variable year to year), while the monsoon rains gradually weaken in September and end before the last week of September and winter from October to January. The mean annual rainfall recorded is about 910 mm. Violent local squalls of short duration are sometimes generated in summer. The cloud of dust can be so thick that it becomes dark even during the day.

5.1.0 PREVIOUS WORK

- 5.1.1 The Bundelkhand area is referred by Medlicott (1859) who mapped in various parts of the present Madhya Pradesh between 1860 and 1869. Oldham (1859), Hacket (1870) and Mallet (1868) mapped the granite and gneissic rocks of Bundelkhand province as Bundelkhand Granite. The word 'Bundelkhand Gneiss' was coined by Dr. A. M.

Heron (1935), who considered it as the oldest rock of Archaean age and correlated it with Banded Gneissic Complex and Berach Granite of Rajasthan.

- 5.1.2 Gurusiddappa et al. (1984-85), reported specks, stringers and thin veinlets of pyrite, chalcopyrite, covellite along the joints and minor fracture planes within the grey-gneisses. Indications of specks and stringers of pyrite and chalcopyrite with stains have been reported within the medium-grained pink rock. The authors also reported diaspore and pyrophyllites occurring in the form of pocket deposits along quartz reefs trending northeast with fracture plane within metasedimentary rocks along these reefs cutting across. Few pockets of kaolin occur within the area due to alteration of feldspars.
- 5.1.3 Large scale mapping and base metal exploration for an area of 600 sq.km of Bundelkhand granitic terrain in Gwalior district were carried out by Chellani and Chakraborty (2001). The chemical analysis of chip samples collected across shear zones/ lineaments at regular intervals indicate a relatively good mineralisation near Lakhnauti but poor mineralisation near Barera, Bilua, Antri and Aniti. Large scale geological mapping and analysis of channel samples collected from 800m long, 4-6m wide NNE-SSW trending shear zone revealed average copper assay value of 2100 ppm average assay width of 2.49m. The maximum value of copper mineralisation was 5625 ppm. Vikash Kumar Suman and Asrar Ahmad (2015-16) reported the presence of specks of sulphide near Sokra village during STM. Large scale mapping on 1:12,500 scale was carried out in parts of Gatholi Kalan, Dongra Khurd, Pyasa, Kusmar, Baron, Gona, Uldana Kalan and Saidpur areas. The pyrophyllite was observed within the groundmass of quartz-sericite-pyrophyllite schist affected by hydrothermal activity due to the intrusion of quartz veins.
- 5.1.4 During the F.S. 2016-2018, GSI carried out Application of Hyperspectral / Multispectral Remote Sensing techniques to prepare Alteration / Mineralized Zone in Tikamgarh and Jhansi Districts of Madhya Pradesh and Uttar Pradesh respectively. Sulphide and carbonate minerals, such as pyrite, chalcopyrite, azurite and malachite respectively, have been identified during the field work near Laron, Devendrapura, Parara, Kumarpura, Sakera and Baron.
- 5.1.5 S.P. Nim of Geological Survey of India, during Annual Programme 2000-2001, worked in the region and in his report (February 2004) titled "Report on Reconnoitry Survey of Quartz Reefs in Bundelkhand Granitoid Complex for use as Abrasive/Refractory Minerals in parts of Southern Uttar Pradesh (Item No. MIP/NR/UP/2000/003)" had found Tungsten (W) in quartz samples and recommended that Quartz reefs of BGC, have quite promising concentration of tungsten and can be searched for tungsten deposits.
- 5.1.6 MECL in the year 2022 had carried out Reconnaissance Survey (G-4) for copper, lead, zinc and gold in Laron block, District: Jhansi, State: Uttar Pradesh, which is situated about 30 km distance from the Tarichar Khurd block and observed/reported

that the integrated studies of Previous works, Gravity and Magnetic Survey, Geological Mapping, Geochemical sampling and analytical results of surface samples in Laron block were not encouraging for Copper, Lead, Zinc and Gold mineralisation.

- 5.1.7 Mineral Exploration and Consultancy Limited (MECL) has carried out G4 level exploration, with mapping, bed rock, stream sediment and channel sampling, in Tarichar Khurd block and delineated area as potential for Tungsten and Tin deposit. Tungsten(W) mineralisation is associated with quartz reefs of the block along the complete strike length of the exposed quartz reefs. The quartz reef situated near Devendrapura village has given W value up to 444.62ppm and also scheelite has been identified under short-wave UV rays near the high value sample's location. Thus, in the study area, a total of 153 nos. of bed rock, 16 nos. of stream sediment and 25 no. of channel samples have been analysed for tungsten, in which W concentration ranges from 1.34 to 529.28ppm.

