MINERAL EXPLORATION PROJECT PROPOSAL
(MEPP)

FOR
G-4 LEVEL EXPLORATION IN

NAGAVANDA GOLD AND BASEMETAL BLOCK
(KIOCL_34_KA_NGBB),
DAVANGERE, HAVERI & SHIVAMOGGA (Dists), KARNATAKA.

Date of Submission: ...th January 2023

Submitted by:

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To:

The ADG & HOD and CHAIRMAN,
TCC-NMET, Southern Region,
Geological Survey of India,
Bandlaguda, GSI Complex,
Hyderabad, Telangana- 500068

CONTENTS

LIST OF ANNEXURES

LIST OF PLATES

I. SUMMARY

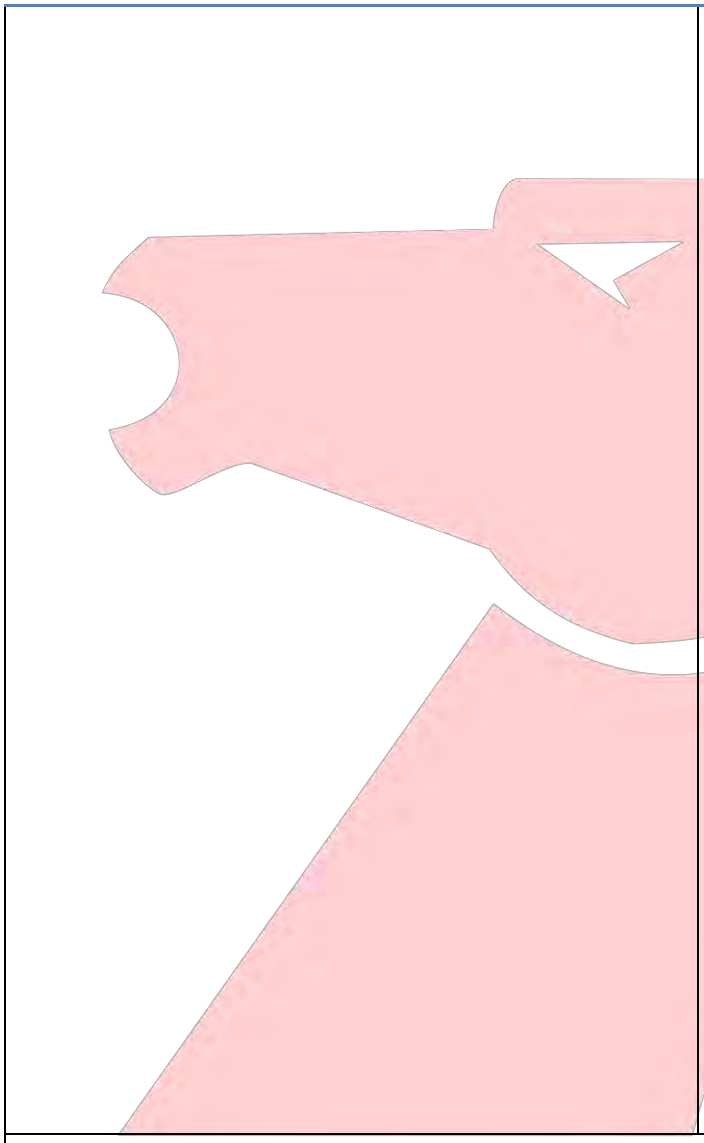
BLOCK ID	KIOCL_34_KA_NGBB
TITLE OF THE PROJECT	Preliminary Exploration for Poly-metallic Mineralisation (Au, Cu, Ni, Co) in Dharwar – Shimoga Schist belt around Nagavanda area, Dhavangere, Haveri and Shimoga Districts, Karnataka (G4 Stage)
CURRENT EXPLORATION AGENCY	KIOCL LIMITED, Bangalore; ***Notified Exploration Agency***
STATUS OF VARIOUS CLEARANCES (LOCAL/ FOREST / OTHERS)	➢ UNDER THE PROVISIONS OF MINES AND MINERALS (DEVELOPMENT AND REGULATION) ACT, 1957 AND MINERALS (EVIDENCE OF CONTENTS) RULES 2015 AND MINERAL CONCESSION RULES, 1960. ➢ DEPRTMENT OF MINING AND GEOLOGY, GOVERNMENT OF KARNATAKA PERMITTED KIOCL LIMITED TO PREPARE AND SUBMIT THE MINERAL EXPLORATION PROJECT PROPOSAL FOR G4 LEVEL OF EXPLORATION IN THE BLOCK (UNDER NMET FUNDING) ON BEHALF OF STATE GOVERNMENT VIDE LETTER NO.DMG-17013/6/2018/2021-22 DTD.21st JUNE 2021 ➢ COPY OF THE CONSENT LETTER RECEIVED FROM DEPT OF MINES AND GEOLOGY, GOVT. OF KARNATAKA IS ENCLOSED @ ANNEXURE 06. ➢ **VIDE LETTER DTD 19TH JAN 2022, MINERAL EXPLORATION PROJECT PROPOSAL FOR UNDER TAKING G4 LEVEL OF MINERAL EXPLORATION WORKS OVER AN EXTNT OF 177.63 SQKM WAS SUBMITTED TO TCC-NMET.**

	➢ **DURING 38TH MEETING OF TCC-NMET, PROPOSAL WAS DISCUSSED AND TCC-NMET RECOMMENDED TO MODIFY THE PROPOSAL TO G3 STAGE OF INVESTIGATION CONSIDERING THE WORKS CARRIED OUT IN THE PROPOSED BLOCK.** ➢ **CONSIDERING THE WORKS CARRIED OUT BY GSI, REVISED BLOCK WITH AN EXTENT OF 63.32 SQKM IS PROPOSED FOR G4 LEVEL OF INVESTIGATION.** ➢ **PREVIOUS WORKS CARRIED OUT BY GSI AND DMG, GOK WERE AIMED FOR ESTABLISHMENT OF BIF ZONES AND WORKS WERE RESTRICTED ONLY FOR SURFACE INVESTIGATION. NO AUTHENTIC DATA ON SUBSURFACE MINERALIZATION OF CU OR AU ARE AVAILABLE IN THE GR'S OF COMPLETED WORKS.** **HOWEVER, DURING PFI (PRELIMINARY FIELD INSPECTION) WORKS PROFUSE MALACHITE STRAINS IN CARBONECOUS SHALE ARE OBSERVED IN THE OLD DUMPS. (REF FIG 2 and 3)** **IN ORDER TO ASCERTAIN THE POTENTIALITY OF THE AREA FOR COPPER AND GOLD MINERALIZATION, PITTING, TRENCHING ALONG WITH SCOUT DRILLING IS PROPOSED IN THE REVISED BLOCK.**
PREVIOUS EXPLORATION AGENCY	GSI and DMG, GoK
GEOLOGICAL REPORTS	➢ RESHMA K, PARADKAR TRIGUN TRIVIKRAM (FS2016-17); CODE NO.GCM/SR/KG/2016/ 044: INTERIM REPORT ON GEOCHEMICAL MAPPING IN TOPOSHEET NO 48N/7 AND PARTS OF C3 QUADRANT OF 48N/12 IN SHIMOGA,

	HAVERI AND DAVANGERE DISTRICTS, KARNATAKA ➢ NEETHU T R, (F S 2016-17); Code No. GCM/ SR/ KG/ 2016/048 INTERIM REPORT ON GEOCHEMICAL MAPPING IN TOPOSHEET NO. 48N/11 AND PARTS OF A1 QUADRANT OF 57K/8 IN HAVERI, DAVANAGERE, SHIMOGA AND KOLAR DISTRICTS, KARNATAKA ➢ VASUDEV V N, VENUGOPAL K, SHANKAR B N, SONNE GOWDA N C (1994); No.218. GEOLOGY OF GRAPHITE-SULPHIDE MINERALIZED TRACK NEAR NAGAVANDA HONNALI SCHIST BELT. HIREKERUR TALUK, DHARWAR DISTRICT, KARNATAKA.
MINERALS TO BE EXPLORED	Gold, Copper and associated Minerals 34 elemental analysis by ICPOES (Sequential Technique)
MINERAL BELT	Dharwar-Shimoga Schist Belt, in parts of Haveri, Dhavangere and Shimoga Districts, Karnataka
TIME SCHEDULE	12 months
OBJECTIVE	➢ To delineate the copper hosted carbonaceous schists / Phyllites and other associated rocks. ➢ To delineate the gold bearing Banded Iron formations. ➢ To assess the mineral potentiality of the area. ➢ Considering the potentiality of the area a G4 level of investigation will be taken up with scout boreholes. ➢ On locating potential areas based on G-4 level Mineral Exploration works, further, exploration will be seamlessly continued as G3 level after the review and recommendations of the TCC, NMET.
Work Components	➢ To carry out Large Scale Geological Mapping on 1 : 12,500 scale. ➢ Stream sediment sampling for Gold, ➢ Bedrock Geochemical Sampling, for AU, Cu etc., ➢ Pitting, trenching and sampling, for AU, Cu etc.,

	➢ Chemical analysis of stream, bedrock, groove/ channel sample, ➢ Petro-minerographic Studies. ➢ Scout drilling of 500m
NAME/NUMBER OF GEOSCIENTISTS	3 Geologists KIOCL LIMITED, BANGALORE
EXPECTED FIELD DAYS (GEOLOGY/GEOPHYSICS/ SURVEY / OTHERS)	LARGE SCALE GEOLOGICAL MAPPING AND DRILLING WORKS ➢ Geologist Party Days : 185 days - 150 days (FIELD) - 30 days (HQ) - 05 days (HQ) for Aerogeophysical data interpretation works. ➢ Survey Party Days : 65 days - 05 days : Fixing of BH points - 30 days : Forest Clearance works - Sampler party days : 201 days
CO-ORDINATES OF THE BLOCK BOUNDARY POINTS	ANNEXURE 05
VILLAGES	Nagavanda Gangayikoppa, Anaji, Guddadamadapura, Medur & Tadakanahalli.
TALUKA	Davangere, Honali, Hirekerur, Shikaripura
DISTRICT	Haveri, Davangere, Shivamogga.
STATE	Karnataka
AREA	
BLOCK AREA	NAGAVANDA GOLD AND BASEMETAL BLOCK, (KIOCL_34_KA_NGBB) : 63.32sqkm
FOREST AREA	RESERVE FOREST: 25.00sqkm (KAGINAHALLI & MADENAHALLI RF)
GOVERNMENT LAND	-
PRIVATE LAND	38.32sqkm
ACCESSIBILTY	
NEAREST RAIL HEAD	HARIHARA
ROAD	➢ THE STUDY AREA CAN BE REACHED THROUGH NATIONAL HIGHWAY NO 04 UP TO HARIHAR AND FURTHER THROUGH STATE HIGHWAY NO 57. THE AREA CAN ALSO BE REACHED THROUGH NATIONAL HIGHWAY NO. 69. ➢ INTERIOR PART OF THE AREA CAN BE ACCESSED BY METAL AND MUD ROADS.
AIRPORT	NEAREST AIRPORT TO THE BLOCK – HUBLI., @150km
HYDROGRAPHY	

