PROPOSAL FOR RECONNAISSANCE SURVEY (G-4 STAGE) FOR CRITICAL MINERALS IN GOPALPURA BLOCK (AREA: 78.80 SQ KM) DISTRICT- CHHATARPUR, MADHYA PRADESH

COMMODITY: CRITICAL MINERALS

MINEREAL EXPLORATION AND CONSULTANCY LIMITED
DR. BABASAHAB AMBEDKAR BHAWAN
SEMINARY HILLS

PLACE: NAGPUR

DATE: January, 2026

Summary of the Block for Reconnaissance Survey (G-4 Stage)

GENERAL INFORMATION ABOUT THE BLOCK

	Features	**Details**
	Block ID	Gopalpura
	Exploration Agency	Mineral Exploration and Consultancy Limited (MECL)
	Commodity	Critical Minerals
	Mineral Belt	Bundelkhand Gneissic Complex
	Completion Period with entire Time schedule to complete the project & Estimated Cost	12 months with about 158.38 Lakhs rupees.
	Objectives	Based on the evaluation of geological data available, the present exploration program has been formulated to fulfill the following objectives: i. To carry out Geological & Structural mapping on 1:12500 scale for identification of mineral bearing formation with the structural features to delineation of potential zones of rare metal and associated mineralization. ii. To collect bedrock, stream sediment samples (from positive catchment area) for analyses of 34 elements by ICPMS. iii. To establish the reconnaissance resources for Critical Mineralsand associated minerals as per UNFC norms & Minerals (Evidence of Mineral Contents) Rules-2015. iv. The outcome of this exploration will decide further exploration strategy for upgradation of block to Preliminary (G-3) Exploration.

	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	Two nos. of Geoscientist (1 Field + 1 HQ)
	Expected Field days (Geology) Geological Party Days	Geologist Party Days: 120 Days (Field) Geologist Party Days: 30 Days (HQ)
1	**Location**	
	The coordinates of corner points of proposed Gopalpura block are as follows:	

Points	Latitude	Longitude
A	24° 59' 41.17" N	079° 38' 25.77" E
B	24° 59' 45.9" N	079° 44' 50.70" E
C	24° 55' 33.96" N	079° 44' 54.42" E
D	24° 55' 58.63" N	079° 38' 29.41" E

	Villages	Chhatarpur, Gopalpura, Dilniya
	Tehsil/ Taluk	Chhatarpur
	District	Chhatarpur
	State	Madhya Pradesh
2.	**Area (hectares/ square kilometers)**	
	Block Area	78.80 sq km
	Forest Area	Details not available
	Government Land Area	Data Not Available
	Private Land Area	Data Not Available
3	**Accessibility**	
	Nearest Rail Head	Chattarpur Railway station 12 km
	Road	Chhatarpur-Ghura Road runs E-W connecting Chhatarpur, Gopalpura with Rajnagar
	Airport	Khajuraho, 35 km
4	**Hydrography**	
	Local Surface Drainage Pattern (Channels)	Major drainage in the area is Ken River, flowing from west to east. The other major stream next to Ken is Kail Nadi, flow from west to east. Smaller streams forming dendritic to sub-rectangular pattern drain the whole area all the stream courses appear to have been controlled by joints.
	Rivers/ Streams	
5	**Climate**	