6.1.0 GEOLOGY OF THE AREA

- 6.1.1 The study area at central part of the Archaean Bundelkhand granite-gneissic complex (3.59 Ga; Saha et al., 2015) comprises granitoid varieties in different shades of colour such as porphyritic and non-porphyritic coarse grained pink granite, medium to fine grained granite with small to large enclaves of older metamorphics/supracrustals. Other important lithounits of study area are linear bodies of quartz reef which from prominent geomorphic features with positive relief in the study area. Supracrustal enclaves are part of green stone belt represented by volcano-sedimentary sequence.
- 6.1.2 The late phase of igneous activity is manifested by the intrusion of very large bodies of quartz reef. The quartz reefs are prominent in the area and form long ridges. Their outcrop pattern varies from lenticular to elongated ridges with multiple branching at the places. The quartz reefs in the mapped area show NNE-SSW to NE-SW general trend. In these quartz reefs we also found the patches of highly crushed and brecciated silicified masses of dark chocolate colored. In these crushed masses the network of milky quartz veins is absent instead we found clast and fragment of milky quartz which indicate later phase brecciation by which network of milky quartz veins get crushed and fragmented. In these quartz reefs there observed very good cross- cut relationship between at least two generation of quartz veins in the older veins. Conspicuous solution structure such as comb structure is also well developed. At many places, iron encrustations have also been found.
- 6.1.3 To establish the stratigraphy, a regional geological map at a scale of 1:50000, in conjunction with the Bhukosh Map of Niwari and Jhansi district by G.S.I., have been meticulously considered. The litho-stratigraphic sequence of the Tarichar Khurd block from which Devendrapura block is carved out is depicted in the table below.

Stratigraphic Sequence of the Tarichar khurd block(G-4)

	Soil/Alluvium
Intrusives	Quartz vein, Dolerite dyke, Quartz reefs, Carbonatite veinlets.
Bundelkhand Granite	Fine grained pink granite, Medium grained granite, Coarse grained pink granite, Coarse grained pink porphyritic granite, Coarse grained grey granite.
Newer Metamorphic Group	Banded Iron Formation (BIF)
Older Metamorphics	Amphibolites, Granodiorite/ Micro-granodiorite

7.1.0 LITHO UNITS

Various lithounits exposed in the block area and described in the following paragraphs

7.1.1 BUNDELKHAND GRANITE

- (1) The Bundelkhand massif is majorly occupied by a large plutonic complex of a batholithic dimension known as Bundelkhand granite. The emplacement of younger Bundelkhand granitoids is suggested to be resultant of collision related tectonics during the Neoproterozoic period (Mondal et al., 2002).
- (2) In the area mainly coarse-grained porphyritic granite, medium grained granite and fine-grained granite are prominently exposed. The coarse-grained porphyritic granite has the maximum aerial extent. In the block majority of the granite are pinkish in colour and at few places small outcrops of grey granites are exposed.

7.1.2 QUARTZ REEFS

- (1) One of the most outstanding features of the Bundelkhand Craton is the occurrence of NE-SW trending giant quartz reefs, which occur as large linear hills/ridges rising sharply above the ground over the basement gneisses and granitoids and form prominent physiographic features. Formation of these reefs is considered to be the outcome of tectonically controlled hydrothermal activity along vertical to sub vertical shear zones that formed in response to extensional tectonics at 2.1-2.0 Ga (Pati et al., 2007; Bhattacharya and Singh, op cit).
- (2) In the area major quartz reefs are also trending in NE-SW direction almost in all portions of the block. The quartz reefs are of various colours viz. milky to dull white, buff, greenish, greyish and jasper varieties of quartz are also seen. Dull white, milky white and pinkish white or reddish white or buff colour quartz are common. No

pattern is discernible in the disposition of different colours of quartz. These quartz reefs have sharp contact with the granitic rocks of BGC and contact is generally covered by scree/debris/soil. Secondary quartz veins in the quartz reefs are frequently seen. At places, quartz reefs exhibit deep red ferruginous coating on the quartz crystals, which suggests that ferruginous solution activity has taken place in the quartz reef.

- (3) Quartz reefs generally show pinching and swelling nature along the strike and also die out probably due to soil cover in between the exposures of reefs. Brecciation and shattering are commonly noted in the reefs and these have undergone polyphase deformation represented by lineaments, faults, different set of secondary quartz veins, different sets of quartz reef. Secondary quartz veins, composed of white quartz, are frequently observed in the quartz reefs.