LOCAL SURFACE DRIANAGE PATTERN CHANNELS / RIVERS / STREAMS	RADIAL PATTERN DRAINAGE. TANAGA HALLA, CHIKKA-HAGARI, ANAJI LAKE
CLIMATE	
MEAN ANNUAL RAINFALL	769mm
TEMPERATURE	WINTER: Around 19.1°C SUMMER: Around 32.0°C
TOPOGRAPHY	
TOPOSHEET NO	48N/07 and 48N/11 BLOCK MARKED ON SoI TOPOSHEET (PLATE-02)
MORPHOLOGY OF THE AREA	The area is represented by undulating topography with dissected structural hills. It is prominent in the north-western and southern parts of the area. The other area shows pediments and pedeplains. The minimum elevation is 608m while the maximum is 861m.
AVAILABILITY OF THE BASELINE GEOSCIENCE DATA	
GEOLOGICAL MAP (1:50 k)	Available
GEOCHEMICAL MAP	Available
GEOPHYSICAL MAP (Aero/ Ground, Regional/ Local scale)	Aeromagnetic Map under NRSA in 1:50,000 scale is available
PREVIOUS WORK:	➢ RESHMA K, PARADKAR TRIGUN TRIVIKRAM (F S 2016-17) • The Andesite rock contains sulphides in the form of disseminations. Pyrite cubes occurs as small segregated patches within the andesite along with the Chalcopyrite. • The two meta ultramafic bodies are around 3.6 km towards northeast from the high Cr value. Out of 8 composite Sample 5 samples (No. 032- **715.50 ppm**, No. 046- **629.90 ppm**, No. 061- **536.60 ppm**, No. 075- **732.80 ppm**, No. 089-**519.80 ppm**, No. 104- **544.60 ppm**). The area needs to be studied in detail for establishing any zone of Cr. • Contributing factor for concentration of V in composite no.075, 089, 090, 104, 105 and 106 may be andesite, ultramafic bands and ferruginous phyllite. Possible anomalous nature of V concentration needs to be confirmed by detail study. ➢ NEETHU T R, (F S 2016-17);



- Occurrence of associated Ni and Cr in ultramafic bodies (exposed in central-western part of the mapped area) is a good indicator of suitable geological setup for enrichment of PGE in ultramafic bodies. Though values of Ni (13 ppm to 203 ppm) and Cr (25 ppm to 729 ppm) are not very high but considering their association with ultramafic rock, these ultramafic bodies should be mapped in detail with sampling in close intervals.

➢ Subramani N; Basavaraja K & Sampath Rajan N (2000)

➢ Two mineralization zones have been reported at Kumaranahalli and Haraganahalli, both vein and disseminated type of sulphidic mineralization is noticed in chert bands. From the samples collected, **0.2 to 0.1 g/t of gold values** have been reported.

➢ VASUDEV V N, VENUGOPAL K, (F S1983-84);

- 6 samples of Gossan collected from 6 different trenches gave copper values for **0.06 to 0.51% Cu** and samples of malachite bearing chert carbonaceous shale gave values between **0.64 to 12.80% Cu**. The geological set up of Nagavand area is ideal for investigating hidden sulphide deposits and also for gold- mineralisation.
- Considering the present demand of poly metals, Nagavanda block warrants for detailed investigation.

PRELIMINARY FIELD INSPECTION BY KIOCL:

Technical Team of KIOCL visited the various parts around Nagavanda Gold and Base metal Block on 14th to 17th September 2021 and 08th to 13th Jan 2023 to study the site conditions.

Observations:

- Vegetative/ Soil cover observed is black-brown soil and agricultural activities are prevalent in the area.
- Lithologies Observed:
  - ➢ **BIF:** The lithounit (POI 18) is pale brown in colour, bedded, fine grained BIF with alternate bands of Chert and Hematite noticed. The chert bands are thicker than the iron ore bands.
  - ➢ **Carbonaceous Shale**:

- ❖ Carbonaceous shale band with an approx. dimension of 200m X 20 m is observed in between BIF and Phyllite bands. 2nos of Old workings and 1 no of dump are also observed in the carbonaceous shale zone.
- ❖ Carbonaceous shale rock on surface exhibits dark grey to black in colour, fine grained very soft, friable, and finely laminated. Carbonaceous shale can be easily removable in to thin layers.
- ❖ Structurally it trends along E-W direction and dipping 55^0 towards Northerly.
- ❖ Carbonaceous shale rock samples collected from the dumped material situated near the old working exhibiting Malachite strains.

- **Quartz porphyry:** This lithounit (POI 271) is greyish to whitish grey in colour, phaneric, has megascopic crystals of quartz with a fine, aphanetic micro-crystalline ground-mass. In the hand specimen, the quartz appears as small rounded, clear, greyish, with their grain boundaries corroded or resorbed.
- **Andesite**: The lithounit (POI 258) is grey to earthy colour, fine to medium grained, presence of feldspar & pyroxene observed. This rock contains sulphides in the form of disseminated and well-developed cubic crystals of pyrite within the quartz vein (50-70mm width) are traversed within andesite.
- **Meta-Ultramafic:** The lithounit (POI 4A) is pale green in colour, foliated, fine grained Ultramafic rock.
- **Meta gabbro:** The lithounit (POI 15A) is light green in colour, fine to medium grained, Meta-gabbro.
- **Phyllite:** The lithounit (POI 16) is pale brown in colour, weathered, fine grained, foliated Phyllite with 1cm scale white quartz vein noticed.

Field Photographs

Figure 01: BIF Exposure in proposed Block

Figure 02 & 03 :Carbonaceous shale samples collected from dump area exhibiting Malachite strains

Figure 04: Old working pit of Carbonaceous Shale

Figure 05: Quartz porphyry

II. DETAILED DESCRIPTIONS

A. BLOCK SUMMARY

1. Physiography

The proposed area is falling in the Toposheet 48N/07 and 48N/11. Nagavanda ~~Gold~~ Polymetalic mineral Block of 63.32sqkm area is having an undulating topography with low dissected structural hills (prominent in the north western and southern parts) with pediments and pedeplains. The maximum elevation observed in the dissected structural hill is MSL 861, and varies upto MSL 752. The lowest elevation point will be MSL 608.

The drainage of the area has southerly and westerly. A few westerly flowing nalas join the Kumudvati River, which is a tributary of Tungabhadra River drain the study area. Northwest Southeast trending linear ridge acts as a water divide. The streams are ephemeral in nature. The area shows presence of large number of manmade reservoirs/lakes.

The study area lies 346 km NW of Bengaluru and is well connected by road and rail. The main towns in the area are Shikaripur and Hirekerur, Shimoga and Sagara are the nearest railway station from Shikarpur on Bengaluru – Sagar railway line. The study area can be reached through national highway no 4 up to Harihar and from Harihar via state highway no 57. (Plate-01).

2. Previous work

Bruce Foote (1886) was the first to carry out geological mapping in this region and observations were recorded in "The Geological features of the Southern Marhatta Country and adjacent districts", published in Mem. Geol. Surv. Ind. Vol. XII, 1876. He recognized the plutonic rocks as Achaeans and proposed the name Dharwars for the schistose rocks. K. C. Channabasappa (1951) carried out investigation for ochre near Masur village, Dharwar District and concluded that the ochre is of poor quality and limited quantity and has no commercial importance. J. Narayana Murthy (1961, 1966) systematically mapped parts of

Shikarpur taluk in Shimoga district and concluded that the quartz chlorite schist and micro granites form the principal rock units in the area.

Gururaja Rao T.P, Abhinaba Roy and S. K. Biswas (1976) systematically mapped the area on 1:63,360 scale and concluded that huge thickness of greywacke-shale succession resembles fly ash facies of sedimentation with reducing environment of deposition and also stated that the area has undergone two phases of deformation. First generation fold is more pronounced, shows regional tectonic trend and the second deformation is mild and right angle to the F1. Ziauddin et al (1978) reported pillowed agglomerates and other volcanic variants from the area. B.O Thakkar (1979) mapped the area to collect data on structure, geology and stratigraphy of the area. He concluded that the area has a sequence of volcano-sedimentary rock. N. Subramani, K. Basavaraja, N. Sampath Rajan (2000) systematically mapped the area on 1:25000 scale and established structure, tectonic setting and lithostratigraphy of the area. The schistose rocks of Dharwar–Shimoga Schist belt comprise the oldest rocks in the Shimoga Schist Belt. Achaean meta-sedimentary and Proterozoic sequences are main lithologies in areas under study and its vicinity. Geological sequences of these areas are systematically established and well classified. Dharwar Supergroup of rocks is mainly meta sedimentary intruded by contemporaneous or younger granitoids.

Dharwar Super group is further divided in older Bababudhan Group and younger Chitradurga Group. There are several schist belts in the craton, viz., Shimoga, Kolar, Hutti, Sandur etc., which are equivalent to the Chitradurga Group. Biotite gneiss of Peninsular Gneissic Complex-I forms the oldest rock unit in the study area. Thick soil cover is seen the northern part of the area and hence good exposures are scare. In the southern part of the area numerous continuous and discontinuous BIF bands trending E-W to NW-SE are seen associated with the metasedimentary rocks. Contact between these rock types are not clearly seen due to thick soil cover.

