PROPOSAL FOR PRELIMINARY EXPLORATION FOR GRAPHITE AND VANADIUM IN CHARWADIH BLOCK, PALAMU AND LATEHAR DISTRICTS, JHARKHAND (G3 STAGE)

COMMODITY: GRAPHITE AND VANADIUM

BY

GEOLOGICAL SURVEY OF INDIA

EASTERN REGION, STATE UNIT: JHARKHAND

PLACE: RANCHI
DATE: 17.04.2026

Summary of the Block for G3 Level Exploration

GENERAL INFORMATION ABOUT THE BLOCK

Features	Details
Block ID	Charwadih Block
Exploration Agency	Geological Survey of India, Eastern Region, State Unit: Jharkhand
Commodity	Graphite and Vanadium
Mineral Belt	Chotanagpur Granite Gneissic Complex (CGGC)
Completion period with entire time schedule to complete the project	One year (FS 2026-27)
Objectives	1. To establish the subsurface continuity and estimate the resources of graphite and vanadium.
Whether the work will be carried out by the proposed agency or through outsourcing	work is to be carried out by the proposed agency.
Name/Number of Geoscientists	Two geoscientists
Expected Field days	Officer 1: 100 days at field Officer 2: 100 days at field Supervisory officer: 10 field days

1. Location

Block

Cardinal Points	Latitude	Longitude
A	23.89185	84.31702
B	23.89651	84.32295
C	23.89132	84.32728
D	23.89389	84.33071
E	23.88411	84.33813
F	23.87804	84.32973
G	23.88798	84.32216

H	23.88692	84.32082
Tehsil/Taluk	Manika	
District	Palamu	
State	Jharkhand	

Topo sheet number	73A/05
Villages	Charwadih

2. Area

Block Area	2 sq. km.
Forest Area	Data not available
Government Land Area	Data not available
Private Land Area	Data not available

3. Accessibility

Nearest town	Latehar town, about 29 km to the southeast of Charwadih village
District headquarters	Medininagar (Daltonganj), about 37 km northwest of Charwadih village
Nearest Rail head	Latehar, about 32 km southeast of Charwadih village
Nearest Airport	Ranchi, 145 km

4. Hydrography

Small seasonal streams

5. Climate

Arid.

6. Topography

Soil covered area with small mounds.

7. Availability of baseline geoscience data

Geological map	Large-scale geological mapping and earlier G4 investigations by GSI in and around the block
Geochemical data	Surface chemical data from Granite gneiss, felsic dykes and channel samples in and around the block, NGCM
Geophysical data	NGPM. NAGMP

8. Justification for taking up G3 level exploration

1. Pandiya and Rawat (2020) have carried out G4 exploration and identified one graphite bands trending in NNW-SSE in Charwadih block. The length of band is approximate 800m and dipping moderately (50°-65°) towards the SW.

2. The bedrock (BRS) sample collected from Charwadih yielded highly encouraging values for Fixed carbon (FC) which ranges of 8.20% to 15.10% and vanadium (V) ranging from 736 ppm to 2132 ppm.
3. In the trench sample, FC ranges from 2.34 to 18.66% and V is upto 650ppm.

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1.0 INTRODUCTION

Graphite and vanadium are categorized amongst the 30 critical minerals delisted for the purpose of auction directly by the Government of India with benefits to be accrued by the State Government is yielding rich dividends and strengthening the resource position of the state. These efforts are providing a broader push to secure domestic supply chains and reduce dependence on imports. Global events have shown the fragility of imported mineral supplies. By strengthening its own graphite production from the state of Jharkhand – India enhances both economic resilience and strategic autonomy.

Graphite here occurs as disseminated flakes within metamorphic rocks and coal-associated formations. These deposits may vary in grade, but they are abundant and strategically significant. The graphite belt comprises assemblage of quartzite, graphite gneiss, and calc-silicate rocks with graphite occuring as lensoidal bands and lenticular bodies wrapping along the foliation plane of associated schists and gneissic country rocks.The country rock belong to Chotanagpur Gneissic Complex which accomodates enclaves of unclassified metamorphic rocks.