7.1.3 BANDED IRON FORMATION (BIF)

- (1) Banded Iron Formation (BIF) is exposed as linear discontinuous ridges occurring within medium to coarse-grained pink granite and migmatites. BIF is the most conspicuous in the enclave suite of Bundelkhand Massif and is widespread. Compositionally they are banded quartz-magnetite rock, banded magnetite-grunerite rock and banded quartz-grunerite-garnet-actinolite rock. These form low mounds in a peneplained granitic country.
- (2) In the block about 1.75 km WNW of Asati Khurd and NW of Devandrapura village, a highly ferruginous quartz reef /BIF hillock is located. The ferruginous quartzite having high specific gravity was folded with bands parallel to S0 or S1 (with dip about 80° due SE). The associated quartz reef has been emplaced in two generations. The chemical analysis of it shows higher iron content along with calcium and magnesium. Bed rock sample analysed from this outcrop has given value of 35.53% Fe, 189.64 PPM Zn and 108.03PPM of Ni.

8.1.0 OBJECTIVE OF THE PROPOSED EXPLORATION PROGRAMME

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

- 8.1.1 To prove the lateral and depth continuity of Tungsten identified during G-4 work by proposing geological & structural mapping on 1:4000 scale and systematic drilling up to average borehole depth of 130m at uniform level of 180mRL.
- 8.1.2 To estimate preliminary mineral resource (333) and grade for Tungsten and Tin ore as per UNFC and MEMC- 2015.
- 8.1.3 To facilitate the government to auction the block.

9.1.0 PROPOSED SCHEME OF EXPLORATION

- 9.1.1 In accordance with the objectives set for G-3 level exploration in Devendrapura 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.
- 9.1.2 **Geological Mapping:** Geological mapping will be done in the entire 2.336 sq km area on 1:4000 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.
- 9.1.3 **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 on 1: 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.
- 9.1.4 **Core Drilling:** The present exploration scheme is prepared by proposing 4 nos. of inclined boreholes based on the geological mapping, bed rock and channel sampling carried out in the G4 level exploration programme. The boreholes will be closed judiciously by the field geologist, after complete intersection of the quartz reef 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.

Details of Proposed Boreholes

PBH- NO.	SECTI ON No.	UTM, ZONE-44, DATUM- WGS-84	AZIMUTH (°)	INCLINAT ION ANGLE (°)	PROPOS ED DEPTH (m)	INTERSEC TION LEVEL (mRL)
		BH COLLAR RL				
PBH- 01	S1-S1'	220	N 57 W	50	140	180
PBH-	S2-S2'	240	N 57 W	50	130	180

02						
PBH-03	S3-S3'	240	N 57 W	50	120	180
PBH-04	S4-S4'	240	N 57 W	50	130	180
		Total Meterage			520	

9.1.5 **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 and under short wave UV light in respect of tungsten ore in boreholes.

9.1.6 **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 (-) 200 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 (-200 mesh size) will be kept as duplicate half for future reference. It will generate about 305 Nos. primary samples and 46nos.check samples (10% External and 5% Internal check of Primary samples). The sample length towards the floor marked by non-mineralised zone also needs 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 3 nos. samples before and after the quartz reef need to be drawn to mark the floor of the quartz reef decisively.

9.1.7 **Chemical Analysis:** All the primary samples and check samples will be analyzed for 5 radicals (Sn, W, Cu, Pb&Zn) which may be variable as per indication of other mineralisation. About 10% of primary samples will be sent to NABL external laboratory and 5% in MECL laboratory as check samples for analysis of 5 radicals (Sn, W, Cu, Pb& Zn).

9.1.8 **Petrological & Mineralogical Studies:**

During the course of Geological mapping and core logging, 15 nos. samples from various litho units from surface and intersected in boreholes will be studied for petrography (5 nos.) and mineralized (10 nos.) zones will be studied for the ore mineral assemblages and their distribution, alteration, enrichment etc. in polished sections.

9.1.9 **Specific Gravity:** Twenty samples from drill core of mineralised quartz reef from the boreholes will be subjected to specific gravity determination at MECL petrology laboratory by Walker steel yard balance method. This will be used for resource estimation.

