



FORMAT FOR SUBMITTING PROPOSAL FOR UNDERTAKING EXPLORATION

To
The Director,
Directorate of Geology and Mining, (DGM)
Plot N0-27, Khanij Bhawan,
Cement Road, Shivaji Nagar,
Nagpur-440010, Maharashtra.

Chandrapur, dated the 23rd February'2023

Madam/Sir,

I am submitting the following details for granting 'in-principle' approval of the State Govt. for submitting the scheme of reconnaissance to NMET under Mode-'A' of the Scheme for Engagement of Notified Private Exploration Agencies in Mineral Exploration issued by **Ministry of Mines vide order No. M.VI.16/15/2021.Mines VI dated 12th August'2021.**

1) Name and address of the Applicant		
(a)	Name	GEMCOKATI EXPLORATION PVT.LIMITED
(b)	Postal address	Plot No-34, Bapat Nagar, Chandrapur-442401, Maharashtra.
(c)	Telephone No (Office)	07172 - 287200
(d)	Fax No (Office)	07172 - 287200
(e)	Mobile No	+91 7044208900
(f)	Telephone No (Residence)	
(g)	E-mail address	subrata.sarkar@gemcokati.com
2) Detail of Accreditation as Private Exploration Agencies and Notification under the proviso to Section 4 (1) of the MMDR Act.		
(a)	Date of accreditation granted by QCI-NABET	16 th March'2022
(b)	Date of expiry of accreditation	6 th March'2025
(c)	Date of Notification under the proviso to Section 4 (1) of the MMDR Act.	7 th April'2022
(d)	Date of expiry of notification	6 th March'2025
(e)	Category of the Exploration agency (Category A or B) under Notification	Under category 'A' Exploration Agency.
3) Location details of the area proposed		
(a)	State	Maharashtra
(b)	District(s)	Gadchiroli
(c)	Nearby village(s)	Etapalli Tehsil.
(d)	Survey of India (SOI) Toposheet No (s)	65A/10
(e)	Area in Sq. Km	100 Sq. Km

(f)	Boundary co-ordinates of the Proposed Block (in Decimal Degree)	MURWADA-TUMARIKODI BLOCK						
		LONGITUDE			LATITUDE			
		(A)	80 ⁰	35'	00"	19 ⁰	42'	30"
		(B)	80 ⁰	39'	00"	19 ⁰	42'	30"
		(C)	80 ⁰	39'	00"	19 ⁰	35'	00"
(D)	80 ⁰	35'	00"	19 ⁰	35'	00"		
4) Mineral Potential of the area								
(a)	Name of Mineral(s) identified/expected in the area/block	Iron Ore						
(b)	Basis on which mineral potential of the area has been identified	Geology and Mineral resources of Maharashtra-2000 (Fourth Edition) a publication by DGM, Maharashtra, Nagpur.						
(c)	List of documents/references relied upon in support of item (b) above	Previous Geological mapping/investigation by DGM, MS & GSI. And available documents in public domain.						
5) Documents to be enclosed with the application								
(i)	Demarcation of the proposed block on Toposheet (SOI), Goggle map, 50 K Geol. map and DRM map.							
(ii)	Documents mentioned in items 4 (C) above							
	Place – Chandrapur							
	Date - 23.02.2023.			Signature of the applicant				



Proposal for Iron Ore in Murwada-Tumarikodi Block (100 sq. km),
District: Gadchiroli, Maharashtra for Reconnaissance Survey (G-4 stage) under NMET

COMMODITY: IRON ORE

BY

GEMCOKATI EXPLORATION PRIVATE LIMITED

Plot No-34, Postal Colony, Bapat Nagar, Chandrapur-442401, Maharashtra

Place: Chandrapur
Date: 23rd February'2023



Summary of the proposal for Reconnaissance Survey (G-4) for Iron Ore in MURWADA-TUMRIKODI BLOCK (100 sq. km), DISTRICT: GADCHIROLI, MAHARASHTRA, Toposheet No-65A/10.	
Features	Descriptions
Block ID	Murwada-Tumrikodi Block.
Exploration Agency	GemcoKati Exploration Pvt. Ltd.
Commodity	IRON ORE
Mineral Belt	The supracrustal belts and other tectonometamorphic provinces of Central India have been divided into two crustal provinces viz. Southern Central Province (SCP) and North Central Province (NCP). Southern Central Province is further divided into two parts namely Sakoli Fold Belt (SFB) and Bastar Craton. The proposed block is falling within Bastar Craton .
Schedule of complete the Project	12 months.
Objectives	The Present Exploration Programme (G-4) is formulated based on available data in Public Domain on regional and local level exploration being carried out previously by various agencies in the surrounding areas, with the following objectives via-a vis proposed field components. 1) To carry out Geological Mapping on 1:12,500 scale of the block (100 Sq. Km) to assess various litho units using field equipment's, recording of linear and planar structural features like shear zones, fracture zones and lineaments, looking for iron ore mineralization and to assess the strike continuity of possible Iron ore deposit. 2) To identify wall rock alteration zones, if any by study of Satellite Aster data. 3) To carry out systematic grab/channel sampling of bed rocks. 4) To carry out systematic soil sampling/overburden material of areas overlying targeted host rocks and stream sediments of first and second order streams. 5) Anomalous mineralization zone is to be identified, if any using hand held portable XRFs before undertaking detailed chemical analysis. 6) Petrological studies of possible host rock and their chemical analysis.

