PRELIMINARY EXPLORATION FOR NICKEL AND ASSOCIATED METALS TO THE SOUTH OF KANSA VILLAGE, SUKINDA ULTRAMAFIC COMPLEX OF JAJPUR DISTRICT, ODISHA (G3)

COMMODITY: Nickel and Scandium

BY
GEOLOGICAL SURVEY OF INDIA
EASTERN REGION, STATE UNIT-ODISHA
BHUBANESWAR

PLACE: BHUBANESWAR
DATE: 17.04.2026

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

Features	Details
Block ID	Kansa South Block
Exploration Agency	Geological Survey Of India, Eastern Region, SU-Odisha
Commodity	Nickel and Scandium
Mineral Belt	Sukinda Ultramafic Complex
Completion period with entire time schedule to complete the project	One year (FS2026-27)
Objectives	To assess the potentiality of Nickel and the associated metals & to estimate the resource
Whether the work will be carried out by the proposed agency or through outsourcing	Work will be carried out by the proposed agency
Name/Number of Geoscientists	**2 (G)**
Expected Field days	Officer 1: 100 days Officer 2: 100 days Supervisory officer: 07 field days

1. **Location**

Block

Cardinal Points	Latitude	Longitude
A	85° 51'6.527"	21° 3' 51.583"
B	85° 51'15.094"	21° 3' 56.287"
C	85° 51'23.717"	21° 3' 49.547"
D	85° 51'37.873"	21° 3' 59.013"
E	85° 51'54.474"	21° 3' 56.103"
F	85° 52'1.170"	21° 3' 58.041"
G	85° 52'10.836"	21° 3' 50.374"
H	85° 52'29.837"	21° 3' 56.391"
I	85° 52'30.100"	21° 3' 25.837"
J	85° 51'6.781"	21° 2' 59.194"
Tehsil/Taluk	Sukinda, Danagadi	
District	Jajpur	
State	Odisha	
Toposheet No.	73G/16	
Villages	Kansa	

2. Area

Block Area	3.1 sq.km
Forest Area	Reserve forest, Revenue forest
Government Land Area	No
Private Land Area	Yes

3. Accessibility

Nearest town	Jajpur Road
District headquarters	Jajpur
Nearest Rail head	Jajpur-Keonjhar Road Junction and Tomka station
Nearest Airport	Bhubaneswar, 140 km

4. **Hydrography** : Seasonal streams and Damsal nala

5. Climate: Humid tropical

6. Topography: Flat land and hilly area

7. Availability of baseline geoscience data

Geological map	Detailed map with sample analytical results and borehole locations

8. Justification for taking up G3 level exploration

a. The area of investigation forms a part of Sukinda Ultramafic complex which holds about 98% of countries chromite reserve.

b. During FS2023-25, the area has been explored under G4 stage and Ni concentration up to 1% has been reported in limonite and laterite.

c. The western part of the area has been explored during FS2024-25 and analyzed for Ni resource and reported Ni concentration up to 1.5% in the limonite horizon and up to 0.35% in laterite.

d. Hence, to probe the subsurface continuation of the above limonite-laterite horizon and to find out the Ni potentiality, the area has been proposed for G3 stage investigation by means of drilling and followed by resource estimation.

e. A scout borehole drilled in the area intersected a 18m thick nickeliferous limonite zone having an average of 5648ppm Ni along with a Cobalt mineralized zone measuring 5.0 meters at 500ppm cut-off (Avg. 1035ppm).

PROPOSAL FOR PRELIMINARY EXPLORATION FOR NICKEL AND ASSOCIATED METALS TO THE SOUTH OF KANSA VILLAGE, SUKINDA ULTRAMAFIC COMPLEX OF JAJPUR DISTRICT, ODISHA (G3)

1.0 INTRODUCTION

Nickel has been declared as a critical mineral vide Gazette Notification of THE MINES AND MINERALS (DEVELOPMENT AND REGULATION) AMENDMENT ACT, 2023. It is most essential for modern industry and green energy transition and utilized as the raw material for high strength alloys and manufacturing of electric vehicles.

As the world is going towards green energy transition, focus on Nickel exploration has increased manifold. The Nickel mineralization mainly found to be associated with sulphides and Nickeliferous laterite in association with mafic/ultramafic rocks.

Sukinda ultramafic complex is well known for its's chromite deposit which contributes 98% of country's chromite reserve along with nickel mineralization in the laterites. The laterites and limonites developed over the ultramafics host the nickel mineralization with concentration up to 1% Ni.