10.1.0 QUANTUM OF WORK

9.1.1 The following quantum of work has been proposed for G3 level exploration for Tungsten&Tin ore in Devendrapura block:

Sl. No.	ITEMS OF WORK	UNIT	Proposed Quantum for Devendrapura Block
			G3
1	Geological Mapping (1:4000 scale)	Sq. Km	2.336
2	Topographic Survey (2m contour interval)	Sq. Km	2.336
3	Borehole fixation and Block boundary DGPS Survey	Nos.	8 (4 Bhs + 4 Boundary points)
4	Drilling (Core)	m.	520 (5 Bhs)
5	Primary Sample (Core) for 5 radicals (Sn, W, Cu, Pb & Zn) by AAS method	Nos.	305
6	Check Samples (10%+5%=15%) for 5 radicals (Sn, W, Cu, Pb & Zn) by AAS method	Nos.	46
7	Petrography (5) and Mineragraphy (10)	Nos.	15
8	Specific Gravity	Nos.	20
9	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 10monthsö time. Report writing will take 3 monthsö time with 1 month overlapping with laboratory analysis. Thus, the total duration of the project for completion of the above exploration will be12 months from the date of commencement of the project. Review will be done after 7 months.

SCHEDULED TIME FOR G-3 LEVEL EXPLORATION OF TUNGSTEN AND TIN ORE IN DEVENDRAPURA BLOCK, DISTRICT- NIWARI, MADHYA PRADESH													
S.No.	Activities	MONTHS											
		1	2	3	4	5	6	7	8	9	10	11	12
1	Camp setting												
2	Core drilling (1 rig)												
3	Geologist days (Field)												
4	Sampling days, core sampling												
5	Camp winding												
6	Laboratory studies												
7	Geologist days (HQ)												
8	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.													

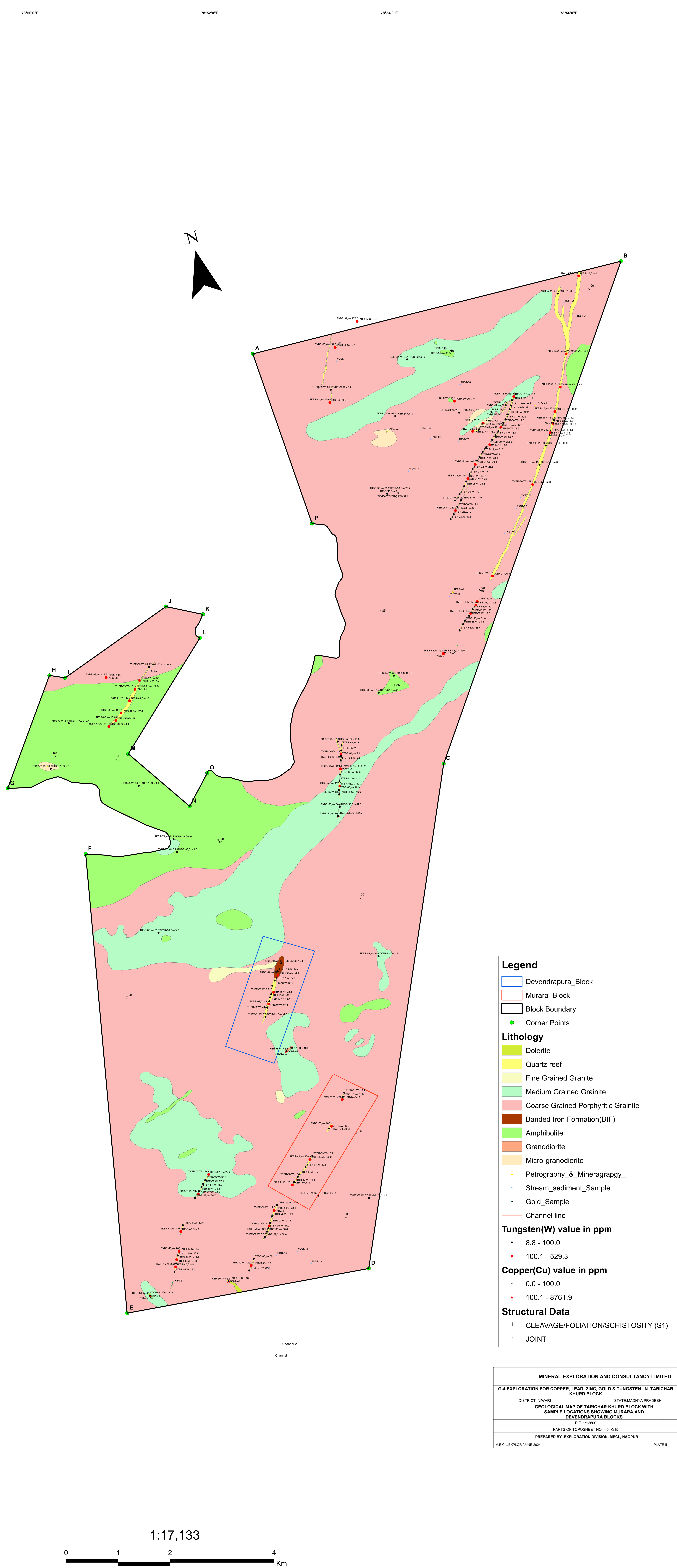
10.1.2 Cost has been estimated based on actual schedule of rates mandated in the circular OM No. 61/1/2018/NMET dated 31st March 2020 for NMET funded Projects. The total estimated cost is Rs. 146.55Lakhs. The summary of cost estimates for this G3 level exploration is given below:

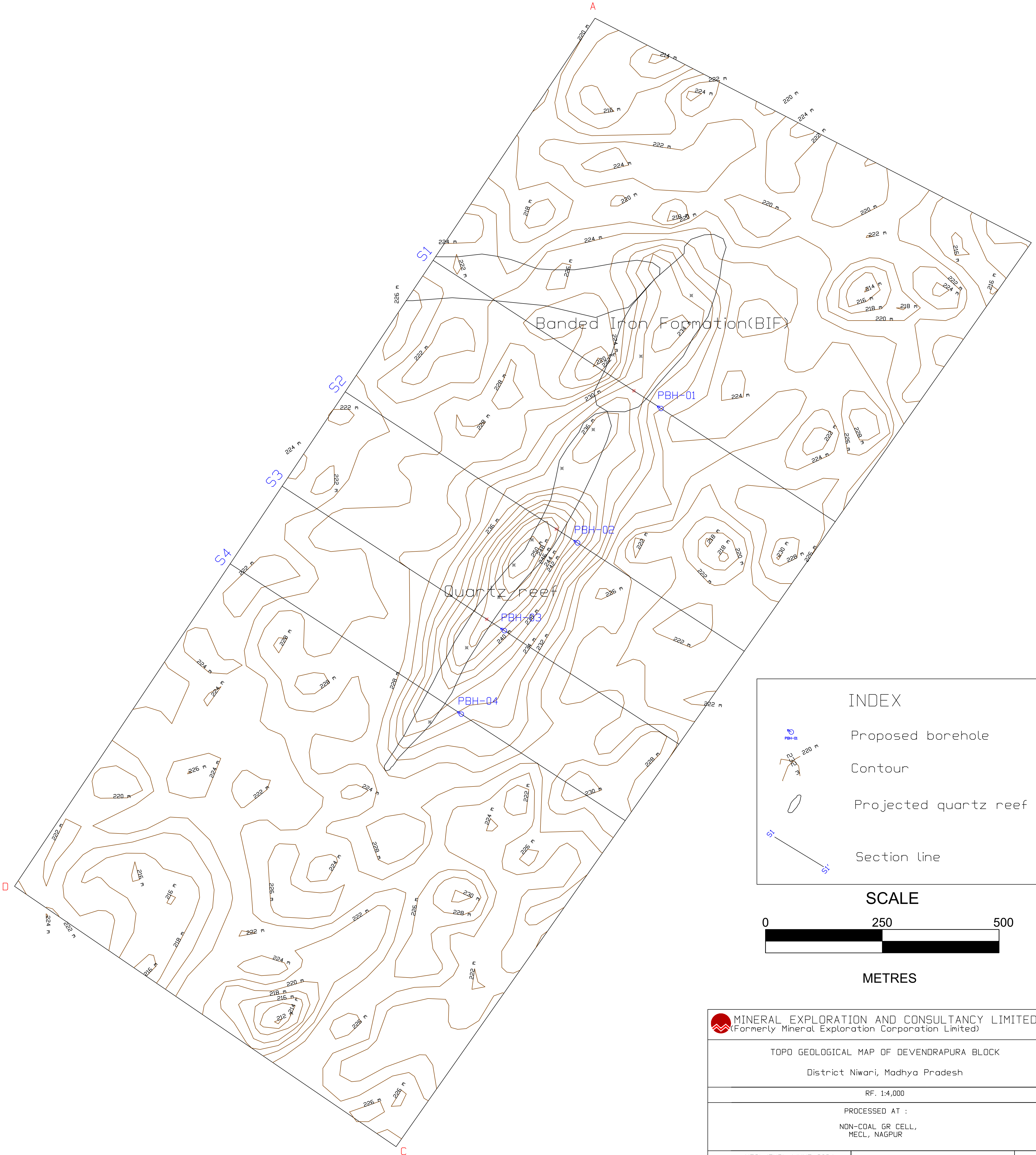
Summary of Cost Estimates

Sl. No.	Item	Total Estimated Cost (Rs.)
1	Geologist mandays Core logging, sampling	2,233,980
2	Excavation	0
3	Drilling	7,982,800
4	Labrotary studies	1,002,441
5	Geologist at HQ	360,000
	Sub Total (1 to 5)	11,579,221
6	Exploration Report Preparation	578,961
7	Proposal Preparation	231,584
8	Peer review charges	30,000
9	Sub Total (1 to 8)	12,419,766
10	GST 18%	2,235,558
	Total:	14,655,324
	Say Rs. In Lakh	146.55

Enclosures:

- 1-Location Map of the proposed block
- 2-Geological map of Tarichar Khurd Block(G-4) showing proposed block(G-3)
- 3-Topo geological mapwith sections and borehole location
- 4-Geological cross sections- Plate-IV
- 5-Cost Sheet