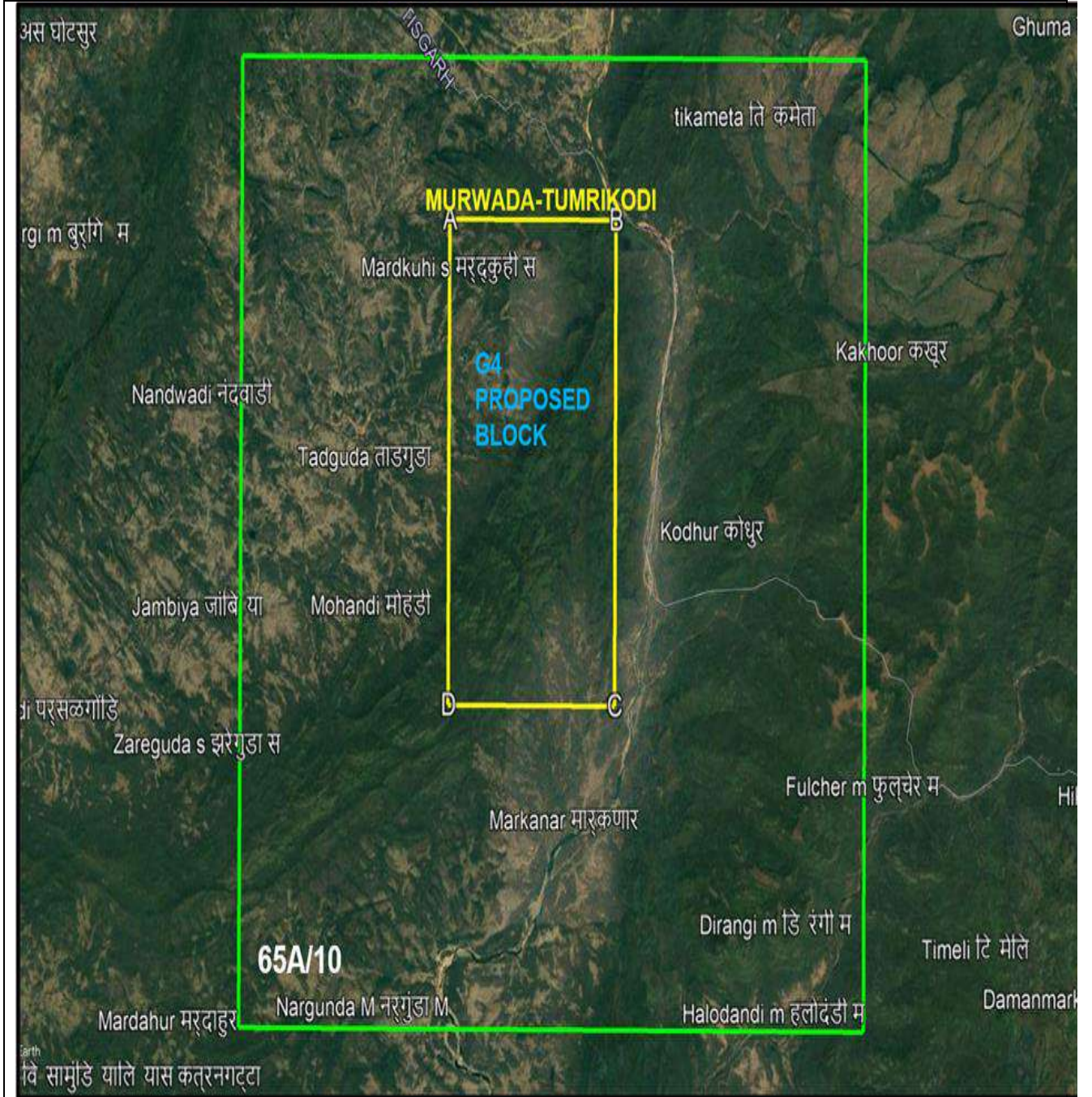


	7) Pitting-trenching of selected zones and sampling. 8) To assess G4 category (334) Iron Ore resources in the Block area as per UNFC norms and Minerals (Evidence of Mineral Contents) Rules 2015
Whether the work is to be carried out by the proposed agency or through outsourcing and details thereof.	The work will be carried out by the proposed agency ie. Gemcokati Exploration Pvt. Ltd.
Components to be outsourced and name of the outsourced agency.	Not applicable
Name /Number of Geoscientists	Two Geologist (2 G), Two Geophysicist (2GP) & Surveyor (01).
Expected Field Days (Geologist, Geophysicist, Surveyor)	Geologist- 240 days :: Geophysicist-50 days :: Surveyor – 30 days
1-Location	
Co-ordinates of the proposed block	1. A--80°35'00"-- 19°42'30" 2. B--80°39'00"-- 19°42'30" 3. C--80°39'00"-- 19°35'00" 4. D--80°35'00"--19°35'00"
Villages	Paidi, Koindud, Murwada, Tumrikodi
Tehsil/Taluk	Ettapalli.
District	Gadchiroli
State	Maharashtra
2-Area (hectares/sq.km)	
Block Area	100 Sq.Km.
Forest Area	The area is covered by mixed dense Bamboo forest within Koti Protected Forest.
Government Land Area	
3-Accessibility	
Nearest Rail Head	Ballarshah is the nearest Railway Station operated by Central Railways connecting Nagpur via Chandrapur stations. The distance being 210 Km from the Block area.
Road	The study area is well connected with Nagpur/Chandrapur towns by State Highway and accessible throughout the year via Bhamragad, Allapalli and Ashti, which is about 200km from Chandrapur and 350 Km from Nagpur Town.Ettapalli and Ashti are also well connected through Gondia-Chandrapur Narrow Gauge Railway line.

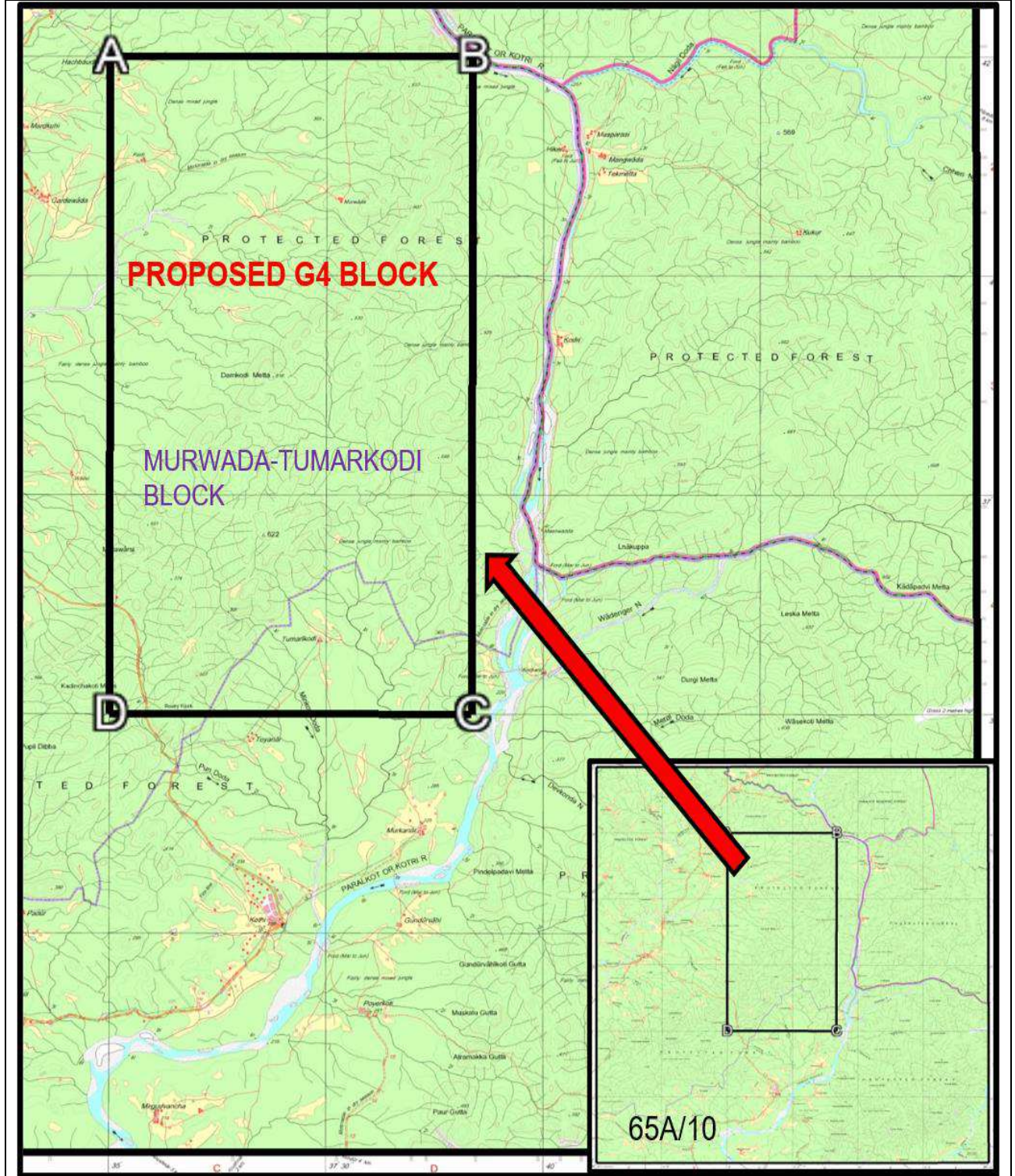
Airport	Nagpur Airport is 320 km away from Block area.
4-Hydrography (Local Surface Drainage Pattern-Channels)	
Rivers and Streams	The first/second order streams of the area display dendritic pattern and are controlled by both lithology and structure of the rocks meeting in the west by Jambia River and in the east by Kotri/Paralkote Rivers.
5-Climate	
	The area is having dry and partly humid climate. The southwest monsoon commences from June and continuous till September. The winter starts from late October/early November and continue to February.
Mean Annual Rainfall	The area experiences an annual average rainfall of about 150 cm during monsoon between June to October. A thick soil cover aided by a good rainfall has given rise to moderately thick vegetation forming deciduous type of forests.
Temperature	The highest and lowest temperatures of the area vary between 45°C and 15°C. May is the hottest month of the season whereas December is the coldest month.
December (Minimum)	8°C
May (Maximum)	40° - 45° C [Average varies from 8°C to 30°C]
6-Topography	
	The area is represented by linear arcuate hill ridges extending from NE-SW. Densely forested terrain with intermittent valleys in between. Western part is pediplain area. The relief difference is much higher, the highest and lowest points being 622m in the East of Matawarsi and 268m in the west near Koindud.
Toposheet No.	65A/10
Morphology of the area	The area exhibits a matured topography having attained peneplanation and surrounded by high linear ridges.
7- Availability of Baseline Geoscience Data	
Geological Map (1:50K/1:25K)	1:50, 000 Scale Geological Map is available and was downloaded from GSI Portal (Bhukosh).
Geochemical Data	Area is not covered by National Geochemical Mapping (NGCM) yet.
Geophysical(Aeromagnetic, ground geophysical, Regional and local GP maps)	Area is not covered by National Geophysical Mapping (NGPM) and National Aero-Geophysical Mapping (NAGMP) yet.

8-Justification for taking up Reconnaissance Survey (G4)	
	(A) The proposed area falls under Western Bastar Craton which hosts numerous Iron Ore occurrences along three distinct parallel arcuate ridges starting from Surjagad Hill range in the north (65A/06) to Damkod Wadvi Hill Range (65A/06 & 65A/10) in the middle and Bhamragad Hill Range (65A/11) in the southern most part. (B) DGM Maharashtra is the pioneer Govt. Agency in initiating the investigation during 1963-64 and continued till 1970-71, where 4034m drilling meterage was drilled in 57 Boreholes in parts of Wureea Hill within Surjagad Hill Range within the Toposheet area of 65A/06. Total 14 prospects have been delineated in this Hill Range with cumulative resource of 154.24 mt. (C) The proposed block falls within the Damkode-Wadvi Hill Range (65A/10). The iron ore is seen exposed on hill tops with spreading of float ore in the slope with (+) 65% Fe. (D) DGM, MS had carried out commendable job in those days in seventies, with several limitations viz. absence of road network, remoteness of the area, (densely forested area) etc. The Geological Reports of those parts are now not available in public domain. Moreover, further exploration work was also not been advanced in last 20-25 years. (E) In view of potentiality of the area as detailed above, the area needed to be revisited and proper GR to be brought out with resources of Iron ore under UNFC G4 stage to facilitate State Govt for initiating auctioning process. (F) Being falling under bulk mineral category with bedded and stratified nature, the Iron ore exploration of this area may be taken up even directly under UNFC-G3 stage, if agreed upon.
	1- Block area on google map. (Toposheet-65A/10) 2- Block area demarcated on Survey of India (SOI) Toposheet(s) 65A/10. 3- Block area overlaying on 50K Geological map. (65A/10). 4- Block area on District Resource Map (DRM).