Table 01: Stratigraphic succession is based on the work carried by Gururaja Rao, T.; Abhinaba Roy & Biswas, S.K. (1976)

Lithology	Formation	Group	Supergroup	Age
Quartz vein	Acid intrusives	Younger intrusives		Palaeoproterozoic
Aplite				
Dolerite	Basic intrusives			
Gabbro				
Banded Iron Formation	Ranibennur	Shimoga Belt (=Chitradurga)	Dharwar	Archaean
Greywacke-Argillite				
Quartz porphyry	Medur			
Andesite				
Metabasalt				
Metaultramfic rock	Joldhal			
Metagabbro				
Banded Magnetite Quartzite				
Ferruginous phyllite				
Limestone	Jhandimatti			
Quartzite				
Chlorite Schist				
Epidote granite	Granitoids	Peninsular Gneiss - I	Peninsular Gneissic Complex	
Biotite Gneiss	Gneisses			

3. Geology of the Area

The areas falling in toposheet 48N/11 and 48 N/07 mainly comprises of Peninsular Gneissic complex-I and older granitoids of Archean age forming the basement, overlaid by Chitradurga Group of rocks of Dharwar Supergroup. Chitradurga Group of rocks is further divided into Jhandimatti, Joldhal, Medur and Ranibennur Formations, later intruded by younger intrusives such as dolerite dykes and quartz veins. Major part of the area is covered by argillites in this area.

Peninsular Gneissic Complex

Peninsular Gneissic complex – I is represented by Biotite gneiss and epidote granite in the southern and south western part of the area. The basement biotite gneiss is leucocratic, light grey to dark grey in colour, coarse grained and massive. Exposures are seen in the quarry sections and rolled boulders north of Somannana Mallapur. Megascopically, the rock comprises of orthoclase, plagioclase, quartz and mica (biotite) as accessory mineral. Banding of leucocratic and melanocratic portions were observed. Quartz veins of varying width ranging from 2.5 cm to 6 cm were observed. Sulphide stains were observed on the surface of biotite gneissic, north of Somannana Mallapur in the quarry cutting. Fresh cubes of pyrites of size ranging from 3mm to 6mm were also observed. Fresh specks of pyrite were also observed in the quartz veins near Somannana Mallapur.

In the south-western corner of the toposheet a small plug of epidote granite is observed. This epidote granite is younger to biotite gneiss. Good exposures were not seen due to thick soil cover and intensive cultivation.

Shimoga Schist Belt

PGC-I is uncomformably overlaid by the volcano-sedimentary rock sequences of Shimoga Schist Belt which is equivalent to Chitradurga Group of rocks. Shimoga Belt i.e., Chitradurga Group is divisible into Jhandimatti, Joldal, Medur and Ranibennur Formations of Archean age.

Jhandimatti Formation: Jhandimatti Formation forms the lower most unit overlying on epidote granite of PGC-I. It is represented by quartz-chlorite schist with interbedded quartzite and limestone. Outcrop of this Formation were seen at northern part of Madenahalli reserved forest, Kaginahalli, south of Chikka Gonigere and at Lambadi Tanda. The quartz chlorite schist of this group is fine to medium grained, foliated, metamorphosed and are having shades of grey to purplish in colour. Exposures of chlorite schist and quartzites are observed in the nalla cuttings and in flanks of hills near Nagavanda. Exposure of reported limestone were not seen

though exposure of dark grey coloured fine grained impure calcareous rock interbedded with greenish chlorite schist were observed at south of
Guddadamadapur. Calcareous nature was inferred on the basis of ridge and groove structures in the above-mentioned interbedded rock.

Jhodal Formation: Jhandamatti Formation is over lained by Joldhal Formation of Shimoga Schist Belt which mainly comprises of ferruginous phyllite, Banded magnetite quartzite, metagabbro and metaultramafites. Exposure of ferruginous phyllite were seen at east of Tadakanahalli, north of Guddadamadapur, south of Hosakatti, Maidur, south and west of Nagavandaa and Kamalapur. Metagabbro and metaultramafites are extensively weathered, greenish grey to rusty brown grey; medium to coarse grained and shows both concordat as well as discordant relationship with ferruginous phyllite.
Metagabbro was observed at south of Hosakatti, in vicinity of Hirekabbar and Chikkakabbar as sill in ferruginous phyllite. Metagabbros are predominantly composed of clinopyroxene, plagioclase, orthopyroxene, chlorite, biotite and big (5-6 mm) crystal of pyrite. Steatite bearing metaultramafites (talc-tremolite-schist) was observed at north of Hirekabbar.
Metaultramafites were also seen as sill at about 2-2.5km south of Mallapan Betta. BMQ interbedded with ferruginous phyllite were seen at south-east of Kaginahalli and Guddadamadapura.South of Govinahalu in 578 hill, tight isoclinals fold were observed in BIF. Banding/ alternate layers of quartizite and magnetite was observed. The thickness varies from 0.5 cm to 2.5 cm. The quartzite layers were thicker than magnetite layers.

Medur Formation: Joldhal Formation is over lained by brownish greyish to greenish, fine grained, hard, compact, foliated and chlorite, feldspar comprising metabasalt, fine to medium grained, light-coloured andesite and medium to fine grained, light coloured, foliated quartz porphyry of Medur Formation. Andesite, meta-quartz porphyry and metabasalt represent the metavolcanics or volcanics of Medur Formation. Metabasalt is exposed as southern flank of folded ridge running from south-west of Malebennur to north of Angaragatti. Andesite is exposed at north of Hosakatti and Tadakanahalli. Meta-quartz porphyry covers a significant

area of toposheet and is well exposed from Timlapur in south-east to north-west of Maidur as a folded sequence and east of Targanhalli. Meta-quartz porphyry has intrusions of young quartz veins, along as well as across the foliation. Minor faulting in quartz veins was also observed.

Ranibennur Formation: The upper most, Ranibennur Formation of this group is represented by Greywacke-argillite (based on old literature but as it was observed in field that rock is meta-greywacke and meta-argillite) rocks with thin bands of Banded Iron Formation belonging to Ranibennur Formation. Argillite/greywacke is coarse grained to medium grained rock with crude to well-developed foliations and is essentially composed of quartz, feldspar, chlorite and mostly contains pyrite. Argillite is fine grained, well foliated, greenish to greyish coloured rock and comprises tiny mineral grains of chlorite, quartz, pyrite and some unidentified minerals which was observed with aided eye. This formation covers around half of the total area of toposheet and exposures are mostly observable along the Tungabhadra River and some residual hillocks. BIF of Ranibennur Formation are deficient of iron rich layer and enriched in silica i.e., quartzite.

Younger Intrusives

The younger intrusives include both basic and acid intrusives. Almost all the rocks types have been intruded by dykes and veins. Very less exposure is seen due to intense cultivation in this area.

Gabbro: Dolerite dykes are associated with metagabbro and ferruginous phyllite of Joldhal Formation near Mallappana Beta trending almost E-W. The rock is green in color, coarse to medium grained, hard and compact. Another set of dykes are observed near north east of Kadur trending NW-SE.

4. Mineral Potentiality based on Geology and Ground Geochemistry:

Recommendations of earlier investigation works

4.1 VASUDEV V N, VENUGOPAL K, SHANKAR B N, SONNE GOWDA N C (1994); No.218. GEOLOGY OF GRAPHITE-SULPHIDE MINERALIZED TRACK NEAR NAGAVANDA HONNALI SCHIST BELT. HIREKERUR TALUK, DHARWAR DISTRICT, KARNATAKA.

- ✓ *Occurrence* of graphite schist was first reported from near Nagavanda, Hirekerur Taluk, Dharwar District by C Narasimha Murthy, DMG, Karnataka in 1961 (Administrative Report 1961-62). Four large pits and one deep trench were opened up in the area and 1,12,000 tons of Graphite shale containing 3.56 % fixed Carbon was estimated.
- ✓ Detailed Mapping of 0.75 sqkm during 1984-85 carried out by Vasudev VN et al, (Sulphide Scheme) in the southern parts of Nagavanda covering the graphite – bearing region earlier reported by C Narasimha Murthy.
- ✓ The carbonaceous phyllites-chert zone at south of Nagavanda is found overlying the major banded ferruginous quartzites close to Nagavanda decollement.

  The succession of rock units is as follows:
  - ➢ Meta andesites
  - ➢ Thinly layered banded ferruginous (possibly sulphidic)
  - ➢ Chert
  - ➢ Thinly bedded ferruginous (shale) schist
  - ➢ Pale grey to bedded carbonaceous (shale) schist
  - ➢ **Bedded black carbonaceous (graphitic shale) phyllitic schist**.

    This rock unit contains thin 10-20cm Gossanized sulphidic chert interbeds. This unit also carried vein quartz sub paralled to the schistosity and bedding.
- ✓ Detailed mapping works revealed the
  - ➢ Resulted in clear cut delineation of 'Gosson Zones' which are intercalated with carbonaceous shale beds.

- Sulphide mineralisation in cherts / quartz associated with bands of carbonaceous schists. Chalcopyrite, Pyrite and Malachite are seen at the contact chert and quartz layer.

✓ The carbonaceous band mapped is only 250m and the carbonaceous shale - iron formations- volcanic rock set up is known to be extended for more than 2km.

✓ 6 trenches were opened to understand the distribution and morphological features of the sulphides in Chert/ quartz.

- Trenching works revealed the existence of narrow zones of Gossanized sulphide Chert/ Quartz.
- 3 categories in 12 nos of samples indicated are collected from the trenches.

Category	Type of lithounits	% Cu
1	Sulphide quartz/ chert enveloped within carbonaceous schist.	1.8% to 2.3 %
2	Same set of samples as Category 1 but containing malachite constitutions samples of Gosssan.	0.64 to 12.8 %
3	Ferruginous Chert and Schists.	0.06% to 0.51%

✓ Association of Carbonaceous shist and sulphudic chert speak of the potentiality of the region for sulphide and Gold Mineralization.

✓ Samples were collected for assaying for gold and copper. However, assaying of gold could not be carried out for want of facilities. An interim report.

