PROPOSAL FOR GOLD AND ASSOCIATED MINERALS IN KILLARHATTI BLOCK, KOPPAL & RAICHUR DISTRICT, KARNATAKA STATE FOR RECONNAISSANCE SURVEY (G4 STAGE) UNDER NMET

(Commodity – Gold and Associated Minerals)

By

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Place: Ahmedabad

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Summary of the Block for G4 stage exploration

	Features	Details
	Block ID	MTCS/NMET-001/2024/KA/Killarhatti
	Current Exploration Agency	Mining Tech Consultancy Services Limited (MTCS), Ahmedabad
	Previous Exploration Agency	Geological Survey of India – G4 Level
	G4 stage Geological Report (Previous stage Geological Report)	GSI has carried out Field Season Programs during Year 1992-93(G4), 2016-2017 (G4) and 2019-2022 (RMT)
	Commodity	Gold and Associated Minerals
	Mineral Belt	Hungund-Kushtagi Schist belt
	Completion Period with entire time schedule to complete the project	10 months
	Objectives	The exploration scheme of Killarhatti block has been formulated with the following objectives: 1. Geological mapping. 2. Geochemical Sampling 3. Ground Geophysical Survey 4. Exploratory scout drilling as per G4 level of exploration. 5. Establishing the extent of gold occurrence and mineralization within the area. 6. Preparation of geological report in line with the Minerals (Evidence of Mineral Contents) Amendment Rules 2015 and prescribed guidelines.
	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	The work will be carried out by the exploration agency (MTCS).
	Name/ Number of Geoscientists	Four (3 Field + 1 HQ). Names will be provided prior to filed work.
	Expected Field days (Geology, Geophysics, Surveyor)	Geology – 180 days (130 Field + 50 HQ), Geophysics – 120 days

1.	**Location**	
	Latitude	15° 46' 30.660" N to 15° 51' 27.496" N
	Longitude	76° 24' 59.256" E to 76° 30' 0.000" E
	Villages	Killarhatti, Garjanhal & Mullur
	Tehsil/ Taluk	Kushtagi and Sindhnur
	District	Koppal & Raichur
	State	Karnataka
2.	**Area (hectares/ square Kilometres)**	
	Block Area	1400 Ha. / 14.00 Sq. Km
	Forest Area	Not Available
	Government Land Area	Not Available
	Private Land Area	Not Available
3.	**Accessibility**	
	Nearest Rail Head	Koppal (75 km)
	Road	SH-29
	Airport	Hubli (165 km)
4.	**Hydrography**	
	Local Surface Drainage Pattern (Channels)	The drainage pattern of the area is dendritic in nature.
	Rivers/ Streams	Stream of first and second order with dendritic pattern is observed within the area.
5.	**Climate**	
	Mean Annual Rainfall	648.21 mm (avg. of previous 10 years)
	Temperatures (December) (Minimum) Temperatures (June) (Maximum)	Minimum – 12.4 Maximum – 40.5
6.	**Topography**	
	Toposheet Number	57 A/5
	Morphology of the Area	The area exhibits moderately undulating topography with minimum and maximum elevation of 490m MSL and 550m MSL respectively.
7	**Availability of baseline geoscience data**	
	Geological Map (1:50K/ 25K)	Available
	Geochemical Map	Available
	Geophysical Map (Aero-geophysical, Ground geophysical, Regional as well as local scale GP maps)	Available

8.	**Justification for taking up G4 stage mineral exploration**	1. Killarhatti block forms a part of **Hungund-Kushtagi Schist belt** of Karnataka which is known for its Gold mineralization. 2. As per previous studies undertaken by GSI during field season programs, i. Gold mineralization had been reported **within the contact of BIF and schistose rocks** near Amrapur & Killarhatti villages. ii. Ancient/old workings are located along the contact of banded ferruginous chert and schistose acid volcanic rocks which show considerable degree of shearing, brecciation, silicification and carbonitisation. iii. Geochemical analysis of the samples from these workings have analysed gold values ranging from **<0.1 g/t to 1 g/t Au.** iv. Encouraging results have been reported during **Regional Mineral Targeting (2019-22).** 3. GSI has recommended more detailed working in this area, specially in the intervening area between Amarapur and Kilarahatti blocks. 4. The block has been discussed in the 68th Technical-cum-Cost Committee (TCC) meeting held 27th to 30th August 2024. The block was recommended with in-principle approval and for further work under G3 level of exploration. Further, during 70th TCC-I meeting held on 24th October 2024, the project proposal was deliberated and the committee has advised: a. The proposal should be revised to G4 from G3 level. b. Further possible target area may be included and thus, area may be increased accordingly. Therefore, MTCS has revised the previous proposal and prepared this proposal under G4 level in Killarhatti over an area of 14.00 Sq.km.