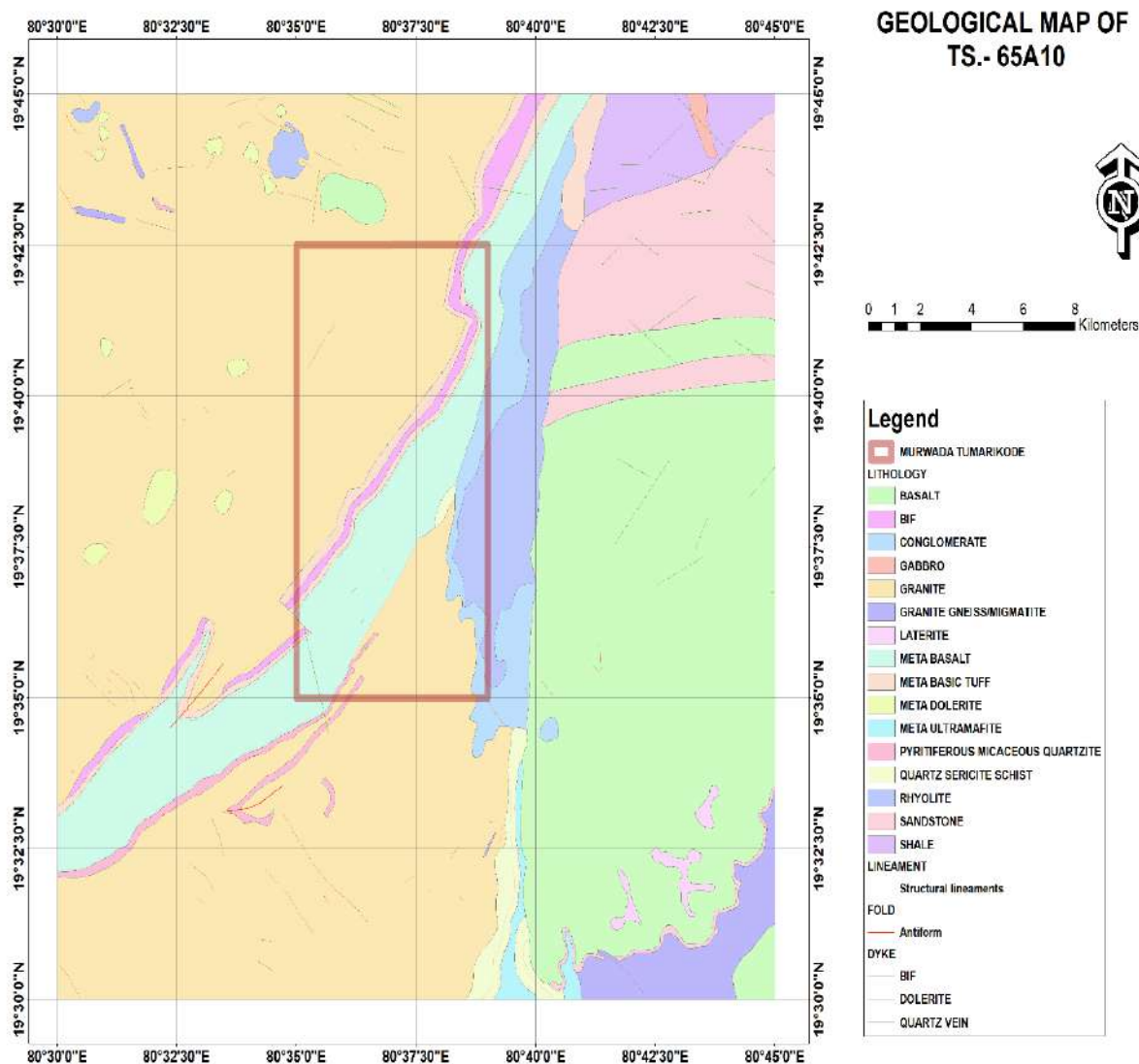
**MURWADA-TUMARIKODI BLOCK AREA, DEMARCATED ON
GOOGLE MAP**



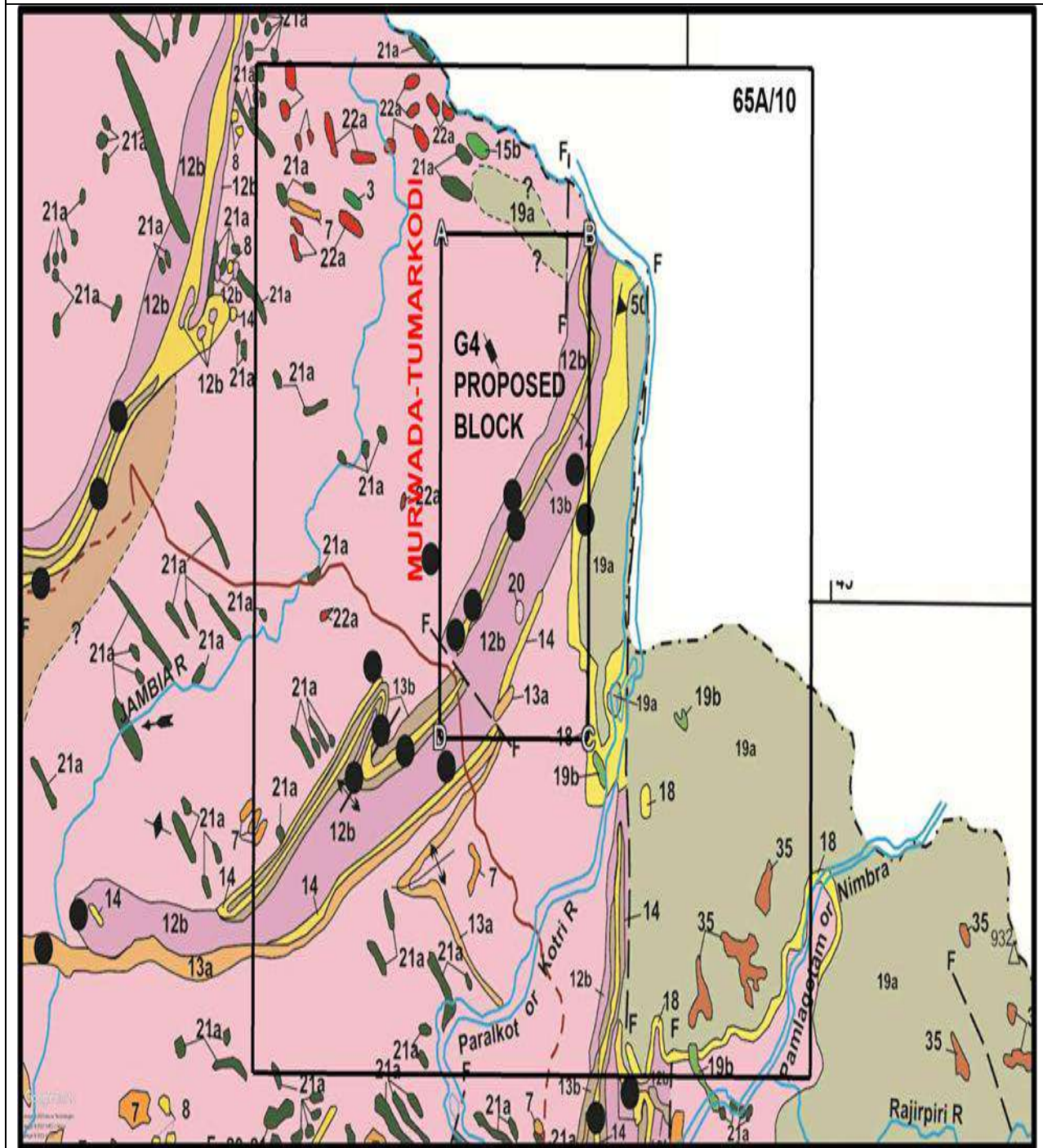
**MURWADA-TUMARIKODI BLOCK AREA, DEMARCATED ON
TOPOSHEET -65A/10**