✓ ***RECOMMENDATIONS:*** *It is suggested that all the litho units in the region be sampled again for assaying for gold as* the *GEOLOGICAL SETTING IS MORE FAVOURABLE FOR LOCATING GOLD MINERALIZASTION.*

4.2 Gist of mineral potentiality based on previous works are provided below;

✓ Key points indicating mineral potentiality based on previous works of GSI and Dept. of Mines and Geology, Govt of Karnataka are tabulated below;

Sl	Authors	Mineral potentiality	Remarks	Distance from the Block boundary
1. Within the Block				
1.1	Sri.Vasudev VN et al, 1994, DMG, GoK	Cu : 0.06 to 12.8 %	➢ 1,20,000 tons of graphite shale containing 3.56% Carbon is estimated. ➢ Delineation of bedded black carbonaceous (graphitic shale) phyllitic schist containing thin 10-20cm Gossanized sulphudic chert interbed. ➢ Sulphide mineralization in cherts/ quartz associated with bands of carbonaceous shists. ➢ Chalcopyrite, Pyrite and Malachite are seen contact of Chert and quartz layer. ➢ Carbonaceous shale mapped is only 250m and the Iron formations- volcanic rock setup is known to be extended for more than 2 km.	-
2. Outside the Block (In Eastern direction)				
2.1	Sri. Subramani N et al,2000, GSI	Au: 0.1 to 0.2 gm/t	➢ 2 mineralization zones were reported at Harganahalli and Kumaranahalli ➢ Both vein and disseminated type of suphidic mineralization is noticed in chert bands. ➢ Sulphide rich zones are reported in BIF associated with acid volcanics. ➢ Preliminary sampling has indicated that the rock types are auriferous.	➢ Harganahalli : 2 km East of the Block ➢ Kumaranahalli : 12 km East of the Block
2.2	Smt. Priya et al, GSI, FSP:2019-20	Pb : 0.1 to 0.61 % Zn : 0.1 to 0.34 % (Band I & II)	➢ BIF bands of Chikkagonageri area shows encouraging occurrences of Pb and Zn apart from Fe and Mn. ➢ Band I and II, 12 samples are showing maximum values of Pb ranging from 0.10% to 0.61 % whereas Zn values range from 0.10% to 0.34%. ➢ Band III to VIII indicates moderate to high concentration of Mn.	➢ Chikkagonageri 4 kms East of the Block
3. Outside the Block (In Western direction)				
3.1	Reshma K,, NGCM, GSI, 2018	Cu : 50 ppm to 146.70 ppm,	➢ Higher values of Cu are observed in the central part of the area; in and around Varaha village	➢ Varaha : 10 kms West of the Block

- ✓ End Use Grade Classification of IBM -2015 indicates the following Threshold values for Copper.

  i) Ore with 1.85% Cu & above
  ii) Ore with 1.0% to 1.85% Cu
  iii) Ore with 0.5% to (-) 1.0% Cu
  iv) Ore with (-) 0.5% Cu

- ✓ Most of the samples collected from trenches during investigation works carried out by Sri. Vasudev V N et all have indicated the values higher than the Threshold values of IBM.
- ✓ Block marked on 1:50K data of GSI at Plate 03.

5. Scope for proposed Exploration:

To assess the mineralization of gold and base metals in the proposed area by detailed surface sampling and drilling few scout borehole to ascertain the presence of Mineralised zone / zones in the area. If, the scout boreholes are positive with cu mineralisation having sufficient grade, thickness and continuing for considerable strike length. In such a situation a proposal will be put up to the TCC, NMET for seamlessly upgrading to G3/G2 level of Mineral Exploration.

Justification :

i) The area seems to be potential for the exploration of Gold and Base metals
ii) Though the surface samples show Cu values range from 0.51% to 2.3%, however, one sample analysing 12.8% cu is not taken into account, considering this may a point anomaly.
iii) DMG Karnataka drilled boreholes in the area, the data (summarised core litholog, mineralised zones, core sampling, and analytical data) is not available neither in the office of the DMG nor with the authors.
iv) During the pre-field visit, the carbonaceous shale dumps show profuse malachite stains this indicates the presence of sub-surface mineralisation. Hence, needs to be probed by drilling few scout boreholes to ascertain the sub-surface mineralisation and its further extensions, if any in the area.
v) The decision of the TCC to mount a G3 stage may kindly be relooked into considering the above.
vi) Therefore, it is opined that preliminary exploration (G4) stage with 1: 12,500 scale mapping covering an area of 64 sq.km area with 5 scout boreholes of 500m to be

drilled in the area to find out the copper mineralisation at depth, if exists its extension to be traced.

6. Recommendations of G4 level Mineral Exploration Reports:

No G4 works are carried out for Gold and Basemetal in the area.

7. Objectives:

a. To carryout Large Scale Geological Mapping in 1:12,500 scale.

b. To delineate strike continuity and structural behaviour of Lithounits.

c. Carry out scout drilling to establish possible extents of enriched / potential mineralised zone / zones.

d. On locating potential areas, to bring the area at G3 level ME Works or for auctioning.

e. ME Works shall be confirming to

- MMDR Act-1957 and Amendments,
- Minerals (Evidence of Mineral Contents) Rule- 2015 and Amendments,
- Mineral (Auction) Rules-2015 and Amendments
- IBM GUIDELINES

B. PREVIOUS WORKS

Details of previous works carried out by GSI are provided at Chapter 4 above.

C. BLOCK DESCRIPTION:

The boundary coordinates of the proposed block are given in table @ Annexure 05.

D. PLANNED METHODOLOGY

1.1. LARGE SCALE (1: 12500) GEOLOGICAL MAPPING (LSM):

a. Study and interpretation of available Aero Geo – physical, NGPM, NGCM data and maps of the areas including previous Study Reports (if any, to be obtained from GSI or other agencies) for creating a geological Base Map of the Blocks.

b. LSM by traversing (total 178sqkm), to identify and demarcate
   - Carbonaceous shale - iron formations- volcanic rocks for sulphide facie, Copper and gold mineralization.
   - Ultramafic rocks for mineralization of Ni, Cr and possibilities of PGE mineralization.
   - Andesite, BMQ and Ferruginous phyllite- REE

c. Bed Rock / channel samples, stream sediment samples, trench samples will be collected and analysed for proving mineralization.

d. 1st order or 2nd order Stream Sediment Samples shall be collected with panning of sediments for heavy minerals.

e. Pit /Trench sampling dimensions
   - On defining the anomalies and geological structures, detailed pitting / trenching/ groove, will be carried out.
   - Trenches / pits will be planned to establish subsurface continuity.

1.2. SURVEY WORKS:

a. RL's and co-ordinates of LSM works, observation points will be marked using handheld GPS units.

b. DGPS / Total Station Survey will be carried out for fixing up Boreholes points on the ground (by establishing Block Base Station using SoI Ground Control Points / Bench Marks and Triangulation Ref Points etc).

1.3. **EXPLORATORY DRILLING:**

a. Present Exploration scheme proposes 500 m of Scout Drilling (05 no's , inclined OR Vertical)

b. Scout drilling will be carried out with reference to LSM (1:12,500 scale) in order to establish the potential mineralized zones/ bands.

c. The boreholes will be planned in such a way that the enrichment zone is possible lying deeper, hence intended to puncture the mineralised zone at 70 m vertical depth.

d. Core drilling with double tube core barrel shall be deployed to ensure maximum core recovery.

e. Position extent and number of boreholes shall be based on the recommendations of LSM works. However, details of tentative meterage planned are provided below;

PBH No	Proposed drilling meterage	Angle of Inclination	Targeted lithounits
1	121	70^0	Carbonaceous Shale
2	112	70^0	Carbonaceous Shale
3	103	70^0	Carbonaceous Shale
4	84	70^0	BIF
5	80	70^0	BIF
Total	**500**		

Tentative geological plan of carbonaceous shale and BIF zones along with proposed borehole locations and Tentative Cross sections of the Proposed Boreholes are provided at Plate 04 & 05.

1.4. **LABORATORY STUDIES**

a. Chemical Analysis:

- All the Primary samples will be analysed at Mineral Exploration laboratory, KIOCL Limited (BFU), Panambur, Mangaluru, Karnataka or NABL certified laboratories. Details of samples to be analysed are provided in quantity table at Annexure 02.

- Sample Analysis will be as per laid down standards.

- Samples shall be analyzed for 34 elements by ICP-AES / ICPMS and Gold by fire assay method.
- 20 nos samples will be analyzed for Proximate analysis of Graphite.
- 10% of primary samples will be subjected to analysis at a NABL certified external laboratory as Check Samples.

b. Physical Analysis

- Petrological studies like Preparation and study of Polished Thin Section will be done on BRS/Core samples.
- SEM / EPMA studies will be carried out in order to identify the facies of mineralization.

1.5. **EXPLORATION REPORT:**

- Generate a detailed Report (Final G4 level Report) along with a Geological Map identifying and establishing OBIVIOUS GEOLOGICAL POTENTIAL (OGP) Areas with quantity and quality of resources worthy of further exploration to realize an AUCTIONABLE BLOCK.
- Data generated from G-4 level works, and earlier data if any shall be presented in the Report as per the guidelines laid down in provisions of MINERAL (EVIDENCE OF CONTENTS) RULES 2015 in the NMET prescribed format for Peer Review.

1.6. **DIVERSION OF FOREST LAND:**

- Proposed block extent of 63.32 sqkm includes around 25 sqkm of Reserve Forest area.
- Sub surface investigations such as Pitting & Trenching works, Scout drilling shall be carried out under the provisions of FC Act 1980.

- Payment towards diversion of forest land for exploration works including NPV payment shall be payable by Department of Mines and Geology, Govt of Karnataka.
- Preparatory works such as filing of Form C application, approach road survey, physical demarcation of proposed boreholes and trenches, tree enumeration works shall be carried out as per the provisions of the Act.
- Cumulatively 30 mandays of survey works is projected towards execution of above works.

E. NATURE, QUANTUM AND TARGET

Quantum of work proposed is provided @ Annexure No - 02.

F. TIME LINES

Total period proposed for G4 level Mineral Exploration works is 12 months

Time Schedule Chart is provided @ Annexure No – 01

G. BREAKUP OF EXPENDITURE:

Total estimated cost is **Rs. 2,28,22,468/-** inclusive of GST (TWO crores TWENTY EIGHT lakhs TWENTY TWO thousand FOUR hundred SIXTY EIGHT only)

H. TERMS OF PAYMENT

- KIOCL shall raise invoice for the quantum work executed and completed in accordance with the approved MEPP, as per NMET guidelines, for payment.
- Projected cost estimates are based on the SOC of NMET circulated vide Office Memorandum dtd. 31st Mar 2020. However, cost of execution will be claimed with appropriate escalation as per procedure.