PROPOSAL FOR RECONNAISSANCE EXPLORATION (G4 LEVEL) FOR GOLD & ASSOCIATED MINERALS IN KILLARHATTI BLOCK, RAICHUR & KOPPAL DISTRICT, KARNATAKA.

1. Block Summary

1.1. Physiography

The area is located near Killarhatti Village in Kushtagi and Sindhnur Tehsil, Koppal & Raichur District of Karnataka. The area is bounded between latitude 15° 46' 30.660" N to 15° 51' 27.496" N and longitude 76° 24' 59.256" E to 76° 30' 0.000" E and falls within the Survey of India Toposheet no. 57 A/5.

The area exhibits moderately undulating topography with minimum and maximum elevation of 490m MSL and 550m MSL respectively. The southwest part of the area comprises of ridges with highest elevation. Stream of first and second order with dendritic pattern is observed within the area which finally descends into Kanakanala Reservoir.

1.2. Background Geology

Regional Geology

The rocks exposed in the study area form a part of the Hungund-Kushtagi Schist Belt (HKSB) of Dharwar Supergroup and could be considered as the northern continuation of Ramagiri-Penakacherla schist belt. This schist belt attains as a long narrow linear belt in NW-SE direction. The study area represented by the volcano-sedimentary rocks, such as amphibolite, metabasalt, quartz porphyry, quartz-chlorite schists, quartzite, banded ferruginous quartzites associated with ferruginous shale and phyllites.

The bands of ferruginous quartzite & associated shale and phyllite form discontinuous ridges, where the ridge portion is occupied by the banded ferruginous quartzite and the low-lying valley portion is occupied by the ferruginous shale & phyllites. A few minor bands of these are seen to west of Mydardokki, SE of Shulkunti, north and SE of Magaldal north and east of Idlapur, south and SE of Hagaldal, north and east of Wandali, Arbhogapur, NW and SE of Kalmalli tanda, south of Amrapur, NW-SE of Kilarihatti and Ratnapur hatti, northwest of (southern) Adavibhavi.

The banded ferruginous quartzite is followed downward by chlorite schist and pillow lava. Often thin bands of magnetite quartzite alternate with quartz-chlorite schist which upwards forms the banded ferruginous quartzite.

The rocks of Hungund-Kushtagi schist belt are subjected to deformation and alteration due to various episodes of tectonism and associated hydrothermal alteration and lastly exhumation. Surface evidence for gold/sulphide mineralisation have been noticed in the central part of the schist belt at a few localities such as Naranhal, Jajadgudda, Arbhogapur and Amarapur, over a stretch of about 17 km. Here, several small to big old workings, supposed to be for gold, are present in the BIF and associated metabasic volcanic rocks which show considerable degree of shearing, brecciation, silicification

and carbonitisation. Some of the samples from these workings have analysed gold values ranging from <0.1 g/t to 0.5 g/t Au. (C.G. Hemantha kumar et.al).

Stratigraphy of HKSB as mentioned in Regional Mineral Targeting (RMT) Report 2019-22 is given below (after Banerjee & Kanungo, FS 2021-22):

Table I: Stratigraphy of HKSB (after Banerjee & Kanungo, FS 2021-22)

<table>
<tr><th>Lithology</th><th colspan="2">Formation/Group</th></tr>
<tr><td>Quartz vein
Tourmaline quartz vein
Quartz pegmatite reef
Aplite
Barite vein
Diorite dyke
Dolerite
Younger gabbro</td><td colspan="2">Younger intrusives</td></tr>
<tr><td colspan="3">Intrusive contact</td></tr>
<tr><td>Quartz syenite
Closepet pink granite
Closepet grey granite
Garnet bearing Monzogranite</td><td colspan="2">Closepet equivalent granite</td></tr>
<tr><td colspan="3">Intrusive contact</td></tr>
<tr><td>Quartz syenite
Monzogranite
Granodiorite</td><td colspan="2">PGC-II equivalent granites</td></tr>
<tr><td colspan="3">Intrusive and/or Tectonic contact</td></tr>
<tr><td>Quartzite, Chert, Dolerite dyke, Welded tuff, Metadiorite, Plagiogranite, Rhyodacite, ranophyric metagabbro, Alkali metagabbro, Anorthositic gabbro, medium and coarse grained gabbro, talk tremolite schist, metapyroxenite and chromitic serpentinite</td><td colspan="2">KALMANGI GROUP (allochethonous fragments of Archean ophiolites)</td></tr>
<tr><td colspan="3">Tectonic contact</td></tr>
<tr><td>Banded Iron formation (BIF), Meta-argillite, Metapelite, felsic meta-tuff, meta-rhyolite porphyry, meta-rhyolite, meta-rhyodacite, meta-dacite, meta-andesite, meta-agglomerates, intermediate volcanics (Chlorite schist) and meta-mafics</td><td>MUDENUR FORMATION</td><td rowspan="3">Hungund Kushtagi Schist belt (Equivalent to Chitradurga Group of rocks)</td></tr>
<tr><td colspan="2">Tectonic contact</td></tr>
<tr><td>Metabasalt and Pillowed Metabasalt</td><td>ILKAL FORMATION</td></tr>
<tr><td colspan="3">Basement not exposed</td></tr>
</table>