INDEX

Proposed borehole

Contour

Projected quartz reef

Section line

SCALE

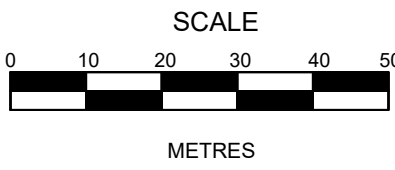
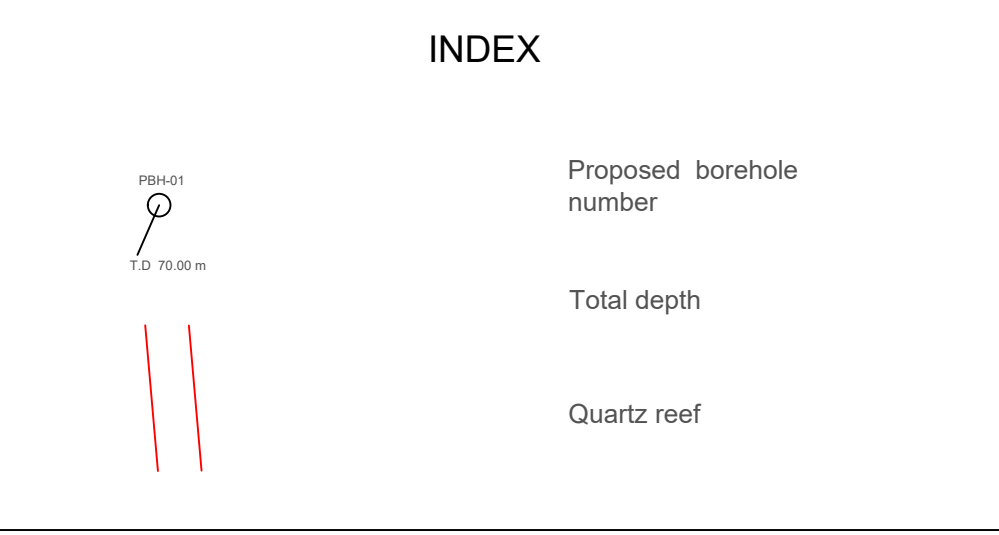
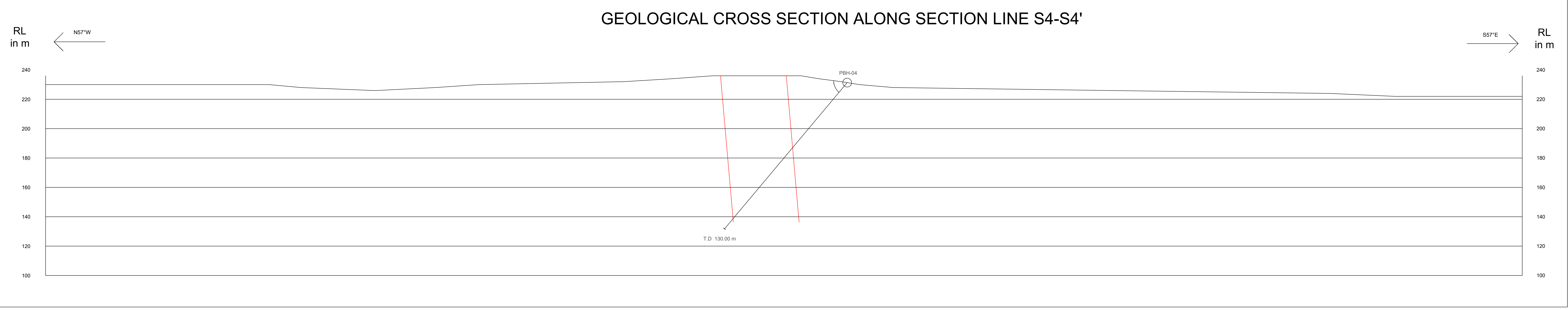