BACKGROUND INFORMATION

1.1 Regional Geology

The proposed area for investigation is a part of Domain 1B of CGGC. The E-W trending Domain IB is sandwiched between Gondwana Boundary Fault (GBF) in the south and Bihar Mica Belt (BMB) of Domain II in the north. This domain comprises felsic gneiss of varied mineralogy and composition which suffered granulite grade metamorphism and anatexis. Variably metamorphosed gneisses and schists of supracrustals and basic rocks occur as enclaves within the felsic gneiss (Fig. 1). Prasad (1972) carried out mapping on 1:31680 scale and reported high-grade graphite lenses and bands around Ledwakhar-Rabda area in part of T.S. 73A/1, Sohri-Ekta area, in part of T.S. 73A/05 and Arapur area in part of T.S. 72D/4 in Palamu district. Ahmad and Nagar (2018) carried out GCM in T.S. 73A/5, graphite was observed near Ejamar and Barwaiya village. They reported anomalous zone of V over graphite schist. LSM on 1:12,500 for graphite exploration carried out by Pandiya and Rawat (2020) in parts of T.S. 73A/05 in Palamu and Latehar District (Fig. 1). During mapping, a total of 15 bands of graphite schist in form of linear continuous and discontinuous bodies were delineated. A package of quartzite, graphite schist and calc-silicates rocks are closely associated. On the basis of mapping and disposition of various bands of graphite schist, five prospective blocks for graphite mineralisation have been identified. The exploration blocks namely Adhmaniya, Karma, Siuri and Budhiyabagi have been completed upto G2 stage. In addition to the graphite bands in the abovementioned blocks, graphite schist band at Tumbagara, **Charwadih** and north of Hurmur is marked during FS 2019-20. Graphite

mineralisation is strata bound, hosted by graphite schist. Graphite is flaky in nature, occurs along the foliation plane as isolated flat, plate-like grains. The bedrock (BRS) sample collected from Charwadih yielded highly encouraging values for Fixed carbon (FC) which ranges of **8.20% to 15.10%** and vanadium (V) ranging from **736 ppm to 2132** ppm. In the trench sample, FC ranges from 2.34 to 18.66% and V is upto 650ppm. In this block graphite schist is associated with calc-silicate and granite gneiss. The proposed block is an extension of Budhiyabagi G2 exploration block with another one additional graphite band.

The proposed Charwadih Block for preliminary exploration (G3 stage) is bounded by latitude 23.87804 to 23.89651 and longitude 84.31702 to 84.33813 covering an area of 2 Sq. km (Fig.3). In this block one graphite schist band trending NNW-SSE has been observed. The length of band is approximate 800m with 50m width and dipping moderately (50°-65°) towards west. Another band (Northern part of the block, Length-250m; width-25m) is identified by Singh and Khalkho (2024) during detail mapping in Budhiyabagi Block which is an SE extension of graphite schist Band-I.

1.2 Previous work on the proposed working area

1. Pandiya and Rawat (2020) have carried out G4 exploration aand identified one graphite bands trending in NNW-SSE in Charwadih block. The length of band is approximate 800m and dipping moderately (50°-65°) towards the SW.

2. The bedrock (BRS) sample collected from Charwadih yielded highly encouraging values for Fixed carbon (FC) which ranges of 8.20% to 15.10% and vanadium (V) ranging from 736 ppm to 2132 ppm.

3. In the trench sample, FC ranges from 2.34 to 18.66% and V is upto 650ppm.

4. Another band (Northern part of the block, Length-250m; width-25m) is identified by Singh, Khalkho and Ravi (2024) during detail mapping in Budhiyabagi Block which is an SE extension of graphite schist Band-I.

2.0 OBJECTIVES

1) To establish the subsurface continuity and estimate the resources of graphite and vanadium.

3.0 BLOCK DESCRIPTION

3.1 Location and extent

The North East of Muthli block is situated in the southeastern part of toposheet no. 73A/05, about 29 km northwest of Latehar town. Siwana is stated in the source proposal to lie about 37 km southeast of district headquarters Medininagar (Daltonganj). The proposed block is defined by four corner coordinates as given below.

Cardinal Points	Latitude	Longitude
A	23.89185	84.31702
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4.0 METHODOLOGY / WORK PLAN

The preliminary exploration will be carried out by means of surface exploration including DM, systematic collection of BRS/channel, pitting and trenching along with subsurface exploration by drilling of 800m along 08 inclined boreholes at an approx., a spacing of 200m. The DM on 1: 2000 scale will be carried out with contour interval 2m. Out of 08 boreholes, 06 boreholes will be put to intersect the graphite mineralisation at first level (30m) and remaining boreholes will be put to intersect the mineralised zone at the second level (60m). The area is freehold i.e. no RP/ML/PL granted so far. The ground geophysical survey (SP) of 22 L. Km with a traverse interval of 100m will be carried out to know the strike continuity in the soil cover area and depth persistence of graphite mineralization. Before commencement of drilling activity, the area may be checked for forest clearance.

