PROPOSAL FOR RECONNAISSANCE SURVEY (G-4 STAGE) IN KALASAPURA BLOCK (129.0 SQ.KM AREA) FOR QPC HOSTED GOLD MINERALISATION & COPPER DISTRICT: CHIKKAMAGALURU, KARNATAKA

COMMODITY: GOLD, COPPER

BY

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PLACE: NAGPUR

DATE: 20.12.2023

Summary of the Block for Reconnaissance Survey (G4 Stage)
GENERAL INFORMATION ABOUT THE BLOCK

	Features	Details
	Block ID	Kalasapura Block
	Exploration Agency	Mineral Exploration & Consultancy Limited (MECL)
	Commodity	Gold & Copper
	Mineral Belt	Bababudan Group, Dharwar Super Group
	Completion period with entire Time schedule to complete the project	14 Months
	Objectives	The present exploration program at G4 stage has been formulated to fulfil the following objectives. i) To carry out Large scale Geological mapping on 1:12,500 scale associated with surface geochemical sampling (bedrock/soil/stream sediment) and analysis to identify the surface manifestations and lateral disposition of the QPC hosted Gold mineralisation and copper mineralized zones in the extension areas of adjoining previously explored GSI block. ii) To carryout ground geophysical survey (Induced Polarization (I.P) cum Resistivity, S.P. & Magnetic method) to demarcate potential areas for mineral targeting and giving sub-surface positive details of extension of concealed ore body. iii) To carryout trenching/pitting work in the identified anomalous areas. iv) Based on the positive outcome of geological mapping, surface geochemical sample results, ground geophysical survey and trenching/pitting work, scout drilling (500m in 5 Bhs) shall be carried out in the potential mineral bearing area to confirm the subsurface continuity of mineralisation. iv) To estimate Reconnaissance resource (334) for Gold, Copper along with accessory elements if any as per UNFC norms and Minerals (Evidence of Mineral Content) Rules-2015 at G-4 level.

	Whether the work will be carried out by the proposed agency or through outsourcing and details thereof. Components to be outsourced and name of the outsource agency	Work will be carried out by MECL
	Name/Number of Geoscientists	Two nos. Geoscientist (Field + HQ)
	Expected Field days (Geology, Geophysics, surveyor)	Geologist Party days:180 days
		Geophysicist Party days: 60 days
		Surveyor Party days:45 days

1.	**Location**	The Kalasapura Block area falls in Survey of India Toposheet No. 48 O/15 and covers total area of 129.00 sq.km north of Kalasapura village. Chikkamagaluru District, State Karnataka.
	Latitude and Longitude	Corner cardinal points of Kalasapura G4 Block (129 sq.km)

CORNER POINTS	UTM (ZONE:43N)		LATITUDE	LONGITUDE
	EASTING m	NORTHING m	N	E
A	584825.870	1469878.090	13°17'41.54"	75°46'59.31"
B	606054.400	1477198.810	13°21'37.37"	75°58'45.76"
C	607966.770	1470821.150	13°18'09.54"	75°59'48.48"
D	601441.430	1468316.530	13°16'48.84"	75°56'11.31"
E	601232.410	1469108.880	13°17'14.66"	75°56'4.46"
F	601108.160	1469599.720	13°17'30.65"	75°56'00.39"
G	600548.310	1469458.040	13°17'26.10"	75°55'41.77"
H	600671.150	1468966.870	13°17'10.10"	75°55'45.79"
I	600844.060	1468120.510	13°16'42.53"	75°55'51.43"
J	596883.810	1466921.030	13°16'03.97"	75°55'39.69"
K	584827.000	1467658.590	13°16'29.29"	75°46'59.11"

	Villages	Kalasapura, Devagondanahalli, Sindigere, Marle & Kartikere
	Tehsil/Taluk	Chikkamagaluru
	District	Chikkamagaluru
	State	Karnataka
2.	**Area (hectares/ square kilometres)**	
	Block Area	129.0 sq.km
	Forest Area	NA
	Government Land Area (Bilanam)	Data not available
	Charagaha	Data not available
	Private Land Area	Data not available
3.	**Accessibility**	
	Nearest Rail Head	Devnur (32km) Arsikere (50km)

	Road	About 4km SE from Chikkamagaluru
	Airport	Hassan (48km) & Shimoga (113 km)
4.	**Hydrography**	
	Local Surface Drainage Pattern (Channels)	The area is dissected by south-flowing nalas. The drinking water needs of the villages are met by a number of dug wells in the granitic rocks which have a weathered zone of 6-8 metres. A few natural springs in the area have been noted in the granitic terrain.
	Rivers/ Streams	No major river exists in the area. A major east-west nala commencing from S.E. of Mirale is impounded by three major tanks near the villages of Kalasapura, Ishwarahalli and Belavadi, beyond which thin nala joins the Veda River.
5.	**Climate**	
	Mean Annual Rainfall	Average annual rainfall is 600 mm
	Temperatures (December) (Minimum) Temperatures (June) (Maximum)	Minimum temperatures 20^{O}C (Dec-June), Maximum temperatures up to 39^{O}C (March-June)
6.	**Topography**	
	Toposheet Number	48 O/15
	Morphology of the Area	Kalasapura area forms the south-eastern part of the lofty Bababudan hills characterised by the parallel hill ranges trending inan almost east-west direction. Physiographically the area is hilly and elevation range from 1150m to 1060mSL in hilly area and 860m in plain lands. In general, topography sloping towards south. The hills near Kalasapura rise more than 700' (213 m) above the ground level. The hill located 400 metres north of Kalasapura consists of brown-coloured massive quartzites at the top and is markedly devoid of vegetation.
7.	**Availability of baseline geoscience data**	
	Geological Map (1:50K/25K)	Regional geological map sourced from Bhukosh (1:50K) available.
	Geochemical Map	Not available.
	Geophysical Map (Aeromagnetic, ground geophysical, Regional as well as local scale GP maps)	Not available.
8.	**Justification for taking up Reconnaissance Survey/ Regional Exploration**	1. The proposed Kalasapura (G4) block area lies in Bababudan green stone belt of Western Dharwar craton of southern India. The area is known for incidence of gold in the basal conglomerates. QPC hosted gold mineralisation is reported in Kartikere, Devagondanahalli and Kalasapura areas. Disseminated copper mineralisation in grey massive quartzites representing Bababudan group are also reported from Kalasapura area by many workers in the past.

		2. Ancient mining activity, and evidence of smelting for copper ore in the form of slag dumps and clay crucibles seen in the vicinity of Devagondanahalli and Kabbigaragalli of Chikkamagaluru District of Karnataka 3. Quartz pebble conglomerate (QPC) of Bababudan group is oligomitic type consists of quartz pebbles in Kalasapura area are very similar to lithologic characters and stratigraphic setting to the WitwatersRand conglomerates of South Arfic, Jacobina of Brazil and Terwakan of Ghana, all of which are known for economic gold mineralisation (Boyle, 1979). The conglomerates of WitwatersRand, South Africa host the world's largest gold deposits. 4. In Kartikere and west of Devagondanahalli, the QPC horizon containing pyrite and fuchsite mica is invariably auriferous, the gold value ranges from 0.1 g/t to 0.84 g/t. (Mukherjee, 1990). Sulphide bearing QPC is 1 to 2m wide and the overall thickness of QPC ranges from 10 to 20m. Panning of some samples showed rare fine gold specks. (Mukherjee, 1990). 5. Bhushan, et.al (2010) reported that Bababudan group of QPC contains detrital pyrite and uraninite, and resembles the well-known uranium and gold bearing conglomerates of the Witswaterand Basin of South Africa. Two samples of the basal conglomerates and quartzite analysed yielded gold values of 0.37 and 1.67 ppm. (source: Journal Geological Society of India, Vol.75 Jun-2010) 6. Visawanatha of GSI (F.S.1972-73) carried out exploratory drilling in 9 boreholes (885.25m) in the Kalasapura area (0.33 sq.km) and revealed copper mineralisation in grey massive quartzites/quartz reef over a continuous strike length of 240m and 420m in the western and the eastern block respectively. Mineralized quartzite/quartz reef proved over a strike length of 240 m, with an exposed outcrop width of 60 m and an average thickness of 3.7m. The grade of copper varies from 0.13 % to 0.43%. A possible resource of 0.16 m.t. with an average grade of 0.25% Cu was estimated. 7. Viswanatha (1973) recommended that "The attractive feature of the occurrence is the absence of overburden and favourable topography with the mineralised beds dipping parallel to the slope. If the occurrence proved promising, the prospect appears attractive for cheap cost of exploitation". 8. It is pertinent to mention that, the total GSI estimated resource of 0.16 m.t. with 0.25% Cu in previously explored GSI block area (0.30 sq.km) may not be sufficient for mining point of view. Hence, there is a need to explore possibilities for further continuity of mineralisation in the adjoining areas for

		enhancing the resource position of the prospect. Hence, further integrated exploration at G4 stage is required in the extension areas of the previously explored GSI block for further augmentation of copper ore resources in the area. 9. During the formulation of the project, MECL geologist visited the site and verified the incidence of QPC horizon with some alteration patterns and sulphide bearing grey quartzites in the Kalasapura area. Out of total 7 nos. bedrock samples collected from the area, 2 nos. sulphide bearing Quartzite samples indicated Cu values 0.338% and 0.444% Cu. 10. Considering similar geological setup with known deposits, available literature and previous worker's recommendations, the area hold potential to explore in detail with holistic exploration approach. Hence, integrated exploration at G4 stage in the larger area to be taken up to ascertain the exact potentiality of the prospect for gold and copper. 11. In light of the above, the present exploration program at G4 stage has been formulated to locate potential auriferous zones hosted by QPC and also to establish further continuity of copper mineralisation with the adjoining previously explored GSI Block in the proposed Kalasapura Block area. 12. The positive outcome of the present exploration would be helpful and facilitate the Govt. for auctioning of the block.

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1.0.0 BLOCK SUMMARY

1.1.0 Introduction

1.1.1 India ranked 6th in the world gold production in the year 1905, whereas, presently it produces gold from three mines namely Hutti, Uti, Hirabuddni of HGML in Karnataka and from one private mine in Prorjana Mine (Kundarkocha) in Jharkhand besides as by product from the copper mines of HCL.

1.1.2 Now the production of gold in India is a meagre one to two tonnes per annum only. But the fascination for the yellow metal in our country never dies; with the spiralling demand for the metal, makes more thrust for exploration in strategic mineral, Precious metal, PGE and Cobalt by Government of India. In the preceding two decades there has been no deposits of any sizeable dimension found in our country.

1.1.3 Copper with its unique physical, mechanical and electrical properties, has played a vital role in the industrial growth of a nation. In India, around 75% of demand is met through imports. The increasing demand of copper metal in the country could be eased with the exploration of new copper deposits of economic importance.

1.1.4 Globally, the market for copper is one of the largest of all metals behind iron and aluminium. The size of the global market for refined copper is over U$150 billion every year, Copper has been a material component in the growth of human civilizations for thousands of years. Copper is easy to work with, an efficient conductor of heat and electricity, corrosion resistant and its abundant.

1.1.5 During, preceding decades no large-scale metal deposit has been discovered in India. However, the possibility of working of small mineral bodies in proximity to each other, though technological advances and increased operational efficiency, cannot be ruled out. At the back drop of amendment of MMDR Act, 2015 by Government of India, an impetus is being given for funding, if not large deposits, but a cluster of small deposits occurring in close proximity to each other. Therefore, it is

necessary and imperative to locate and explore such small deposits in clusters.

1.2.0 Background Information

1.2.1 Kalasapura Block lies in the Bababudan greenstone belt of western dharwar craton. Disseminated Copper ores are reported from Kalasapura area by many workers in the past. Ancient mining activity, and evidence of smelting for copper ore in the form of slag dumps and clay crucibles seen in the vicinity of Devagondanahalli and Kabbigaragalli of Chikkamagaluru District of Karnataka

1.2.2 Narasimhan and Viswanatha of GSI (1970) carried out investigations involving regional mapping (150 sq.km on 1:63,360 scale), plane table mapping (0.33 sq.km on 1:1000 scale), trenching (232 cu.m.) and surface groove sampling (231 nos.) and indicated that the copper mineralisation hosted by grey massive quartzite over a strike length of 800 m over an exposed width of 80 m and an estimated thickness of 15 m. An exploratory drilling programme was recommended to ascertain the width and grade of the deposit.