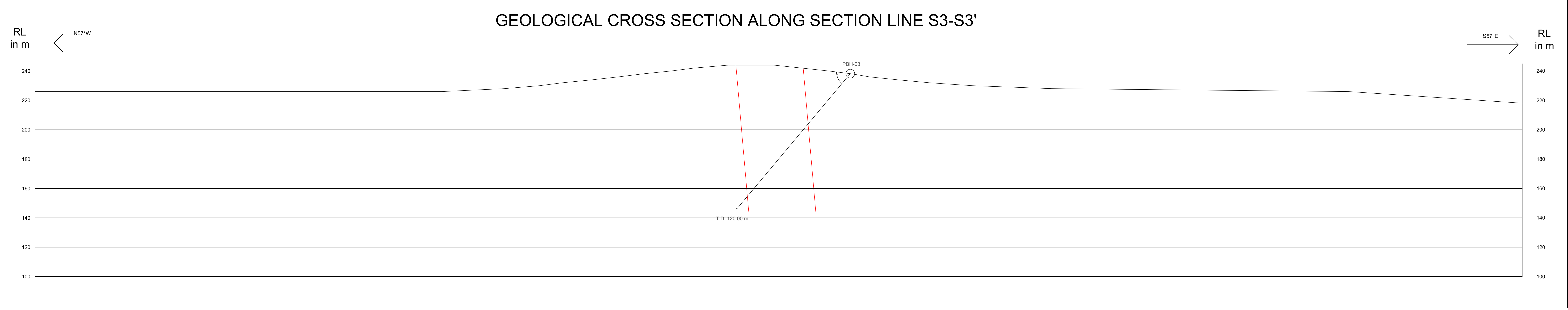
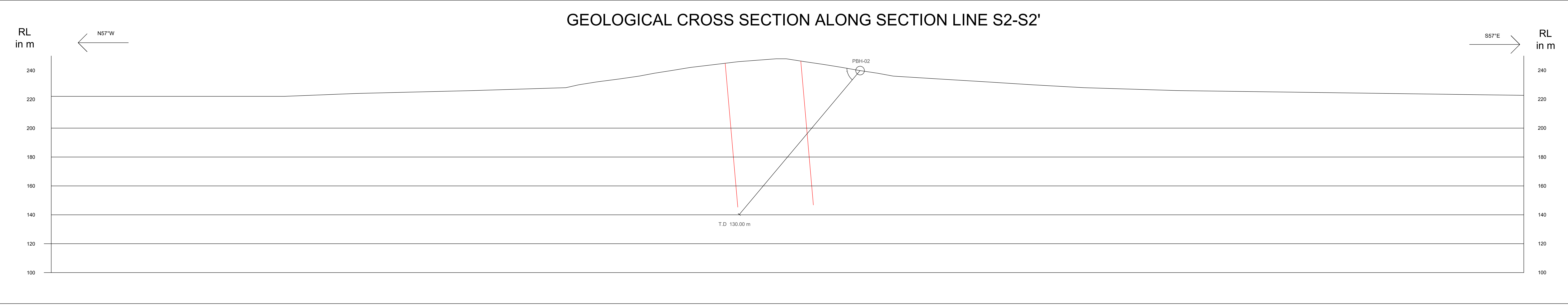
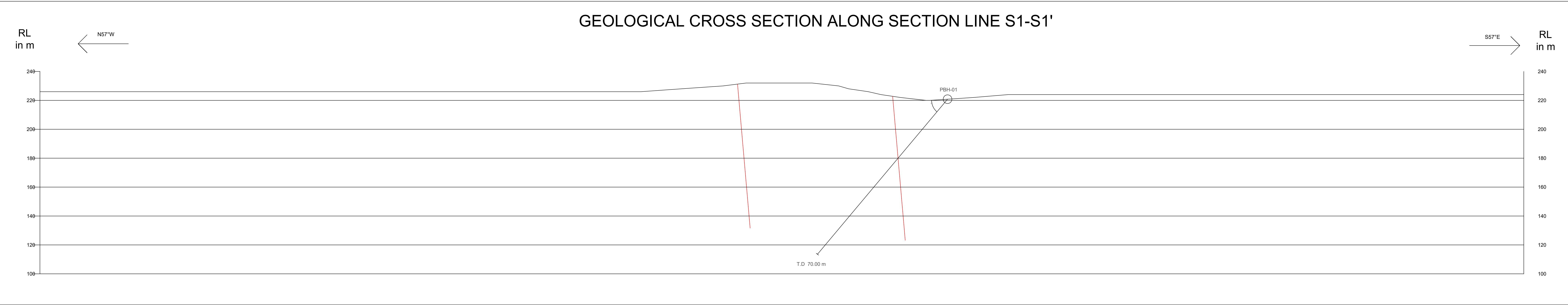
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250