5.0 NATURE AND QUANTUM OF WORK

Nature of Work	Work proposed for Charwadih Block
1. Geological Survey: Detailed Mapping (1:2,000)	2 sq. km
2. Technological survey: a. Surface Exploration i. Pitting / Trenching (PT) ii. Pit / Trench Sample (PTS) iii. BRS (Groove / Chip / Channel) b. Subsurface Exploration i. Drilling ii Core Sample (CS) iii GP logging	 50 m^3 50 nos. 20 nos. 800 m 250 nos. 400 m
3. Petrological studies i. Petrochemical Sample (PCS) ii. Petrological Sample (PS) iii. Ore Microscopy (OM) iv. SEM Study v. Raman spectroscopy vi. Geotechnical studies (Bulk Density)	 15 nos. 10 nos. 05 nos. 05 nos. 05 nos. 10 nos.
4. Geophysical Survey (SP)	22 L. km
4. Chemical analyses i. BRS, PTS & CS - Vanadium and Fixed Carbon ii. Check samples iii. PCS (Major, Trace and REE) iv. TOTAL	 320 nos. 25 nos. 15 nos. 360 nos.

6.0 TIMELINE

The proposed exploration programme is planned in such a way that all the activities like mapping, surface sampling, drilling, logging, core sampling and associated geological work and laboratory work will be completed within 12 months. Report writing will take 4 months with 2 months overlapping with laboratory analysis. Thus, the total duration of the project for completion of the above exploration will be 12 months from the date of commencement of the project.

SCHEDULED TIME FOR THE PROPOSED G-3 LEVEL EXPLORATION

S.No.	Activities	APR 2026	MAY 2026	JUN 2026	JUL 2026	AUG 2026	SEP 2026	OCT 2026	NOV 2026	DEC 2026	JAN 2027	FEB 2027	MAR 2027
		1	2	3	4	5	6	7	8	9	10	11	12
1	Surface sampling	■	■	■									
2	Geological Mapping (1:2000)		■	■	■								
3	Drone topographic Survey			■									
4	Laboratory studies		■	■	■	■		■	■	■	■	■	
5	Core drilling			■	■	■		■	■				
6	Geophysical borehole logging			■	■	■		■	■				
7	Core sampling			■	■	■		■	■	■			
8	Report writing/ Peer review									■	■	■	■

***Time loss on account of monsoon/agricultural activity/forest clearance/ local law & order problems will be addition to above time line.**

8.0 COST

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Nature and Quantum of work in the project		
1	Drilling (m)	800 m
2	Geophysical Survey (SP)	22 L.km
3	Geophysics Borehole logging	400m
4	Pit/Trench/BRS	70
5	Core samples	250
6	PCS	15
7	PS	10
8	Geotechnical studies Bulk Density	10
9	SEM	5
10	Raman	5
11	OM	5
12	Chemical Analysis	360

Summary of Cost Estimates

Sl. No.	Items	Total Estimated Cost (Rs.)	Funding
1	Survey work (Borehole fixation and block boundary demarcation)	₹ 8,92,960.00	NMEDT
2	Drilling	₹ 80,00,000.00	NMEDT
3	Laboratory studies	0	By GSI
4	Geologist at HQ	0	By GSI
	Sub Total (1 to 4)	₹ 88,92,960.00	By GSI
5	Exploration Report Preparation	0	By GSI
6	Proposal preparation	0	By GSI
7	Peer review charges	0	By GSI
	Sub Total (1 to 7)	0	By GSI
	Total	₹ 88,92,960.00	NMEDT
	GST 18%	₹ 16,00,732.80	
	Total Cost with 18 % GST	₹ 1,04,93,692.80	
	Say Rs.in Lakh	₹ 104.94 Lakhs	NMEDT

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 stem for all DGPS is compulsory	Per Point of observation	1.3.2		**24,000.00**	16	₹ 3,84,000.00
9	b	Charges of one qualified surveyor with Total station for carrying out topographical survey in different RF and surface contouring at different interval, fixation of borehole and determination of co-ordinates and reduced Level (RL) of the boreholes with total station etc. a) Charges of one surveyor per day (without labour) (Up to 4 labourers will be allowed per surveyor)	one surveyor per day	1.3.1		**10,500.00**	40	₹ 4,20,000.00
	c	Labour Charges for Survey work	Per day	As per Govt rates		**556.00**	160	₹ 88,960.00
Total Cost B (in case of out sourcing)								**₹ 8,92,960.00**