1.2.3 Consequently, Visawanatha of GSI (F.S.1972-73) carried out exploratory drilling in 9 boreholes (885.25m) in the Kalasapura area (0.33 sq.km) and revealed copper mineralisation in grey massive quartzite/quartz reef over a continuous strike length of 240m and 420m in the western and the eastern part of the block respectively. Mineralized quartzite/quartz reef proved over a strike length of 240 m, with an exposed outcrop width of 60 m and an average thickness of 3.7m. The grade of copper varies from 0.13 % to 0.43%. A possible resource of 0.16 m.t. with an average grade of 0.25% Cu was estimated. It was recommended that *"the attractive feature of the occurrence is the absence of overburden and favourable topography with the mineralised beds dipping parallel to the slope. If the occurrence proved promising, the prospect appears attractive for cheap cost of exploitation".*

1.2.4 Keeping in view of the above, DMG, Karnataka given consent to MECL for carrying out exploration in Kalasapura Block, Chikkamagaluru District, Karnataka through their letter No. DMG-17013/6/2018/2021-22, dated 19.06.2021.

1.2.5 The area known for uranium mineralization associated with QPC and AMD carried out exploration work (1972-76 & 2004-05) in this region. Upon MECL request, AMD intimated no objection to MECL for carrying out G4 exploration work in the proposed block area vide their letter No. AMD/MECL/2021/1, dated 03.02.2022.

1.2.6 Subsequently, MECL submitted G4 stage exploration proposal for Copper over 33 sq.km area in Kalasapura Block in 38th TCC meeting held on 24th& 25th Feb, 2022. After detailed deliberations, committee opined that the block was already explored at least for G4 stage and a possible resource of 0.16 m.t. with an average grade of 0.25% Cu was estimated and there is no scope for similar exploration. Hence, committee suggested that a modified project proposal for the G3 stage exploration over identified potential areas may be submitted in the next TCC meeting.

1.2.7 In view of this, MECL had submitted the revised proposal for G3 stage exploration in Area-B & C in Kalasapura block over 15 sq.km by excluding Area-A (previously explored GSI block) through detailed geological mapping (1:4000 scale), exploratory drilling along with surface geochemical sampling and ground geophysics.

1.2.8 After detailed deliberations the committee opined, though the copper value in all boreholes of GSI is below 0.22% and block was previously mapped on 1:63,360 scale, the potentiality of the block may be re-verified in light of geophysical (SP and magnetic) methods and three boreholes of first level and one borehole of second level in Area-B. Committee suggested to take up preliminary exploration for copper and associated minerals in Kalasapura block (Area B & C) by deploying geological mapping on 1:4000 scale, geochemical sampling, ground geophysical survey, trenching, drilling (350m in four (3+1) boreholes), physical & petrological studies. The committee recommended the proposal for approval of EC, with an estimated cost of Rs. 147.09 Lakh (including GST) in time schedule of 12 months.

1.2.9 Subsequently, 28th Executive Committee (EC) of NMET held on 23rd March, 2023 was opined that the area and quantity of reserve does not seem to be promising at this stage. EC deferred the project and asked to check the viability of the mineral resource for mining.

1.2.10 It is pertinent to mention that, the total GSI estimated resource of 0.16 m.t. with 0.25% Cu in 0.30 sq.km area may not be sufficient for mining point of view. Hence, there is a need to explore possibilities for enhancing the resource position of the prospect. Hence, further exploration is required for the augmentation of resource position in the extension areas to the adjoining previously explored GSI block.

1.2.11 Moreover, the area is known for incidence of gold in the basal conglomerates of Bababudan Group (Dharwars). These conglomerates are very similar to the conglomerates of WitwatersRand, South Africa which host the world's largest gold deposits. In southern Karnataka, this conglomerate is oligomict type consisting mostly of quartz pebble

conglomerate (QPC) is well manifest in Bababudan, Siggegudda Western Ghat and Chitradurga belts of Karnataka.

1.2.12 In light of the above, the present exploration proposal at G4 stage has been formulated in search of any auriferous zones hosted by QPC and also to find out further continuity of previously explored GSI Block for Copper mineralisation in the Kalasapura Block area of Chikkamagaluru District of Karnataka.

1.3.0 Location and Accessibility

1.3.1 The Kalasapura block is located about 22 kms E.S.E of Chikkamagaluru. The nearby railway station is Devanur (35 Km) & Arsikere (50 Km). the area falls in toposheet No. 48 O/15. Chikkamagaluru is the district headquater and about 230 km from state capital, Bangalore. **(Plate No.1).**

1.4.0 Physiography and Climate

1.4.1. In general, the study area forms the south-eastern part of the lofty Bababudan hills characterised by the parallel hill ranges trending in an almost east-west direction. Physio-graphically the area is hilly and elevation range from 1150m to 1060mSL in hilly area and 860m in plain lands. In general, topography sloping towards south. The hills near Kalasapura rise more than 700' (213 m) above the ground level. The hill located 400 metres north of Kalasapura consists of brown-coloured massive quartzite/quartz reef at the top and is markedly devoid of vegetation.

1.4.2 Kalasapura falls in the rain shadow zone of Bababudan hills and receives an average rainfall of 600 mm. per annum compared to average rainfall of 2,600 mm. In the Bababudan hills. Daily temperature ranges between 18-32°celsius on any given day across the district. Minimum temperature $20^{O}C$ (Dec-June), and maximum temperature up to $39^{O}C$ (March-June).

1.5.0 Flora and Fauna

1.5.1 Fauna around the area consists of trees here and there with shrubs. Rock outcrops are devoid of vegetation and at places hills area occupied by common varies of floral species, plants and shrubs. Fauna noticed in the area common variety like crow, rats, dogs, pigs and monkeys.

2.0.0. Regional Geology

2.0.1 The geological formations of the Kalasapura area belongs to south-eastern parts of the Bababudan Schist Belt in Chikmagalur District and the rock formations belong to the Pre-Cambrian meta-sedimentary and meta-volcanic suites of rocks (Dharwar Super group). The generalized succession of these formations was first suggested by Viswanathan (1973) is given in the **Table I.A.**

Table I.A
Regional Stratigraphic sequence of Litho units
(after Viswanathan, 1973)

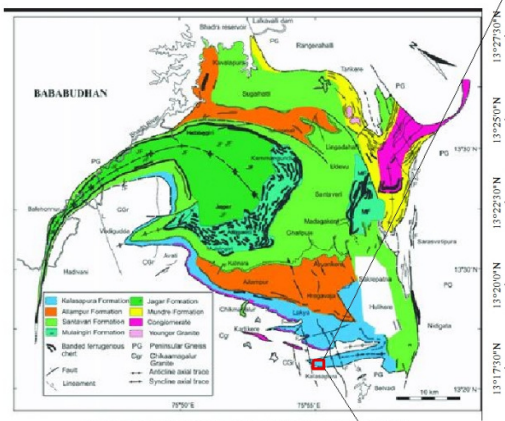
PROTEROZOIC	DHARWAR SUPER GROUP		10. Dolerite
			9. Vein quartz carrying specks of pyrite and chalcopyrite.
			8. Pink porphyritic diorite
		BABABUDAN GROUP	7. Banded iron formations
			6. Chloritic and graphitic phyllites
			5. Quartz-chlorite-schists interbedded with chlorite phyllites and tuffs
			4. Meta-basalts (amygdaloidal amphibolites) interbedded with garnetiferous chlorite phyllites and current bedded quartzite's meta-pyroxenties and sills of gabbro
			3. Current bedded quartzite and quartz sericite-schist carrying sulphide mineralization of interest.
			2. Conglomerate (oligomictic) with sulphide dissemination and with possible concentrations of gold and Uranium
----------Unconformity----------			
ARCHEAN			1. Grey porphyritic granite (part of Peninsular Gneissic complex)

2.0.2 Pre-Cambrian meta-sedimentary and meta-volcanic suit of rocks (Dharwar Super group), unconformably resting over the Chikmagalur grey porphyritic granite and the associated migmatites with a well-defined angular unconformity.

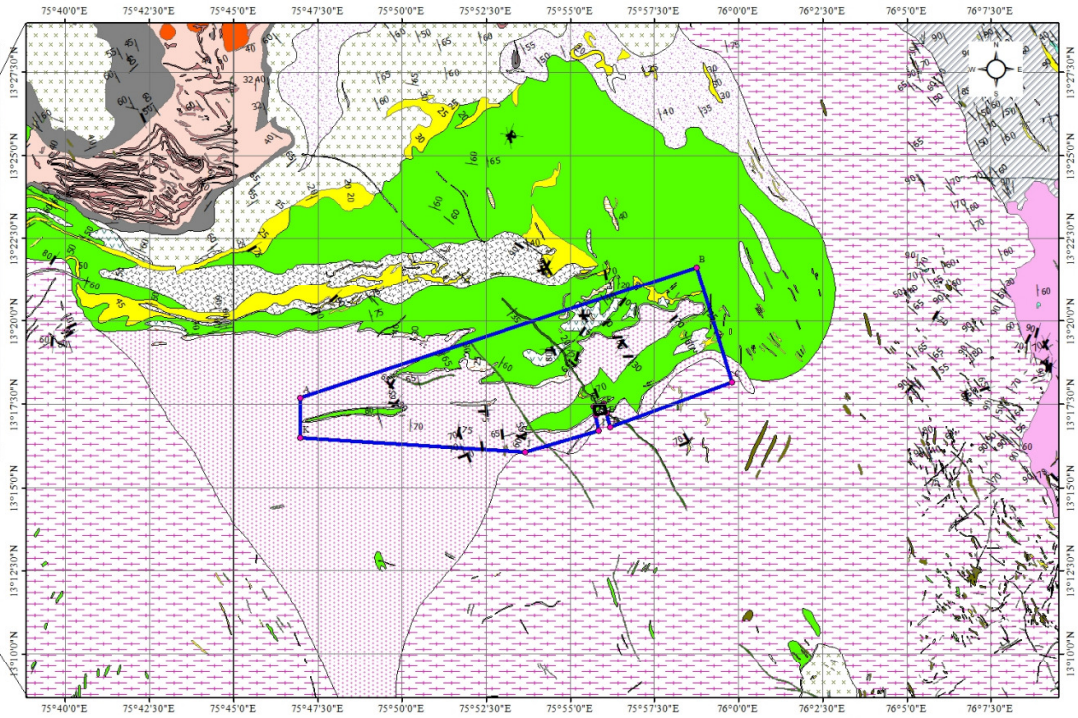
2.0.3 The conglomerates are characterised by the presence of well-rounded quartzite and bluish vein quartz pebble, set in a quartzite matrix. The matrix of the QPC consists of quartz (sand-size), muscovite, sericite, fuchsite, biotite, microcline, pyrite, chalcopyrite, rutile, zircon and ilmenite. This type of basal conglomerate is termed "Oligomictic". The conglomerates exhibit grading and sorting, with alternate pebbly zones and quartzite bands. These are overlain by a thick bed of current bedded quartzite, and quartz-sericite schist which forms the host rock for sulphide mineralisation. The conglomerate quartzite horizon is overlain by a thick sequence of meta-volcanic suite of rocks represented by amygdular amphibolites and greenstones, acid lava flows and tuffs. These volcanics are also interbanded with current-bedded quartzites and garnetiferous chlorite phyllites and are in turn overlain by chloritic and graphitic phyllites and banded iron formations.

2.0.4 The meta-basalts in the lower parts of the sequence comprise amygdular amphibolites with interbeds of garnetiferous phyllites while the upper parts of the sequence comprise green stones with chlorite phyllites (in places graphitic). These formations are intruded by dolerite, veins of quartz, dykes of pink porphyritic diorite and ultramafic Rocks. Regional geological map with location of proposed Kalasapura Block (G4) is given in Fig. No.1 and Plate No.II.

REGIONAL GEOLOGICAL MAP OF PROPOSED KALASAPURA BLOCK (G-4)
DISTRICT- CHIKKAMANGALURU, KARNATAKA



GEOLOGICAL MAP OF BABABUDAN SCHIST BELT SHOWING
THE LOCATION OF PROPOSED KALASAPURA-KARTIKERA BLOCK (G-4)



1:150,000

0 2 4 8 12 16 Kilometers

LEGEND

MAP SOURCE: BHUKOSH, GSI

- GSI block boundary
- **ORIENTED STRUCTURAL PLANE**
- CLEAVAGE/FOLIATION/SCHISTOSITY (S1)
- JOINT
- PROPOSED KALASAPURA BLOCK CORNER POINTS
- PROPOSED KALASAPURA BLOCK BOUNDARY (G-4)
- AMPHIBOLITE
- BANDED IRON FORMATION
- BANDED MAGNETITE QUARTZITE
- CARBONACEOUS PHYLLITE
- CHLORITE SCHIST
- CONGLOMERATE
- DIORITE PORPHYRY
- DOLERITE
- EPIDIORITE
- FERRUGINOUS PHYLLITE
- FUCHSITE QUARTZITE
- GABBRO
- GRANITE GNEISS
- GRANITOID
- LATERITE
- META-BASALT
- META-DOLERITE
- META-GABBRO
- META-PYROXENITE
- META-RHYOLITE
- META-ULTRAMAFITE
- MIGMATITE GNEISS
- OLIGOMICTIC CONGLOMERATE
- PINK GRANITE
- PORPHYRITIC GRANITE
- PYROXENITE
- QUARTZ VEIN/REEF
- QUARTZ-GARNET-SERICITE SCHIST
- QUARTZITE
- SERICITE SCHIST

PLATE-II

2.1.0. Geology of the Block

2.1.1. The main rock formation is a thick bed of brown coloured quartzite, which rests on the undulatory surface of grey porphyritic granite with an angular unconformity. The base of the quartzite unit is marked by a thin zone of oligomictic quartz-conglomerate. Some members show current bedding and good sorting. There are pebbly beds separated by quartzites in the lower parts. The pebble zones carry pyrite concentrations in the matrix. The quartzite unit also carries intercalations of quartz-sericite-schist and bands of amygdular amphibolites and tuffs. In the area West of Devagondanahalli, QPC horizon is interbanded with orthoquartzite showing current bedding and asymmetric ripple marks. In general, an upward fining of pebble size from 10 cm at the base to 2 cm at the top of the bed is noticeable in this area.