2.0 BACKGROUND INFORMATION

2.1 Regional Geology

Sukinda chromite belt, known for its chromite deposite, is a V-shaped valley extending from east to west with northeast-southwest strike. The belt gets narrow towards east and gradually opens up towards west, lies between the Daitari hill to the north and Mahagiri hill to the south. The chromite deposits of the Sukinda massif are part of layered ultramafic bodies which occur within Archaean low-grade metamorphic rocks of the Iron Ore Group (IOG) in the Singhbhum Craton of the Indian Shield. This is the largest ultramafic body in the Singhbhum Craton and it is a layered complex composed of rhythmic layers of orthopyroxenite – dunite – serpentinite –chromitite. It has intruded into the Archaean Iron Ore Group (IOG) of rocks (cherty quartzite and banded magnetite quartzite) at a width of 2-5 km and extends nearly 25 km in an ENE–WNW direction from Kansa (east) to Maruabil (west) and beyond (Nayak et al. 2023, Mondal et al. 2006).

The Sukinda massif shows scanty exposures of the rocks due to extensive and deep weathering process forming laterites and limonites (Lateritization/Limonitization). The ultramafic units are mostly represented by serpentinised dunite-peridotite with olivine-chromitite and chromite bands and along with subordinate amount of pyroxenite devoid of chromite mineralization**.** Dunite predominates in the north-east and gradually changes over to peridotite towards south-west (Chakraborty & Chakraborty, 1984).

Secondary serpentine and silica occur as fracture-filling veins in chromitites. The chromitite bodies frequently occur in alternate layers, with serpentine or limonite forming stratiform type deposit within the Sukinda ultramafic complex (Chakraborty & Chakraborty, 1984). The different varieties of chromite ore present in the area are massive, banded and spotted, laminated and friable in nature and was presumably formed in-situ by early fractionation. There are altogether six seams of chromite encountered in the Sukinda valley (Mondal et al. 2006).

Nickel enrichment is found in the limonitic cappings over the Sukinda ultramafic complex.

2.2 Previous work on the proposed working area

a. The Sukinda ultramafic complex was systematically mapped on 1: 63000 scale by M.N.Deekhitulu (FS: 1950-51), G.H.S.V.Prasad Raoet. al. (FS: 1951-54) and R.N.Banerjee (FS: 1961-62).

b. Ghosh and Singhal (1962) reported enrichment of Ni in the chromite quarries of Saruabil and Sukerangi areas in Sukinda chromite belt.

c. P. K. Banerjee (FS 1962-63) through preliminary geochemical prospecting in ultrabasic rocks of Sukinda Chromite belt, demarcated the Nickeliferous zones which resulted up to 4000 ppm Ni.

d. P.K. Banerjee (1966 and 1964-67) reported presence of higher concentration of Ni in the laterite capping of Kumardah – Kansa Sector of Sukinda Chromite belt and demarcated 3 Ni rich zones, analysing > 0.8% Ni.

e. P.K.Jena (2008) through specialized Thematic Mapping on 1:25,000 scale brought out a new chromiferous ultramafic unit (25m * 40m) at Tungeisuni village, The unit resulted Cr: up to 4787ppm; Ni: 1730-1814 ppm.

f. Baral et al. (FS2023-25) through LSM, brought out the disposition of ultramafic and laterite units around Tungeisuni to Kansa area which resulted Cr_2O_3 up to 10.82% and Ni value up to 1%.

g. Mishra et al. (FS2024-25) carried out G3 exploration in Kansa-Kamarda sector (western part of proposed G3 block) to evaluate the potentiality of Ni, Co and chromite by systematic drilling. The result of Ni concentration have been obtained up to 1.5% in the limonite horizon and 0.17-0.35% in laterite.

Based on the above reportings , field observations and continuity of similar geological set up, 3.1 sq. km area to the south of Kansa village, Jajpur district falling in parts of T.S. No. 73G/16 is being proposed for G3 stage exploration during FS2026-27. The area is bounded by latitudes 21° 2' 59.194"- 21° 3' 59.013" and longitudes 85° 51'6.527"- 85° 52' 30.100". Detailed mapping on 1:5000 scale has already been completed in the area, as observed the area is the immediate eastern extension of Kansa-Kamarda G3 block and dominantly under soil cover (lateritic soil), hence the major work component will include systematic pitting/trenching, followed by drilling at 400m x 400m grid to encounter the underneath laterite horizons and to evaluate their potentiality for Ni and associated metals in the area. The total number of boreholes planned is 20 to 22. As observed the continuity of the limonite horizon up to 90m depth and its potentially with Ni concentration up to 1.5%, each borehole will be drilled up to an approximate depth of 100m with an approximate drilling meterage of 2000m. Upon receipt of all the analytical result of drill holes, resource estimation will be carried out for Ni (Co, Cr if any) at different cut-offs.