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KIOCL LIMITED, BANGALORE

(*Notified Exploration Agency*)

MEPP – G4 LEVEL MINERAL EXPLORATION IN

Nagawanda Gold and Basemetal Block (Block ID: KIOCL_34_KA_NGBB), Karnataka

Annexure – 01

TIME SCHEDULE CHART (G4 Level)

Sl	Details of Works	Duration in months	1	2	3	4	5	6	7	8	9	10	11	12
1	**CAMP SETTING**	01	↔					Review						
2	**LARGE SCALE GEOLOGICAL MAPPING** (Includes 63.3 sq km of LSM + 100 nos of BRS + 35 nos of SSS + 100 cum Trenching)	04		↔										
	2.1 Geologist Party days (01 Party)			60 days										
	2.2 Laboratory Works	03		↔										
				50 days										
3	**Ground Geophysics works**	01				↔								
	3.1 Survey Party days for Ground Geophysics					30 days								
4	**Surface Drilling**	5												
	4.1 Preparatory works for drilling (Approach road making)													
	Drilling works (01 rig - 500m)								↔					
	4.2 Geologist Party days (01 Party)								90 days					
	4.3 Laboratory Works	04								↔				
										90 days				
5	**Survey Works**													
	5.1 Survey party days for DGPS survey of Boreholes 5 pts) - 01 party	05 days											↔	
6	**Camp Winding**	01												↔
7	**Preparation of Reports and Maps**	01												↔

Note : Subsurface investigations such as Pitting, Trenching and Drilling works will be carried out in 6 working moths after receipt of Forest Clearance under FC Act 1980

ANNEXURE 02

QUANTITY OF WORK

Sl	Stage	Components		Unit	Qty	
1	Interpretation of Aerogeophysical data (NRSA) and NGPM data of GSI			nos	**1**	
2	Large Scale Geological Mapping (1:12,500)	Large Scale Geological Mapping (1:12500 Scale)		sqkm	**63.3**	
3		Bed Rock Samples		nos	**100**	
4		Stream Sediment Samples		nos	**35**	
5		Trenching works		cum	**100**	
6	Ground Geophysics	Gravity & Magnetic		pts	**100**	
7	Drilling works	No of Bore Holes		nos	**5**	
8		Approach Road making		km	**3**	
9		Core Drilling (NQ series @ 100 m per borehole)		m	**500**	
10		Detailed core/ sample logging including supply of core/ sample boxes		m	**500**	
11		Transportation of drill rigs (01 unit x 600 km one way)		km	**1200**	
12		Drill core preservation		m	**100**	
13		DGPS Survey for fixing up of borehole points		nos	**5**	
14	Lab works - 34 elemental analysis	Primary Analysis	BRS	nos	**100.0**	**535.0**
15			Stream Sediment Samples	nos	**35.0**	
16			Trench samples	nos	**100.0**	
17			Drill Core	nos	**300.0**	
18		Internal Check sample analysis (5%)	BRS	nos	**5.0**	**27.0**
19			Stream Sediment Samples	nos	**2.0**	
20			Trench samples	nos	**5.0**	
21			Drill Core	nos	**15.0**	
22		Composite sample analysis (10%)	BRS	nos	**10.0**	**54.0**
23			Stream Sediment Samples	nos	**4.0**	
24			Trench samples	nos	**10.0**	
25			Drill Core	nos	**30.0**	
26		External Check sample analysis (10%)	BRS	nos	**10.0**	**54.0**
27			Stream Sediment Samples	nos	**4.0**	
28			Trench samples	nos	**10.0**	
29			Drill Core	nos	**30.0**	
30	Lab works - Analysis of Au by Fire assay method	Primary Analysis	BRS	nos	**50.0**	**270.0**
31			Stream Sediment Samples	nos	**20.0**	
32			Trench samples	nos	**50.0**	
33			Drill Core	nos	**150.0**	
34		Internal Check sample analysis (5%)	BRS	nos	**3.0**	**13.0**
35			Stream Sediment Samples	nos	**2.0**	
36			Trench samples	nos	**3.0**	
37			Drill Core	nos	**5.0**	

38		Composite sample analysis (10%)	BRS	nos	**5.0**	**27.0**
39			Stream Sediment Samples	nos	**2.0**	
40			Trench samples	nos	**5.0**	
41			Drill Core	nos	**15.0**	
42		External Check sample analysis (10%)	BRS	nos	**5.0**	**27.0**
44			Stream Sediment Samples	nos	**2.0**	
45			Trench samples	nos	**5.0**	
46			Drill Core	nos	**15.0**	
47	Proximity analysis of Graphite			nos	**20.0**	**20**
48	Sample preparation & handling			nos	**1007**	
49	Petro studies	Preparation of Standard Thin section		nos	**10**	
50		Petrographic studies		nos	**10**	
51		Preparation of Polished Thin section		nos	**10**	
52		Ore micoscopic studies		nos	**10**	
53		EPMA studies		hrs	**10**	
54		Photomicrographs		nos	**20**	
55	Report preparation			nos	**1**	

COST ESTIMATES

Sl	Item of Work	Unit	Rates as per NMET SoC 2020-21		Year 2022-23			Remarks
			SOC Item No	Rates as per SOC	Qty	Amount (Rs)		
(a)	(b)	(c)	(d)	(e)	(f)	(g)=(e)*(f)		
1	Interpretation of Aerogeophysical data and NGPM data							
1.1	Charges towards purchase of aerogeophysical maps	nos	1.1	5,400	1.0	5,400	50,400	Reimbursement as per prescribed rates
1.2	Geologist Party days for interpretation - HQ	nos	1.2	9,000	5.0	45,000		
2	LARGE SCALE GEOLOGICAL MAPPING WORKS (1:12,500 scale :63.3sq km)							
2.1	Geologist Party days - Field	days	1.2	11,000	150.0	16,50,000	27,82,920	
2.2	Geologist Party days - HQ		1.2	9,000	30.0	2,70,000		
2.3	Labour charges	days	5.7	431	300.0	1,29,300		
3	TRENCHING WORKS							
3.1	Trenching works	cum	2.1.2	3,800	100.0	3,80,000		
4	SURVEY WORKS							
4.1	Fixation of borehole and determination of Co-ordinates and RL by DGPS	days	1.6.2	19,200	5.0	96,000		
4.2	Labour charges	days	5.7	431	20.0	8,620		Amount will be reimbursed for unskilled labour as per the notified rates by the Central Labour Commissioner (Rs.431/- per day) or respective State Govt. whichever is higher)
4.3	Survey mandays for Forest Clearance works	days	1.6.1a	8,300	30.0	2,49,000		

5	GROUND GEOPHYSICS							
5.1	Gravity & Magnetic Survey	nos	3.1b	4,500	100.0	4,50,000	7,24,860	
5.2	Survey party days	days	1.6.1a	8,300	30.0	2,49,000		
5.3	Labour charges	days	5.7	431	60.0	25,860		
6	DRILLING							
6.1	Surface Drilling (01 rig - Hard Rock)	m.	2.2.1.4a	11,500	500.0	57,50,000	69,47,650	
6.2	Transportation of drill rigs (01 unit x 600 km one way)	km	2.2.8	36	1200.0	43,200		
6.3	Drilling camp setting cost	per drill	2.2.9a	2,50,000	1.0	2,50,000		
6.4	Monthly accomadation charges for drilling camp	monthly basis	2.2.9	50,000	3.0	1,50,000		
6.5	Drilling camp winding cost	per drill	2.2.9b	2,50,000	1.0	2,50,000		
6.6	Approach road making for Rugged - Hilly terrain	Km	2.2.10b	32,200	6.0	1,93,200		
6.7	Construction of Concrete pillar (12"X 12"X30")	per borehole	2.2.7a	2,000	5.0	10,000		
6.8	Borehole plugging by cement	per m	2.2.7b	150	15.0	2,250		
6.9	Core preservation	m	5.3	1,590	100.0	1,59,000		
6.10	Land/Crop compensation (in case the BH falls in agriculture land)	per borehole	5.6	20,000	5.0	1,00,000		
6.11	Land/Crop compensation (in case the trenches falls in agriculture land)	per borehole	5.6	20,000	2.0	40,000		
7	LABORATORY STUDIES							
7.1	Sampler charges	days	1.5.2	5,100	201.0	10,25,100	13,71,624	

7.2	Sample processing works (663 nos)	Labour charges	days	5.7	431	804.0	3,46,524		Amount will be reimbursed for unskilled labour as per the notified rates by the Central Labour Commissioner (Rs.431/- per day) or respective State Govt. whichever is higher)
7.3	Sample analysis (34 elemental analysis)	Primary	per sample	4.1.14	7,731	535.0	41,36,085	51,79,770	
7.4		Internal Check (5%)		4.1.14	7,731	27.0	2,08,737		
7.5		Composite (10%)		4.1.14	7,731	54.0	4,17,474		
7.6		External Check (10%)		4.1.14	7,731	54.0	4,17,474		
7.7	Gold analysis by Fire assay method	Primary	per sample	4.1.5a	2,380	270.0	6,42,600	8,02,060	
7.8		Internal Check (5%)		4.1.5a	2,380	13.0	30,940		
7.9		Composite (10%)		4.1.5a	2,380	27.0	64,260		
7.10		External Check (10%)		4.1.5a	2,380	27.0	64,260		
7.11	Proximity Analysis of Graphite		per sample	4.1.16	3,000	20.0	60,000	60,000	
7.12	Petro studies	Preparation of Standard Thin section	nos	4.3.1	2,353	10.0	23,530	2,97,260	
7.13		Complete Petrological Report of rock sample	nos	4.3.4	4,232	10.0	42,320		
7.14		Preparation of Polished Thin section	nos	4.3.2	1,549	10.0	15,490		
7.15		Mineragraphic studies	nos	4.3.4	4,232	10.0	42,320		
7.16		Digital photomicrographs of Thin section	nos	4.3.7	280	10.0	2,800		
7.17		EPMA studies	hrs	4.4.1	8,540	20.0	1,70,800		
8	Peer review of report		lumpsum				10,000	10,000	
9	Sub Total						1,82,26,544	1,82,26,544	

10	Preparation of Exploration Project Proposal	lumpsum	5.1	2% of the project cost or Rs 3.8 lakh whichever is lower	5 Hard copies along with Soft copy	3,64,531	3,64,531	EA has to submit the Hard copies and the soft copy of the final proposal along with maps and Plan as suggested by the TCC- NMET in its meeting while clearing the proposal.
11	Exploration Report (5% of (Sl 9 + Sl 10))		5.2(iii)	For the projects having cost exceding Rs 150 lakhs but less than Rs 300 lakhs : A Minimum of Rs. 7.5 lakhs or 3% of the value of work whichever is more	5 Hard copies along with Soft copy	7,50,000	7,50,000	EA has to submit the final Geological Report in Hard Copies (5 nos) and the soft copy to NMET.
12	GRAND TOTAL (9 to 11)					1,93,41,075	1,93,41,075	
13	GST 18%					34,81,393	34,81,393	GST will be reimbursed as per actual and as per notified prescribed rate
14	Grand Total (with GST 18%)					2,28,22,468	2,28,22,468	Say Rs.229 Lakhs

Note: Survey mandays for Forest Clearance works includes Topo survey for making approach to Proposed Borehole (PBH) and Trench points, online filing of Form C, Physical demarcation of Approach roads and Trenches locations, Tree enumeration works, liosoning works with forest officials and arrangement of site visit of forest officials.