2.1.2 The quartzite unit is overlain by a thick sequence of amygdular amphibolite (metabasalts) which is exposed in the northern parts of the quartzitic ridge. Further north in the valley, granites are exposed separating two synclinal outliers.

2.1.3. The general strike of the rock formations is east-west corresponding to the linear trends of the hills. The general dip is northerly. The formations north of Kalasapura represent a syncline. In the valley north of Kalasapura hill the amygdular amphibolites are seen occurring juxtaposed with granite.

2.1.4. Due to the rolling dips, the quartzite bed at places becomes horizontal and at places becomes very steep (50º-65º). Correspondingly, the strike also locally swerves from east-west to almost north-south. Reversal of dip in eastern and western part of the dolerite dyke is marked on the available geological map (F.S.1973). Quartzite beds dip northerly in the western side of dolerite dyke whereas bed dips south-easterly or southerly in the eastern part of the dolerite dyke might be due to anticlinal plunging fold. The geological map of the block area is given as **Plate No.III.**

2.2.0. Mineralisation

2.2.1 Bababudan schist belt is Archaean greenstone belt comprises of a basal uriniferous, pyritiferous and Gold bearing QPC, which has been derived from a source area exposed to anoxic atmosphere and deposited in a reducing environment. In no other greenstone belt such enormous amount of quartzite, carbonates, stromatolitic carbonates and BIFs have been deposited. Therefore, this greenstone belt of Dharwar Craton, have a special place and significance as pointed out by Drury (1988) in his review of Naqvi and Rogers (1987)

2.2.2 The oligomict conglomerate consists mainly of quartz pebbles in Kalasapura area are very similar in lithologic characters and stratigraphic setting to the WitwatersRand conglomerate of South Africa, Jacobina of Brazil and Terwakan of Ghana, all of which are known for economic gold mineralisation (Boyle, 1979).

2.2.3 The conglomerates are characterised by the presence of well-rounded quartzite and bluish vein quartz pebble, set in a quartzite matrix with minor amounts of fuchsite and pyrite. The basal Oligomictic conglomerate bands and pebbly quartzite with chloritic biotitic and fuchsite intercalations also carry rich dissemination of pyrite in the matrix. The QPC horizon containing pyrite and fuchsite mica is invariably auriferous (Mukherjee, 1990)

2.2.4 Significant sulphide mineralisation is restricted to grey massive quartzite in which disseminations of pyrite and chalcopyrite are seen. The mineralized quartzite/quartz reef north of Kalasapura is exposed over a strike length of about 700 metres with an outcrop width of 90m in East-West direction. The formations are cut by a north-south dolerite dyke which divides the mineralized area into two sectors Western sector (280metres long) and Eastern sector (420 metres long).

2.2.5 Surface indications of the sulphide mineralisation are the yellowish brown to reddish brown colouration on the outcrops, malachite and azurite encrustations and leached voids with fillings of limonite and at places with fine honeycomb box work. The massive quartzite band/quartz reef forms the main host rock for copper mineralisation

while the sheared buff quartzite band is mostly barren with weak pyrite disseminations at places. The copper mineralisation is in the form of fine to coarse dissemination of chalcopyrite with sporadic stringers, bunches and patches. The concentration varies both along the strike and in depth. The top one metre of the quartzite/quartz is leached and at places malachite and azurite encrustations are seen.

2.2.6 The quartz pebble conglomerate (QPC), basal unit of Bababudan Group marks the base of Dharwar Supergroup and this lithological unit is the main target of investigation for gold mineralisation. Current bedded quartzite/grey massive quartzite and quartz sericite-schist carrying sulphide mineralization of interest is the another target litho unit for copper mineralization in the block area.

2.3.0 Mineral Potentiality based on geology, geophysics, ground geochemistry etc.

2.3.1 The area forms the part of Bababudan schist belt and is known for incidence of gold mineralisation in oligomictic conglomerates (QPC) and copper mineralisation in grey massive quartzites of Bababudan group of Dharwar super group.

i). QPC hosted Gold Mineralisation:

2.3.2 The oligomict conglomerate consists mainly of quartz pebbles and are very similar in lithologic characters and stratigraphic setting to the WitwatersRand conglomerate of South Africa, Jacobina of Brazil and Terwakan of Ghana, all of which are know for economic gold mineralisation (Boyle, 1979).

In Kartikere area, a metre-wide band of pebbly bed with abundant pyrite and fuchsite could be traced for a strike length of 200 m within the QPC. This sulphide rich band occurs immediately above the very coarse QPC which rests over the granite. This sulphide QPC assayed 0.5 g/t of gold on fire assay. In Kartikere outlier and area west of Devagondanahalli the QPC horizon containing pyrite and fuchsite mica

is invariably auriferous, the gold value ranges from 0.1 g/t to 0.84 g/t. This sulphidic QPC is 1 to 2 wide and the overall thickness of QPC ranges from 10 to 20m. Panning of some samples showed rare fine gold specks. (Mukherjee, 1990).

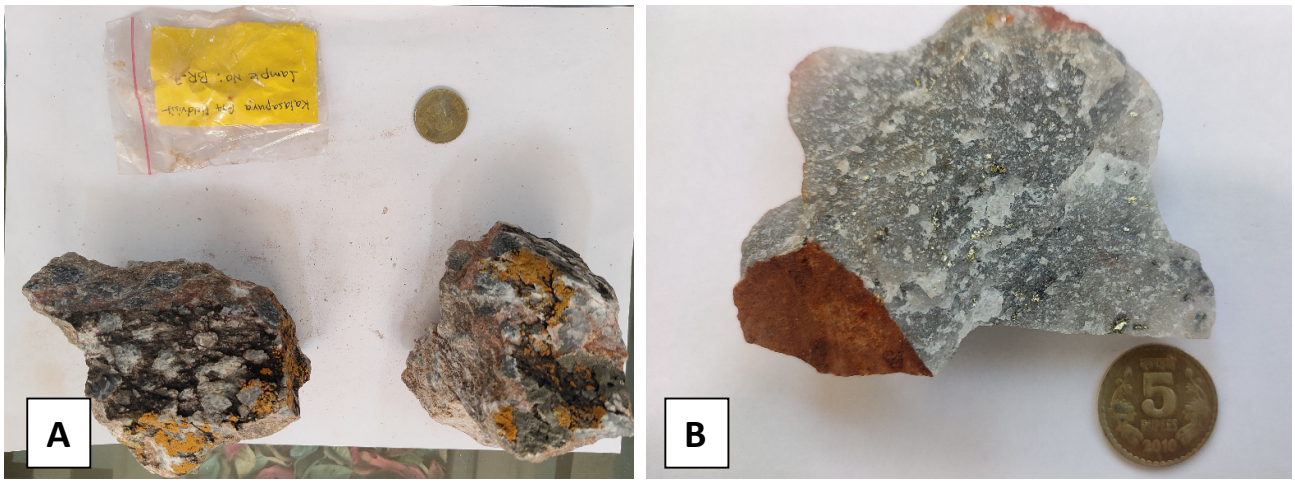


Figure: A: QPC with ferruginisation/goethitisation , N of Kalasapura B) Massive quartzite with disseminations of chalcopyrite and sulphides, N of Kalasapura

ii). Copper Mineralisation:

2.3.3 During F.S.1973, Vishwanatha (GSI) carried out exploratory drilling of 9 boreholes (885.25m) in Kalasapura area revealed copper mineralisation occurs in the grey massive quartzite/quartzs as fine disseminations over a continuous strike length of 240 metres in the Western Block and as sporadic weak disseminations to over a strike length of 420 metres in the East Block. In the West Block, the mineralized quartzite/quartz reef has a thickness varying from 11.00 to 24.00 m and the copper mineralisation of interest is confined to a thickness of 17.00 m from the upper contact of quartzite with the amygdular amphibolites. Copper mineralisation in individual borehole in the West Block varies from 1.10 to 8.01 m with an average thickness of 3.27 m, over a strike length of 240 metres. The grade varies from 0.13 to 0.29 % Cu with some sections containing up to 0.43% Cu. The

average grade of mineralisation is estimated to be around 0.25% Cu. A possible reserve of 0.16 million tonnes of 0.25% Cu was estimated. Copper zones intersected in the boreholes are given in Table No.II.A.

Table No.II.A

Copper mineralized zones intersected in boreholes drilled by GSI (F.S.1973)

S.No.	Borehole No.	Depth of intersection of mineralized quartzite (pyrite zone) (in meters)	Zone of Copper mineralisation		
			Depth along hole (in meters)	True width (in meters)	Grade % Cu.
1	2	3	4	5	6
West Block					
1.	KP/1	0.00-17.10	1.75-9.76	8.01	0.29
			3.85-7.96	4.11	0.43
2.	KP/2	0.00-8.00	4.35-5.48	1.10	0.13
3.	KP/3	0.00-15.71	9.80-16.71	6.87	0.23
			Sub zones		
		i)	9.80-11.48	1.64	0.13
		ii)	11.48-14.96	3.48	0.36
		iii)	11.48-16.71	5.23	0.26
4.	KP/4	0.00-13.66	9.50-12.41	2.91	0.15
5.	KP/6	0.00-16.80	10.05-12.30	2.25	0.18
			13.01-15.35	2.34	0.21
			15.85-16.80	0.95	0.22
6.	KP/7	0.00-10.75	0.75-1.68	0.93	0.14
			6.70-6.90	0.20	0.18
			8.57-9.10	0.53	0.17
			OR	**1.66**	**0.15**
7.	KP/8	5.00-13.55	5.30-6.55	1.25	0.15
	KP/9	3.00-17.85	4.63-5.05	0.42	0.24
			7.55-8.25	0.70	0.25
			11.00-11.95	0.95	0.21
				2.07	**0.23**
East Block					
9.	KP/5	No copper mineralization of interest			

2.3.4 Viswanatha (1973) had recommended as “The attractive feature of the occurrence is the absence of overburden and favourable topography with the mineralised beds dipping parallel to the slope.

2.3.5 During the formulation of the project, MECL geologist visited the site and verified the incidence of QPC horizon with some alteration patterns and sulphide bearing grey quartzites in kalasapura area. During 1st visit total 7 no.s bedrock samples collected from quartzites. 2 Nos sulphide bearing grey Quartzite samples shown Cu values 0.338% and 0.444% Cu. During the 2nd visit, MECL geologist collected total 13 nos. bedrock

samples from the area. Out of 13 nos. samples, total 8 nos. bedrock chip samples collected from QPC horizon while 5 nos. samples collected from grey massive quartzites. Samples have been sent to lab for assay of Gold.

3.0.0. Previous Work / Background information

3.1.1 Bruce Foote (1900) recorded the presence of copper carbonates in the basement conglomerate for the first time. Ancient attempts at mining and smelting have been recorded by him near Devagondanahalli village. Later Smeeth (1913) of the Mysore Geological Department carried out prospecting work on these conglomerates and recorded the presence of copper and gold. Large number of samples collected by Balaji Rao (1913) of the same Department, indicated traces of gold and minor values for Cu. However, two samples from Kalasapura band collected by him gave a value of 0.42% Cu and traces of gold.

3.1.2 Smeeth (1913) carried out prospecting on the basal conglomerate of Bababudan schist belt and recorded the presence of copper and gold. Rama Rao (1963) reported the presence of gold in the basal conglomerate horizon to the north of Chikmaglur in the Bababudan belt. According to him, panning of these pebbly conglomerates indicated traces of gold and only one stray sample indicated 2 dwt of gold. Following this result, 66 samples were collected by the Mysore Geological Department and all those samples assayed less than 1 dwt. of gold. (Rama Rao, 1963).