1.3. Scope for proposed exploration

Reconnaissance Survey (G4 stage) is proposed to be undertaken within the study area. The work comprises of the following:

I. Geological mapping (1:12,500 scale)

II. Geochemical Sampling (bedrock/ channel/ stream sediment)

III. Ground Geophysical Survey

IV. Trenching

V. Scout drilling.

1.4. Objectives

The objectives of current exploration program shall be:

I. Updation of existing geological map in 1:12,500 scale.

II. Establishing the extent of gold occurrence and mineralization within the area.

III. Preparation of geological report in line with the Minerals (Evidence of Mineral Contents) Amendment Rules 2015 and prescribed guidelines

1.5. Previous Work

Previously, exploration works have been undertaken by GSI during FSP 1992-93 (G4), 2016-17 (G4) and 2019-22 (RMT) for Gold and associated minerals. The summary of work conducted by GSI is given below.

A. <u>Preliminary Exploration for Copper, Gold and Molybdenum in Kalmangi, Tondshihal, Tavaregere and Kamatgi, Kushtagi Hungund Schist Belt, Raichur and Bijapur District, Karnataka; FSP 1992-93 (G4); C.G. Hemantha Kumar</u>

Exploration has been undertaken within the area under G4 level. The details are provided below:

Location	Kalmangi, Tondshihal, Tavaregere and Kamatgi Dist.- Raichur, Karnataka SoI TS No. - 57 A/5
Rock types	Amphibolite, metabasalt, quartz porphyry, quartz-chlorite schist, quartzite and banded ferruginous quartzite, ferruginous shale, phyllite of Dharwar Supergroup and granites, basic and acid intrusives of post-Dharwar
Ore Mineralization	Gold mineralization had been reported along the contact of banded ferruginous chert and schistose acid volcanics
Mapping	215 sq. km (1:25,000 scale),

	Large scale mapping in 0.37 sq. km (1: 1,000 scale)
Sampling	407 soil/bedrock samples collected.
Grade	Au values range from 0.1 to 1.0 ppm.
Findings	▪ Surface evidences for gold/sulphide mineralization have been reported in the central part of the schist belt at a few localities such as Naranhal, Jajadgudda, Arbhogapur and Amarapur, over a stretch of about 17 km ▪ At Amarapur and Killarhatti blocks, the ancient/old workings are reported along the contact of banded ferruginous chert and schistose volcanics; therefore, this contact zone is mentioned as promising location for gold mineralization. ▪ Geochemical sample analysis of the samples from these workings have analysed gold values ranging from <0.1 g/t to 1 g/t Au. ▪ Further exploration in terms of trenching and detailed sampling on either side (contacts) of banded ferruginous chert has been suggested by GSI between Amarapur and Killarhatti area.

B. <u>Reconnaissance Survey for Gold & Associated Elements in North of Tawargeri Areas, Raichur & Koppal Districts, Karnataka (Block-SR-KAR-02) (Stage-G4); FSP 2016-17; Shashi Ranjan</u>

Exploration has been undertaken within the area under G4 level. The details are provided below;

Location	North of Tawergiri Dist. – Raichur and Koppal, Karnataka SoI TS No. - 57 A/5
Rock types	Meta-volcanics and meta-sedimentary sequence of rocks belonging to Hungund-Kushtagi Belt of Dharwar Supergroup, Peninsular Gneissic Complex-I (PGC-I) and granites (equivalent of Closepet Granite).
Ore Mineralization	Sporadic sulphide mineralization (chalcopyrite and pyrite, arsenopyrite) is present within the metabasalts, BIF & argillites.
Mapping	Reconnaissance survey in 335 sq. km. Large scale mapping in 150 sq. km (1:12,500 scale)

Sampling	101 bedrock samples, 54 stream samples, P/T – 150 CuM
Grade	101 bedrock samples collected with the sample results: Au: 30- 142 ppb, Cu: 10 - 395 ppm., Zn: 10 - 1250 ppm., Co: 10 - 395 ppm, Ni: 10 - 395 ppm., Cr: 10 - 340 ppm.
Findings	▪ Based on the field observations, followed by petrography and preliminary geochemistry it is reported that minor amounts of sporadic sulphide mineralization (chalcopyrite and pyrite, arsenopyrite) are present within the metabasalts, BIF and argillites exposed near Tawargeri area.