	Mean Annual Rainfall	Subtropical climate condition exists within the area. Average rainfall is about 1257 mm. The temperature ranges between 40 to 47.60 c. The predominant wind direction is North West -south east.
	Temperatures (Maximum) (Minimum)	Maximum Temperature: 46.2°C Minimum Temperature: 4.2°C
6	**Topography**	
	Toposheet Number	54 P/09 & 54P13
	Physiography of the Area	Physiographically the area is characterized by rugged and undulating topography with moderately high hills interspaced by stretches of alluvium.
7	**Availability of baseline geosciences data**	
	Geological Map (1:50K/ 25K)	1:50000 (NGDR)
	Geochemical Map	NGCM, RMT report
	Geophysical Map	Available
8.	**Justification for taking up Reconnaissance Survey / Regional Exploration**	1. The selection of the Gopalpura Block is based on multiple geological, structural and geochemicalcriteria that collectively enhance its mineralisation potential. 2. Reconnaissance sampling by GSI (FS 2020-22) yielded several anomalous metal values, including: ❖ 520.91 ppm and 417.97 ppm W with 66.61 ppm and 13 ppm of Li in quartzite from Gopalpura ❖ 25.73 ppm, Li with 67.93 ppm of W from the Dolerite 3. These anomalous values—well above crustal background—indicate an active mineralization system. 4. Not only Li and W, the chemical analysis of hydrothermally altered quartz vein exposed near Kanti in Gopalpura shows high concentration of Co (193 ppm), Cu (1194ppm) and Pb (740ppm). 5. Moderate gravity zones around Gopalpura coincide with reported metal anomalies, confirming structurally controlled mineralisation trends. 6. Integration of geological, geochemical, geophysical and remote sensing data identifies multiple overlapping favourable indicators, strongly supporting the need for systematic G4 reconnaissance exploration.

PROPOSAL FOR RECONNAISSANCE SURVEY (G-4 STAGE) FOR CRITICAL MINERALSIN GOPALPURA AREA, DISTRICT –CHHATARPUR, STATE -MADHYA PRADESH (AREA 78.80 SQ. KM.)

1.0.0 INTRODUCTION:

1.0.1 India's growing industrial and strategic sectors—steel, alloy manufacturing, superalloys, energy storage, aerospace and defence—depend heavily on critical minerals such as Nickel (Ni), Chromium (Cr) and Tungsten (W). Consumption of these minerals has increased sharply, while indigenous production remains insufficient to meet national requirements. Tungsten, in particular, is classified as a critical and strategic metal due to its essential use in defence-grade hardmetals, high-density alloys and cutting tools. Nickel and Chromium constitute integral components of stainless steel, battery technologies, superalloys, catalysts and electroplating industries.

1.0.2 Given the limited known deposits of these metals in India, systematic exploration in favour able geological terrains is of paramount importance. The Bundelkhand region, characterised by ancient granitoid complexes, mafic–ultramafic intrusions and quartz vein systems, presents favourable geological conditions for diverse mineralisation styles, including hydrothermal and magmatic types.

1.0.3 The Gopalpura block has been identified as a promising target based on reconnaissance work by the Geological Survey of India (GSI), which has indicated anomalous values of Ni, Cr and W in various lithologies including quartzite, amphibolite and mafic intrusives. These preliminary indications necessitate a structured exploration programme at the G4 level, including reconnaissance mapping, sampling, trenching and integrated interpretation.

1.0.0 BACKGROUND

1.0.1 On enactment of MMDR Amendment Act- 2015, Minerals (Evidence of Mineral Contents) Rule 2015 and Mineral Auction Rules 2015, Govt. of India directed State Government to speed up exploration work for different Mineral Commodities in the respective states. Accordingly, MECL has prepared the proposal for Reconnaissance (G4) level involving identification of mineralized areas worthy of further investigation towards deposit identification.

1.0.2 The Exploration for strategic, critical, rare metals, rare earths elements, PGE and precious metals is given top priority by Govt. of India after amendment of MMDR

act 2015. Keeping this in view, the present proposal is being put up for Reconnaissance Survey (G-4) for Critical Minerals in Gopalpura block.