3.1.3 Narasimhan and Viswanatha of GSI (1970) carried out investigations involving regional mapping (150 sq.km on 1:63,360 scale), plane table mapping (0.33 sq.km on 1:1000 scale), trenching (232 cu.m.) and surface groove sampling (231 nos.) and indicated that the copper mineralisation revealed in grey massive quartzites over a strike length of 800 m over an exposed width of 80 m and an estimated thickness of 15 m. An exploratory drilling programme was recommended to ascertain the width and grade of the deposit.

3.1.4. Later during 1973, Viswanatha had carried out exploratory drilling of 9 boreholes (885.25m) in Kalasapura area revealed copper mineralisation occurs in the grey massive quartzite/quartz as fine disseminations over a continuous strike length of 240 metres in the Western Block and as sporadic weak disseminations to over a strike length of 420 metres in the East Block. Copper mineralisation in individual borehole in the West Block varies from 1.10 to 8.01 m with an average thickness of 3.27 m, over a strike length of 240 metres. The grade varies from 0.13 to 0.29 % Cu with some sections containing up to 0.43% Cu. Mineralized quartzite/quartz reef proved over a strike length of 240 m, with an exposed outcrop width of 60 m and an average thickness of 3.7m. The grade of copper varies from 0.13 % to 0.43%. A possible resource of 0.16 m.t. with an average grade of 0.25% Cu was estimated.

3.1.5. Atomic Mineral Directorate (Govt. of India) has carried out investigations in various phases during 1973-74, 1974-75, 1975-76, 1976-77 and 2004-05 to locate uranium mineralisation associated with QPC in the area. Reconnoitory drilling (2,829m) was carried out by AMD in three areas Viz., Kalasapura (3 boreholes), Devagondahanhalli (9 boreholes) and Hosakote (2 boreholes) to explore QPC type of uranium mineralisation. No significant radioactivity has been recorded by AMD in the overlapping part of the block, which is mostly soil covered.

3.1.6 GSI (F.S.1986-87) carried out preliminary examination of oligomict conglomerate for gold in parts of the Bababudan group of Dharwar super group in southern Karnataka. The work consisted of large scale mapping, sampling for gold assay, panning and testing for radio activity by G. M. counter in the field at some selected sections in Bababudan, Siggegudda and Chitradurga schist belts. Within Kartikere outlier and the area west of Devagondanahalli the QPC horizon is interbanded with orthoquartzite showing current bedding and asymmetric ripple marks. In general, an upward fining of pebble size from 10 cm at the base to 2 cm at the top of the bed is noticeable in this area. Within the section, the QPC horizon containing pyrite and fuchsite mica is invariably auriferous, the gold value ranges from 0.1 g/t to 0.84 g/t. This sulphidic QPC is 1 to 2 wide and the overall thickness of QPC ranges from 10 to 20m (Mukherjee, 1990).

3.2.0. Observation and Recommendations of previous work

3.2.1 The area is known for incidence of gold in the basal oligomict type conglomerates (QPC) of Bababudan Group (Dharwars). These conglomerates are very similar to the conglomerates of WitwatersRand, South Africa which host the world's largest gold deposits. Oligomict type consisting mostly of quartz pebble

conglomerate (QPC) is well manifest in Bababudan, Siggegudda Western Ghat and Chitradurga belts of Karnataka. Mukherjee (1990) reported that within Kartikere outlier and the area west of Devagondanahalli section the QPC horizon containing pyrite and fuchsite mica is invariably auriferous, the gold value ranges from 0.1 g/t to 0.84 g/t.

3.2.2 Global distribution of major QPC hosted gold deposits and their characteristics are presented below Figure. (source: USGS).

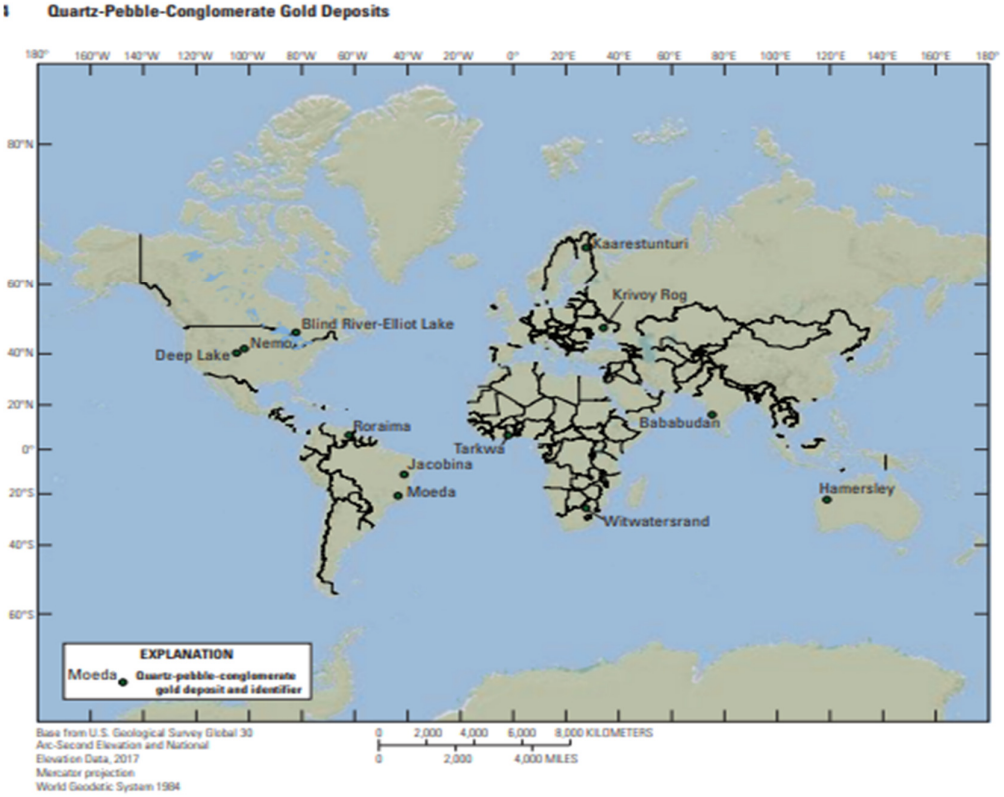


Figure 1. Global distribution of major quartz-pebble-conglomerate gold deposits.

Table 1. Geologic and production information on the major quartz-pebble-conglomerate deposits of the world.

[Ga, gigga-annum; Ma, mega-annum; n.d., no data; t, metric tonne; ?, uncertain]

Basin name	Location	Basin age (Ma)		Basin setting	Gold (Au) production	Iron (Fe) minerals	Significant uranium (U)	Significant hydrocarbon	Likely source	Hosting unit	Selected references
		maximum	minimum								
Witwatersrand	South Africa	2,970	2,714	foreland, retroarc, passive margin, intracratonic sag	>50,000 t	pyrite	yes	yes	3.1-3.0 Ga granite-greenstone	Central Rand and Western Rand Groups	Gregory, 1909; Pretorius, 1976, 1981a; Minter, 1977; Minter and others, 1993; Frimmel and others, 2005a
Tarkwa	Ghana	2,133	2,097	foreland	>280 t	hematite, magnetite	no	no	Paleoproterozoic greenstone	Tarkwaian Series	Sestini, 1973; Milési and others, 1991; Hirdes and Nunoo, 1994; Pigois and others, 2003
Jacobina	Brazil	2,086	1,883	foreland	>70 t	pyrite, hematite	no	yes	Archean-Eoproterozoic granite-greenstone	Serra do Córrego Formation	Ledru and others, 1997; Teixeira and others, 2001
Elliot Lake	Canada	2,450	2,219	foreland	negligable	pyrite	yes	yes	Archean granite	Huronian Supergroup	Fralick and Miall, 1989
Moeda	Brazil	2,800	2,200(?)	foreland	>10 t	pyrite	yes	minor	Archean granite-greenstone	Moeda Formation	Minter and others, 1990
Roraima	northern South America	2,000	1,900	foreland	n.d.	magnetite	no	no	2.3-2.1 Ga Guiana Shield granite-greenstone	Roraima Group	Santos and others, 2003; Frimmel and others, 2005b
Bababudan	India	2,900	2,600(?)	foreland	negligable	pyrite	yes	no	Archean granite-greenstone	Bababudan Group	Srinivasan and Ojakangas, 1986
Hamersley	Australia	2,780	2,630	graben	n.d.	pyrite	yes	yes	3.53-2.83 Ga Pilbara craton granite-greenstone	Mount Bruce Supergroup	Carter and Gee, 1987
Kaarestunturi	Finland	1,880	1,800	graben	prospect	magnetite, hematite	no	no	Lapland greenstone belt	Kumpu Group	Härkönen, 1984

Source: USGS Scientific Investigation Report 2010-5070-P

3.2.3 Bhushan, et.al (2010) reported that Bababudan group of QPC contains detrital pyrite and uraninite, and resembles the well-known uranium and gold bearing conglomerates of the Witswaterand Basin of South Africa. Two samples of the basal conglomerates and quartzite analysed yielded gold values of 0.37 and 1.67 ppm. (source: Journal Geological Society of India, Vol.75 Jun-2010)

3.2.4. Viswanatha (1973) had recommended that “The attractive feature of the copper occurrence is the absence of overburden and favourable topography with the mineralised beds dipping parallel to the slope. If the occurrence proved promising, the prospect appears attractive for cheap cost of exploitation”.

3.2.5 It is pertinent to mention that total estimated copper ore resource of 0.16 m.t. with 0.25% Cu in the previously explored GSI Block (0.3 sq.km) of Kalasapura area may not be sufficient for mining point of view. In order to enhance resource potential of the area further exploration in the adjoining of previously explored GSI block is required to establish the extension of ore body continuity and further augmentation of copper ore resources in the area.

3.2.6 In light of the above, an integrated exploration program at G4 stage over an area of 129 sq.km has been formulated to target QPC horizon for gold mineralisation and also to figure out the exact copper ore potentiality of the area.

3.3.0. Scope of Proposed Exploration

3.3.1 The Reconnaissance Survey at G-4 stage comprises, large scale geological mapping (1:12,500 scale) with surface geochemical sampling (bedrock/soil/stream sediment), Ground Geophysical survey, trenching/pitting scout drilling and associated survey, chemical analysis and physical analysis and Report preparation.

3.4.0 Objectives of Present Exploration

The present exploration program at G4 stage has been formulated to fulfil the following objectives.

i) To carry out Large scale Geological mapping on 1:12,500 scale associated with surface geochemical sampling (bedrock/soil/stream sediment) and analysis to identify the surface manifestations and lateral disposition of the QPC hosted Gold and copper mineralized zones in extension areas of adjoining previously explored GSI block.

ii) To carryout ground geophysical survey (Induced Polarization (I.P) cum Resistivity, S.P. & Magnetic method) in the identified potential area.

iii) To carryout trenching/pitting work in the identified anomalous mineralized zones

iv) Based on the positive outcome of geological mapping, surface geochemical sample results, ground geophysical survey and trenching/pitting work scout drilling (500m in 5 Bhs) shall be carried out in the potential mineral bearing area to confirm the subsurface continuity of mineralisation.

v) To estimate Reconnaissance resource (334) for Gold, Copper along with accessory elements if any as per UNFC norms and Minerals (Evidence of Mineral Content) Rules-2015 at G-4 level.

3.5.0. Block description

3.5.1 The Kalasapura Block area falls in Survey of India Toposheet No. 48 O/15 and covers total area of 129.00 sq.km in and around villages Kalasapura Devagondanahalli, Sindigere, Kartikere in Chikkamagaluru District, State Karnataka. The block location marked on toposheet is given in **PLATE No.I.** The Co-ordinates of the corner points of the block area both in UTM and geodetic are given in **Table No.-III.A**.

Table III.A : Block Corner Points of Kalasapura (G-4) Block, (129.00 Sq. Km.), Chikkamagaluru District, Karnataka

CORNER POINTS	UTM (ZONE:43N)		LATITUDE	LONGITUDE
	EASTING m	NORTHING m	N	E
A	584825.870	1469878.090	13°17'41.54"	75°46'59.31"
B	606054.400	1477198.810	13°21'37.37"	75°58'45.76"
C	607966.770	1470821.150	13°18'09.54"	75°59'48.48"
D	601441.430	1468316.530	13°16'48.84"	75°56'11.31"
E	601232.410	1469108.880	13°17'14.66"	75°56'4.46"
F	601108.160	1469599.720	13°17'30.65"	75°56'00.39"
G	600548.310	1469458.040	13°17'26.10"	75°55'41.77"
H	600671.150	1468966.870	13°17'10.10"	75°55'45.79"
I	600844.060	1468120.510	13°16'42.53"	75°55'51.43"
J	596883.810	1466921.030	13°16'03.97"	75°55'39.69"
K	584827.000	1467658.590	13°16'29.29"	75°46'59.11"

4.0.0 Planned Methodology

4.1.1 In accordance to the objective set for the block, the exploration programme is proposed. The Exploration shall be carried out as per Minerals (Evidence of Mineral Contents) Rule-2015. Accordingly, the following scheme of exploration is formulated in order to achieve the objectives. The details of different activities to be carried out are presented in subsequent paragraphs.