C. <u>Report on Regional Mineral Targeting in the Hungund Kushtagi Schist Belt, Eastern Dharwar Craton, Karnataka; FS 2019-22; P.K. Abhilash et. al.</u>

Regional mineral targeting within Hungund Kushtagi Schist Belt was conducted during FSP 2019-22 covering multiple parts. The details are provided below;

Location	Rampur- Konapur, Gorajinal, Kalmalli, Kandagal, Ilhal, Naranhal, Amrapur, Mudennur, Kyadaguppi, Mudalgundi, Myadardokki, Malladagudda, Gadi Sunkapur, Tondsihal area Dist. – Raichur, Koppal, Bagalkot and Bijapur SoI TS No. - 7P/11, 12, 15, 16; 48M/09, 13; 56D/3, 4, 8; 57A/1, 2, 5, 6, 7, 9, 10, 11, 14, 15
Rock types	The supracrustal rocks of the schist belt belonging to Dharwar Supergroup consist of metabasalt (massive metabasalt, schistose metabasalt, pillowed metabasalt,) and meta sedimentary rocks such as banded iron formation and quartzite. The intrusive mafic rock suites are hornblende gabbro, anorthisitic gabbro, hornblendite, pegmatoidal gabbro of mafic ultramafic sequence of Kalmagi. The schist belt is intruded by the younger granitoids (grey & pink granite, porphyritic granite) of Closepet age, which is also associated by numerous granitic pegmatites.
Mapping	Aerial reconnaissance and PGRS studies- 7500 sq.km Geological Mapping – 500 L Km. (gap area mapping/traverse mapping/ alteration mapping with the help of remote sensing and geophysics) Drilling -1336.35 m Pitting and Trenching – 111 Cu.M Ground Geophysical Survey - Magnetic Sq. Km (121 L Km) & IP

	(40.5 L Km.)
Sampling	Chemical Analysis -1,710 nos
Findings	Based on data integration and field evidences zones, potential areas demarcated for orogenic gold are ▪ Rampur-Konapur, Gorajinal, Kalmalli, Kandagal, Ilhal, Naranhal, Amrapur, Mudennur, Kyadaguppi, Mudalgundi, Myadardokki, and for granite-associated systems, the areas identified are Malladagudda, Gadi Sunkapur, Tondsihal-Kyadaguppi area. ▪ G3 stage exploration is proposed in the Amrapur block, with 1000m drilling and detailed mapping of 2 sq.km. The work will involve tracing of Au-mineralized zone intersected in borehole KKA-1, further towards NW and SE along the strike. ▪ The Amrapur G3 block, Gadi Sunkapur G3 block and Tondsihal G4 blocks has been proposed in FS 2023-24. The other areas can be explored in future.

2. Block description

Killarhatti block falls within the Survey of India Toposheet no. 57 A/5. The co-ordinates of cardinal points of the area are given in Table II.

Table II: Cardinal points of Killarhatti Block

Block corner points / Cardinal Points	WGS-84		WGS-84 / 43 N	
	Latitude	Longitude	Northing	Easting
A	15° 50' 53.664" N	76° 24' 59.256" E	1752660.73	651676.39
B	15° 51' 27.496" N	76° 25' 36.823" E	1753708.11	652786.94
C	15° 50' 27.487" N	76° 26' 43.172" E	1751877.29	654773.44
D	15° 49' 22.385" N	76° 27' 33.283" E	1749886.74	656278.24
E	15° 47' 51.908" N	76° 29' 5.886" E	1747125.29	659053.20
F	15° 46' 48.677" N	76° 30' 0.000" E	1745193.33	660677.39
G	15° 46' 30.660" N	76° 29' 50.258" E	1744637.51	660391.40
H	15° 47' 11.752" N	76° 28' 43.097" E	1745886.35	658383.71
I	15° 48' 15.569" N	76° 27' 52.985" E	1747837.30	656878.76
J	15° 49' 9.107" N	76° 26' 59.876" E	1749471.79	655287.04

3. Planned Methodology

A desktop study was conducted by MTCS based on the geoscience data available on NGDR and Bhukosh portal. Few traverses were planned based on the findings from desktop study. A site visit was conducted by MTCS team during September 2024 in order to access the study area and understand the geology.