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 decrese 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	800	₹ 80,00,000.00
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	30	₹ 0.00
20		Land / Crop Compensation (in case the BH falls in agricultural Land)	per BH	5.6		30,000.00	8	₹ 0.00
21		Construction of concrete Pillar (12"x12"x30")	per borehole	2.2.7a		2,000.00	8	₹ 0.00
22		Borehole plugging with cement	per borehole	2.2.8		10,000.00	8	₹ 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	2000000	₹ 0.00

						maximum ceiling of Rs.20 Lkh		
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	350	₹ 0.00
Total Cost D- outsourced								**₹ 80,00,000.00**
Total (Survey Work + Drilling)								**₹ 88,92,960.00**
GST 18%								**₹ 16,00,732.80**
Total Fund Required inclusive of 18% GST								**₹ 1,04,93,692.80**
								~ 1.05 Cr

9.0 BIBLIOGRAPHY

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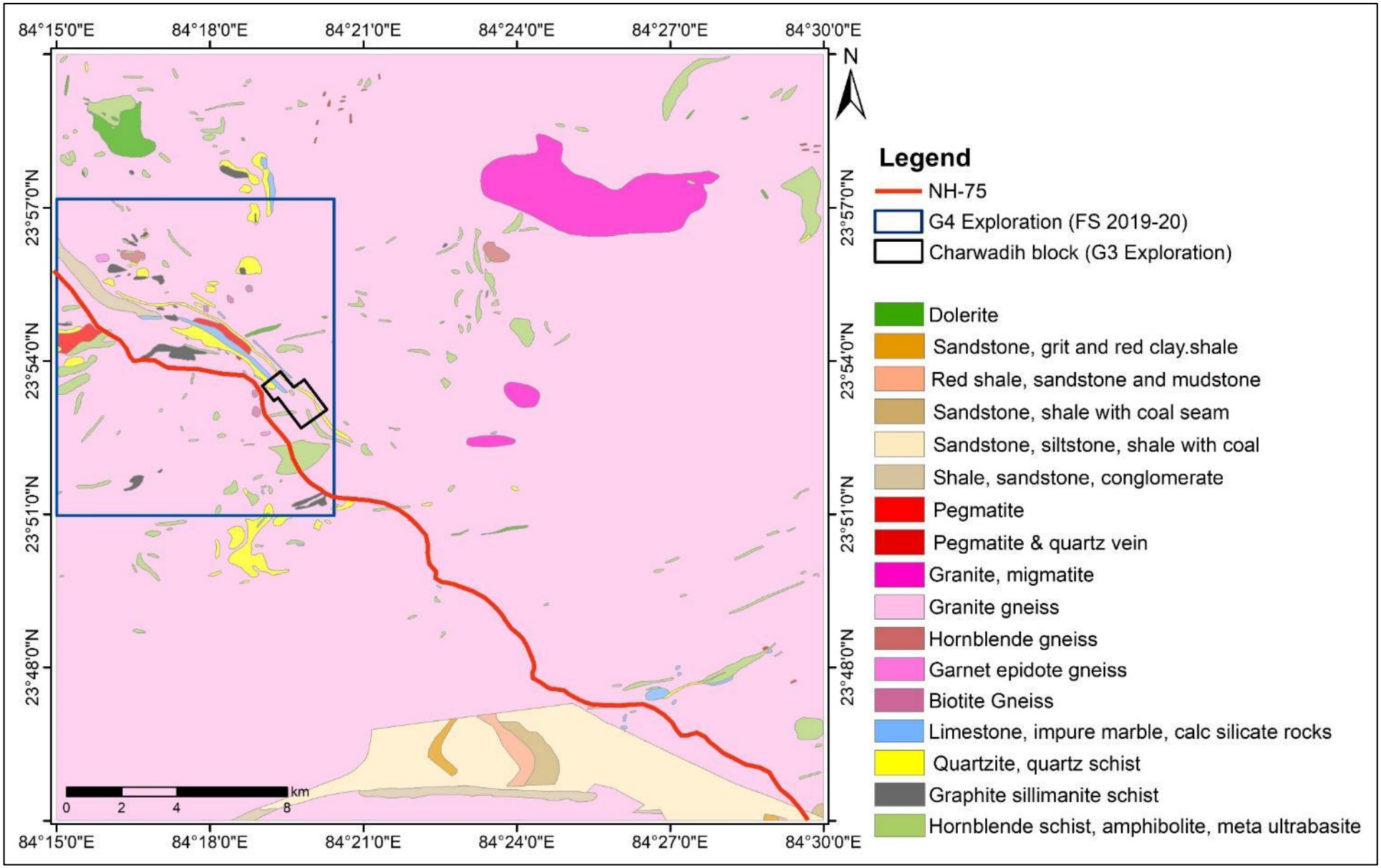