4.2.0. Geological Mapping

4.2.1. Large scale Geological mapping on 1:12,500 scale shall be carried out in the total 129 sq.km area. Rock types, their contact, structural features will be mapped. Surface manifestations of the ore bodies

available along with their surface disposition will be marked on the map. Surface (bedrock/soil/stream sediment) samples shall be collected from the area for analysis of Gold (Au) and Copper (Cu-Pb-Zn, Co, Mo, Se &Te) and associated minerals.

4.3.0. Geochemical Sampling

4.3.1. Surface sampling (Bed Rock/Soil/Stream sediment):

4.3.2. During the course of Geological mapping a total 150 nos of Bed rock/soil/stream sediment samples shall be collected from the area preferably targeting host lithologies of mineralisation for the analysis of Au and Cu, Pb, Zn, Ni, Co, Te, Mo & Se. Gold (Au) analysis shall be carried out by fire assay method.

4.4.0 Check sampling:

4.4.1 Total 10 Nos External check i.e. 10% of surface bedrock/soil/stream sediment shall be analyzed for assay of Au and Cu, Pb, Zn, Ni, Co, Te, Mo & Se. Gold (Au) analysis shall be carried out by fire assay method.

4.5.0 Surveying:

4.5.1. DGPS and total station survey instruments shall be utilized for survey work in the area. Survey party will be associated with geophysical survey team to fix the survey stations and profiles and plotting its location on map for proper interpretation of the survey data. During scout drilling, borehole fixation and determination of reduced level and co-ordinates of the boreholes will be undertaken.

4.5.0. Geophysical Survey:

4.5.1. In general, the area is occupied by chain of hills i.e. east-west striking ridges and plain land. Isolated hillocks and some undulations are seen at places. The area is covered with vegetation and shrubs. In view of presence of vegetation and soil cover the need of the ground Geophysical survey is felt to uncover the concealed extension of mineralized bodies if any in the area. On interpretation of data of geological mapping, geochemical sampling, if required surface

geophysical survey will be carried out to assess the continuity of surface manifestations of mineralized zones in strike and dip direction.

4.5.2 In present exploration, Integrated ground geophysical survey shall be carried out to delineate potential mineralized zone in the area. Induced Polarization (I.P.) cum Resistivity, S.P & Magnetic Survey shall be carried out in the identified potential area at tentatively at 100m traverse/profile interval and 20m station interval tentatively involving cumulative 30 Lkm.

4.6.0. Exploratory Mining (Trenching/Pitting)

4.6.1. Shallow trenching (Excavation) shall be carried out in the potential zones/anomaly zones identified based on the results of Geological mapping, surface sampling and ground geophysical survey. A provision of shallow trenching of 200 cubic meter is kept. Trenching/pitting shall be done for correlation of mineralized zones (if any) on surface up to a depth of 2m after removal of soil/weathered column in the area. Locations of trenches on ground will be decided by field geologist based on field observations. A provision of 150 Nos of primary samples and 15 nos of external check (10%) samples is kept for analysis of Au & Cu, Pb, Zn, Ni, Co, Te, Mo & Se. Gold (Au) assay shall be carried out by fire assay method.

4.6.2. The trench /pit walls will be mapped on 1:200 scale.

4.6.3. Thus, a total of 200 cu m of shallow trenching/pitting work along with associated geological & laboratory studies shall be carried out in the area.

4.7.0. Core Drilling:

4.7.1. As discussed in para 3.4.0, based on the positive outcome of geological mapping, surface geochemical sample results, ground geophysical survey and trenching/pitting work, scout drilling (500m in 5 boreholes) shall be taken up in the identified potential mineral bearing area to confirm the subsurface continuity of mineralisation.

4.7.2 Borehole deviation survey by multi-shot camara shall be carried out for all 5 No.s scout boreholes (500m)

4.7.3 Borehole geophysical logging shall be carried out for all 5 nos. scout boreholes (500m).

4.8.0. Drill Core Logging:

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

4.9.0. Drill Core Sampling:

4.9.1. During geological logging of drill core, mineralized zone will be marked on the basis of concentration of mineralisation and lithology. The primary sample length shall be maximum for 0.50m and sample length may vary due to variation in mineralisation and lithology, recovery factor etc. Total 150 Nos of primary and 15 Nos. of external check (10%) will be analysed for Au and Cu, Pb, Zn, Ni, Co, Te, Mo & Se. Gold (Au) samples shall be analysed by fire assay method.

4.10.0 Whole Rock Analysis:

4.10.1 Whole Rock analysis for SiO_2, Al_2O_3, Fe_2O_3, TiO_2, MnO, CaO, Na_2O, K_2O+H_2O, MgO, P_2O_5, CO_2, & S radicals will be carried out on 10 Nos samples to check the rock types, their variation in chemical composition.

4.11.0 Petrological & Mineralogical Studies:

4.11.1 During the course of Geological mapping and core logging total 10 samples from various lithounits from surface and boreholes will be studied for petrography studies. Total 10 samples collected from mineralized zones will be studies for ore mineral assemblages and their distribution, alteration, enrichment etc in polished sections.

4.12.0 Specific gravity determination:

4.12.1 Total 10 nos. drill core samples shall be subjected for specific gravity determination.

4.13.0 Composite Samples:

4.13.1 Total 10 Nos of composite samples (Borehole) shall be analysed for 34 elements analysis by ICP-MS method. Total 10 nos. composite samples collected from mineralized zones shall be analysed for Au & Ag by fire assay method.

5.0.0 Proposed quantum of work

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

Table No-V. A
Envisaged Quantum of proposed work in Kalasapura Block (G4)

S.No.	Item of Work	Unit	Target
1	**Large Scale Geological Mapping (on 1:12,500 Scale)**	sq.km	129.00
2	**Geochemical Sampling**	Nos.	150 Nos.
	a) Bed rock/Channel/Soil		
3	**Ground Geophysical Survey**		
	IP. Induced Polarization (I.P) cum Resistivity S.P and Magnetic	Line km	30
4	**Pitting/Trenching**	cu.m	200
5	**Exploratory Drilling** (Scout drilling, core logging & sampling)	m.	500 (5 Bhs)
6	**LABORATORY STUDIES**		
	Chemical Analysis		
	A. Primary & Check Samples (BRS/Soil/Stream Sediments)		
	a. For Au by fire assay	Nos	165
	b. For Cu, Pb, Zn, Ni, Co, Te, Mo and Se	Nos	165
	B. Primary & Check Samples from Trench		
	a. For Au by fire assay	Nos.	165
	b. Cu, Pb, Zn, Ni, Co, Te, Mo and Se	Nos	165
	C. Primary & Check Samples- Drill Core		
	a. For Au by fire assay	Nos	165
	b. For Cu, Pb, Zn, Ni, Co, Te, Mo and Se	Nos	165
	D. Composite Samples		
	a. For 34 Elements by ICPMS	Nos	10
	b. For Au & Ag by fire assay	Nos	10
7	**Physical & Petrological Studies**		
	i. Preparation and study of thin section	Nos	10
	ii. Preparation and study of polish section	Nos	10
	iii. Digital Photographs	Nos	10
	iv. Whole Rock Analysis	Nos	10
	v. Sp. Gravity Determination	Nos	05
8	**Report Preparation (Digital format)**	Nos	1

6.0.0 Manpower Deployment

6.0.1 Manpower deployment List may be provided later.

7.0.0 Cost estimate

7.0.1. 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 promotional projects of MOM. The total estimated cost is **Rs. 259.69 Lakhs** with a timeline of 14 months. The summary of cost estimates for Reconnaissance Survey (G4 stage) is given in **Table No.-VII.A** and details of cost estimates is given in **Table No. –VII.B.** Tentative Time schedule/action plan for proposed Reconnaissance Survey (G4) for is given in **Table No. VII-C.**

Table No-VII.A: Summary of Cost Estimates (G4 stage)

Sl. No.	Item	Total
A	Geological Work	3555360
B	Geophysical Survey	5336559
C	Survey work	560220
D	Pitting & Trenching	666000
E	Drilling	7164900
F	Borehole Geophysical logging	311125
G	Laboratory Studies	3217440
	Sub total	20811604
H	Report	750000
I	Peer Review	30,000
J	Proposal Preparation	416,232
	Total	22007836
K	GST (18%)	3,961,410
Total cost including 18% GST		25,969,247
SAY, in Lakhs		**259.69**

Table No.VII.B

Cost Estimates for Reconnaissance Survey (G4) for QPC hosted Gold Mineralisation & Copper in Kalasapura block, District: Chikkamagaluru. Karnataka. [Block area- 129.00 sq. km; Nos. of Borehole- 5; Borehole depth range- upto 100m; Schedule timeline- 14 months]							
S. No.	**Item of Work**	**Unit**	**Rates as per NMET SoC 2020-21**		**Estimated Cost of the Proposal**		**Remarks**
			SoC-Item -Sl No.	**Rates as per SoC**	**Qty.**	**Total Amount (Rs)**	
A	**Geological Mapping Other Geological Work & Surveying**						
	Geological mapping, (1:12,500 scale) & Trenching , drilling work	129 sq.km					
i	a. Charges for Geologist per day (Field) for geological mapping & trenching work, drilling work	day	1.2	11,000	180	1,980,000	
ii	b. Labours Charges; Base rate	day	5.7	504	360	181,440	Amount will be reimburse as per the notified rates for unskilled labor by the Central Labour Commissioner or respective State Govt. whichever is higher
	c. Charges for Geologist per day (HQ)	day	1.3	9,000	60	540,000	
	d. Charges for one Sampler per day (1 Party)	one sampler per day	1.5.2	5,100	120	612000	
	e. Labours (4 Nos)	day	5.7	504	480	241920	Amount will be reimburse as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higher
	Sub Total- A					**3,555,360**	
B	**Ground Geophysical Survey**						
1	IP. Induced Polarization (I.P) cum Resistivity S.P and Magnetic	Per Line Km	3.4b	1,448,693	3	4,346,079	(8 -10 line Km=14,48,693/-) (30LKm cummulative)
3	Geophysicist party days (Field)	per day	3.18	11,000	60	660,000	
4	c. Labours Charges	day	5.7	504	120	60480	Amount will be reimburse as per the notified rates for unskilled labor by the Central Labour Commissioner or respective State Govt. whichever is higher
5	Geophysicist party days (HQ)	per day	3.18	9,000	30	270,000	
	Sub Total- B					**5,336,559**	
C	**Survey work for Block boundary demarcation, geophysical survey layout & Trenching work**						
a	DGPS Survey for BH fixation & RL determination	Per Point of observation	1.6.2	19,200	5	96000	5 Bhs
b	Charges of Surveyor (1 party) for Geophysical survey layout work & Block boundary demarcation	one surveyor per day	1.6.1a	8,300	45	373500	
c	Labours Charges for survey work;	day	5.7	504	180	90720	Amount will be reimburse as per the notified rates for unskilled labor by the Central Labour Commissioner or respective State Govt. whichever is higher
	Sub-Total C					**560,220**	
D	**Trenching/Pitting**						
	a) Excavation of Trenches	per cu.m	2.1.1.	3,330	200	**666000**	
E	**DRILLING**						
1	Drilling up to 300m (Hard Rock)	m	2.2.1.4a	11,500	500	5,750,000	
2	Borehole deviation Survey by Multishot Camera	m	2.2.6	330	500	165,000	
3	Land / Crop Compansation (in case the BH falls in agricultural Land)	per BH	5.6	20,000	5	100,000	Amount will be reimburse as per actuals or max. Rs. 20000 per BH with certification from local authorities
4	Construction of concrete Pillar (12"x12"x30")	per borehole	2.2.7a	2,000	5	10,000	
5	Transportation of Drill Rig & Truck associated per drill (2 rigs)	Km	2.2.8	36	2,600	93,600	1300 km to & fro from Nagpur/ Rig
6	Monthly Accomodation Charges for drilling Camp (up to 2 Rigs)	month	2.2.9	50,000	3	150,000	
7	Drilling Camp Setting Cost	Nos	2.2.9a	250,000	1	250,000	
8	Drilling Camp Winding up Cost	Nos	2.2.9b	250,000	1	250,000	
9	Road Making (Flat Terrain)	Km	2.2.10a	22,020	5	110,100	Road Making will be considered as per the requirement and Road Making Charges will be reimbursed for max. 5 km.
10	Drill Core Preservation	per m	5.3	1,590	180	286,200	
	Sub Total E					**7,164,900**	
F	**Borehole Geophysical Logging**	5 Bhs of 350m each	3.12	622.25	500	**311,125**	Base Rate Rs.10, 88, 941/1750=622.25per m
G	**LABORATORY STUDIES**						
1	**Chemical Analysis**						
i)	**Geochemical Sampling-Surface samples (Bedrock /Soil/Stream sediment)**						
	a. Au by Fire Assay	Nos	4.1.5a	2,380	150	357,000	
	b. for Cu, Pb, Zn, Ni, Co, Te, Mo and Se	Nos	4.1.7a & b	3,511	150	526,650	AAS Method
ii)	**Surface Check samples (10% External)**						
	b) For Au (Gold) by Fire Assay	Nos	4.1.5a	2,380	15	35,700	
	a. for Cu, Pb, Zn, Ni, Co, Te, Mo and Se	Nos	4.1.7a & b	3,511	15	52,665	AAS Method
iii)	**Trench & Check Samples from**						
	Trench samples						
	a) For Au (Gold) by Fire Assay	Nos	4.1.5a	2,380	150	357,000	
	b). for Cu, Pb, Zn, Ni, Co, Te, Mo and Se	Nos	4.1.7a & b	3,511	150	526,650	AAS Method
iv)	**Trench Check samples (10% External)**						
	a) For Au (Gold) by Fire Assay	Nos	4.1.5a	2,380	15	35,700	
	b). for Cu, Pb, Zn, Ni, Co, Te, Mo and Se	Nos	4.1.7a & b	3,511	15	52,665	AAS Method
v)	**BH Core samples**						
	a) For Au (Gold) by Fire Assay	Nos	4.1.5a	2,380	150	357,000	
	b). for Cu, Pb, Zn, Ni, Co, Te, Mo and Se	Nos	4.1.7a & b	3,511	150	526,650	AAS Method
vi)	**BH Core samples (10%External)**						
	a) For Au (Gold) by Fire Assay	Nos	4.1.5a	2,380	15	35,700	
	b). for Cu, Pb, Zn, Ni, Co, Te, Mo and Se	Nos	4.1.7a & b	3,511	15	52,665	AAS Method
vii)	**Composite Samples**						
	a. 34 Elements by ICPMS	Nos	4.1.14	7,731	10	77,310	
	a. For Au & Ag by fire assay	Nos	4.1.5a	4,760	10	47,600	
2	**Physical & Petrological Studies**						
i	Preparation of thin section	Nos	4.3.1	2,353	10	23,530	
ii	Study of thin section	Nos	4.3.4	4,232	10	42,320	
iii	Preparation of polish section	Nos	4.3.2	1,549	10	15,490	
iv	study of polished section	Nos	4.3.4	4,232	10	42,320	
v	Digital Photographs	Nos	4.3.7	280	10	2,800	
vi	Whole Rock Analysis	Nos	4.1.15a	4,200	10	42,000	
vii	Sp. Gravity	Nos	4.8.1	1,605	5	8,025	
						3,217,440	
H	**Total A to H**					**20,811,604**	
I	**Geological Report Preparation**	**5 Hard copies with a soft copy**	**5.2**	Exploration cost exceeding 150 lakh but less than 300 lakh: A Minimum of ₹7.5 lakh or 3% of the work whichever is more		**750,000**	Reimbursement will be made after submission of the final Geological Report in Hard Copies (5 Nos) and the soft copy to NMET.
J	**Peer review Charges**		**As per EC decision**			**30,000**	
K	**Preparation of Exploration Proposal (5 Hard copies with a soft copy)**	**5 Hard copies with a soft copy**	**5.1**	2% of the Cost or Rs. 5 Lakhs whichever is less		**416,232**	EA will be reimbursed after submission of 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.
L	**Total Estimated Cost without GST**					**22,007,836**	
M	**Provision for GST (18% of J)**					**3,961,410**	GST will be reimburse as per actual and as per notified prescribed rate
N	**Total Estimated Cost with GST**					**25,969,247**	
				or Say Rs. In Lakhs		**259.69**	
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 execusion of the project by NEA on its own, a Certifiate regarding non outsourcing of any component/project is required.						