2.1.0 LOCATION AND ACCESSIBILITY

2.1.1 The proposed Gopalpura block over an extent of 78.80 sq km area and lies in Chhatarpur district (Toposheet No. 54 P/09 & 54P13), Madhya Pradesh. The major villages located within the proposed block are Chhatarpur, Gopalpura, Dilniya. All the villages in the area are well connected to each other and to the highways by motorable roads and tracks. The nearest railway station is at Chhatarpur which is about 5 km in north of the proposed block. The nearest airport is at Khajuraho which is about 40 km SE of the proposed block. The location map of the proposed block is provided as Plate No- I. The detailed location of the boundary points is given in Table 1.

Table 1: Coordinates of Corner Points of Proposed Gopalpura block, Chhatarpur district, Madhya Pradesh

Cardinal Points	Latitude	Longitude
A	24° 59' 41.17" N	079° 38' 25.77" E
B	24° 59' 45.9" N	079° 44' 50.70" E
C	24° 55' 33.96" N	079° 44' 54.42" E
D	24° 55' 58.63" N	079° 38' 29.41" E

2.2.0 PHYSIOGRAPHY

2.2.1 Physiographically the area is characterised by rugged and undulating topography with moderately high hills interspaced by stretches of alluvium.

2.3.0 DRAINAGE

2.3.1 Major drainage in the area is Ken River, flowing from west to east. The other major stream next to Ken is Kail Nadi, flow from west to east. Smaller streams forming dendritic to sub-rectangular pattern drain the whole area all the stream courses appear to have been controlled by joints.

3.1.0 REGIONAL GEOLOGY

3.1.1 The proposed study area forms a part of the Bundelkhand Granitoid–Gneiss Complex, one of the oldest crustal blocks of the Indian Shield, comprising mainly Archaean to early Proterozoic granitoids and their metamorphic enclaves. This craton represents a stable continental nucleus dominated by tonalite–trondhjemite–granodiorite (TTG) suites and later granitic plutons emplaced during multiple magmatic episodes. The terrain exhibits a mosaic of grey granites, pink porphyritic

granites, granitic gneisses, pegmatites, quartz reefs, amphibolites and mafic dykes, reflecting long-lived tectono-magmatic activity. These rocks collectively define a high-grade metamorphic terrane, structurally reworked by regional shearing and multi-phase plutonism.

3.1.2 The dominant rock types in the region include coarse- to fine-grained granites, hornblende-bearing granites and grey granites forming the main structural backbone of the Bundelkhand massif. Older metamorphic enclaves such as quartzite, amphibolite, schist and banded gneiss occur as xenoliths and roof pendants within younger granitic bodies, indicating assimilation during magma emplacement. These enclaves preserve significant mineralogical and structural signatures of pre-granitic crustal evolution and act as favourable hosts for mafic-related mineralisation. Quartz reefs, often brecciated and ferruginous, traverse the granitoid terrain and form prominent ridges marking brittle deformation zones.

3.1.3 The regional structural architecture is defined by a network of NE–SW, NW–SE and N–S trending lineaments, shear zones and fracture corridors. NE–SW trending quartz reefs represent major regional shears, displaying intense silicification, brecciation and hydrothermal alteration. Mafic dykes intrude the granitoid complex in predominantly NW–SE trends, representing late-stage Proterozoic magmatic events. These structures form significant geological controls for fluid movement and emplacement of mineralisation, especially where lineament intersections coincide with quartz veins or mafic contacts. The structural pattern strongly influences the localisation of hydrothermal alteration zones observed in remote sensing data.

3.1.4 The interplay of granitoid magmatism, mafic intrusions and shear-controlled hydrothermal activity has created a favourable environment for polymetallic mineralisation, particularly Ni, Cr and W. Mafic and amphibolite bodies provide a source for Cr–Ni enrichment, while the quartz reefs and breccia zones facilitate tungsten-bearing hydrothermal fluids. Remote sensing and field studies have confirmed widespread argillic, phyllic, propylitic and ferruginous alteration, characteristic of a hydrothermal system active along regional structure. Together, these geological, structural and metamorphic attributes make the region highly prospective for metallic mineral deposits and justify further systematic exploration.