MURWADA-TUMARIKODI BLOCK AREA, DEMARCATED ON 50 K GEOLOGICAL MAP



**MURWADA-TUMARIKODI BLOCK AREA, DEMARCATED ON
District Resource Map.**



PLOT NO. 34, POSTAL COLONY, BAPAT NAGAR, CHANDRAPUR 442401, MAHARASHTRA

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DETAILED GEOLOGICAL REPORT

**PROPOSAL OF RECONNAISSANCE SURVEY (G-4) FOR IRON ORE
IN MURWADA-TUMARIKODI BLOCK (100 SQ. KM),
DISTRICT: GADCHIROLI, MAHARASHTRA**

COMMODITY: IRON ORE

BY

**GEMCOKATI EXPLORATION PRIVATE LIMITED
E-77 MIDC ROAD, CHANDRAPUR 442406, MAHARASHTRA**

PLACE: CHANDRAPUR

DATE: 13th MAY'2023



Summary of the block for Reconnaissance Survey (G-4) for Iron ore in MURWADA-TUMARIKODI BLOCK (100 sq. km.), District: Gadchiroli, Maharashtra, Topo sheet No-65A/10.	
GENERAL INFORMATION ABOUT THE BLOCK	
Features	Details
Block ID	MURWADA-TUMARIKODI BLOCK.
Exploration Agency	Gemco Kati Exploration Pvt. Ltd.
Commodity	IRON ORE
Mineral Belt	The area belongs to the Bastar craton in Central Indian Peninsular shield, bounded by Satpura Mobile Belt in the Northwest, Eastern Ghat Mobile Belt (EGMB) in the East; Godavari graben in the South and the Deccan Trap in the West. The Bastar Craton covers parts of Southern Orissa, South eastern Madhya Pradesh, and Eastern and South eastern Maharashtra.
Time Schedule to complete the Project	Time Line for Exploration work is 6 months.
Objectives	The block area falls in the vicinity of operational Surjagad Iron Ore Mines, on curvilinear Damkod-Wadvi Hill range. The presence of host rock lithology for Iron viz. BIF and ferruginous Phyllites, encourages to take up the G4 Exploration in this area. Evaluation of previous work and recent field visits by Gemcokati has indicated occurrence of encouraging values of Iron ore in and around the proposed block. On the basis of evidences of mineralization, the present exploration program (G4) has been proposed, incorporating the encouraging analytical values of field samples to fulfil the following objectives. 1) To carry out Geological mapping on 1:12,500 scale for demarcation of Iron ore bearing host rock with the structural features to identify the surface manifestations and lateral disposition of the mineralized zones. 2) To carry out trenching, if possible in this part of the area-50 cum and collection of 50 trench samples for whole rock analysis. 3) To collect bedrock samples, Channel samples and to analyze for major oxides for further course of Exploration program. 4) Petrological studies of possible host rock and their chemical



	analysis. 5) To estimate reconnaissance resources (334) along with accessory elements as per UNFC norms and Minerals (Evidence of Mineral Content) Rules-2015 at G-4.
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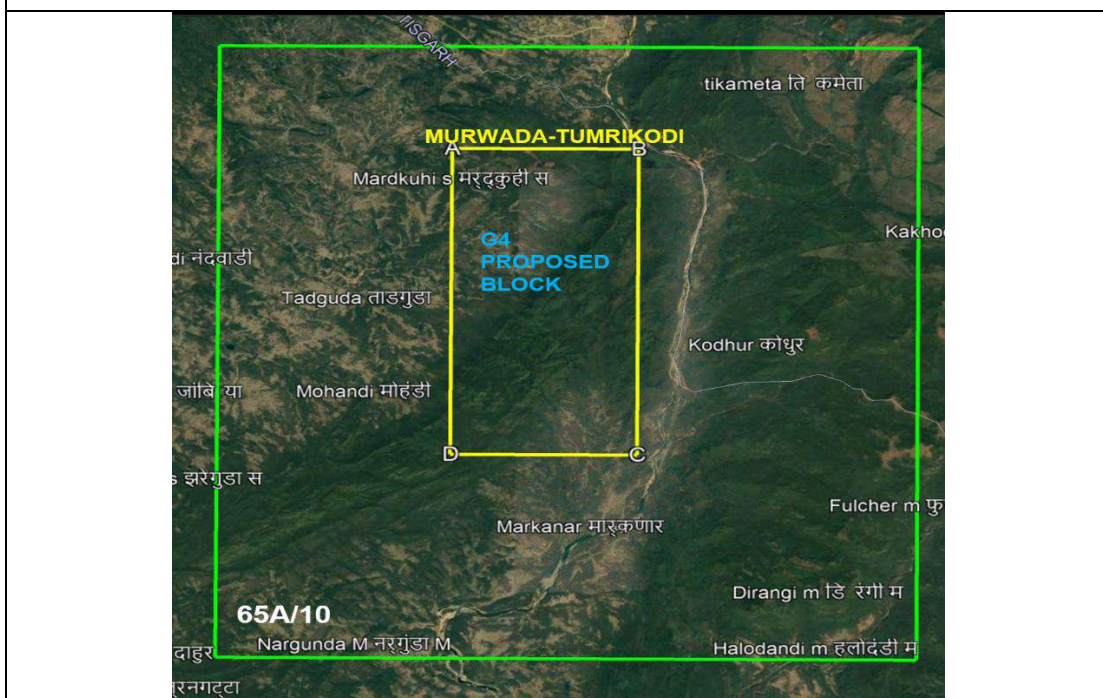
Whether the work is to be carried out by the proposed agency or through outsourcing and details thereof. Components to be outsourced and name of the outsourced agency	Work will be carried out by the proposed agency ie. Gemcokati Exploration Pvt. Ltd Not applicable
Name /Number of Geoscientists	Two Geologist (2 G)
Expected Field Days (Geologist)	Per Geologist- 150 days [30 days in HQ.+120 days in field]
1-Location	
Co-ordinates of the proposed block	1. A- 80° 35'00" -- 19° 42' 30" 2. B- 80° 39'00" - 19° 42'30" 3. C- 80° 39'00" – 19° 35' 00" 4. D- 80° 35'00" -- 19° 35' 00"
Villages	Paidi, Koindud, Murwada, Tumrikodi
Tehsil/Taluk	Ettapalli
District	Gadchiroli
State	Maharashtra
2-Area (hectares/square km.)	
Block Area	100 Sq.Km.
Forest Area	The area is covered with mixed dense protected forest.
Government Land Area	-
3-Accessibility	
Nearest Rail Head	Mul is the nearest Railway Station, operated by Central and South-Central Railways, connecting Nagpur and Chandrapur Cities.

Road	The study area adjoining Bhamragarh is well connected with Chandrapur Towns by State Highway and accessible throughout the year, distance being 205 Km via Allapalli and Asthi,, which are about 46 km from Ettapalli and connected by District Main Road, Bhamragarh a prominent tribal village in the area which is 20 km south of Jinjgaon. Ettapalli is Tehsils Hqrs. and of 165 Kms away from Chandrapur.
Airport	Nagpur Airport: 310 km from Block area
4-Hydrography (Local Surface Drainage Pattern- Channels)	
Rivers and Streams	The first/second order streams of the area display dendritic pattern and are controlled by both lithology and structure of the rocks meeting in the west by Jambia River and in the east by Kotri/Paralkote Rivers.
5-Climate	
	The area is having dry and partly humid climate. The southwest monsoon commences from June and continuous till September. The winter starts from late October/early November and continue to February.
Mean Annual Rainfall	The area experiences an annual average rainfall of about 140 cm during monsoon between June to October. A thick soil cover aided by a good rainfall has given rise to moderately thick vegetation forming deciduous type of forests.
Temperature	The highest and lowest temperatures of the area vary between 45°C and 15°C. May is the hottest month of the season, whereas December is the coldest month.
December (Minimum)	10°C
May (Maximum)	40° - 45° C [Average varies from 10°C to 30°C]
6-Topography	
Topo sheet No	65A/10
Morphology of the area	The area exhibits a high mountainous ridges running north east-south west direction. The area is covered by densely forested terrain with intermittent valleys in between. The relief difference is much higher, the highest and lowest points being 622 m south of Tumarikodi and 268 m near Koindud, towards southern part.
7- Availability of Baseline Geoscience Data	
Geological Map (1:50K/1:25K)	1:50, 000 Scale Geological Map is available and was downloaded from GSI Portal (Bhukosh).
Geochemical Data	Area is not covered yet by NGCM.