Table-VII.C

Schedule timeline for Reconnaissance Survey (G4) for QPC hosted Gold & Copper in Kalasapura Block, District: Chikkamagaluru, Maharashtra.

S. No.			1	2	3	4	5	6	7	8		9	10	11	12	13	14
1	Camp Setting	Months/Days															
2	Geological Mapping & Sampling	days															
3	Geophysical survey	L.km															
4	Geophyscist party days (HQ) for data interpretation & Report	Days															
5	Pitting/Trenching	cu.m															
6	Surface Drilling (1 rigs)	m															
7	Survey Party days	days															
8	Geologst Man days	days															
9	Sampler Man days	days															
10	Camp Winding	months															
11	Laboratory Studies	Nos.															
12	Report Writing with Peer Review	months															

Review for Scout Drilling

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

8.0.0 Justification

8.1.0 The proposed Kalasapura (G4) block area lies in Bababudan green stone belt of Western Dharwar craton of southern India. The area is known for incidence of gold in the basal conglomerates. QPC hosted gold mineralisation is reported in Kartikere, Devagondanahalli and Kalasapura areas. Disseminated copper mineralisation in grey massive quartzites representing Bababudan group are also reported from Kalasapura area by many workers in the past.

8.2.0 Ancient mining activity, and evidence of smelting for copper ore in the form of slag dumps and clay crucibles seen in the vicinity of Devagondanahalli and Kabbigaragalli of Chikkamagaluru District of Karnataka

8.3.0 Quartz pebble conglomerate (QPC) of Bababudan group is oligomitic type consists of quartz pebbles in Kalasapura area are very similar to lithologic characters and stratigraphic setting to the WitwatersRand conglomerates of South Arfica, Jacobina of Brazil and Terwakan of Ghana, all of which are known for economic gold mineralisation (Boyle, 1979). The conglomerates of WitwatersRand, South Africa host the world's largest gold deposits.

8.4.0 In Kartikere and west of Devagondanahalli, the QPC horizon containing pyrite and fuchsite mica is invariably auriferous, the gold value ranges from 0.1 g/t to 0.84 g/t. (Mukherjee, 1990). Sulphide bearing QPC is 1 to 2m wide and the overall thickness of QPC ranges from 10 to 20m. Panning of some samples showed rare fine gold specks. (Mukherjee, 1990).

8.5.0 Bhushan, et.al (2010) reported that Bababudan group of QPC contains detrital pyrite and uraninite, and resembles the well-known uranium and gold bearing conglomerates of the Witswaterand Basin of South Africa. Two samples of the basal conglomerates and quartzite analysed yielded gold values of 0.37 and 1.67 ppm. (source: Journal Geological Society of India, Vol.75 Jun-2010)

8.6.0 Visawanatha of GSI (F.S.1972-73) carried out exploratory drilling in 9 boreholes (885.25m) in the Kalasapura area (0.33 sq.km) and revealed copper mineralisation in grey massive quartzites/quartz reef over a continuous strike length of 240m and 420m in the western and the eastern block respectively. Mineralized quartzite/quartz reef proved over a strike length of 240 m, with an exposed outcrop width of 60 m and an average thickness of 3.7m. The grade of copper varies from

0.13 % to 0.43%. A possible resource of 0.16 m.t. with an average grade of 0.25% Cu was estimated.

8.7.0 Viswanatha (1973) recommended that “The attractive feature of the occurrence is the absence of overburden and favourable topography with the mineralised beds dipping parallel to the slope. If the occurrence proved promising, the prospect appears attractive for cheap cost of exploitation”.

8.8.0 It is pertinent to mention that, the total GSI estimated resource of 0.16 m.t. with 0.25% Cu in previously explored GSI block area (0.30 sq.km) may not be sufficient for mining point of view. Hence, there is a need to explore possibilities for further continuity of mineralisation in the adjoining areas for enhancing the resource position of the prospect. Hence, further integrated exploration at G4 stage is required in the extension areas of the previously explored GSI block for further augmentation of copper ore resources in the area.

8.9.0 During the formulation of the project, MECL geologist visited the site and verified the incidence of QPC horizon with some alteration patterns and sulphide bearing grey quartzites in the Kalasapura area. Out of total 7 nos. bedrock samples collected from the area, 2 nos. sulphide bearing Quartzite samples indicated Cu values 0.338% and 0.444% Cu.

8.10.0 Considering similar geological setup with known deposits, available literature and previous worker’s recommendations, the area hold potential to explore in detail with holistic exploration approach. Hence, integrated exploration at G4 stage in the larger area to be taken up to ascertain the exact potentiality of the prospect for gold and copper.

8.11.0 In light of the above, the present exploration program at G4 stage has been formulated to locate potential auriferous zones hosted by QPC and also to establish further continuity of copper mineralisation with the adjoining previously explored GSI Block in the proposed Kalasapura Block area.

8.12.0 The positive outcome of the present exploration would be helpful and facilitate the Govt. for auctioning of the block.

9.0.0 References:

1 Viswanatha (1973) - Exploratory Drilling for Copper ore in Kalasapura, Chikkmagaluru District, Karnataka (Geological Survey of India)..

2. K. R. Raghu Nandan, B. K. Dhruva Rao and M.L. Singhal, Exploration for Copper, Lead and Zinc ores in India, GSI Bulletin No.47, 1981

2. District Resource Map –Chikkamagaluru District, Karnataka, Geological Survey of India (2005)

4. Mukherjee (1990), Preliminary Examination of Oligomict Conglomerate for Gold in parts of Southern Karnataka (Geological survey of India).

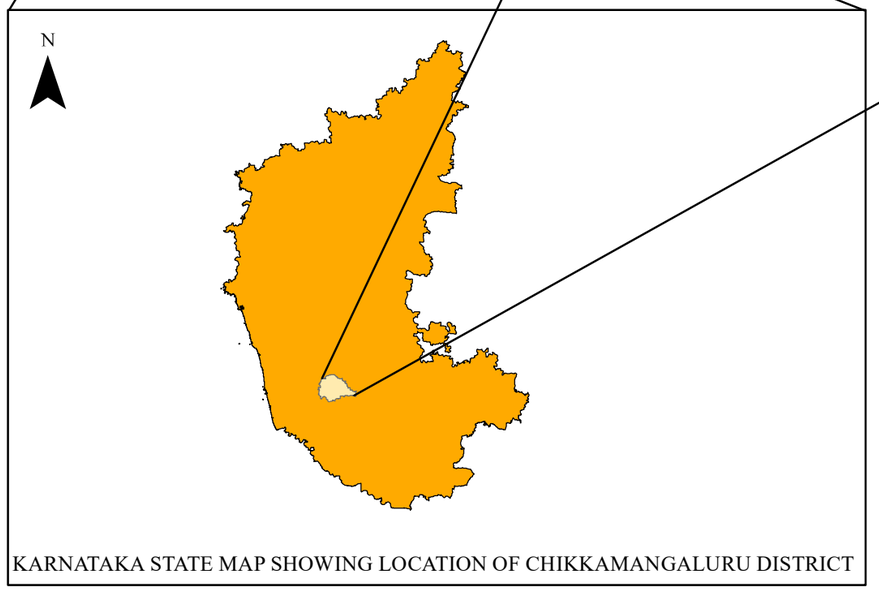
5. Bhushan et.al (2010) Geochemistry of clastic sediments from Sargur supracrustals and Bababudan group, Karnataka: Implications on Archean Proterozoic boundary (Journal Geological society of India Vo. 75, June 2010 pp 829-840)