Table No. 2.1: Litho-Stratigraphic succession in the western part of BGC (after Shrivastava et. al 2001, Gaur et al. 2016, Tank et al. 2018)

Supergroup / Group	Litho Units
Alluvium / Soil	Chambal Alluvium: Light Grey, fine to medium grained micaceous sand with lenses of grey and pink granite pebbles, calcareous and iron nodules Banda alluvium: Reddish brown silt clay with lenses of reddish quartzo-feldspathic sand and ocassional basal congolomerate and grit
Unconfirmity	
Deccan Traps	Basaltic Lava Flows
Unconfirmity	
Vindhyan Super Group	A thick pile of sedimentary rocks comprising of sandsrone, limestone, shale, Orthoquartite and conglomerates
	Unconfirmity
Bijawar Group	A sequence of sedimentary / metasedimentary rocks comprising of quartzite, slate, shale, tuffaceous shale, quartzitic sandstone with subordinate bands of ferrugenous and calcareous rocks
Unconfirmity	
Bundelkhand Granitoid Complex (BGC)	Basic Intrusives: Dolerite and gabbro dykes, quartz reefs and veins. Pegmatite/aplite veins granite porphyry. Leucogranite. Pink granite: fine to monzo granite. Grey granite: fine to Monzo granite, migmatite and gneisses
Older Metamorphic group	Amphibolite, hornblende diorite, metasediments and BIF

3.2.0 GEOLOGY OF THE BLOCK

3.2.1 Gopalpura block is dominated by rock units belonging to the Bundelkhand Granitoid Complex, with subordinate enclaves of older metamorphic rocks and a suite of mafic intrusions. The granitoids occur as massive to locally sheared bodies, displaying pink, grey and porphyritic varieties with medium- to coarse-grained textures. Within the granitic terrain, isolated bands and lenses of amphibolite, quartzite, chlorite schist and ferruginous breccia occur as relic enclaves and tectonic fragments. These rocks provide essential insights into the pre-granitic basement architecture and serve as potential hosts for Cr–Ni mineralisation and structural traps for hydrothermal tungsten deposition.

3.2.2 One of the most prominent geological features of the block is the system of NE–SW trending quartz reefs, some of which are 1–5 m thick and traceable across several kilometres. These reefs frequently show brecciation, ferruginisation and silicification, suggesting repeated structural reactivation and hydrothermal fluid influx. In several locations such as Himmatpura, Ajnar, Gopalpura and Digaria, quartz veins show intense argillic to phyllic alteration with iron-oxide staining and

sulfide mineralisation. These alteration zones correlate strongly with geochemical anomalies, particularly high tungsten values in quartzite at Himmatpura and W–Cu–Pb in hydrothermally altered veins at Gopalpura.

3.2.3 The block contains multiple NW–SE trending mafic dykes and isolated amphibolite bodies, which are critical in understanding the source of Ni and Cr mineralisation. Amphibolite exposures near Badwaha and Digaria show elevated Cr (up to 818 ppm) and Ni (up to 229 ppm) values, indicating enrichment of these metals within mafic protoliths. These intrusives, often magnetic and Fe–Mg rich, form prominent ridges and linear belts and frequently display shearing, chloritisation and sulphidation. Their contact zones with quartzite and granitic gneiss are prime targets for disseminated or vein-controlled Ni–Cr sulphide mineralisation.

3.2.4 The local structural pattern is governed by NE–SW, NNW–SSE and NW–SE trending fractures, shear zones and brittle faults. The NE–SW lineaments control the emplacement of quartz reefs, while the NW–SE intrusives reflect late Proterozoic dyke injections. In many locations, cross-cutting relationships between these structural systems are associated with enhanced alteration and metal enrichment. Hydrothermal mineralisation, including pyrite, chalcopyrite, malachite, and scheelite, is observed along these structures. The combination of brittle deformation, hydrothermal alteration and mafic–felsic contacts creates multiple favourable micro-environments for deposition of tungsten-bearing quartz veins and Cr–Ni bearing mafic bodies, justifying the focus of the proposed exploration programme.