Fig. 1 Geological map of toposheet no. 73A/05 showing the proposed block.

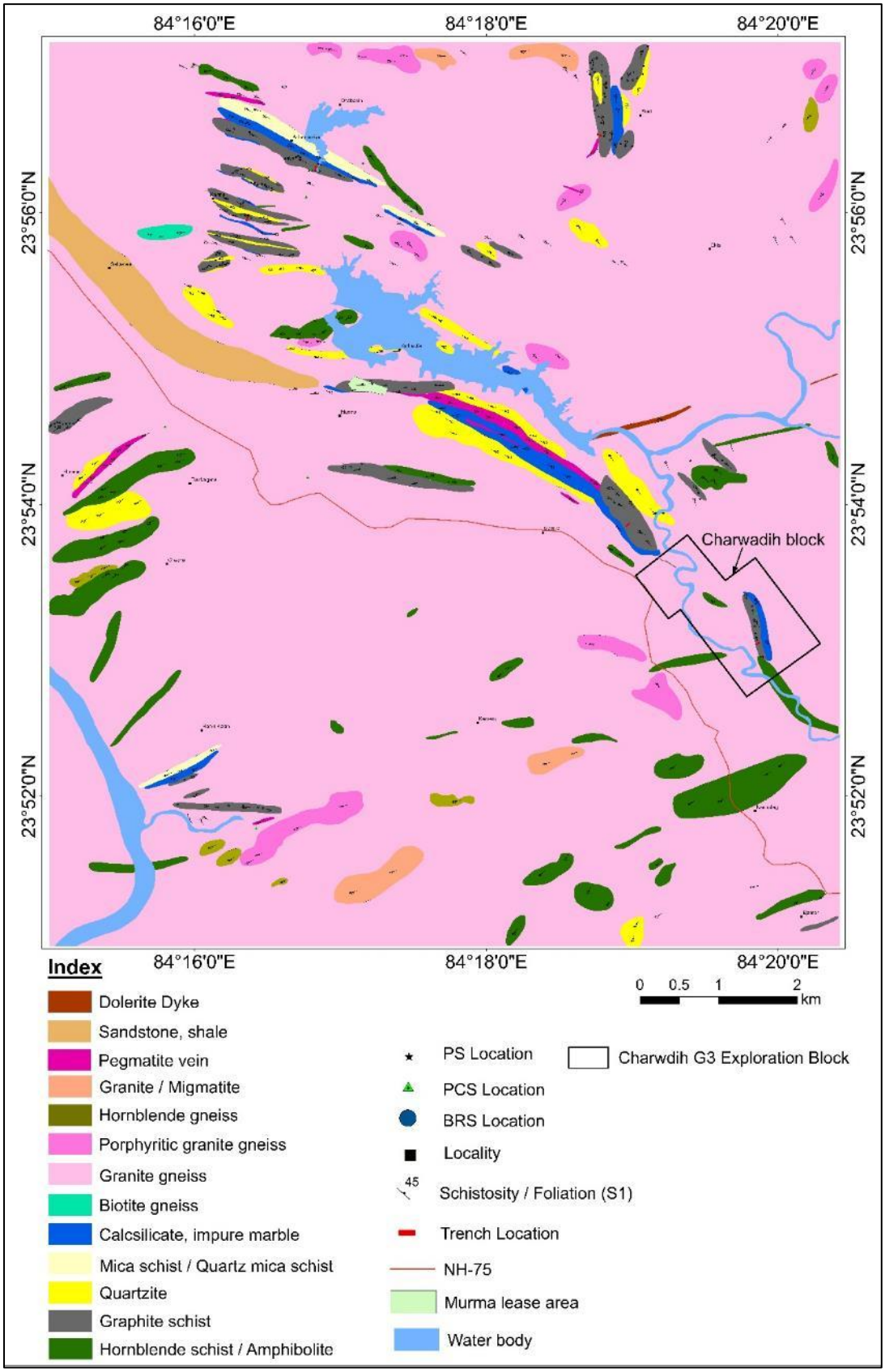

Fig. 2 Large Scale Map of Part of toposheet no. 73A/05 showing location of proposed block.