LETTER OF UNDERTAKING MINERAL EXPLORATION WORKS AS PER NMET FORMAT

ಕೆಐಓಸಿಎಲ್ ಲಿಮಿಟೆಡ್
(ಭಾರತ ಸರ್ಕಾರದ ಉದ್ಯಮ)
ನೋಂದಾಯಿತ ಕಾರ್ಯಾಲಯ :
೨ನೇ ವಿಭಾಗ, ಕೋರಮಂಗಲ
ಬೆಂಗಳೂರು – ೫೬೦ ೦೩೪.
ದೂರವಾಣಿ : ೦೮೦–೨೫೫೩೧೪೬೧ ರಿಂದ ೬೬
ಫ್ಯಾಕ್ಸ್ : ೦೮೦–೨೫೫೩೨೧೫೩–೫೯೪೧
ವೆಬ್ ಸೈಟ್ : www.kioclltd.in

KUDREMUKH
ಐಎಸ್ಒ 9001, 14001 ಮತ್ತು ಓಹೆಚ್ಎಸ್ 45001 ಸಂಸ್ಥೆ
ಆಗಿ ಎಸ ಒ 9001, 14001 ತಥಾ
ಓಎಚಎಸಎಸ 45001 ಕಂಪನಿ
ISO 9001, 14001 &
OHSAS 45001 COMPANY

के आई ओ सी एल लिमिटेड
(भारत सरकार का उद्यम)
पंजीकृत कार्यालय :
II ब्लाक, कोरमंगला,
बेंगलूर - 560 034.
कार्यालय : 080-25531461 - 66
फेक्स : 080-25532153-5941
वेबसाईट : www.kioclltd.in

KIOCL LIMITED
(A Government of India Enterprise)
Registered Office :
II Block, Koramangala,
Bengaluru - 560 034.
Telephone : 080-25531461 - 66
Fax : 080-25532153-5941
Website : www.kioclltd.in
CIN : L13100KA1976GOI002974

Annexure-4

FORMAT FOR CERTIFICATE TO BE SUBMITTED ALONG WITH PROJECT PROPOSAL

To

The Director & HOD
National Mineral Exploration Trust (NMET)
Ministry of Mines
F-114, Shastri Bhavan
New Delhi- 110001

It is certified that

1. Project titled " Reconnaissance Exploration (G4- Level) of Nagawanda Gold and Basemetal Block (KIOCL_34_KA_NGBB), Davangere District, Karnataka" along with estimated cost Rs. 2,28,22,468/- (including GST) is submitted for consideration of NMET funding.

2. The project proposal is prepared following the guidelines prescribed in Minerals (Evidence of Mineral Contents) Rules, 2015 in case of mineral exploration project proposals.

3. The Proposal has been duly examined and concurred by associate finance in accordance with canons of financial propriety.

4. The same project proposal or project proposal with similar objectives has not been submitted to any other funding agency by this organisation and the project proposal bears no duplication with existing work / ongoing project undertaken by this agency.

Yours faithfully

टी.सामिनाथन/T. SAMINATHAN
अध्यक्ष सह प्रबंध निदेशक
Chairman cum Managing Director
केआईओसीएल लिमिटेड/KIOCL LIMITED
II ब्लॉक, कोरमंगला, बेंगलूरु-560034
II Block, Koramangala, Bengaluru-560034

Date:.....

Place:.....

ANNEXURE 05

BOUNDARY CO-ORDINATES OF THE BLOCK

Boundary Point	Latitude (dd mm ss)	Longitude (dd mm ss)
A	14 18 29.62	75 34 57.20
B	14 20 01.20	75 32 40.90
C	14 20 12.30	75 30 01.00
D	14 21 28.37	75 27 53.50
E	14 19 24.01	75 27 17.48
G	14 17 28.96	75 30 59.25
H	14 16 07.91	75 35 01.26

ANNEXURE 06

CONSENT LETTER RECEIVED FROM DEPT OF MINING & GEOLOGY, GOVT. OF KARNATAKA

GOVERNMENT OF KARNATAKA

No. DMG-17013/6/2018/2021-22/754

Office of the Director,
Department of Mines and Geology,
Khanija Bhavan, Race Course Road,
Bangalore-1, dated: 19.06.2021.

To,
M/s KIOCL Limited
(A Government of India Enterprises)
II Block, Koramangala
Bengaluru- 560 034.

21 JUN 2021

Sir,

Sub: Permissions for carrying out G4 level exploration works - reg.
Ref: Your letter No. KIOCL/MED/2021/33 dated: 19.01.2021.

****

With reference to the above subject and as per the request made by you under references, you are hereby accorded permission to prepare and submit the exploration proposal for G4 level of exploration in the following blocks to NMET Technical Committee, Government of India on behalf of State Government of Karnataka after verifying the reports of state DMG, GSI and other agencies.

SL No	Name of the block	Extent In sqkm	District	Mineral
1	Nagavanda Block	177.63	Haveri	Gold & Associated Minerals

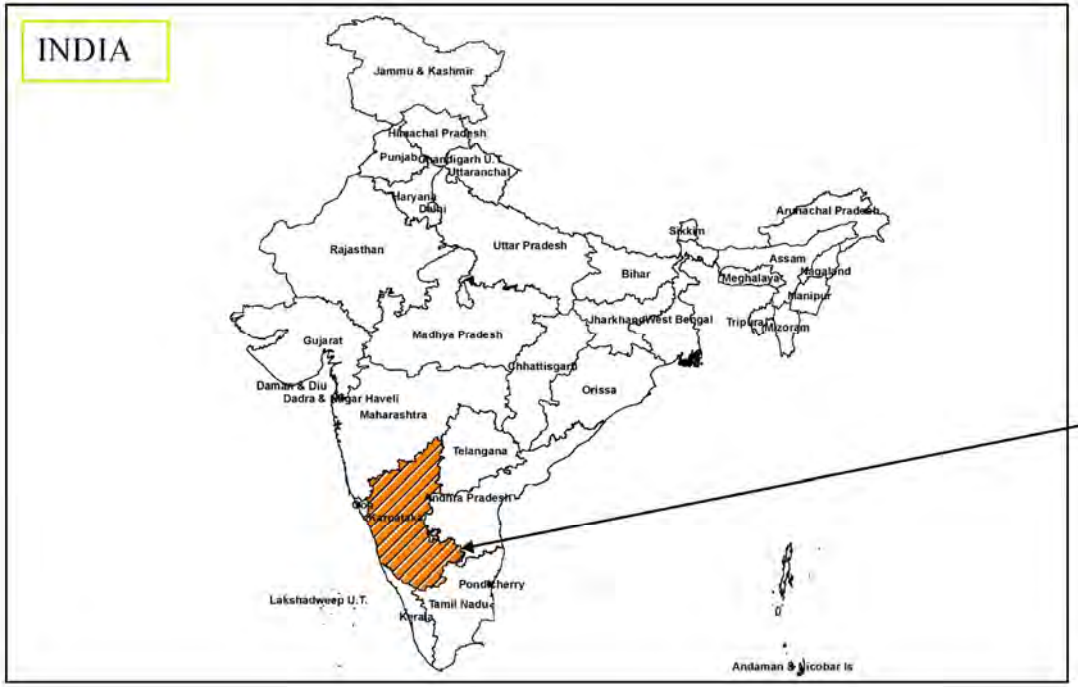
This is for your kind information and further needful in the matter.