Fig 1: Photograph showing landscape of the study area

Fig 2: Photograph showing Chlorite Schist

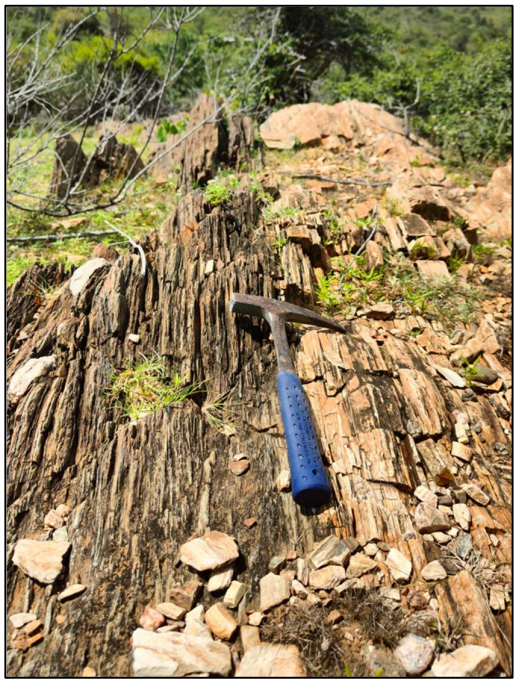

Fig 3: Photograph showing Contact between Chlorite Schist and Meta-rhyolite

Fig 4: Photograph showing Banded Iron Formation (Oxidised)

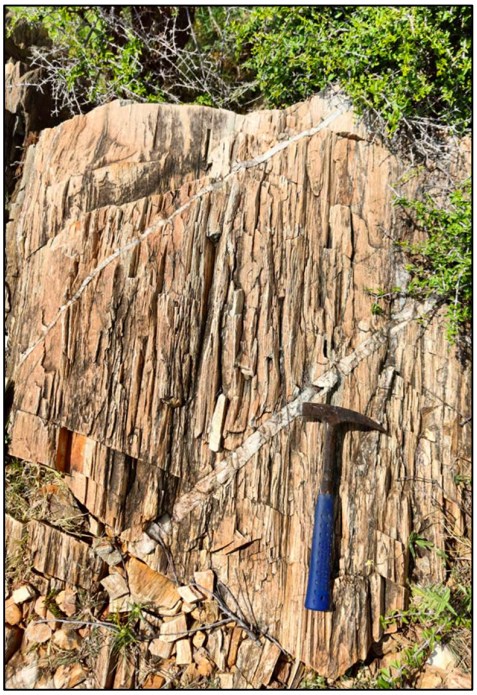

Fig 5: Photograph showing Quartz veinlets

During the site visit, MTCS team has collected few rock chip samples from various parts of the study area. The samples will be analyzed for various elements (viz. Au, Ag, Co, Cr, Cu, Mo, Ni, Zn, Fe, FeO, SiO_2 and Al_2O_3).

Based on the initial findings during the site visit, a reconnoitory survey (G4 level) has been formulated for Killarhatti Block in line with the objectives. At the end of this study, a geological report will be prepared as per the Minerals (Evidence of Mineral Contents) Amendment Rules 2015 and will be submitted to NMET technical committee for their review and suggestions towards further action in this block.

The details of different activities to be carried out are described below:

3.1 Remote Sensing

Remote sensing studies using satellite and ASTER imagery will be done for the entire 14.00 sq.km. area to identify the lineaments & other structural features and the mineral potential zones by mineral targeting process.

3.2 Geological Mapping & Ground Truthing

Based on the remote sensing data analysis, reconnaissance survey will be carried out in the block. The main object of this study will be updation of existing geological map and cover the unexplored area (about 4 sq.km.) located on the southern portion of the block that was not studied earlier. The existing geological map of GSI (1:12,500 scale) will be clubbed and a combined map of the entire block will be prepared (at 1:12,500 scale) incorporating the present data.

During this initial mapping program, systematic surface (bedrock) and stream sediment samples (from 1st order streams) will be collected for Gold analysis.

3.3 Geochemical Sampling

3.3.1 Surface sampling (Bedrocks Samples)

During geological mapping, 150 bedrock samples (channel samples) of various exposed rocktypes will be collected, prepared and analyzed for Gold & associated minerals.

3.3.2 Stream Sediment Sampling

The stream sediment samples shall be collected from the entire study area of 14.00 sq.km. The samples shall be collected systematically after studying the drainage pattern, forest cover and accessibility within the area. Total 25 stream sediment samples shall be collected and analyzed for Gold & associated minerals.

In addition, a total of 18 no. of check samples from Bedrock and Stream Sediments will be analyzed for Gold & associated minerals.

3.4 Geophysical Survey

Though the area has been covered by NGPM (at 1:50,000 scale) for Gravity and Magnetic survey on a regional scale, an integrated Ground Magnetic and Self-Potential (SP) is planned to carry out in the proposed block to identify the structural features and mineralization in detailed manner. Traverses will be planned excluding villages, waterbodies etc. in N45°E direction with section interval of 100m and station interval of 10m.

Based on the outcome of Magnetic-SP survey, Induced Polarization (IP) survey is planned within the targeted zones. For budget purpose, a total of 100 Line km is planned for geophysical survey. The zones containing anomalous values will be targeted for trenching and scout drilling.

3.5 Pitting/Trenching

Trenching shall be carried out within the potential zones demarcated by geophysical survey. For budget purpose, total 100 CuM excavation have been considered.