4.0.0 PREVIOUS WORK

4.1.0 The word “Bundelkhand Gneiss” was coined by Heron (1935), who considered it as the oldest rock of Archaean age and correlated with Banded Gneissic Complex and Berach Granite of Rajasthan. Geological Survey of India undertook the first systematic survey of the Bundelkhand region during FS 1873-77. Medlicot (1859) has given the first geological account of the Bundelkhand area, describing schist and Banded Iron formation (BIF) at Baretha.

4.1.1 Jhingran and Puri (1956) studied the Bundelkhand Granite in detail. They described that Bundelkhand Granite is dominantly granodiorite in composition, grading locally into adamelite. Singhain & Bejarniya (1988) carried out systematic geological mapping in parts of 54O/12. They reported Molybdenite in medium grained grey granite injection, SE of Manpura. They also reported gossan capping

which is indicative of sulphide NE of Rampura and malachite stains NE of Gotet, both in east-west trending quartz reefs.

4.1.2 A two-year Regional Mineral Targeting (RMT) project was carried out to find potential areas for mineral occurrences after integration of thematic maps from geological mapping (GM), geochemical mapping (GCM), geophysical mapping (GPM) and Remote Sensing (RS) followed up by ground validation, throughout in general and anomalous zones in particular, over an area of 3000 sq. km. to bring out to regional anomalies based on predictive modeling of the data

4.1.2.1 The RMT project is having three main objectives viz. characterising of nature of mineralization in the BGC, search mineralisation, and identification of potential blocks for exploration work

4.1.2.2 Geological map of 1:50K scale is the base map for the RMT project

4.1.2.3 The study area consists of mainly the variants of granites and enclaves of older supracrustal (gneiss/amphibolite) of various dimensions belonging to Bundelkhand Granitoid Complex (BGC).

4.1.2.4 The Archaean granites intruded by felsic (quartz and pegmatite) and basic/mafic dykes.

4.1.2.5 The shearing effect is also observed in quartz reefs, During field work it was also observed that basemetal and pyrophyllite mineralization in the area is controlled by quartz reefs/veins. The presence of diamond was also confirmed from Angore ultramafic bodies by the earlier workers in the area.

4.1.3 **Lineaments are very important in search of mineralization** as these are the weak zones that may serve to localize magmatic-related ore-forming fluids, with the implication that lineament mapping might be used as an exploration guide for ore deposits.

4.1.3.1 In the study area, lineaments are mainly represented by quartz reefs and basic dykes which are clearly observed in remote sensing studies.

4.1.3.2 A comparison of the alteration pattern and lineament density map showed a good correlation indicating that primary mineralization in the area may be structurally and tectonically controlled

4.1.3.3 Based on the results of the interpretation and integration with reported mineralization, high values of GCM data and field validation, it is observed that the all the reported mineralization is present mainly around the lineaments and

these lineaments were also influenced by the high GCM values of copper, molybdenum, nickel, pyrophyllite, gold and REE.

4.1.4 **NGPM Data:**

4.1.4.1 The study area is covered by ground and aerial geophysical mapping. In ground geophysical mapping, Bouguer gravity and magnetic data analysis was carried out. The Bouguer

4.1.4.2 The gravity map shows two high anomaly zones (outside RMT area) and a major gravity low zone having ENE-SWS trend. Low zone appears due to presence of sandstone in Bijawar basin.

4.1.4.3 The magnetic anomaly contour map shows that the area exhibits a dominant magnetic high anomaly in the central to eastern part of the area. The magnetic high anomaly originated in the northern part may be due to the presence of mafic intrusives.

4.1.4.4 These high magnetic zones were checked during field work and observed that at places it coincides with the presence of mafic-ultramafic bodies. The RSAS has demarcated few important blocks for PGE, diamond and copper in thearea.