Yours faithfully,

DIRECTOR

DGM(ME) for needful pl
22/6/2021

pl note & for needful 23/6
DM/ME


INDIA
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Bihar
Sikkim
Arunachal Pradesh
Assam
Nagaland
Meghalaya
Manipur
Tripura
Mizoram
Jharkhand
West Bengal
Gujarat
Madhya Pradesh
Chhattisgarh
Orissa
Daman & Diu
Dadra & Nagar Haveli
Maharashtra
Telangana
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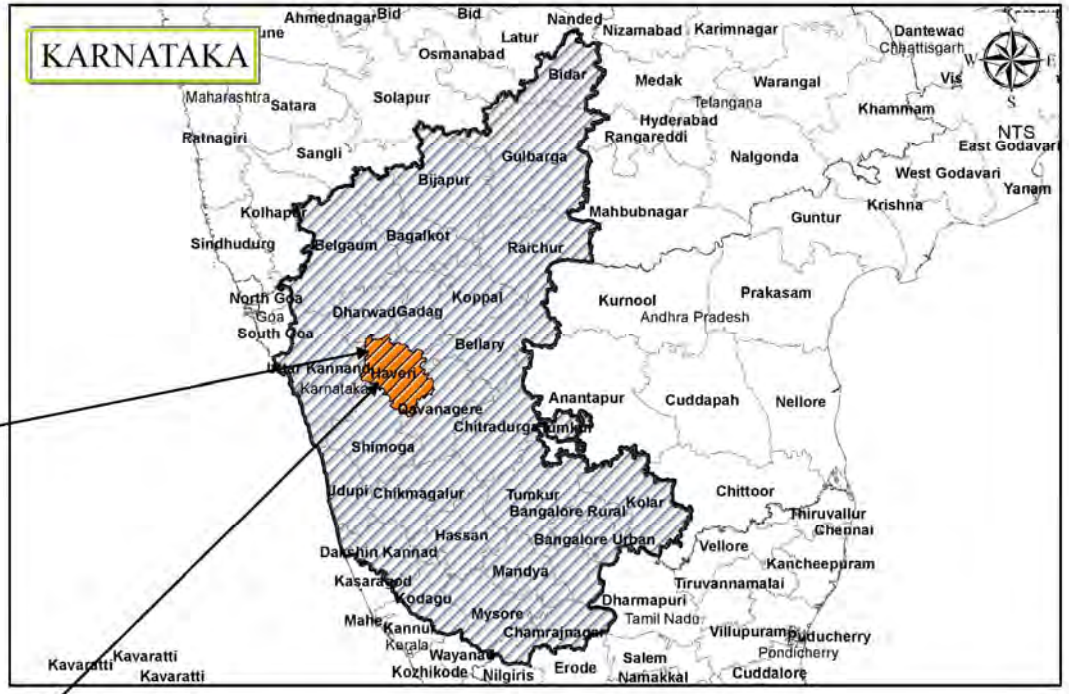
Goa
Karnataka
Pondicherry
Tamil Nadu
Kerala
Lakshadweep U.T.
Andaman & Nicobar Is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Maharashtra
Satara
Solapur
Telangana
Hyderabad
Rangareddi
Khammam
Ratnagiri
Sangli
Gulbarga
Nalgonda
Bijapur
West Godavari
Krishna
Guntur
Kolhapur
Mahbubnagar
Sindhudurg
Belgaum
Bagalkot
Raichur
North Goa
Goa
South Goa
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Gadag
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Chitradurga
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Thiruvallur
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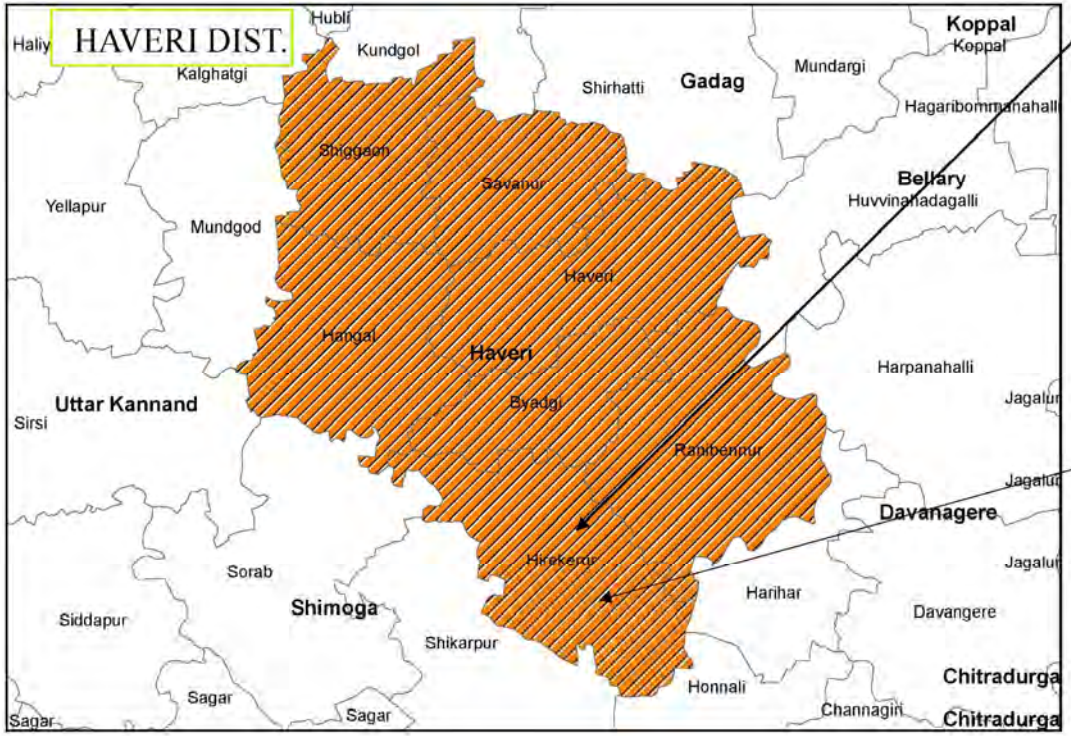
HAVERI DIST.
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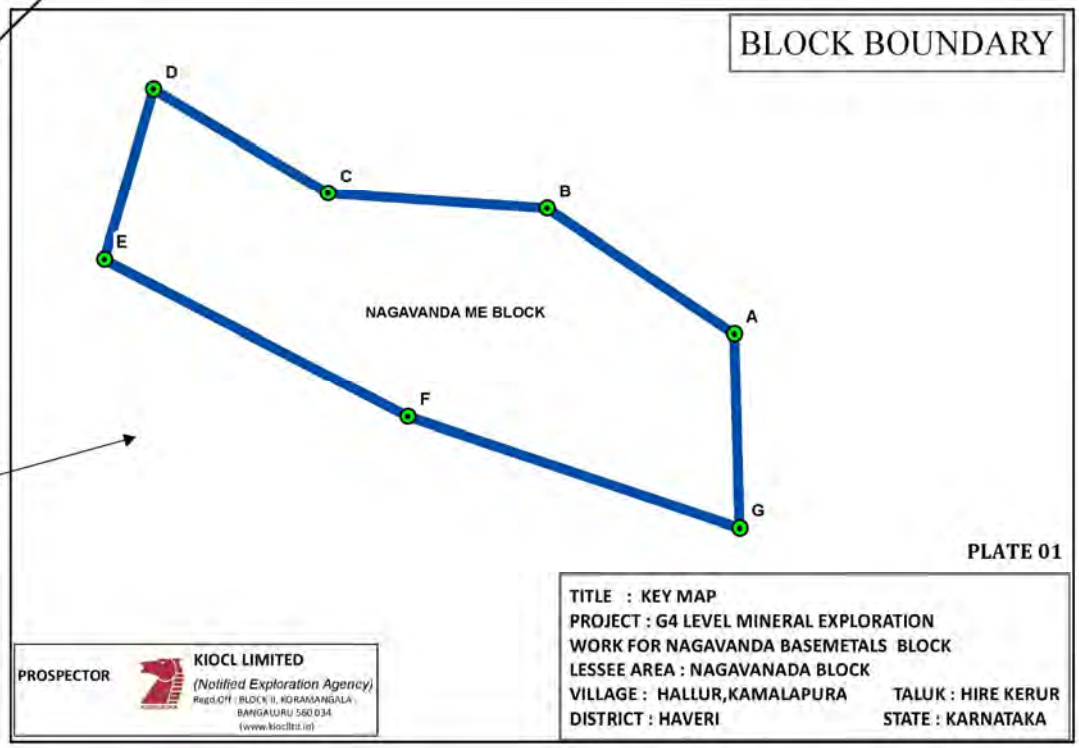
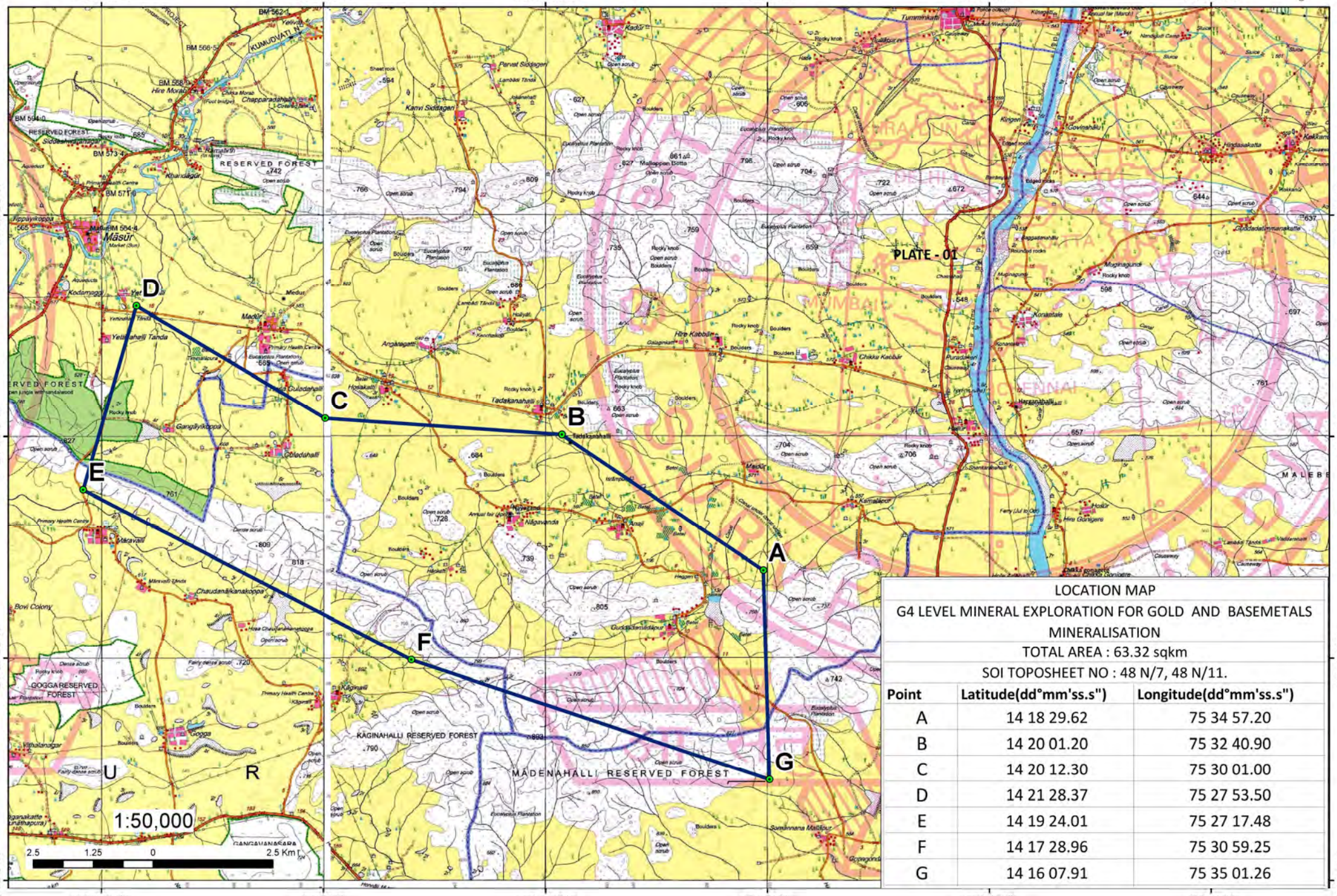
Mundargi
Hagaribommanahalli
Shiggaon
Savanur
Bellary
Huvvinahadagalli
Yellapur
Mundgod
Haveri
Hangal
Haveri
Harpanahalli
Uttar Kannand
Sirsi
Byadgi
Ranibennur
Davanagere
Sorab
Hirekerur
Harihar
Shimoga
Siddapur
Davangere
Shikarpur
Chitradurga
Honnali
Sagar
Channagiri
Chitradurga
Sagar
Sagar