Locations of the trenches on ground will be decided by field geologist based on field observations. A provision of 55 no. primary & check trench samples is kept for analysis of Gold & associated minerals. The locations of the trenches will be marked on the map.

3.6 Scout Drilling

Based on the outcome of geological mapping, sampling and geophysical survey, 4 inclined (inclination 45^{o}) scout boreholes are planned in the target area with a total drilling meterage of 100m to intersect the ore body at 1st level.

The drill cores will be logged systematically and rocktypes, structural features, textures, mineralization will be recorded along with Rock Quality Designation (RQD) feature.

The survey team will be engaged for fixation of boreholes and collar survey. Survey

team will also be associated during geological mapping & geophysical study by taking the sample points and laying survey profiles.

3.6.1 Borehole deviation survey

Borehole deviation survey has not been proposed for the boreholes due to less drilling depth.

3.6.2 Sampling

The mineralized cores will be sampled at 0.50m interval; as far as possible, the immediate footwall and hanging wall rocks (3m length each) will also be sampled at 1m interval, depending upon the intensity of mineralization, change in lithology and core recovery etc. It is envisaged that:

i. Around 100 No. of primary samples with 10 check samples will be generated from the mineralized zone intersections and hanging & footwall rocks. All the primary and check samples would be analyzed for Gold & associated minerals in NABL accredited laboratory.

ii. Whole Rock (XRF) Analysis for Major Oxides will be done for 20 samples.

iii. During the course of Geological mapping and drill core logging 20 no samples in total from various litho-units from surface & drill cores will be taken for petrography and mineragraphic studies for identifying mineral distribution, alteration, enrichment etc. in polished sections along with capturing digital photographs.

iv. Total 5 samples will be analyzed by XRD method for identification of different minerals.

3.7 Specific Gravity Determination

For the specific gravity determination, a total of 5 samples are proposed. The samples are to be drawn from ore zones / mineralized zones.

4. Quantum of Work

Quantum of work proposed by MTCS in Killarhatti block is given below table (Table IV).

Table IV: Work quantum

Sl. No.	Nature of work	Unit	Quantum
A	**GEOLOGICAL MAPPING & ASSOCIATED ACTIVITIES**		
1	Geological Mapping [including Multispectral and DEM data analysis]	sqkm	14
2	a) Bedrock Sampling (Channel samples)	No	150
	b) Stream sediment Sampling	No	25
B	**GEOPHYSICAL SURVEY**		
1	IP, Resistivity Magnetic survey & S.P. Survey	Lkm	100
C	**PITTING/TRENCHING**		
1	Trenching	cum	100
D	**SCOUT DRILLING**		
1	Scout Drilling (Hard Rock)	m	500
2	Borehole Fixation and DGPS Survey	No.	4
E	**LABORATORY STUDIES**		
1	**Primary samples** (ICP-MS Ni-S Fire Assay)		
a	Bedrock Samples	No	150
b	Stream Sediment Samples	No	25
c	Trench Samples	No	50
d	Drill Core Samples	No	100
2	**Check samples**		
a	Bedrock Samples	No	15
b	Stream Sediment Samples	No	3
c	Trench Samples	No	5
d	Drill Core Samples	No	10
3	**ICPMS (Analysis of 34 elements)**		
a	Analysis by ICPMS method	No	50
b	Check samples	No	5
4	**XRF Analysis for Major Oxides**	No	20
5	**Samples for Physical & Petrological Studies**	No	10
6	**Digital Photograph**	No	10
7	**Specific Gravity Determination**	No	5
8	**XRD Analysis**	No	5
D	**GEOLOGICAL REPORT PREPARATION**		
1	Geological Report Preparation [As per Minerals (Evidence of Mineral Contents) Rule-2015]	No	1

5. Time schedule and cost estimates

5.1. Time schedule

The proposed exploration program is planned to complete all activities like camp setting & winding, geophysical survey, scout drilling & associated geological works along with laboratory work will be completed within 8 months. Report writing will be done another 2 months. Thus, the total duration of the project shall be 10 months from the date of commencement. The bar chart showing activities wise time schedule is placed in Table No. V.

Table V: Tentative Time schedule/action plan for proposed Reconnaissance Survey (G-4)

Activity	Type of Job	Months										
		1	2	3	4		5	6	7	8	9	10
Desktop study with Remote sensing, multispectral and DEM data analysis (including obtaining clearances etc)	HQ					Review						
Camp setting	Field											
Geological Mapping (including surface & stream sediment sampling)	Field											
Geophysical survey (including mobilization & data acquisition)	Field											
Geophysical survey (interpretation & report)	HQ											
Trenching (including logging, sampling etc)	Field											
Drill Rig mobilization	Field											
Scout Drilling	Field											
Laboratory Studies of Samples	Field											
Geological Report Preparation & submission to NMET	HQ											

Note: Time loss on account of any natural calamity /agricultural activity/forest clearance / local law & order problem/ lockdown etc will be additional to the above timeline.