3.0 OBJECTIVE

To assess the potentiality of Nickel and the associated metals & to estimate the resource

4.0 BLOCK DESCRIPTION

4.1 Location and extent

The Kansa South block is located to the north-eastern part of the state of Odisha in Jajpur district. The block is situated in a mining hub named Kaliapani-Kumardah sector and near the state's major steel plants. It is located about 45 km northwest of Jajpur Road and is well connected to the Jajpur District Headquarters by means of NH-720, SH-20 and NH-20. The nearest railway station is Tomka, on the East Coast railway network along the Bhubaneswar-Barbil line, located approximately 15 km to the east of the block. The nearest airport is located in the state capital Bhubaneswar which is about 140 km in distance. The block boundary co-ordinates are as follows;

Cardinal Points	Latitude	Longitude
A	85° 51'6.527"	21° 3' 51.583"
B	85° 51'15.094"	21° 3' 56.287"
C	85° 51'23.717"	21° 3' 49.547"
D	85° 51'37.873"	21° 3' 59.013"
E	85° 51'54.474"	21° 3' 56.103"
F	85° 52'1.170"	21° 3' 58.041"
G	85° 52'10.836"	21° 3' 50.374"
H	85° 52'29.837"	21° 3' 56.391"

I	85° 52'30.100"	21° 3' 25.837"
J	85° 51'6.781"	21° 2' 59.194"

5.0 METHODOLOGY / WORK PLAN

The major work component of the proposed block comprises surface exploration by means of pitting/trenching and sampling and sub-surface exploration by means of drilling , core logging and sampling. Total 22 nos. ($1^{st}/2^{nd}$ levels) of bore holes will be drilled over an area of 3.1 sq.km. to find out the depth continuity of laterite-limonite horizon and their Nickel potentiality. Petrographic studies followed by XRD, SEM-EDX and EPMA will be carried to identify the Ni and associated mineral phases. After getting all the analytical results resource estimation will be done for the area.

6.0 NATURE AND QUANTUM OF WORK

Nature Of Work	Work Proposed For Kansa South Block for FS2026-27
Drilling	2000m
P&T	30 Cu.m
Pit/Trench sampling	30 nos.
Petrochemical sampling	10 nos.
Core sampling	1500 nos.
Petrographic study	15 nos.
OM (Number)	5 nos.
XRD (Number)	5 nos.
SEM-EDX (Number)	5 nos.
EPMA	5 nos.
Chemical Analysis	1695 nos.

7.0 TIMELINE

The exploration work proposed for FS2026-27 will be initiated after deployment of vehicle, drilling unit, surveyor and contingent advance. All the assigned work will be completed by 31st January, 2027 if the required facilities are provided on time. Report writing and report submission will be completed by 30th June, 2027, only after getting all analytical results by 31st May, 2027 as it aims towards resource estimation.

SCHEDULED TIME FOR THE PROPOSED G-3 LEVEL EXPLORATION

S.No.	Activities	APR, 26	MAY, 26	JUN, 26	JUL, 26	AUG, 26	SEP, 26	OCT, 26	NOV., 26	DEC, 26	JAN, 27	FEB,27	MAR, 27	APR, 27	MAY, 27	JUN, 27
1	Drilling				Rainy Season											
2	P&T															
3	Pit/Trench sampling															
4	Petrochemical sampling															
5	Core sampling															
6	Petrographic study															
7	OM (Number)															
8	XRD (Number)															
9	SEM-EDX (Number)															
10	EPMA															
11	Chemical Analysis															
12	Lab. studies (PS-OM-SEM-EPMA)															
13	Report writing															

8.0 COST

The surveyor will demarcate the block boundary points along with borehole points on phase wise. Drilling will be commenced after getting borehole approval. The other work components include pitting/trenching, surface sampling and core logging and sampling along with laboratory studies (PS, OM, XRD, SEM-EDX and EPMA).