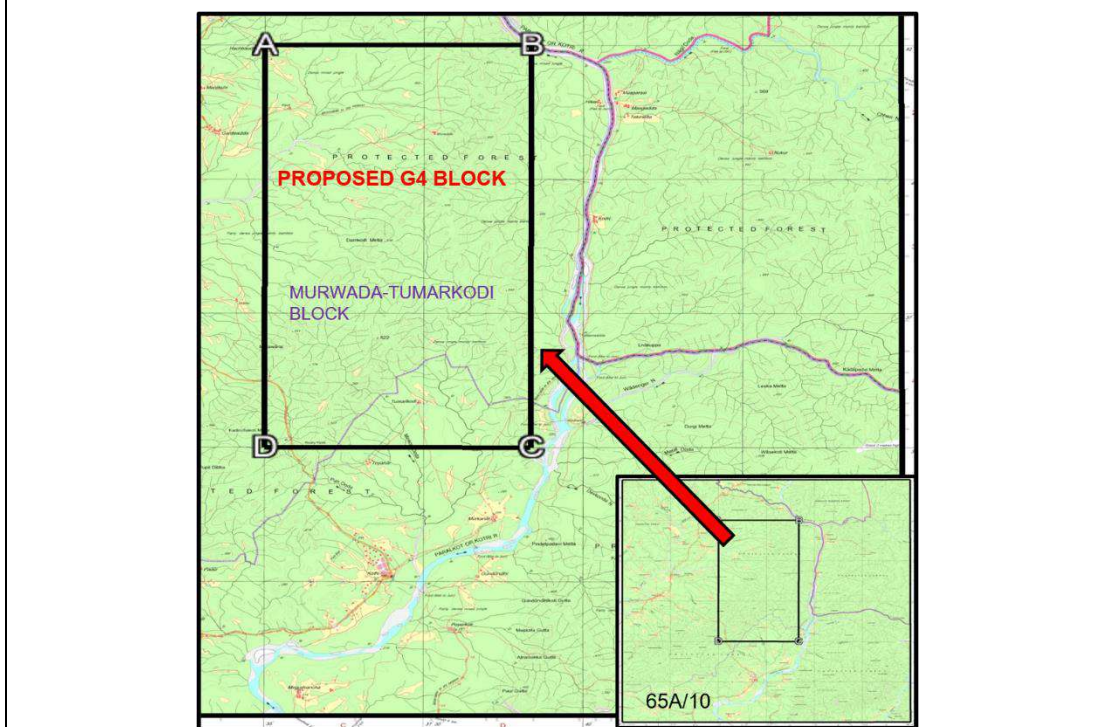
Geophysical(Aeromagnetic, ground geophysical, Regional and local GP maps)	Area is not covered yet by NGPM.
8-Justification for taking up Reconnaissance Survey/Regional Exploration	
	i) The proposed area falls within Western Bastar Craton which hosts numerous Iron Ore and Base Metal deposits in, Gadchiroli and adjacent Chandrapur Districts viz. Surjagad and around Minjhari to Nei-Delli Lal Heti to Thanewasna to Ghanpur-Mudholi. ii) Mineralization of Iron is occurring around the area associated with Banded Iron Formation (BIF) and ferruginous Phyllites. iii) Iron ore Mines at Surjagad is operational right now, is the only mining activity prevailing in the close vicinity of the block area. iv) Geological activities had been suspended in this part of Gadchiroli District since last 40 years. v) Even two most prestigious National Programs ie.National Geochemical Mapping (NGCM) and National Geophysical Mapping (NGPM) coupled with STM work have not yet been initiated in this part of Maharashtra. vi) Major part of Gadchiroli District is designated "Obvious Geological Potential" Area (OGP) and remain unexplored. vii) Gemcokati is a Maharashtra (Chandrapur) based NPEA and presently camping at Surjagad for drilling work of M/s-Lloyd Steel, has a locational advantage and willing for initiating exploration activities in this part. viii) During recent field traverses, GEMCOKATI has identified BIF and Phyllites at several places, collected few samples and analyzed them for Iron ore from M/s Tata Steel, Joda. Samples are showing values ranging between 59.25% - 60.40 % Fe. ix) Alenga-Nendwadi Block situated in the western part of the proposed block on Damkod-Wadvi Hill Range has been recently been awarded to Gemcokati along with two other southern blocks on Iron ore viz, Tadgaon-Wateli and Marampalli-Jinjgaon, during 52nd TCC,NMET held on 27th May'2023 at New Delhi. x) Based on mineralization evidences, the present program at G-4 level has been proposed through Geological mapping and surface sampling.

	xi) This G4 work will be helpful in estimation of reconnaissance resources of Iron. Geochemical sampling of BRS will be helpful in assessing the disposition and grade of mineralization. xii) The Reconnaissance Survey (G4) will eventually help in planning of detailed exploration program (in case upgraded to G-3 level) which in turn will facilitate the state Government for auctioning of block.
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MURWADA-TUMARIKODI BLOCK area shown on google map. (Topo sheet- 65A/10).



Location of the proposed block demarcated on Survey of India(SOI) Topo sheet(s) 65A/10





**Detailed proposal for Reconnaissance Survey (G4) for Iron Ore in MURWADA-TUMARIKODI BLOCK
(100 sq.km), District: Gadchiroli, Maharashtra, Topo sheet no-65A/10.**

1.0.0. Block Summary

1.1.0 Preamble:

- 1.1.1** Iron is the second most abundant element after Aluminum, constituting 5.6 per cent of the Earth's crust. The vast majority of it is found in form of oxides, besides its occurrences are also known in form of silicates, and less commonly as carbonate and sulphide minerals. Iron ore is the raw material used to make pig iron utilized ultimately in the manufacture of steel. Realizing its vast utility in modern day world, it is unanimously considered to be "more integral to the global economy than any other commodity, except perhaps oil". The ore is usually in form of oxide either hematite or magnetite, varies in colour from dark grey, bright yellow, deep purple, to rusty red.
- 1.1.2** Iron has been known to mankind since antiquity. Iron is ubiquitous in the lithosphere as either a major constituent or in trace amounts. By far the most important use of iron is in the making of steel, which is essentially an alloy of iron with carbon and other elements depending on end use. India is one of the earliest manufacturers and users of iron and steel in the world. Literature survey reveals many documentary evidences such as making of various surgical instruments in the 3rd & 4th century B.C. Till 18th century iron and steel making in India was at par with that of Europe in the form of village crafts. The scene was totally changed with the invention of the Bessemer process in 1856 and the Basic Open-Hearth Process in 1878. These developments led to significant increase in the world steel production from 0.5 Mt in 1870 to 28 Mt in 1900.
- 1.1.3** Iron ore in India is found in form of either hematite and/or magnetite. About 79% haematitic ore deposits are found predominantly in the Eastern Sector (Chhattisgarh, Jharkhand and Odisha) while about 93% magnetite ore deposits occur in Southern Sector (Karnataka, Goa, Andhra Pradesh, Kerala & Tamil Nadu). Karnataka alone contributes nearly 72% of magnetite deposit in India. Of these, hematite is considered to be superior because of its higher grade. Indian deposits of hematite belong to the Precambrian Iron Ore Super group of rock. The ore zone occurring as capping is restricted to bands/interbeds of banded iron formation lithounit (BIF in short) comprises massive, laminated, friable and powdery ore types from top to bottom.

1.1.4 Maharashtra:

Iron ore deposits are found associated with the Iron ore Group rocks of Archaean age. It comprises older schist and unclassified crystalline overlain by metamorphosed sedimentary rocks such as quartzite, banded ferruginous quartzite, schist and phyllites. These metasedimentary rock formations are intruded by dolerite, granite, gneisses etc. The iron ores are derived from banded ferruginous quartzite (BHQ) by leaching of silica. The economically viable deposits in Maharashtra occur in Chandrapur, Gadchiroli, Bhandara in the Eastern

part and Sindhudurg district (Shiroda, Reddi mines area) on the seacoast in the western part of the State. Minor occurrences are reported from Nagpur, Nanded, Satara and Yavatmal districts of Maharashtra. They are mostly concentrated in the Vidarbha region on the Eastern part of the State where ore bodies occur as lenses in banded hematite quartzite. The ore minerals are mainly hematite and minor magnetite.

1.2.0 Physiography

The area exhibits a high mountainous ridges, covered by densely forested terrain with intermittent valleys in between. The area Damkod-Wadvi Hill Range situated in the south of main Surjagad Hill Range, is characterized by higher ridges traversing NE - SW direction. The relief difference is much higher, the highest and lowest points being 622 m south of Tumarikodi and 268 m near Koindud, towards southern part. The general slope of the area is towards west and south west. Higher order streams are meeting with Jambia River towards western part and with perennial Paralkot/Kotri River towards east and south.

1.3.0 Background of Previous work:

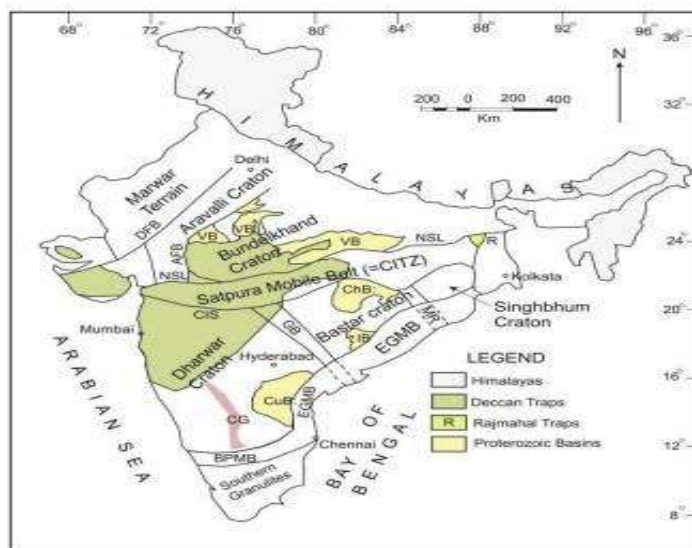
The Topo sheet area of **65A/10** was first mapped by H.P.Saxena et.al. during FS-1978-79, where few incidences of Base metal occurrences were reported by their team, vide GSI Report Accession No- **CR-014491**. Subsequently, reported occurrences by them were, later validated by Sengupta & Das during FS-1982-83 vide GSI Report Accession No- **CR-016829**. Their findings didn't reveal any significant base metal mineralization in the area.