5.2. Cost estimates

Based on the Schedule of Charges (SoC) of projects funded by National Mineral Exploration Trust (NMET) w.e.f. 01.04.2020 tentative cost has been estimated for this project. The total estimated cost is Rs. 442 Lakhs. The summary of cost estimates for Reconnaissance Survey (G-4 Level) is given in Table No. VI and details of cost estimates are given in Table No. VII.

Table VI - Summary of Cost estimates

Sl. No	Item	Estimated Cost	
		INR	INR, Cr
A	Geological Mapping & Asso. Works	1,977,770	0.20
B	Geophysical Survey	14,486,930	1.45
C	Scout Drilling	7,584,560	0.76
D	Laboratory Studies	4,888,090	0.49
E	Geological report preparation	868,121	0.09
F	Exploration Proposal Preparation	500,000	0.05
G	Report Peer Review	30,000	0.003
H	Tendering Cost + Operational Charges	1,389,086	0.14
I	GST (18%)	5,710,420	0.57
	Grand Total	**37,434,976**	**3.74**

6. Manpower deployment

Manpower deployment List shall be provided prior to the commencement of work.

7. Break-up of expenditure

Detailed estimated cost for G-4 level exploration in Killarhatti block over an area of 14.00 Sq. km. is given in Table VII.

Table-VII: Cost Estimate for Reconnaissance Survey (G4) Proposal for Gold & Asso. Minerals in Killarhatti Block, Raichur & Koppal District, Karnataka

Title of Project - Estimate Cost for Reconnaissance Survey for gold and associated minerals in Killarhatti area, Koppal& Raichur, Karnataka
Total Area – 14.00 sqkm; No. of Borehole: 4; Scout drilling: 500m; Completion Time - 10 months; Review: 4 months

Sl. No.	Item of work	Unit	Rates as per NMET SoC 2020-21		Estimated Cost of the Proposal		Remarks
			SoC-Item -Sl No.	Rates per Unit as per SOC (Rs)	Quantum	Total Amount (Rs)	
A	**GEOLOGICAL MAPPING & ASSOCIATED ACTIVITIES**						
a	Charge for procurement of Satellite Imagery (CartoDEM, 2.5m posting, DSM, 14km x 14km scene) for Remote sensing, multispectral and DEM data analysis	Lumpsum	1.1	Satellite imagery/ Aerial Photo	1	6,290	As per actual
b	Geologist (HQ)	day	1.2	9,000	30	270,000	
c	Geologist (Field)	day	1.2	11,000	90	990,000	
d	Labor (Field) - 2 No per Geologist	day	5.7	522	180	93,960	Amount will be reimbursed as per the notified rates by the Central Labor Commission or respective State Govt. whichever is higher
e	Trenching	cubic meter	2.1.1	3,300	100	330,000	
f	Sampler - 1 No	day	1.5.2	5,100	40	204,000	
g	Labor (Sampling) - 4 Nos	day	5.7	522	160	83,520	Amount will be reimbursed as per the notified rates by the Central Labor Commission or respective State Govt. whichever is higher
					Sub-*Total* A	**1,977,770**	
B	**GEOPHYSICAL SURVEY (OUTSOURCED)**						
a	IP, Resistivity Magnetic survey & S.P. Survey	10 Lkm	3.4b	1,448,693	10	14,486,930	Total 100LKM approx.
b	Geophysicist (Field)	day	3.18	11,000	0	0	
c	Charge of Surveyor for Geophysical survey layout work	day	1.6.1a	8,300	0	0	

Sl. No.	Item of work	Unit	Rates as per NMET SoC 2020-21		Estimated Cost of the Proposal		Remarks
			SoC-Item -Sl No.	Rates per Unit as per SOC (Rs)	Quantum	Total Amount (Rs)	
d	Labor (Field) - 4 No.	day	5.7	522	0	0	Amount will be reimbursed as per the notified rates by the Central Labor Commission or respective State Govt. whichever is higher
e	Geophysicist (HQ)	day	3.18	9,000	0	0	
					Sub-*Total* B	**14,486,930**	
C	**SCOUT DRILLING**						
a	Scout Drilling upto 300m (Hard Rock)	m	2.2.1.4a	11,500	500	5,750,000	
b	BH deviation survey by multishot camera	per m	2.2.6	330	0	0	
c	Land / Crop Compensation (in case the BH falls in agricultural Land)	per BH	5.6	20,000	4	80,000	as per actual
d	Construction of concrete Pillar (12"x12"x30")	per BH	2.2.7a	2,000	4	8,000	as per actual
e	Transportation of Drill Rig & Truck associated per drill	km	2.2.8	36	2500	90,000	To & Fro from Raighad, Chhattisgarh
f	Accommodation Charges for drilling Camp (upto 1 Rigs)	month	2.2.9	50,000	3	150,000	
g	Drilling Camp Setting Cost	No	2.2.9a	250,000	1	250,000	
h	Drilling Camp Winding up Cost	No	2.2.9b	250,000	1	250,000	
i	Road Making (Flat Terrain)	km	2.2.10a	22,020	15	330,300	as per actual
j	Drill Core Preservation	per m	5.3	1,590	200	318,000	
l	Bore Hole Fixation and determination of co-ordinates & Reduced Level of the boreholes by DGPS	Per Point of observation	1.6.2	19,200	4	76,800	
m	Sampler - 1 No	day	1.5.2	5,100	47	239,700	
n	Labour (Sampling) - 4 Nos	day	5.7	522	80	41,760	Amount will be reimbursed as per the notified rates by the Central Labor Commission or respective State Govt. whichever is higher
					Sub-Total C	**7,584,560**	