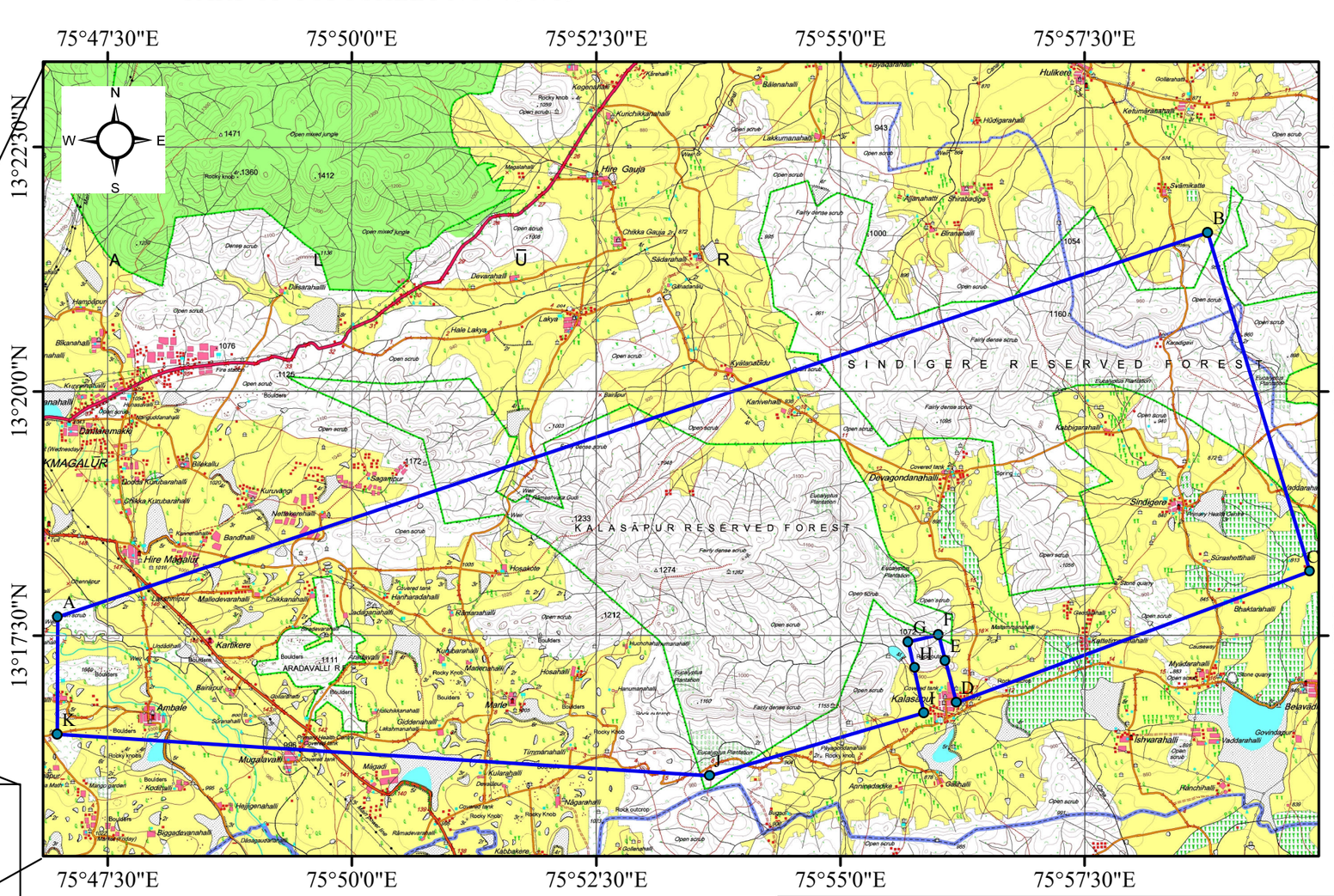
List of Plates:

Sl. No.	Description	Plate No.
1	Location Map of Proposed Kalasapura Copper Block (G-4) Chikkamagaluru District, Karnataka	Plate No. I
2	Regional Geology Map of Proposed Kalasapura Block (G-4), Chikkamagaluru District, Karnataka	Plate No. II
3	Block Geology Map of Proposed Kalasapura Copper Block (G-4), Chikkamagaluru District, Karnataka	Plate No. III

LOCATION MAP OF PROPOSED KALASAPURA BLOCK (G-4) (AREA-129 SQ KM)
DISTRICT-CHIKKAMAGALURU, KARNATAKA

PART OF TOPOSHEET NO. 48O/15





Legend

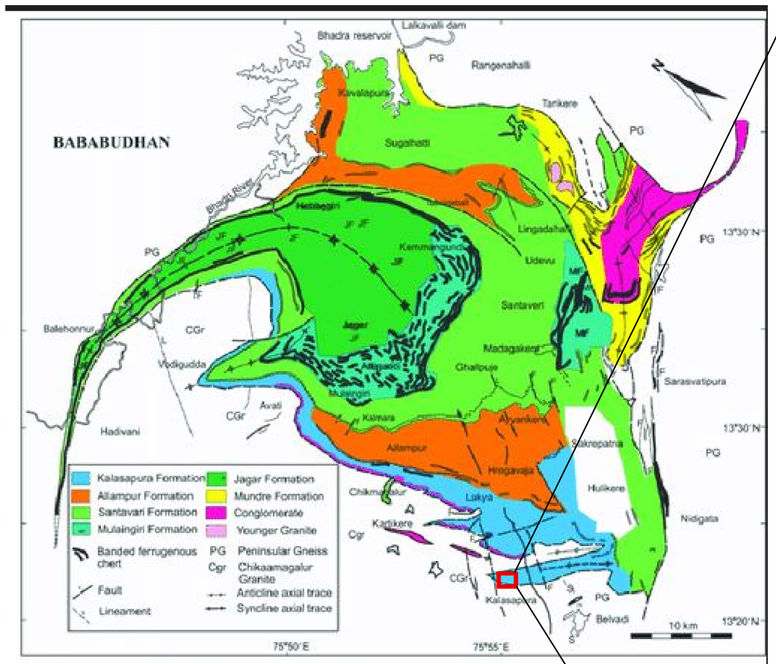
- PROPOSED KALASAPURA BLOCK BOUNDARY (G-4)
- PROPOSED KALASAPURA BLOCK CORNER POINTS

BLOCK BOUNDARY CORNER POINTS OF PROPOSED KALSAPURA BLOCK (G-4)

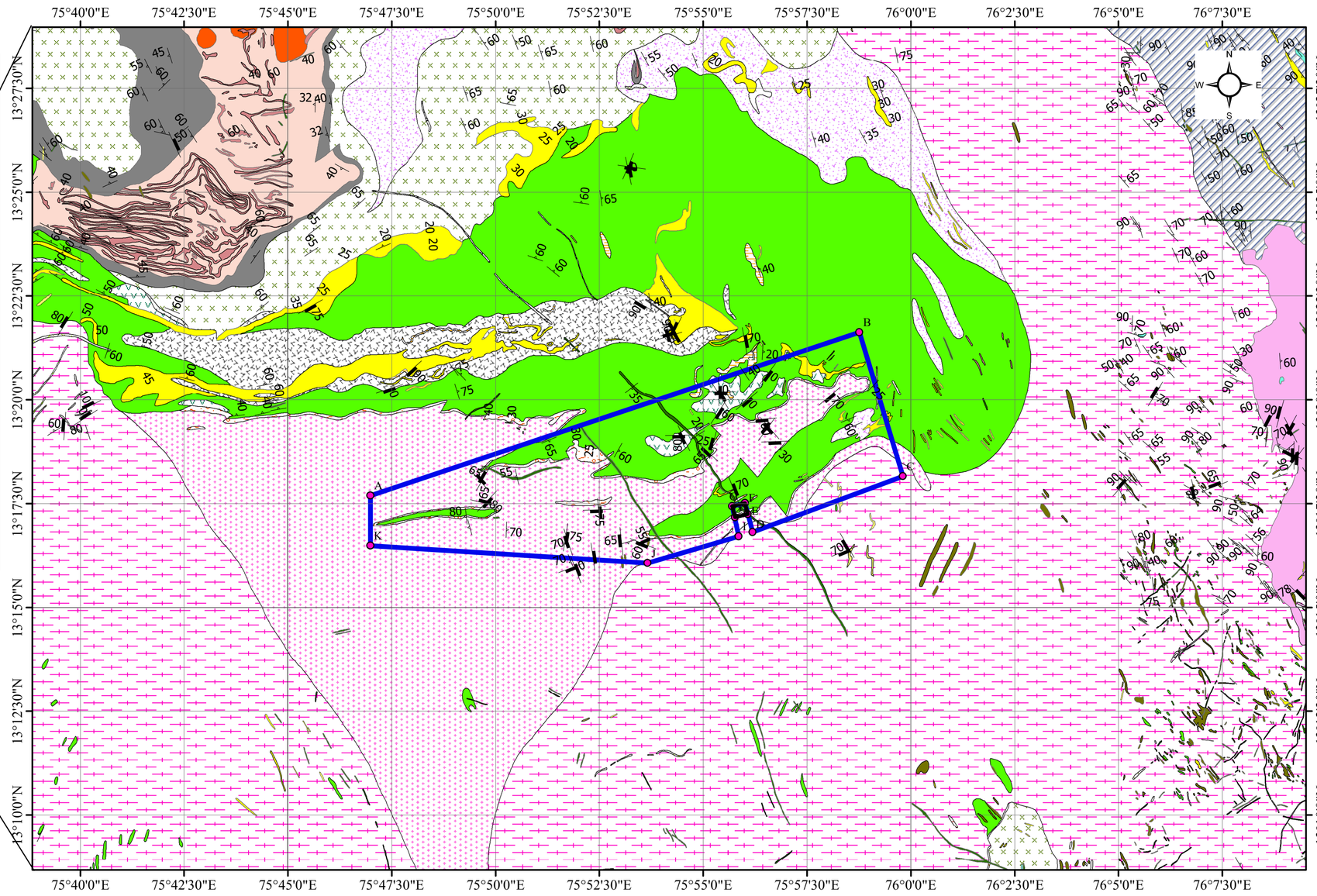
CORNER POINTS	LATITUDE N	LONGITUDE E
A	13°17'41.54"	75°46'59.31"
B	13°21'37.37"	75°58'45.76"
C	13°18'09.54"	75°59'48.48"
D	13°16'48.84"	75°56'11.31"
E	13°17'14.66"	75°56'04.46"
F	13°17'30.65"	75°56'00.39"
G	13°17'26.10"	75°55'41.77"
H	13°17'10.10"	75°55'45.79"
I	13°16'42.53"	75°55'51.43"
J	13°16'03.97"	75°53'39.69"
K	13°16'29.29"	75°46'59.11"

PLATE-I

REGIONAL GEOLOGICAL MAP OF PROPOSED KALASAPURA BLOCK (G-4)
DISTRICT- CHIKKAMANGALURU, KARNATAKA



GEOLOGICAL MAP OF BABABUDAN SCHIST BELT SHOWING
THE LOCATION OF PROPOSED KALASAPURA-KARTIKERA BLOCK (G-4)