BLOCK BOUNDARY
D
C
B
E
NAGAVANDA ME BLOCK
A
F
G
PLATE 01
TITLE : KEY MAP
PROJECT : G4 LEVEL MINERAL EXPLORATION
WORK FOR NAGAVANDA BASEMETALS BLOCK
LESSEE AREA : NAGAVANADA BLOCK
VILLAGE : HALLUR,KAMALAPURA TALUK : HIRE KERUR
DISTRICT : HAVERI STATE : KARNATAKA
PROSPECTOR
KIOCL LIMITED
(Notified Exploration Agency)
Regd.Off : BLOCK II, KORAMANGALA
BANGALURU 560 034
(www.kioclltd.in)

NAGAVANDA ME BLOCK DISTRICT : HAVERI STATE : KARNATAKA

PLATE - 02



LOCATION MAP

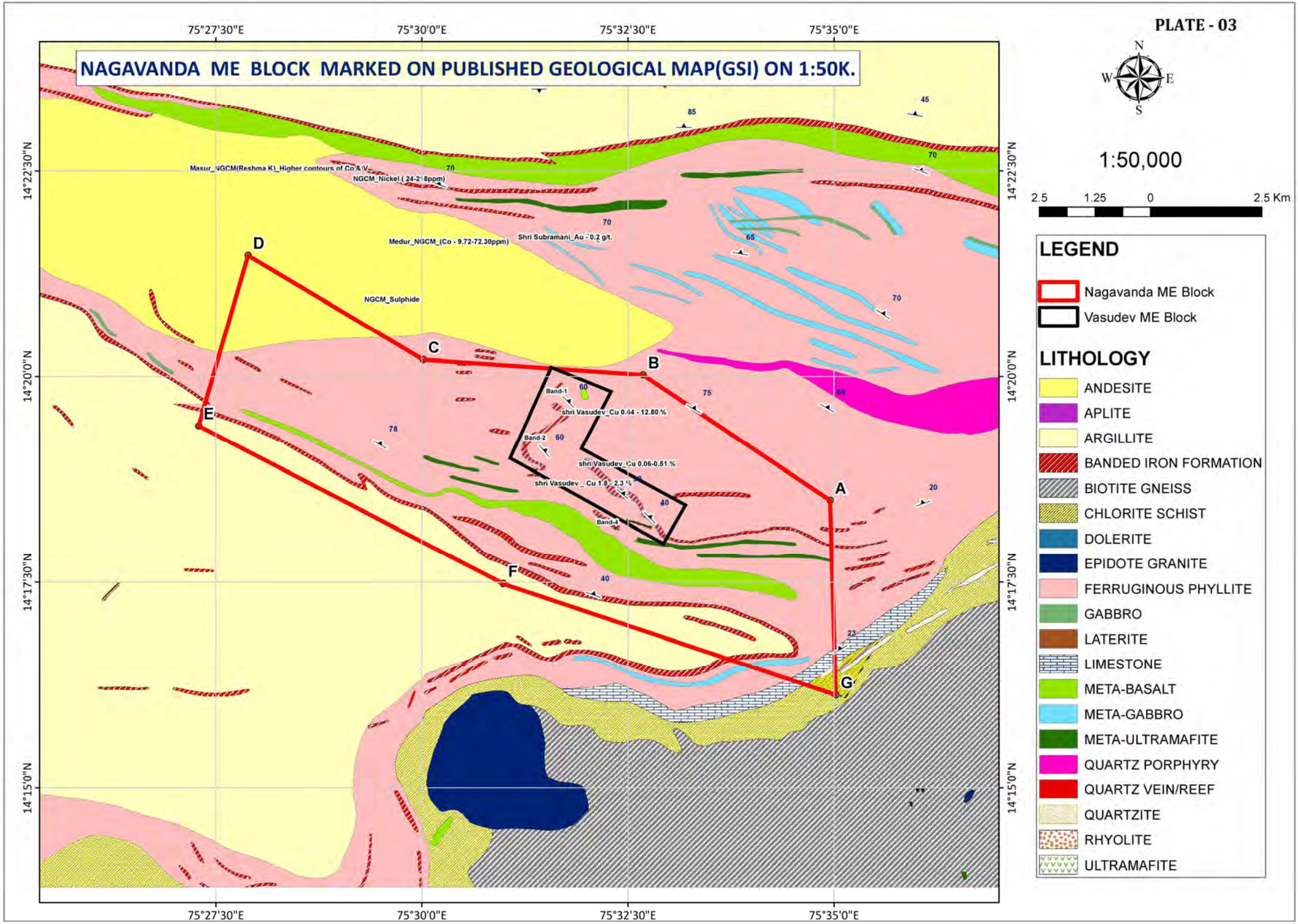
G4 LEVEL MINERAL EXPLORATION FOR GOLD AND BASEMETALS MINERALISATION

TOTAL AREA : 63.32 sqkm

SOI TOPOSHEET NO : 48 N/7, 48 N/11.

Point	Latitude(dd°mm'ss.s")	Longitude(dd°mm'ss.s")
A	14 18 29.62	75 34 57.20
B	14 20 01.20	75 32 40.90
C	14 20 12.30	75 30 01.00
D	14 21 28.37	75 27 53.50
E	14 19 24.01	75 27 17.48
F	14 17 28.96	75 30 59.25
G	14 16 07.91	75 35 01.26

PLATE - 03


NAGAVANDA ME BLOCK MARKED ON PUBLISHED GEOLOGICAL MAP(GSI) ON 1:50K.
75°27'30"E
75°30'0"E
75°32'30"E
75°35'0"E
14°22'30"N
14°20'0"N
14°17'30"N
14°15'0"N
N
S
E
W
1:50,000
2.5 1.25 0 2.5 Km
Masur_NGCM(Reshma K)_Higher contours of Co & V
NGCM_Nickel (24-2 8ppm)
Medur_NGCM_(Co - 9.72-72.30ppm)
Shri Subramani_Au - 0.2 g/t.
NGCM_Sulphide
Band-1
shri Vasudev_Cu 0.64 - 12.80 %
Band-2
shri Vasudev_Cu 0.06-0.51 %
shri Vasudev _ Cu 1.8 - 2.3 %
Band-4
A
B
C
D
E
F
G
LEGEND
Nagavanda ME Block
Vasudev ME Block
LITHOLOGY
ANDESITE
APLITE
ARGILLITE
BANDED IRON FORMATION
BIOTITE GNEISS
CHLORITE SCHIST
DOLERITE
EPIDOTE GRANITE
FERRUGINOUS PHYLLITE
GABBRO
LATERITE
LIMESTONE
META-BASALT
META-GABBRO
META-ULTRAMAFITE
QUARTZ PORPHYRY
QUARTZ VEIN/REEF
QUARTZITE
RHYOLITE
ULTRAMAFITE

TENTATIVE SURFACE GEOLOGICAL PLAN OF NAGAVANDA BLOCK INDICATING CARBONACEOUS SHALE AND BIF BANDS

PLATE-04

555000 556000 557000 558000 559000 560000

1584000 1583000 1582000 1581000

N S E W

70 62 70 61 55 E' PBH-05 Shri Vasudev V N Cu (0.64- 12.80%) 58 60 E D' 50 45 50 55 PBH-04 52 D Navagand 58 Shri Vasudev V N Cu (0.06- 0.51%) Shri Vasudev V N Cu (1.8- 2.3%) 60 61 55 58 45 55 55 C' B' A' 60 58 60 PBH-03 PBH-02 PBH-01 52 52 50 C B A 52

LEGEND

- PBH Location
- Sectional Line

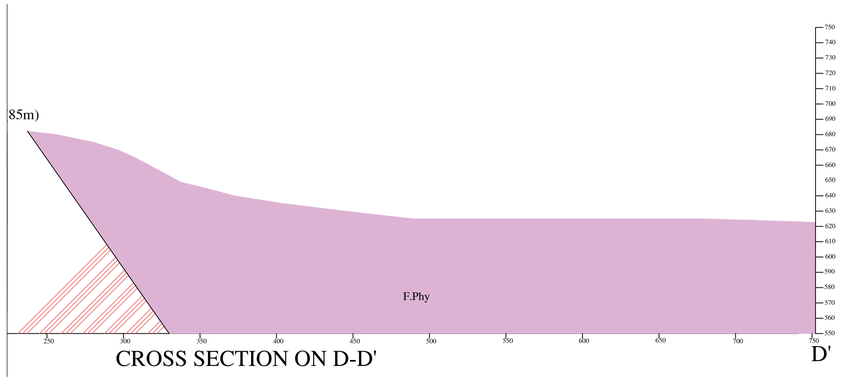
LITHOLOGY

- BIF
- Carb.shale
- F chert
- Meta ultramafite
- ferruginous phyllite

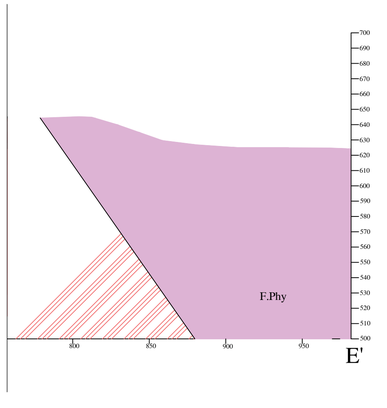
1:15,000

0 0.5 1 Km

CROSS SECTION ON B-B'



CROSS SECTION ON D-D'



LEGEND

- FERRUGINOUS PHYLLITE
- CARBONACEOUS SHALE
- BIF

PLATE No: 05

TITLE	**GEOLOGICAL CROSS SECTION**
PROJECT	NAGAVANDA BLOCK
VILLAGE:- NAGAVANDA	SCALE 1:1000
DISTRICT: SHIVAMOGA	STATE :- KARNATAKA
PROSPECTOR	**KIOCL LIMITED** ***(Notified Exploration Agency)*** Regd. Off: BLOCK II, KORAMANGALA, BENGALURU 560 034 (www.kioclltd.in)

KUDREMUKH