Summary of the Cost estimates

Sl. No.	Item	Total Estimated Cost (Rs.)	Funding
1	Geology and Survey	0	By GSI
2	Drilling	2,00,00,000.00/-	**NMEDT**
3	Survey work	7,68,000.00/-	**NMEDT**
4	Laboratory studies	0	By GSI
5	Geologist at HQ	0	By GSI
	Sub Total (1to 4)	2,07,68,000.00/-	
6	Exploration Report Preparation	0	By GSI
7	Proposal Preparation	0	By GSI
8	Peer review charges	0	By GSI
9	Sub Total (1to8)	2,07,68,000.00/-	By GSI
10	GST18%	37,38,240.00/-	
	Total:	**2,45,06,240.00/-**	
	Say Rs. In Lakh	**245.06/-**	

Item of Work			Unit	SoC-Item -Sl No. NMEDT	Rates as per NMET SoC 2025		Estimated Cost	
							Qty.	Total Amount (Rs)
B. SURVEY WORK								
In case of outsourced								
9	a	Demarcation of lease boundary , Fixation of boreholes and determination of coordinates and reduced level (RL) of the boreholes by DGPS (including charges of labourers deployed for the work)- use of CORS Network system for all DGPS is compulsory	Per Point of observation	1.3.2		**24,000.00**	32	₹ 7,68,000.00
Total Cost B (in case of out sourcing)								**₹ 7,68,000.00**

Item of Work			Unit	SoC-Item -Sl No. NMEDT	Rates as per NMET SoC 2025		Estimated Cost	
							Qty.	Total Amount (Rs)
D. Drilling - OUT SOURCED								
18.a	**DRILLING**	Drilling in/ Drilling in Soft rock/ Strata: HQ size borehole up to 400m Depth and NQ Size beyond 400m depth in case of NQ size drilling is done before 400m depth, the rate shall decrease by 20%	m	2.2.1.1c		5,500.00	0	₹ 0.00
18.b		Drilling in/ Drilling in Hard rock/ Strata: HQ size borehole up to 400m Depth and NQ Size beyond 400m depth in case of NQ size drilling is done before 400m depth, the rate shall decrease by 20%	m	2.2.1.1d		10,000.00	2000	₹ 2,00,00,000.00
18.c		Drilling in/ Drilling in Very Hard rock/ Strata: HQ size borehole up to 400m Depth and NQ Size beyond 400m depth in case of NQ size drilling is done before 400m depth, the rate shall decrease by 20%	m	2.2.1.1e		12,650.00	0	₹ 0.00
18.d		Drilling for Lignite	m	2.2.1.1a		4,783.00	0	₹ 0.00
18.e		Drilling for Coal	m	2.2.1.1b		7,975.00	0	₹ 0.00

18.a		Mechanised Auger Drilling for soft strata up to 30m depth	m	2.2.2.1		4,760.00	0	₹ 0.00
18.b		Hand Auger drilling in soft strata up to 30 m depth	m	2.2.2.2		3,808.00	0	₹ 0.00
18.c		RC Drilling	m	2.2.3		8,870.00	0	₹ 0.00
18.d		Non coring drilling	m	2.2.4		4,000.00	0	₹ 0.00
19	DRILLING RELATED EXPENDITURE HEADS	Borehole Deviation Survey by Multishot survey tool (interval 6m; azimuth and inclination to be recorded)	per shot	2.2.5		330.00	0	₹ 0.00
20		Land / Crop Compensation (in case the BH falls in agricultural Land)	per BH	5.6		30,000.00	22	₹ 0.00
21		Construction of concrete Pillar (12"x12"x30")	per borehole	2.2.7a		2,000.00	22	₹ 0.00
22		Borehole plugging with cement	per borehole	2.2.8		10,000.00	22	₹ 0.00
23		Miscellaneous Charges (Transportation of Drilling Rig, accommodation for Drilling Camp, Camp setting and winding, construction of approach road)	Lumpsum	0	2.2.9.3	For Drilling cost >1 Cr: and less than 2 Cr 15 % of the Drilling Cost with a maximum ceiling of Rs.20 Lkh	2500000	₹ 0.00
24		Drill Core Preservation- One complete BH plus mineralised cores of all the BHs of the block/ prospect to be preserved in GI Core boxes and subsequently transported to the notified core repository.	per m	X		1,590.00	500	₹ 0.00
Total Cost D- outsourced								**₹ 2,00,00,000.00**
Total (Survey Work + Drilling)								**₹ 2,07,68,000.00**
GST 18%								**₹ 37,38,240.00**
Total Fund Required inclusive of 18% GST								**₹ 2,45,06,240.00**
								~ 2.45 Cr

9.0 BIBLIOGRAPHY

Banerjee, P. K.(1966): Progress Report on the investigation for Nickel in the Kumardah-Kansa Block, Sukinda Ultramafic Field, Cuttack District, Orissa. (Unpublished report for FS 1965-66, Geological Survey of India)**.**

Banerjee, P.K (1972): Geology and geochemistry of the Sukinda Ultramafic field, Cuttack district, Orissa, Mem. G.S.I Vol.103.