During 1963-1970, the DGM Maharashtra had carried out Exploration work across the curvilinear Surjagad Hill range and inferred resources of Iron ore was estimated. However, the reference of this work viz. Geological report, information about Borehole location, depth, chemical analysis etc. are not available in public domain.

The areas in and around present area within Topo sheet-65A/10, were mapped by GSI viz. R. Raman, (1969-70) in Toposheet No. **65A/01**, Phadtare (1966-67) in sheet No. **65A/02**. Pattanik(1982-83) in Topo Sheet-**65A/02 & 07**, Hemmady (1967-68) in Toposheet No. **65A/03**, Saxena et.al.(1978-79) in Topo sheet-**65A/06 & 10**, Pattnaik & Sengupta(1977-78) in Topo sheet-**65A/07**, Jain & Pattanik(1978-79) in Topo sheet-**65A/06,07 & 11**, Rajarajan, K. (1964-65) in Toposheet No. **64D/07, 64D/11**. D. Subramaniam (1968-69) in Toposheet No. **65B/01, 56N/13**.

The Geological mapping of this Surjagarh and surrounding areas (**Topo sheet 65A/06 & 10**) was carried out by GSI Viz. T. Krishnama Charlu and K. Kumaran (1978-79), S.K. Pattnaik & S.K. Sengupta (1977-78), R.V. Iyer (1969-70).

1.3.1 [Regional Geology] Description of stratigraphic units:



Generalized tectonic map of Indian subcontinent: Precambrian Cratons, Mobile Belts and Lineaments. AFB = Aravalli Fold Belt, DFB = Delhi Fold Belt, EGMB = Eastern Ghats Mobile Belt, SMB = Satpura Mobile Belt, NSL = Narmada-Son Lineament, CIS = Central Indian Suture and BPMP = Bhavani-Palghat Mobile Belt. Proterozoic Rifts and Basins include IB = Indravati Basin, ChB = Chhattisgarh Basin, GB = Godavari Basin; MR = Mahandi Rift; CuB = Cuddapah Basin, VB = Vindhyan Basin. CG = Closepet Granite (after from Rao and Reddy, 2002 and Meert et al., 2010).

The litho assemblage consists of granite gneisses with enclaves of meta pelites, calc gneisses, amphibolite, (BIF/BMQ/BHQ), quartzite, ultra mafites, mafic intrusives and younger granites under Bengal Group. Bailadila Group comprises Banded Haematite quartzite, Banded Haematite Chert, Banded Magnetite quartzite, Banded Magnetite chert, chert, phyllite, quartz arenite, ferruginous shale and meta greywacke. They form linear ridges with a regional N-S trend, often with lateral displacement due to faulting and complex folding. The main ridges where Bailadila Group of rocks are exposed around **Bailadila Range, Rowghat, Sonadehi, Dalli Rajhara hills and Surjagad Hill Range.**

Amphibolite/Hornblende schist/Actinolite schists:

Most common rock type in the area, at times extending over a length of about 500 meters with width ranging from a few meters upto a hundred meters and more. It also occurs as restites in the migmatites which is best exposed in the **Bande River section**. The rock is highly weathered and is traversed by thin quartzofelspathic veins.

Volcanics:

The rocks occur as along, parallel bands associated with migmatite and amphibolite. It is a fine to medium grained, amygdular, well foliated rock. The rock maintains a sharp contact with the associated migmatite, amphibolite and granite gneiss, as found in the Bande River section near **Kandudi**.

Sillimanite schist:

1. Sillimanite schists occur as lenses and pockets near **Gundapuri** (65A/06 and 65A/07).
2. At the confluence of **Jambia nala with the Bande River**.
3. In the area NW of **Wateli**
4. In the **Jhirmal nala section**
5. In the valley NE of **Boria** and
6. In the **Indravati River section**.

The outcrops vary in length and width ranging from a few meters to over 300 meters and from a few meters upto 20 meters respectively.

Quartzite:

Quartzite's occupy a large area occurs as high hill ranges, the slopes of which are covered with scree and boulders of quartzite. The only quartzite member i.e. Fuchsite quartzite never occurs as hills. It occurs as conformable bands with the metabasics and quartz mica schist in the Bande River section near **Gundapuri**.

Pyroxene quartzite/ferruginous quartzite:

This member of the quartzite group is the most dominant one and occupies a large area particularly in the highest contour in the area. The one containing pyroxene crystals as inclusions, much of which have been altered and weathered leaving only ferruginous stain in patches, occurs north of **Phakur**. At places it is sparsely mineralized with disseminated specks of pyrite and chalcopyrite.

Banded Magnetite Quartzite/Ferruginous Phyllite:

It has a fairly large areal extension, best exposed as high hills near **Katrangatta, Boria, north of Botanphundi, Bod Meta** and near **Irkeduma**. Ferruginous Phyllite which is laterally continuous or merges with the BMQ in the hill near Boria occurs as long band with a width of about 2 meters to 3 meters.

Migmatite Gneisses:

Migmatites have been located in a considerably large area in the Bande River section, Indravati River section (Near Boria), **Birmilli, Jhirmalnala and Jambia nala** sections and in other areas. The exposures occur as long, wide and parallel bands associated with metabasics, gneisses and metavolcanics. The host rock is invariably a meta-basic one having an amphibolitic composition.

Pegmatites:

A number of small (unmappable dimension), pegmatite veins cutting across the gneissic country rock have been located. These veins pinch out and thus occur and consist of buff coloured quartz only.

1.3.2 A Mineral potentiality based on Geology

After carrying out geological mapping in these areas during late sixties, the reference of any further work in recent past is not available in public domain in parts of Gadchiroli District.

The proposed area falls under Western Bastar Craton which hosts numerous **Iron Ore** occurrences in and around Surjagad and **Base metal** occurrence around **Minjhari to Thanewasna and Nei-Delli, Lal Heti** areas of adjacent Chandrapur District. The base metal deposit is confined within the brittle shear zone, extends for a strike length of over 100 km from Govindpur in north to little beyond Kansari in the south, from which many blocks viz. **MINJHARI, BAMHANI, NAI-DELLI-LAL-HETI, GHOT-CHAMURSI, GHANPUR-MUDHOLI AND GONDPIPRI** blocks have been carved out and subsequently few blocks are auctioned.

In course of geological mapping in **late seventies** a number of localities with incidences of mineralization were recorded by GSI and **not yet been validated** viz.

Iron ore mineralization:

The proposed area falls under Western Bastar Craton which hosts numerous **Iron Ore** occurrences along three distinct parallel arcuate ridges starting from Surjagad Hill range in the north (**65A/06**) to Damkod Wadvi Hill Range (**65A/06 & 65A/10**) in the middle and Bhamragad Hill Range (**65A/11**) in the southern most part. The DGM Maharashtra is the pioneer Govt. Agency in initiating the investigation during 1963-64 and continued till 1970-71, in parts of **Wureea Hill within Surjagad Hill Range** (Toposheet area of 65A/06).

The proposed block falls within the Damkod-Wadvi Hill Range (65A/10), where Iron ore is seen exposed on hill tops with spreading of float ore in the slope. Thus, in view of the potentiality of the area G4 item is proposed for validation.

1.3.2 B Mineral potentiality based on Geophysics and ground Geochemistry

Area within Gadchiroli and adjoining Districts in this part, were not been covered either by National Geochemical Mapping [NGCM], National Geophysical Mapping [NGPM] and National Aero Geophysical Mapping Programme [NAGMP]. Hence, there are no data available yet on Geochemistry and Geophysics.

1.3.3- Scope of proposed exploration

Previous work:

The area was first geologically mapped by Saxena et.al in parts of TS-65A/06 & 10 followed by Jain and Patnaik in remaining areas of TS-65A/06 during FS-1978-79. As follow up action, few preliminary appraisal work was also taken up subsequently by Kameswar Rao in FS-1981-82 for Sillimanite, by Sengupta and Das in FS-1982-83 for Base metal occurrence, by Sengupta & Das in FS-1982-83, Patnaik in FS-1982-83 for stream sediment survey and integrated survey by Charlu and Kumaran in FS-1978-79.