4.1.5 **JUSTIFICATION: Prospectivity** analysis was carried out by using geological (lithology and quartz), structural (lineament and shear zones) and geochemical datasets. A predictive potential map was prepared using spatial modeling techniques like Boolean AND & Boolean OR logic model. Gopalpura block was one of the identified blocks. Li and W, the chemical analysis of hydrothermally altered quartz vein exposed near Kanti in Gopalpura shows high concentration of Co (193 ppm), Cu (1194ppm) and Pb (740ppm).

4.1.6 The integrated geological, geophysical and remote-sensing studies carried out over the Gopalpura region clearly establish the area as a high-potential corridor for polymetallic mineralisation, particularly Ni, Cr and W. The Bouguer gravity anomaly map delineates distinct high, moderate and low anomaly zones, with the northern high-gravity zone near Bagwaha reflecting concealed basic/mafic intrusions at depth—favourable hosts for Ni–Cr enrichment. Moderate gravity zones coinciding with Rampura, Digaria and Gopalpura align with known anomalous samples, indicating structurally controlled mineralisation zones in mixed granitic–mafic settings. Remote sensing using ASTER alteration mapping reveals well-developed argillic, phyllic, propylitic and ferric-iron alteration along the dominant NE–SW quartz reefs and shear-controlled fractures, confirming active

hydrothermal alteration systems. Field validation supports these signatures, with widespread ferruginisation, epidote-bearing propylitic zones, and sulphide mineralisation (pyrite, chalcopyrite, molybdenum) at several localities. Critically, chemical analyses show high W (712 ppm) in Himmatpura quartzite, high W–Cu–Pb in Gopalpura hydrothermally altered veins, and significant Cr–Ni anomalies in Digaria and Badwaha amphibolite.

5.0.0 PLANNED METHODOLOGY

5.1.0 Based on the evaluation of geological data available, the present exploration program has been formulated to fulfill the following objectives:

i. Geological and structural mapping on 1:12,500 scale to delineate mineral-bearing lithounits, document structural controls (shear zones, faults, fractures), and identify alteration zones, breccia bodies, and mafic/ultramafic intrusives for assessing their surface expressions and lateral continuity of potential mineralised zones.
ii. Collect bedrock and stream-sediment samples (from positive catchment areas) for multi-element analysis of 34 elements using ICP–MS, with emphasis on Critical Mineralsand associated pathfinder elements.
iii. Carry out trenching across exposed gossans, quartz veins and structurally favourable zones to validate subsurface continuity and to identify zones of enrichment.
iv. Undertake 500 m of scout drilling in the prospective sectors, contingent upon encouraging results from mapping, sampling and trenching.
v. Establish reconnaissance-level (G4) resources for REE-bearing or associated minerals in accordance with UNFC guidelines and the Minerals (Evidence of Mineral Contents) Rules, 2015**.**
vi. Utilise the results of this programme to define the exploration strategy for upgradation of the block to Preliminary Exploration (G3) in subsequent phases.

The details of different activities to be carried out are presented in subsequent paragraphs.

5.2.0 GEOLOGICAL MAPPING

5.2.1 Geological mapping will be carried out in the entire 78.80 km area on 1:12,500 scale to delineate mineral-bearing lithounits, document structural controls (shear zones, faults, fractures), and identify alteration zones, breccia bodies, and mafic/ultramafic intrusives for assessing their surface expressions and lateral continuity of potential mineralised zones.

5.2.1.1 Collection of samples during mapping and Sampling programme includes:

5.2.1.2 100 no of Bedrock chip/channel samples from quartz veins, altered granites, and mafic intrusives.

5.2.1.3 50 no of Stream-sediment samples from positive catchment areas draining the mineralised corridors, especially from ferruginous and propylitic alteration zones mapped around Himmatpura.