500

METRES

MINERAL EXPLORATION AND CONSULTANCY LIMITED (Formerly Mineral Exploration Corporation Limited)		
TOPO GEOLOGICAL MAP OF DEVENDRAPURA BLOCK		
District Niwari, Madhya Pradesh		
RF. 1:4,000		
PROCESSED AT : NON-COAL GR CELL, MECL, NAGPUR		
MECL/EXPL./JUNE-2024	PLATE NO.- III	3



 MINERAL EXPLORATION AND CONSULTANCY LIMITED (Formerly Mineral Exploration Corporation Limited)		
GEOLOGICAL CROSS SECTION ALONG SECTION LINES S1-S1', S2-S2', S3-S3' AND S4-S4'		
Devendrapura Block (G3) District Niwar, Madhya Pradesh		
RF: 1:1000		
PROCESSED AT : NON-COAL GR CELL, MECL, NAGPUR		
MECL/EXPL/JUNE-2024	PLATE NO. - IV-A	4

ESTIMATED COST FOR PRELIMINARY (G-3) LEVEL EXPLORATION OF TUNGSTEN AND TIN ORE IN DEVENDRAPURA BLOCK, DISTRICT-NIWARI, MADHYA PRADESH							
Total Area - 2.336 Sq. Km; Drilling- 985.00m, Completion Time - 12 Months, Review: after 7 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	45	2,29,500	
1.6	4 labours/ party (Rs 431/day/labour) (As per rates of Central Labour Commissioner) for sampling work	day	5.7	522	180	93,960	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	8	1,53,600	Boreholes 04 Nos. + Block Boundary 04 Nos.
Sub-Total 1						22,33,980	
2.0	Excavation						
2.1	Pitting	Cu.m	2.1.2	-	0	-	
Sub-Total 2						-	
3.0	Drilling						
3.1	Drilling -Very hard rock (up to 300m)	m	2.2.1.5a	12,650	520	65,78,000	
3.2	Land / Crop Compansation (in case the BH falls in agreecultural Land)	per BH	5.6	20,000	4	80,000	As per actual
3.3	Construction of concrete Pillar (12"x12"x30")	per borehole	2.2.7a	2,000	4	8,000	
3.4	Transportation of Drill Rig & Truck associated per drill (for 1 rig)	Km	2.2.8	36	1600	57,600	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	1	32,200	
3.9	Drill Core Preservation	per m	5.3	1,590	300	4,77,000	
Sub-Total 2						79,82,800	
4.0	Laboratory Studies						
4.1	Primary + Check Sample - 5 radicals viz. (Sn, W, Cu, Pb & Zn) by AAS method	per sample	4.1.7a	2,506	351	8,79,606	
4.2	Preparation of thin section	per sample	4.3.1	2,353	5	11,765	
4.3	Complete petrographic study report	per sample	4.3.4	4,232	5	21,160	
4.4	Preparation of polish section	per sample	4.3.2	1,549	10	15,490	
4.5	Complete mineragraphic study report	per sample	4.3.4	4,232	10	42,320	
4.6	Specific gravity of rock	per sample	4.8.1	1,605	20	32,100	
Sub-Total 3						10,02,441	
5.0	Geologist man days (1 No.) for geological map & Report (HQ)	days	1.2	9,000	40	3,60,000	
Total (1.0 to 5.0)						1,15,79,221	
5.0	Preparation of Exploration Proposal	Nos	5.1	2% of the cost or Rs. 5.0 lakh - whichever is lower	1	2,31,584	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	5,78,961.05	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						1,24,19,766	
Provision for GST (18%)						22,35,558	GST will be reimburse as per actual and as per notified prescribed rate
Total Estimated Cost with GST						1,46,55,324	
Say Rs. in Lakhs						146.55	
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.							