2.0.0 Block description:

The study area is well connected with Nagpur/Chandrapur towns by state highway No.70B and accessible throughout the year via the district headquarters **Gadchiroli**, which is about 80 km NNW of **Ettapalli** and connected by District Main Road, **Bhamragarh** a prominent tribal village in the area which is 20 km south of **Jinjaon**. **Ettapalli** is Tehsils Hqrs. and of 215 Kms away from Chandrapur and 289 km from **Nagpur**.

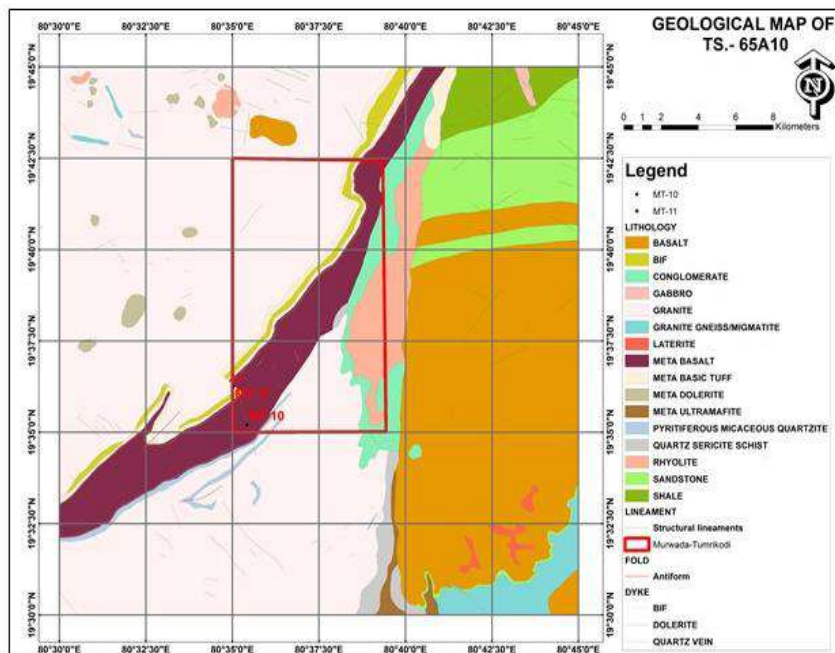
Table: - 1 Block Description

Block corners	LONGITUDE			LATITUDE		
(A)	80 ⁰	35'	00"	19 ⁰	42'	30"
(B)	80 ⁰	39'	00"	19 ⁰	42'	30"
(C)	80 ⁰	39'	00"	19 ⁰	35'	00"
(D)	80 ⁰	35'	00"	19 ⁰	35'	00"

3.0.0 Field visit by GEMCOKATI

GEMCOKATI has conducted field visit in the proposed block. During geological traverses, Gemcokati has identified the host rocks viz. BIF and Phyllites at several places. **2 nos.** of Samples are collected and analyzed through Tata Steel, Joda & Shiva Lab Bangaluru. The analytical results are shown in following Table.

Table - II



Chemical Analysis Report- Tata Steel Ltd Mines Division -Joda

Sr.No.	LATTITUDE	LONGITUDE	SAMPLE NO.	Fe%	SiO2%	Al2O3%	P%	Mn%	TiO2%	K2O%	MgO	Cao	S
1	19°35'11.92"	80°35'25.48"	MT-10	59.25	1.99	1.87	0.056	0.016	0.041	0.027	0.027	0.019	0.007
2	19°36'15.44	80°35'1.45"	MT-11	60.41	4.65	3.9	0.049	0.014	0.293	0.046	0.062	0.042	0.017

Planned Methodology

The exploration program is proposed in accordance to the objective set for reconnaissance survey (G-4) as per Minerals (Evidence of Mineral Contents) Rule-2015.

3.1.0 Geological Mapping

Geological mapping of **100 sq. Km** area of the block would be carried out on **1:12,500 scale**. Various litho units, their contact relationship, textural characters and structural features will be mapped. Surface manifestations of the mineralization available along with their surface disposition will be marked on map.

3.3.0 Geochemical Sampling

3.3.1 Bed Rock Sampling:

During the course of geological mapping the bed rock samples shall be collected from the outcrops exhibiting indications of mineralization like sulphide enrichment, shearing, brecciation, oxidation, silicification, ferruginisation and alteration.

A total **100 nos. bed rock samples** [+ check samples 15%= 15:: **115 nos**] from targeted location would be collected by either chip, groove or channel sampling method for **Whole rock analysis** of major oxides by XRF technique, **Trace element studies** for **10 Nos BRS** [+check 15% =2nos:: **12 nos**] and for assay of (Au and Ag) **5 Nos BRS** [+check 15% =1nos:: **6 nos**].

3.4.0 Petrological & Mineragraphic Studies

During the course of Geological mapping **10 nos.** of samples from various litho units from outcrop will be studied for petrography and **12** number of PCS will be analyzed from mineralized zones will be studied for the ore mineral assemblages and their distribution, alteration, enrichment etc. in polished sections (Mineragraphic studies). **5** OM polished samples for Ore microscopy study.

3.5.0 XRD & Spectroscopy Studies

Five (**5**) samples shall be subjected for XRD studies for mineral phase analysis.

4.0.0 Quantum of Work

The following Table shows the Nature & Quantum of Work to be carried out during Reconnaissance survey

Table: - 2 Quantum of proposed work in Murwada-Tumarikodi Block

Sl.	Item of Work	Unit	Target	Sl No	Cost/Rs	Amount
1	Geological Mapping (on 1:12,500 Scale)	Sq km	100			
	a) Charges for one Geologist per day at HQ	Days	60	1.2a	9,000/	5,40,000/
	b) Charges for one Geologist per day in Field	Days	120	1.2b	11,000/	13,20,000/
	c) Field labourer 4x120=480	Days	480	5.7	477/	2,28,900/
	TOTAL -1					20,88,960
2	Geochemical Sampling/ Laboratory Studies					
	Whole Rock Analysis					
	i)For SiO ₂ , Al ₂ O ₃ , Fe ₂ O ₃ , TiO ₂ , MnO, CaO, Na ₂ O, K ₂ O+H ₂ O, MgO, P ₂ O ₅ , CO ₂ , & S.	Nos.	115	4.1.15 a	4,200/	4,83,000/
	ii)Gold analysis by Fire Assay	Nos	6	4.1.5a	2,380/	14,280/
	iii)Trace element analysis 16 radicals @Rs421/radicals	Nos	12	4.1.15 b	6,736/	80,832
	PCS for whole rock elements	per sampl e	12	4.1.15 a	4,200/	50400
	TOTAL-2					6,28,512/
3	Physical Studies					
	a) XRD	Nos.	5	4.5.1	4,000/	20,000/
4	Petrological Samples					
	Preparation and Study of Thin Sections	Nos	10	4.3.1	2,353/	23,530/
5	Petrographic report of rock samples	Nos	10	4.3.4	4,232/	42,320/
6	Mineragraphic Studies					
	Preparation and study of Polished Section	Nos	5	4.3.2	1,549/	7,745/
	Minerographic report of rock samples	Nos	5	4.3.4	4,232/	21,160/
						7,43,267/

7	Report Preparation (5 Hard copies with a soft copy)	Nos.	1	5.2	1,50,000 / + 4,000/	1,54,000/
8	Preparation of Exploration Proposal (5 Hard copies with a soft copy)	Nos.	1			64,846/
						10,000
9	TOTAL (1 TO 8)					30,61,073/

Table: - 3 Summary of Cost Estimates for Reconnaissance Survey (G-4 Level) Exploration

Sl. No.	Item	Total Estimated Cost (Rs.)
1	Mapping (LSM) and other Geological work (100 sq km)	20,88,960/
2	Laboratory Studies	7,43,267/
4	Sub Total (1 to 2)	28,32,227/
5	Exploration Report Preparation	1,54,000
6	Proposal Preparation	64,846
7	Peer review charges	10,000
8	Sub Total (1 to 7)	30,61,073/
9	GST 18%	5,50,993/
10	Total:	36,12,066/
	Say Rs. In Lakh	36.12/

**Estimated cost for Reconnaissance Survey (G-4) for Iron Ore in Murwada-Tumrikodi Block,
Gadchiroli District, Maharashtra Total block area- 100 sq km; Completion Time- 6 Months**

Sl no.	Item of Work	Unit	Rates as per NMET		Estimated Cost of the Proposal	Total Amount (Rs)	Remarks
			SoC 2020-21				
			SoC- Item SI No.	Rates asper SoC	Qty.		
1	Large scale (LSM) Geological mapping/Trenching.						
1.1	Geologist man days (1 No) for Large scale (LSM) Geological mappin/Trenching	days	1.2b	11,000	120	1,320,000	
1.2	Geologist man days (1 No) for Geological mappin & Report (HQ)	days	102	9,000	60	540,000	
1.3	Labour (field) for (Total 4 Nos i.e. 2 workers per one geologist)	per worker	5.7	477	480	2.28.960	Amount will be reimbursed as per the notified rates by the Central Labour Commissioner (Rs. 477/- per day) or respective State Govt. whichever is higher
	Sub-Total (1)					20,88,960	
2	Laboratory Studies						
2.1	Surface sampling (Bed Rock Samples for whole rock analysis-Major Oxides)	per sample	4.1.5a	4200	115	483000	
2.2	BRS-For Au & Ag (Gold) by Fire Assay	per sample	4.1.5a	2,380	6	14280	