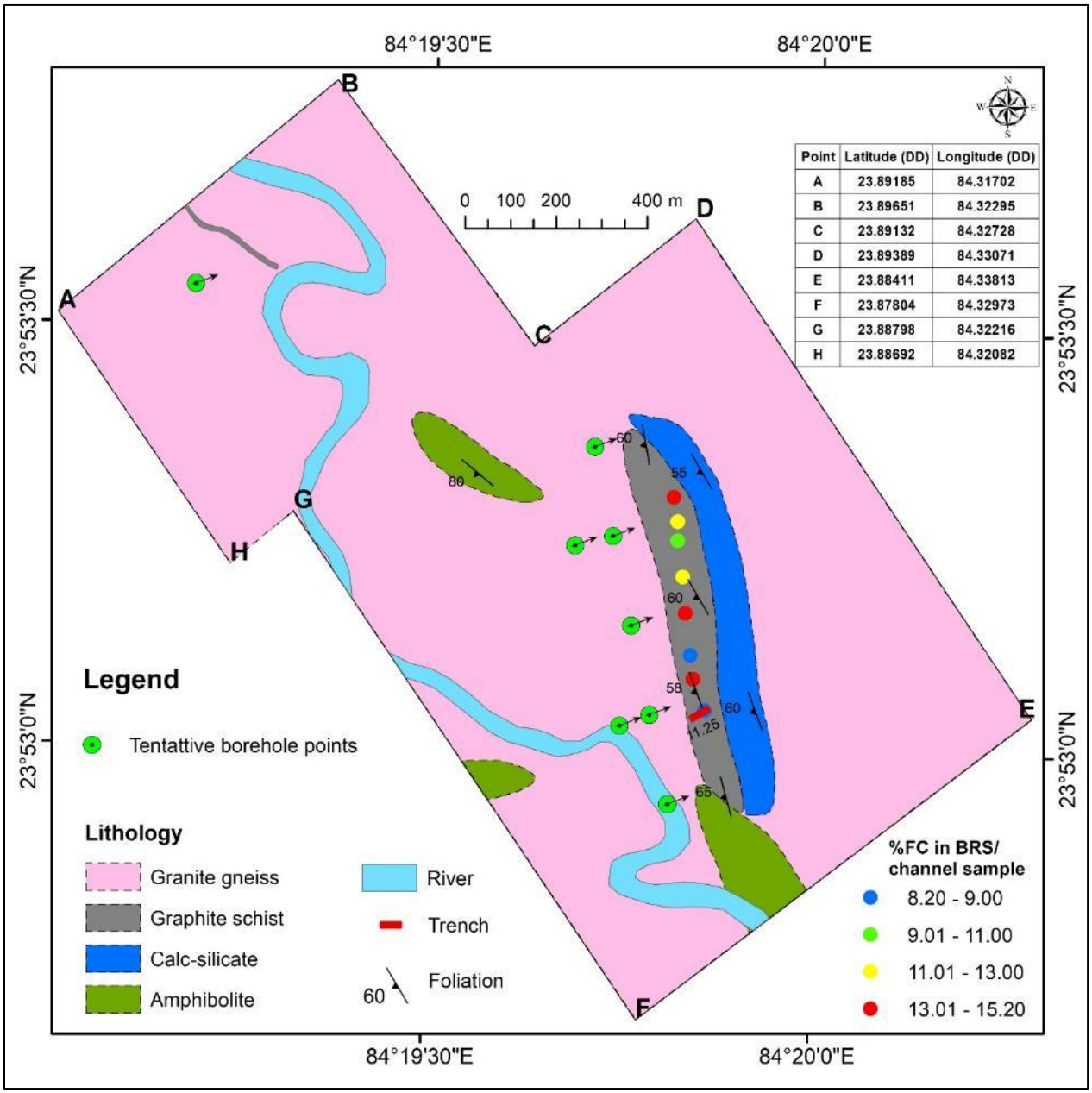

Fig. 3 Geological map (LSM) of Charwadih Block for preliminary exploration for graphite and vanadium with tentative boreholes points.