1:150,000

0 2 4 8 12 16 Kilometers

LEGEND

MAP SOURCE: BHUKOSH, GSI

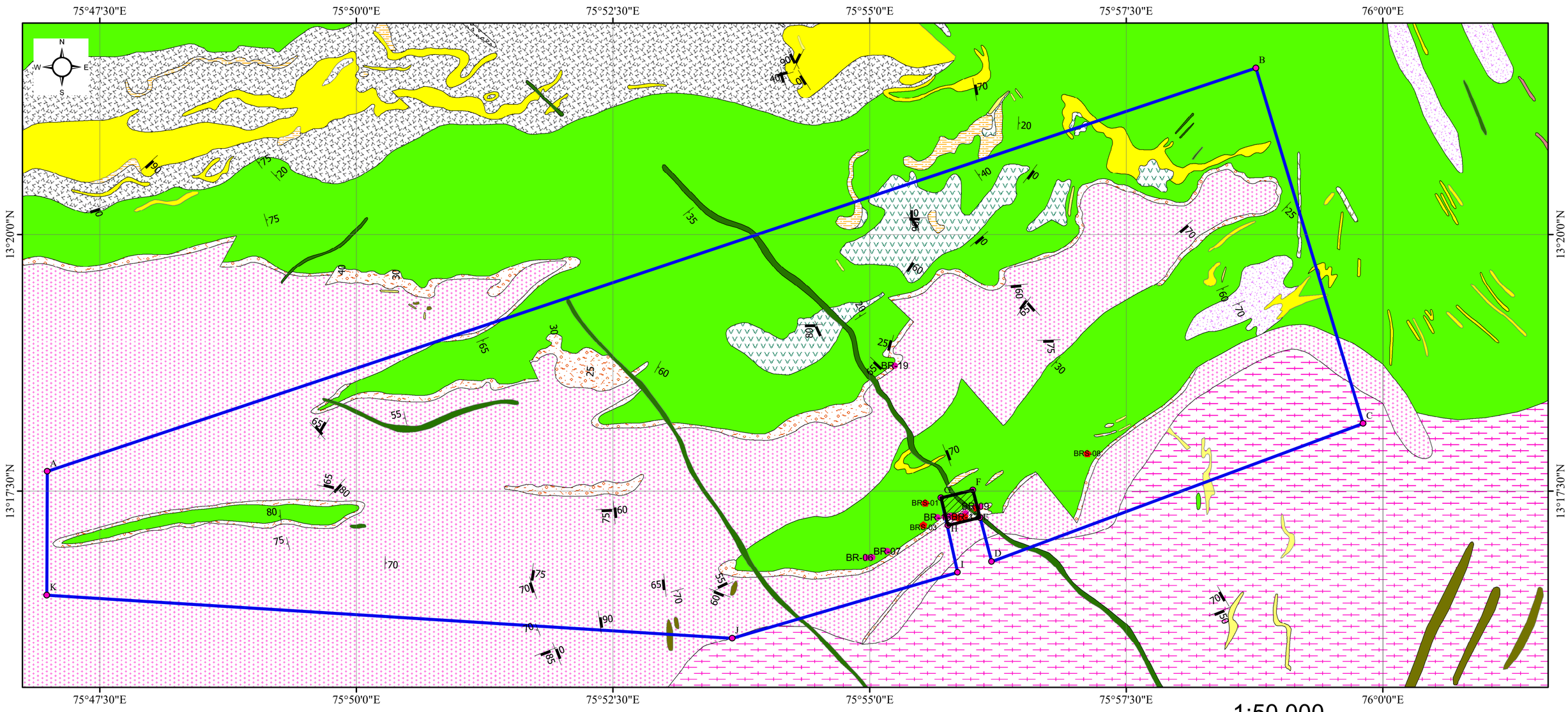
- GSI block boundary

ORIENTED STRUCTURAL PLANE

- CLEAVAGE/FOLIATION/SCHISTOSITY (S1)
- JOINT
- PROPOSED KALASAPURA BLOCK CORNER POINTS
- PROPOSED KALASAPURA BLOCK BOUNDARY (G-4)
- AMPHIBOLITE
- BANDED IRON FORMATION
- BANDED MAGNETITE QUARTZITE
- CARBONACEOUS PHYLLITE
- CHLORITE SCHIST
- CONGLOMERATE
- DIORITE PORPHYRY
- DOLERITE
- EPIDIORITE
- FERRUGINOUS PHYLLITE
- FUCHSITE QUARTZITE
- GABBRO
- GRANITE GNEISS
- GRANITOID
- LATERITE
- META-BASALT
- META-DOLERITE
- META-GABBRO
- META-PYROXENITE
- META-RHYOLITE
- META-ULTRAMAFITE
- MIGMATITE GNEISS
- OLIGOMICTIC CONGLOMERATE
- PINK GRANITE
- PORPHYRITIC GRANITE
- PYROXENITE
- QUARTZ VEIN/REEF
- QUARTZ-GARNET-SERICITE SCHIST
- QUARTZITE
- SERICITE SCHIST

PLATE-II

BLOCK GEOLOGICAL MAP OF PROPOSED KALASAPURA BLOCK (G-4)
DISTRICT- CHIKKAMANGALURU, KARNATAKA



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0 0.5 1 2 3 4 Kilometers

MAP SOURCE: BHUKOSH, GSI

LEGEND

- GSI block boundary
- SAMPLE LOCATION POINTS
- SAMPLE LOCATION POINTS

ORIENTED STRUCTURAL PLANE

- CLEAVAGE/FOLIATION/SCHISTOSITY (S1)
- JOINT
- PROPOSED KALASAPURA BLOCK CORNER POINTS
- PROPOSED KALASAPURA BLOCK BOUNDARY (G-4)
- AMPHIBOLITE
- BANDED MAGNETITE QUARTZITE
- CONGLOMERATE
- DIORITE PORPHYRY
- DOLERITE
- FUCHSITE QUARTZITE
- GABBRO
- GRANITE GNEISS
- GRANITOID
- META-GABBRO
- META-PYROXENITE
- META-RHYOLITE
- META-ULTRAMAFITE
- QUARTZ VEIN/REEF
- QUARTZ-GARNET-SERICITE SCHIST
- QUARTZITE

SURFACE SAMPLE DETAILS

SL No	Sample No	Latitude	Longtitude	Lithology	Cu %
1	BR-01	13.29	75.93	Amphibolite	0.0008
2	BR-03	13.29	75.93	QPC	0.0024
3	BR-04	13.29	75.93	Quartzite with sulphide dess.	0.0003
4	**BR-05**	**13.29**	**75.93**	**Quartzite with sulphide dess.(Chalcopyrite, Pyrite)**	**0.3384**
5	BR-06	13.29	75.93	Quartzite with sulphide	0.0004
6	BR-08	13.30	75.95	Meta basalt	0.0846
7	**BR-09**	**13.29**	**75.93**	**Quartzite with sulphide dess.(Chalcopyrite, Pyrite)**	**0.4441**

PLATE-III

Table No.VII.B

Cost Estimates for Reconnaissance Survey (G4) for QPC hosted Gold Mineralisation & Copper in Kalasapura block, District: Chikkamagaluru. Karnataka. [Block area- 129.00 sq. km; Nos. of Borehole- 5; Borehole depth range- upto 100m; Schedule timeline- 14 months]							
S. No.	Item of Work	Unit	Rates as per NMET SoC 2020-21		Estimated Cost of the Proposal		Remarks
			SoC-Item -Sl No.	Rates as per SoC	Qty.	Total Amount (Rs)	
A	**Geological Mapping Other Geological Work & Surveying**						
	Geological mapping, (1:12,500 scale) & Trenching , drilling work	129 sq.km					
i	a. Charges for Geologist per day (Field) for geological mapping & trenching work, drilling work	day	1.2	11,000	180	19,80,000	
ii	b. Labours Charges; Base rate	day	5.7	504	360	1,81,440	Amount will be reimburse as per the notified rates for unskilled labor by the Central Labour Commissioner or respective State Govt. whichever is higher
	c. Charges for Geologist per day (HQ)	day	1.3	9,000	60	5,40,000	
	d. Charges for one Sampler per day (1 Party)	one sampler per day	1.5.2	5,100	120	612000	
	e. Labours (4 Nos)	day	5.7	504	480	241920	Amount will be reimburse as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higher
	Sub Total- A					**35,55,360**	
B	**Ground Geophysical Survey**						
1	IP. Induced Polarization (I.P) cum Resistivity S.P and Magnetic	Per Line Km	3.4b	14,48,693	3	43,46,079	(8 -10 line Km=14,48,693/-) (30LKm cummulative)
3	Geophysicist party days (Field)	per day	3.18	11,000	60	6,60,000	
4	c. Labours Charges	day	5.7	504	120	60480	Amount will be reimburse as per the notified rates for unskilled labor by the Central Labour Commissioner or respective State Govt. whichever is higher
5	Geophysicist party days (HQ)	per day	3.18	9,000	30	2,70,000	
	Sub Total- B					**53,36,559**	
C	**Survey work for Block boundary demarcation, geophysical survey layout & Trenching work**						
a	DGPS Survey for BH fixation & RL determination	Per Point of observation	1.6.2	19,200	5	96000	5 Bhs
b	Charges of Surveyor (1 party) for Geophysical survey layout work & Block boundary demarcation	one surveyor per day	1.6.1a	8,300	45	373500	
c	Labours Charges for survey work;	day	5.7	504	180	90720	Amount will be reimburse as per the notified rates for unskilled labor by the Central Labour Commissioner or respective State Govt. whichever is higher
	Sub-Total C					**5,60,220**	
D	**Trenching/Pitting**						
	a) Excavation of Trenches	per cu.m	2.1.1.	3,330	200	**666000**	
E	**DRILLING**						
1	Drilling up to 300m (Hard Rock)	m	2.2.1.4a	11,500	500	57,50,000	
2	Borehole deviation Survey by Multishot Camera	m	2.2.6	330	500	1,65,000	
3	Land / Crop Compansation (in case the BH falls in agricultural Land)	per BH	5.6	20,000	5	1,00,000	Amount will be reimburse as per actuals or max. Rs. 20000 per BH with certification from local authorities
4	Construction of concrete Pillar (12"x12"x30")	per borehole	2.2.7a	2,000	5	10,000	
5	Transportation of Drill Rig & Truck associated per drill (2 rigs)	Km	2.2.8	36	2,600	93,600	1300 km to & fro from Nagpur/ Rig
6	Monthly Accomodation Charges for drilling Camp (up to 2 Rigs)	month	2.2.9	50,000	3	1,50,000	
7	Drilling Camp Setting Cost	Nos	2.2.9a	2,50,000	1	2,50,000	
8	Drilling Camp Winding up Cost	Nos	2.2.9b	2,50,000	1	2,50,000	
9	Road Making (Flat Terrain)	Km	2.2.10a	22,020	5	1,10,100	Road Making will be considered as per the requirement and Road Making Charges will be reimbursed for max. 5 km.
10	Drill Core Preservation	per m	5.3	1,590	180	2,86,200	
	Sub Total E					**71,64,900**	
F	**Borehole Geophysical Logging**	5 Bhs of 350m each	3.12	622.25	500	**3,11,125**	Base Rate Rs.10, 88, 941/1750=622.25per m
G	**LABORATORY STUDIES**						
1	**Chemical Analysis**						
i)	**Geochemical Sampling-Surface samples (Bedrock /Soil/Stream sediment)**						
	a. Au by Fire Assay	Nos	4.1.5a	2,380	150	3,57,000	
	b. for Cu, Pb, Zn, Ni, Co, Te, Mo and Se	Nos	4.1.7a & b	3,511	150	5,26,650	AAS Method
ii)	**Surface Check samples (10% External)**						
	b) For Au (Gold) by Fire Assay	Nos	4.1.5a	2,380	15	35,700	
	a. for Cu, Pb, Zn, Ni, Co, Te, Mo and Se	Nos	4.1.7a & b	3,511	15	52,665	AAS Method

S. No.	Item of Work	Unit	Rates as per NMET SoC 2020-21		Estimated Cost of the Proposal		Remarks
			SoC-Item -Sl No.	Rates as per SoC	Qty.	Total Amount (Rs)	
iii)	**Trench & Check Samples from**						
	Trench samples						
	a) For Au (Gold) by Fire Assay	Nos	4.1.5a	2,380	150	3,57,000	
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v)	**BH Core samples**						
	a) For Au (Gold) by Fire Assay	Nos	4.1.5a	2,380	150	3,57,000	
	b). for Cu, Pb, Zn, Ni, Co, Te, Mo and Se	Nos	4.1.7a & b	3,511	150	5,26,650	AAS Method
vi)	**BH Core samples (10%External)**						
	a) For Au (Gold) by Fire Assay	Nos	4.1.5a	2,380	15	35,700	
	b). for Cu, Pb, Zn, Ni, Co, Te, Mo and Se	Nos	4.1.7a & b	3,511	15	52,665	AAS Method
vii)	**Composite Samples**						
	a. 34 Elements by ICPMS	Nos	4.1.14	7,731	10	77,310	
	a. For Au & Ag by fire assay	Nos	4.1.5a	4,760	10	47,600	
2	**Physical & Petrological Studies**						
i	Preparation of thin section	Nos	4.3.1	2,353	10	23,530	
ii	Study of thin section	Nos	4.3.4	4,232	10	42,320	
iii	Preparation of polish section	Nos	4.3.2	1,549	10	15,490	
iv	study of polished section	Nos	4.3.4	4,232	10	42,320	
v	Digital Photographs	Nos	4.3.7	280	10	2,800	
vi	Whole Rock Analysis	Nos	4.1.15a	4,200	10	42,000	
vii	Sp. Gravity	Nos	4.8.1	1,605	5	8,025	
						32,17,440	
H	**Total A to H**					**2,08,11,604**	
I	**Geological Report Preparation**	**5 Hard copies with a soft copy**	**5.2**	Exploration cost exceeding 150 lakh but less than 300 lakh: A Minimum of ₹7.5 lakh or 3% of the work whichever is more		**7,50,000**	Reimbursement will be made after submission of the final Geological Report in Hard Copies (5 Nos) and the soft copy to NMET.
J	**Peer review Charges**		**As per EC decision**			**30,000**	
K	**Preparation of Exploration Proposal (5 Hard copies with a soft copy)**	**5 Hard copies with a soft copy**	**5.1**	2% of the Cost or Rs. 5 Lakhs whichever is less		**4,16,232**	EA will be reimbursed after submission of 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.
L	**Total Estimated Cost without GST**					**2,20,07,836**	
M	**Provision for GST (18% of J)**					**39,61,410**	GST will be reimburse as per actual and as per notified prescribed rate
N	**Total Estimated Cost with GST**					**2,59,69,247**	
					or Say Rs. In Lakhs	**259.69**	
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 execusion of the project by NEA on its own, a Certifiate regarding non outsourcing of any component/project is required.						

Table-VII.C

Schedule timeline for Reconnaissance Survey (G4) for QPC hosted Gold & Copper in Kalasapura Block, District: Chikkamagaluru, Maharashtra.

S. No.			1	2	3	4	5	6	7	8		9	10	11	12	13	14
1	Camp Setting	**Months/Days**															
2	Geological Mapping & Sampling	**days**															
3	Geophysical survey	**L.km**															
4	Geophyscist party days (HQ) for data interpretation & Report	**Days**															
5	Pitting/Trenching	**cu.m**															
6	Surface Drilling (1 rigs)	**m**															
7	Survey Party days	**days**															
8	Geologst Man days	**days**															
9	Sampler Man days	**days**															
10	Camp Winding	**months**															
11	Laboratory Studies	**Nos.**															
12	Report Writing with Peer Review	**months**															

Review for Scout Drilling

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