5.2.1.4 All samples will be analysed for 34 elements through ICP–MS, focusing on: REE suite, W, Mo, Cu, Ni, Cr, Ta, Nb, Li, Rb, Cs, and associated pathfinder elements. This will help establish multi-element geochemical anomalies for prioritising targets.

5.2.1.5 10% of all the Primary Samples will be sent for external check in NABL External Labs by ICPMS method

5.3.0 **EXPLORATORY MINING (PITTING /TRENCHING)**

5.3.1 A Total 100 cu.m Pitting/trenching is proposed.

systematic channel sampling will be carried out along both exposed walls. After cleaning and preparing the trench faces, continuous channels will be cut at a uniform interval of 2–3 metres along the entire trench length (about 30–35 m). Each channel will be oriented perpendicular to the geological structures to capture true lithological and mineralisation variation. Representative chips will be collected from a 5–7 cm deep and 8–10 cm wide channel using geological hammer and chisel. The same procedure will be repeated on the opposite wall to obtain duplicate geological representation, resulting in approximately 75 samples from both walls. All samples will be properly bagged, labelled, documented and sent for geochemical analysis

5.3.2 All samples will be analysed for 34 elements through ICP–MS, focusing on: REE suite, W, Mo, Cu, Ni, Cr, Ta, Nb, Li, Rb, Cs, and associated pathfinder elements. This will help establish multi-element geochemical anomalies for prioritising targets.

5.3.3 10% of all the Primary Samples will be sent for external check in NABL External Labs by ICPMS method

5.4.0 Exploration Activity Review by TCC

5.5.0 The integrated results from geological mapping, bedrock and stream-sediment geochemical analyses, and geophysical surveys will be reviewed in the TCC. Based on this review, any prospective zones identified will be taken up for scout drilling

5.6.0 EXPLORATORY DRILLING

5.6.1 Drilling will be carried out in the prospective zones. on the basis of geological mapping, bedrock sampling and geophysical survey carried out by MECL

5.6.2 Total 500m scout drilling will be carried out and it is proposed to undertake 4–5 scout drillholes, each of approximately 80–120 m depth. Core samples will be collected at a 2 m interval in mineralised or altered zones and at a 4 m interval in barren or unaltered sections. Based on this sampling scheme, each drillhole is expected to yield 40 core samples, resulting in a total of approximately 160 samples from the entire drilling programme. These samples will be systematically logged, split, and submitted for geochemical, petrographic, and mineralogical analyses to characterise lithology, alteration, and mineralisation patterns, providing critical input for defining further exploration targets.

5.6.3 All samples will be analysed for 34 elements through ICP–MS, focusing on: REE suite, W, Mo, Cu, Ni, Cr, Ta, Nb, Li, Rb, Cs, and associated pathfinder elements. This will help establish multi-element geochemical anomalies for prioritising targets.

5.6.4 10% of all the Primary Samples will be sent for external check in NABL External Labs by ICPMS method

5.7.0 **PETROLOGICAL & MINERAGRAPHIC STUDIES:**

5.7.1 During the course of Geological mapping and sampling 10 nos. of samples from outcrops of various lithounits will be collected to carry out Petrography and Minerography. These samples would be drawn from ore zones and host rocks.

5.8.0 XRD & EPMA STUDY

5.8.1 To know the different mineral phases which can possibly host REE, 8 samples will be studied by XRD method. Whole-rock XRD on representative fresh and altered samples (pegmatite, quartzite, gossan, altered granite, amphibolite) to identify primary mineralogy