Baral et.al (FS2023-25): Reconnaissance survey for chromite and nickel in Tungeisuni Block, Sukinda Ultramafic Complex, Jajpur district, Odisha, GSI unpublished report

Deekhitulu, M. N. (FS:1951-52). GSI Unpublshd. Report.

Jena, P.K. (2008) Report on STM for Iron Ore in the IOG group of rocks occurring in the south eastern part of Tomka- Daitari Belt, Kendujhar and Jajpur districts, Orissa (part of T.S. No. 73G/16, H/13 and K/4); FS:2006-08, GSI.

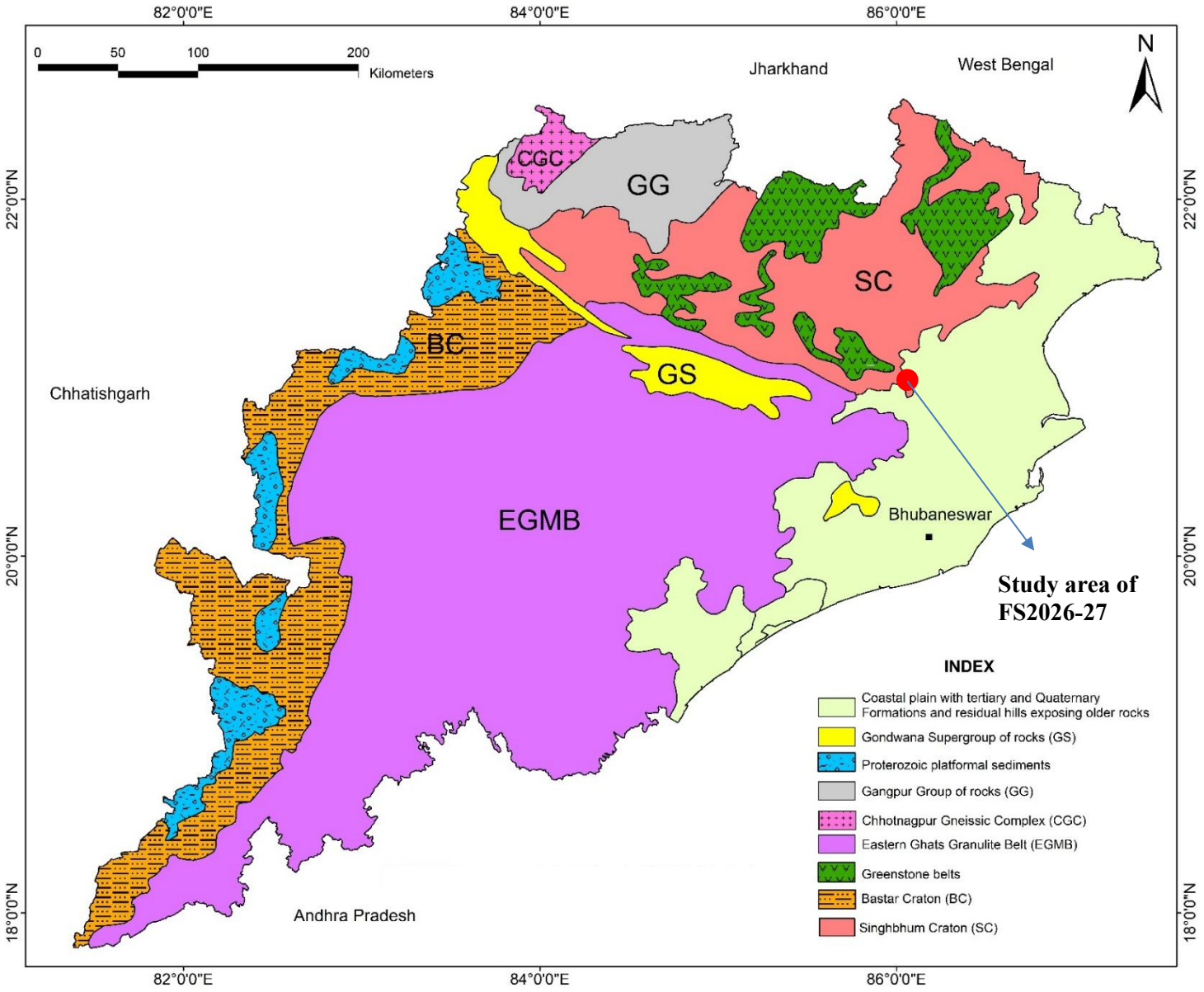


Fig.1: Location of study area of FS: 2026-27 over geological map of Odisha

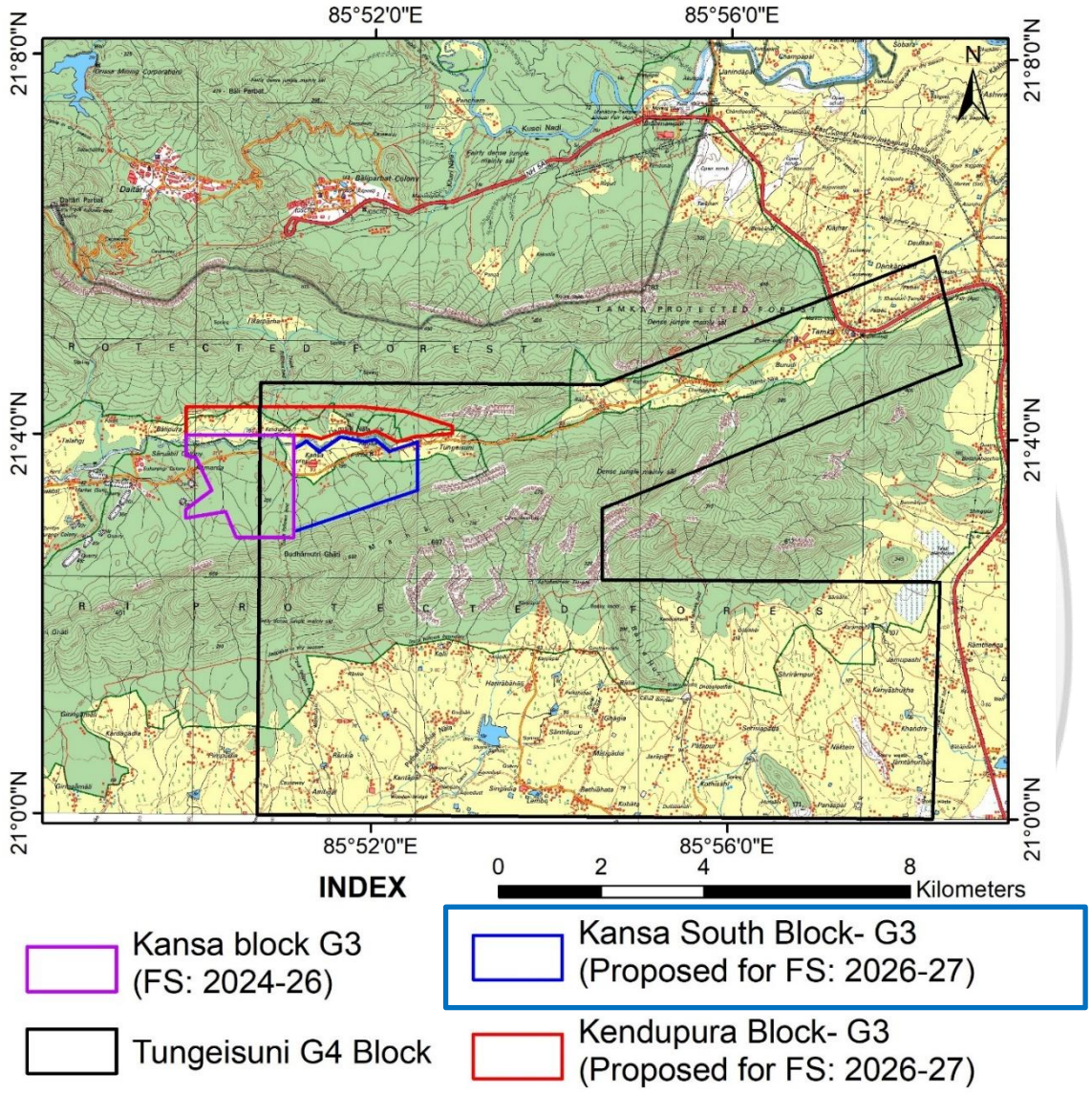


Fig.2: Location of proposed Kansa south G3 block of FS: 2026-27 over T.S. No. 73G/16 along with adjacent explored blocks.