Sl. No.	Item of work	Unit	Rates as per NMET SoC 2020-21		Estimated Cost of the Proposal		Remarks
			SoC-Item -Sl No.	Rates per Unit as per SOC (Rs)	Quantum	Total Amount (Rs)	
E	**LABORATORY STUDIES**						
01	**Chemical Analysis (ICP-MS Ni-S Fire Assay)**						
a	Bedrock + Stream Samples	No	4.1.5d	11,800	175	2,065,000	25 SSS, 150 BRS including grid pattern sampling
b	Trench Samples	No	4.1.5d	11,800	50	590,000	
c	Core Samples	No	4.1.5d	11,800	100	1,180,000	
d	Check samples - [Internal (5%) and External (10%)]	No	4.1.5d	11,800	33	389,400	
02	**XRF Analysis**						
a	XRF Analysis for Major Oxides	No	4.1.15a	4,200	20	84,000	
03	**Physical & Petrological Studies**						
a	***Petrographic Studies (Bedrock+Core Samples)***						
i	Preparation of thin section	No	4.3.1	2,353	10	23,530	
ii	Study of thin section	No	4.3.4	4,232	10	42,320	
b	***Mineragraphic Studies (Bedrock Samples)***						
i	Preparation of polish section	No	4.3.2	1,549	10	15,490	
ii	Study of polished section	No	4.3.4	4,232	10	42,320	
c	***Digital Photographs***	No	4.3.7	280	10	2,800	
d	***Specific Gravity Determination***	No	4.8.1	1,605	5	8,025	
e	***XRD Analysis (Bedrock Samples)***	No	4.5.1	4,000	5	20,000	
					Sub-Total D	**4,888,090**	
					TOTAL COST	**28,937,350**	

Sl. No.	Item of work	Unit	Rates as per NMET SoC 2020-21		Estimated Cost of the Proposal		Remarks
			SoC-Item -Sl No.	Rates per Unit as per SOC (Rs)	Quantum	Total Amount (Rs)	
E	***GEOLOGICAL REPORT PREPARATION***						
01	Geological Report Preparation charge (5 Hard copies with a soft copy)	Lumpsum	5.2	iii	1	868,121	
					Sub-Total E	**868,121**	
F	***EXPLORATION PROPOSAL PREPARATION***						
01	Preparation of Exploration Proposal (5 Hard copies with a soft copy)	Lumpsum	5.1		1	500,000	
					Sub-Total F	**500,000**	
G	***PEER REVIEW***						
01	Report Peer Review	Lumpsum	As per EC decision	30,000	1	30,000	
					Sub-Total G	**30,000**	
H	***TENDERING COST & OPERATIONAL CHARGES***						
	Tendering Cost					2,89,739	
	Operational Charges					10,99,347	
					Sub-Total H	**1,389,086**	
					PROJECT COST WITHOUT GST	**31,724,566**	
					18% GST	**5,710,420**	
					TOTAL PROJECT COST	**37,434,976**	

8. References

a. C.G. Hemantha Kumar et.al. (1995), *Preliminary Exploration for Copper, Gold and Molybdenum in Kalmangi, Tondshihal, Tavaregere and Kamatgi, Kushtagi Hungund Schist Belt, Raichur and Bijapur District, Karnataka; FSP 1992-93.*

b. Shashi Ranjan et.al. (2017), *Reconnaissance Survey for Gold & Associated Elements in North of Tawargeri Areas, Raichur & Koppal Districts, Karnataka (Block-SR-KAR-02) (Stage-G4); Field Season 2016-17.*

c. Abhilash P.K. et.al. (2023), *Report on Regional Mineral Targeting in the Hungund Kushtagi Schist Belt, Eastern Dharwar Craton, Karnataka; Final report for Field Season 2019-22.*

9. List of Plates

Sl. No.	Description	Scale
1	Location Map of proposed Killarhatti (G4) Block	1:50,000
2	Geological Map of Killarhatti (G4) Block	1:50,000