2.3	PCS-Trace elements analysis 16nradicals @ Rs 421/each	per sample	4.1.5a	6736	12	80832	
2.4	PCS for whole rock elements	per sample	4.1.15a	4,200	12	50400	
	Sub-Total (2)					6,28,512/	
3	XRD Studies for identification of minerals	per sample	4.5.1	4,000	5	20,000	
4	Petrological/Mineralographic studies						
4.1	a) Preparation of thin section	per sample	4.3.1	2353	10	23,530	
4.2	b) Study of thin section for petrography	per sample	4.3.4	4232	10	42,320	
4.3	c) preparation of polished section	per sample	4.3.0	1549	5	7,745	
4.4	d) Study of thin polished section for mineragraphy	per sample	4.3.4	4232	5	21,160	
	Sub- Total					7,43,267/	
5	Total (1 to 5)					32,42,327	
6	Geological Report Preparation	Nos	5.2		1	154,000	For the projects having cost up to exceeding Rs.50 Lakhs Minimum of Rs. 1.5 lakhs + 1000/- per additional copy.

7	Preparation of Exploration Proposal	Nos	5.1	380000	1	64,846	2% of approved project cost or 3.8L whichever is lower
8	Report Peer Review Charges	lumpsum	As per Ec decision	10000	1	10,000	
	Total					2,28,846	
9	Total Estimated Cost without GST (A+B+C))					30,61,073/	
10	Provision for GST (18%)					5,50,993/	GST will be reimbursed as per actual and as per notified prescribed rate
11	Total Estimated Cost with GST					36,12,066/	
					Say, in Lakhs	36.12	
	Note:						
*	Marked items not indicated in SoC and required to be taken up during the course of exploration shall be charged separately (as per actuals)						
\$	Trenching/Pitting dimensions are tentative may vary depending upon the geology and field conditions						
#	2nd level of work shall be carried out after review of 1st level work i.e. Geological mapping, geochemical sampling and analysis						

Table: - 5 Tentative Time schedule/action plan for proposed Reconnaissance Survey (G-4) for Iron Ore.

		2023						
		May	June	July	Aug	REVIEW	Sept	Oct
	Activities	1	2	3	4		5	6
1	Geological mapping and sampling							
2	Sample preparation							
3	Analytical work							
4	Trenching							
5	Analytical work							
6	Peer Review							
7	Sampling							
8	Report Preparation							
9	Submission of Report							

	Table: - 6 Reference:
	Authors
1	Agarwal, J.P. 1963 :-Report on investigation of iron ore deposits of Surjagarh area, Chanda District.
2	Chande V. D & Zaheer B. (1976-77) :- A note on the i nvestigation of ultramafic rocks for basemetals, south and west of kurema area (64 a/1) tahsil garhchiroli, district: chandrapur,.
3	Hemmady (1967-68) :- Geology of a part of Garhchiroli and Sironcha Tahsil, Chandrapur District, Maharashtra in Toposheet No. 65A/03
4	R.V. Iyer (1969-70):- Geology of a part of Garhchiroli and Sironcha Tahsil, Chandrapur District, Maharashtra
5	Jain & Pattanik(1978-79):- Geology of a part of Garhchiroli and Sironcha Tahsil, Chandrapur District, Maharashtra in Topo sheet- 65A/06,07 & 11
6	Krishnama Charlu and K. Kumaran (1978-79) :- Geology of a part of Garhchiroli and Sironcha Tahsil, Chandrapur District, Maharashtra
7	Marawar (1966):- Report on the prospecting of Iron ore Deposits of Surjagarh and adjoining areas in Sironcha Tahsil Chanda District.
8	Marwar, et al (1967):- Report on the prospecting of Iron ore Deposits of Surajagarh and Adjoining areas in Sironcha Tahsil of Chanda District
9	Pattnaik & Sengupta(1977-78) in Topo sheet- 65A/07
10	Pattanik(1982-83) in Topo Sheet- 65A/02 & 07
11	Phadtare (1966-67) :- Geology of a part of Garhchiroli and Sironcha Tahsil, Chandrapur District, Maharashtra in sheet No. 65A/02
12	Raman.R (1969-70) :-Geology of a part of Garhchiroli and Sironcha Tahsil, Chandrapur District, Maharashtra in Toposheet No. 65A/01
13	Saxena et.ai.(1978-79) in Topo sheet- Geology of a part of Garhchiroli and Sironcha Tahsil, Chandrapur District, Maharashtra 65A/06 & 10
14	Rajarajan, K. (1964-65) Geology of a part of Garhchiroli and Sironcha Tahsil, Chandrapur District, Maharashtra in Toposheet No. 64D/07, 64D/11
15	Subramanium (1968-69) Geology of a part of Garhchiroli and Sironcha Tahsil, Chandrapur District, Maharashtra in Toposheet No. 65B/01, 56N/13.

Fig. 1- Block boundary on google map.



Fig. 2- Block Boundary on Toposheet.

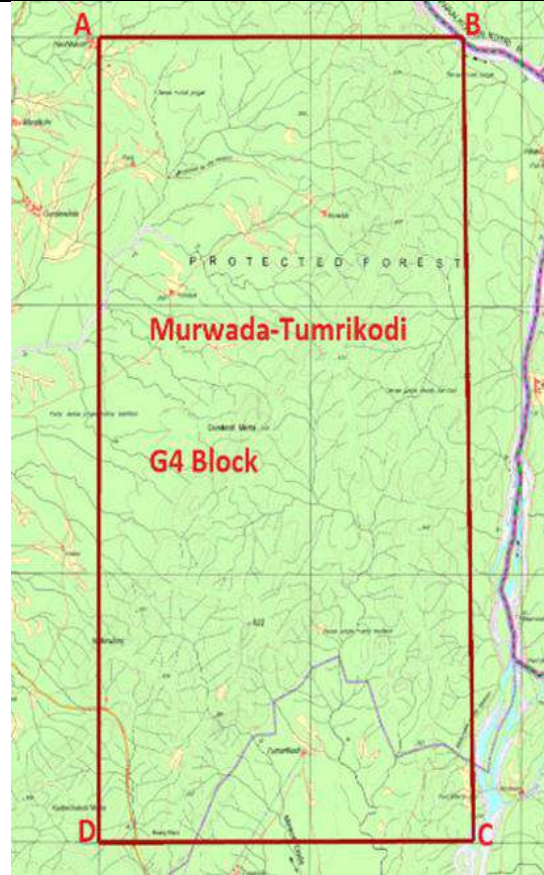


Fig. 3- Block Boundary on Geological Map.

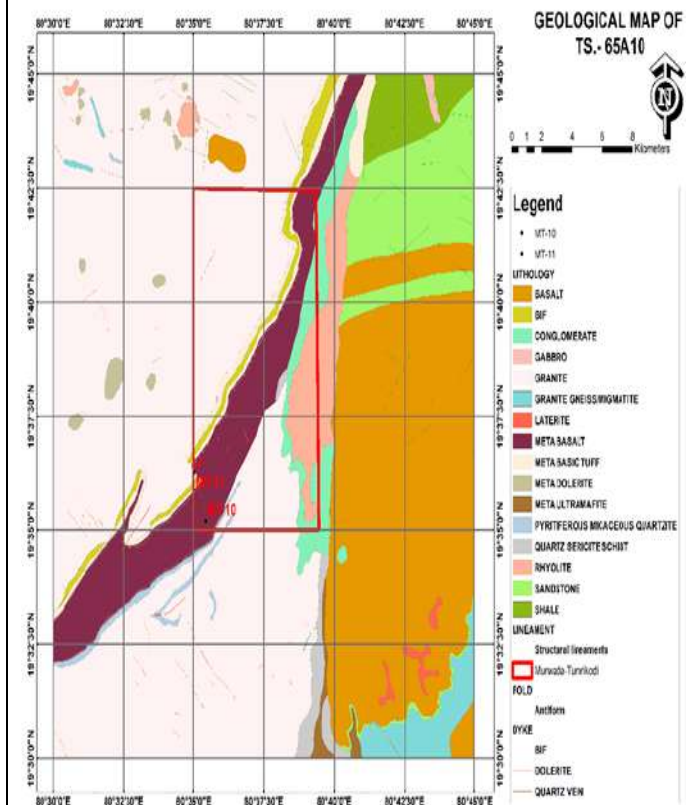


Fig. 4- Map of OGP Area.