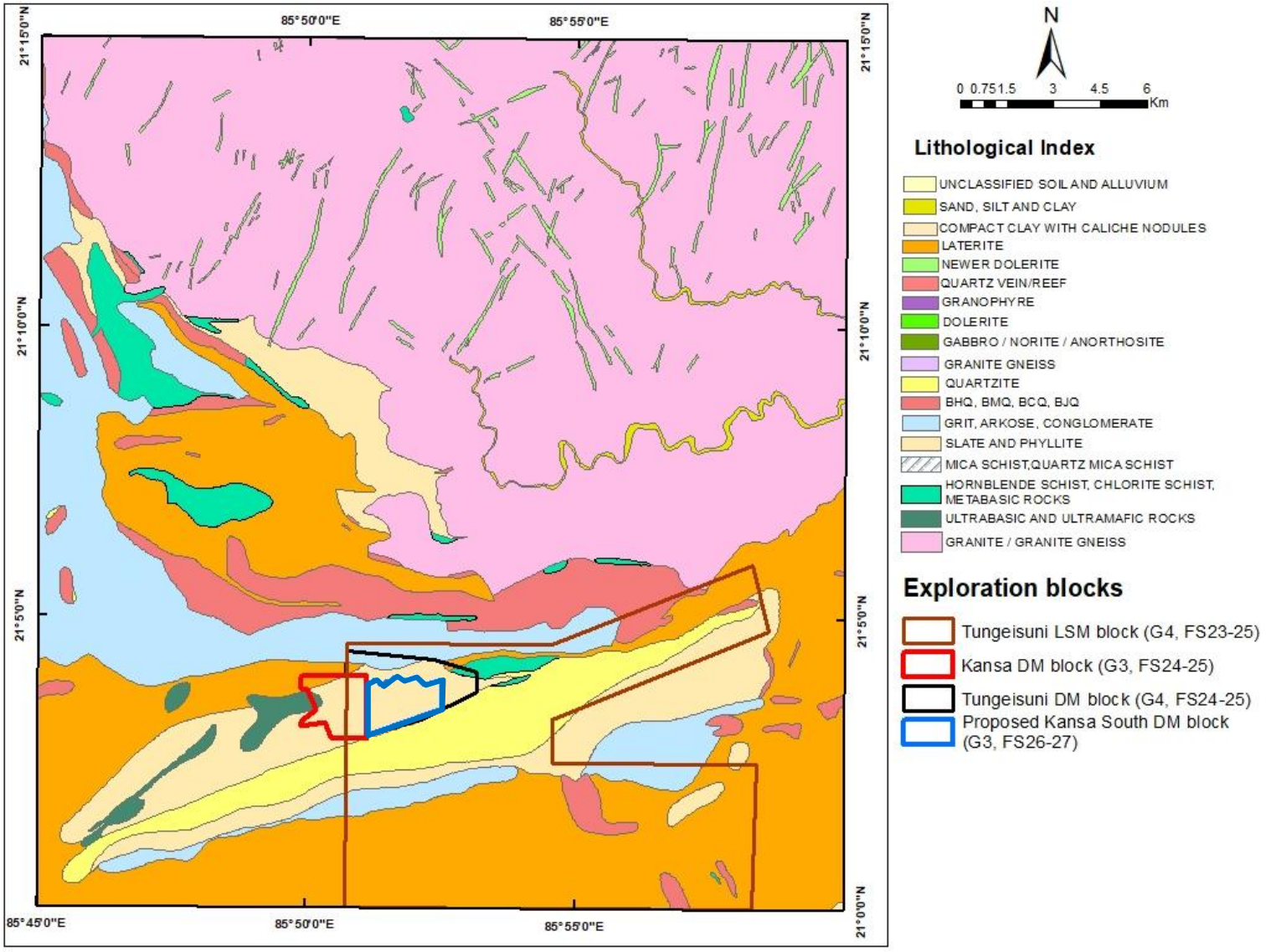
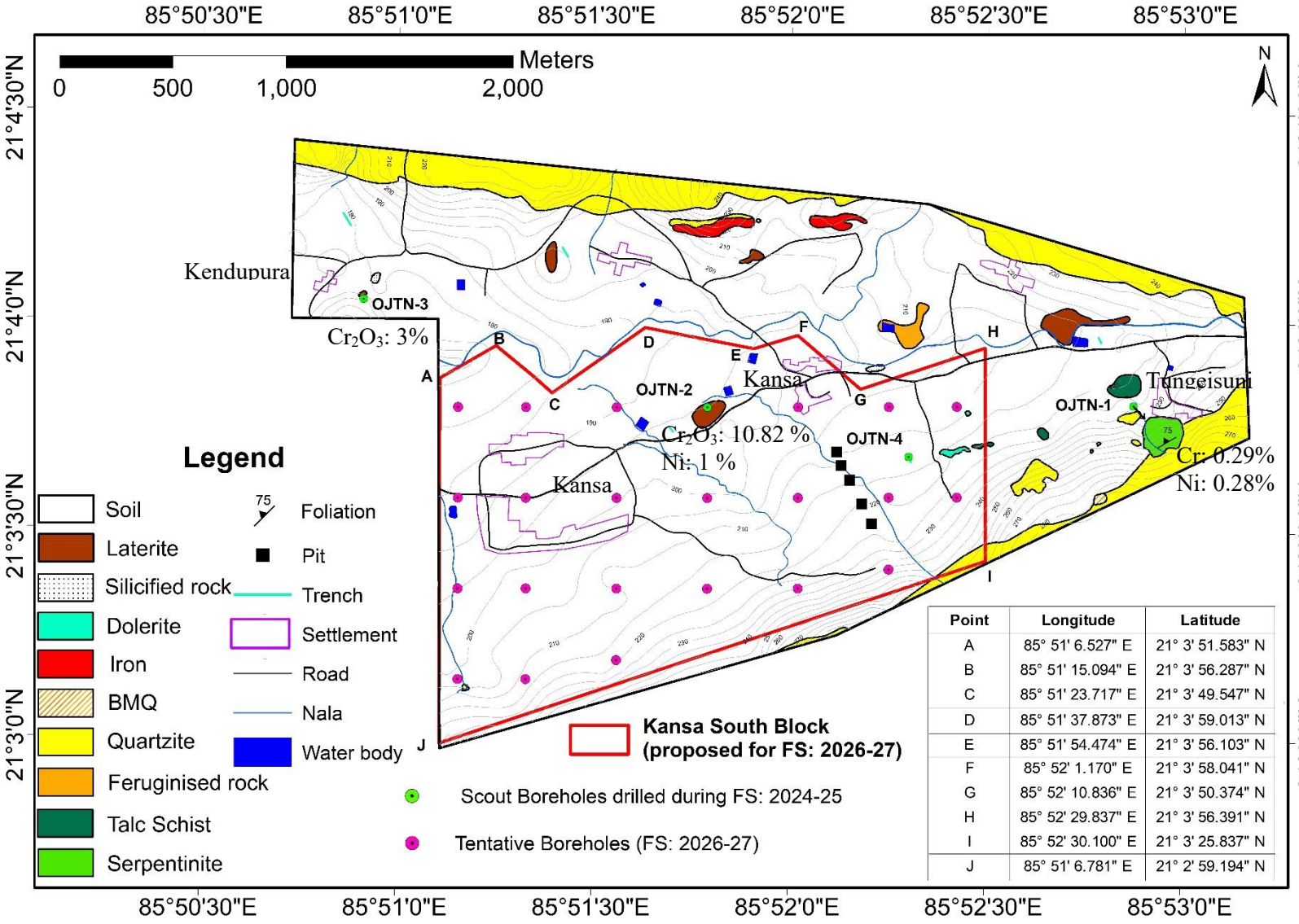


Fig.3 : Location of proposed Kansa south G3 block of FS: 2026-27 over geological map of T.S. no. 73G/16 along with adjacent explored blocks



Point	Longitude	Latitude
A	85° 51' 6.527" E	21° 3' 51.583" N
B	85° 51' 15.094" E	21° 3' 56.287" N
C	85° 51' 23.717" E	21° 3' 49.547" N
D	85° 51' 37.873" E	21° 3' 59.013" N
E	85° 51' 54.474" E	21° 3' 56.103" N
F	85° 52' 1.170" E	21° 3' 58.041" N
G	85° 52' 10.836" E	21° 3' 50.374" N
H	85° 52' 29.837" E	21° 3' 56.391" N
I	85° 52' 30.100" E	21° 3' 25.837" N
J	85° 51' 6.781" E	21° 2' 59.194" N

Fig. 4: Location of proposed Kansa south G3 block of FS: 2026-27 over detailed geological map of Tungeisuni block (FS2024-25).