5.8.2 A provision of 5 hours of EPMA study is also kept.

6.0.0 PROPOSED QUANTUM OF WORK

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

Table No- 5.1

Envisaged Quantum of proposed work

Sl. No.	Item of Work	Unit	Target
1	Geological Mapping (on 1:12,500 Scale)	Sq km	78.80
2	Geochemical Sampling		
I	Bedrock samples for REE suite, W, Mo, Cu, Ni, Cr, Ta, Nb, Li, Rb, Cs, and associated pathfinder elements	Nos	100
ii	Stream Sediment samples for REE suite, W, Mo, Cu, Ni, Cr, Ta, Nb, Li, Rb, Cs, and associated pathfinder elements	Nos	50
iii	Check Samples 10% for REE suite, W, Mo, Cu, Ni, Cr, Ta, Nb, Li, Rb, Cs, and associated pathfinder elements	Nos	15
3	Exploratory Mining		
i	Pitting / Trenching	Cu.m	100
ii	Pit samples for REE suite, W, Mo, Cu, Ni, Cr, Ta, Nb, Li, Rb, Cs, and associated pathfinder elements	Nos	75
iii	Check Samples 10% for REE suite, W, Mo, Cu, Ni, Cr, Ta, Nb, Li, Rb, Cs, and associated pathfinder elements	Nos	8
4	Drilling		
i	Scout Drilling	m	500
ii	Drill core samples for REE suite, W, Mo, Cu, Ni, Cr, Ta, Nb, Li, Rb, Cs, and associated pathfinder elements	Nos	160
iii	Check Samples 10% for REE suite, W, Mo, Cu, Ni, Cr, Ta, Nb, Li, Rb, Cs, and associated pathfinder elements	Nos	16
5	Laboratory Studies		
7	Whole Rock Analysis for Major Oxides by XRF technique	Nos	0
8	Petrological Samples (Surface Samples)	Nos	10
9	Mineragraphic Studies (Surface Samples)	Nos	10
10	XRD Mineral phase analysis	Nos	8
11	EPMA studies	Hrs	5
12	Report Preparation (5 Hard copies with a soft copy)	Nos.	1
13	Preparation of Exploration Proposal (5 Hard copies with a soft copy)	Nos.	1

7.0.0 BREAK-UP OF EXPENDITURE

7.1.0 Tentative Cost has been estimated based on Schedule of Charges (SoC) of projects funded by National Mineral Exploration and Development Trust (NMEDT) w.e.f. 05/12/2025. The total estimated cost is **Rs. 158.38 Lakhs.** The summary of cost estimates for Reconnaissance Survey (G-4 Level) is given in **Table No. - 5.2.** The detailed cost sheet is given as Annexure-I.

Table No. 5.2
Summary of cost estimates for Reconnaissance survey (G-4) in Gopalpura block, District- Chhatarpur, Madhya Pradesh

Sl. No.	Item	Total
1	Geological Work	**22,88,697**
2	Pitting & Trenching	**4,12,500**
3	Drilling	**68,77,460**

Sl. No.	Item	Total
4	Laboratory Studies	**33,05,900**
	Sub total	**1,28,84,557**
5	Report	**2,50,000**
6	Proposal Prepration	**2,57,691**
	Total	**1,34,22,248**
7	GST (18%)	**24,16,004.67**
Total cost including 18% GST		**1,58,38,253**
SAY, in Lakhs		**158.38**

8.0.0 TIMELINE

8.0.1 The entire project is planned tentatively for 12 months. Initially, geological mapping and surface bedrock sampling along with Geophysical survey shall be carried out followed by drilling provided positive results are obtained in the first phase of sampling.

List of Plates

1. Plate –I: Location Map of Gopalpura block (78.80 sq km), District: Chhatarpur, State: Madhya Pradesh.
2. Plate–II: Regional Geological Map showing Gopalpura block (78.80 sq km), District: Chhatarpur, State: Madhya Pradesh.
3. Plate–III: Block Geological Map showing Gopalpura block (78.80 sq km), District: Chhatarpur, State: Madhya Pradesh.

List of Annexure

1. Detailed Cost sheet of Gopalpura block (78.80 sq km), District: Chhatarpur, State: Madhya Pradesh