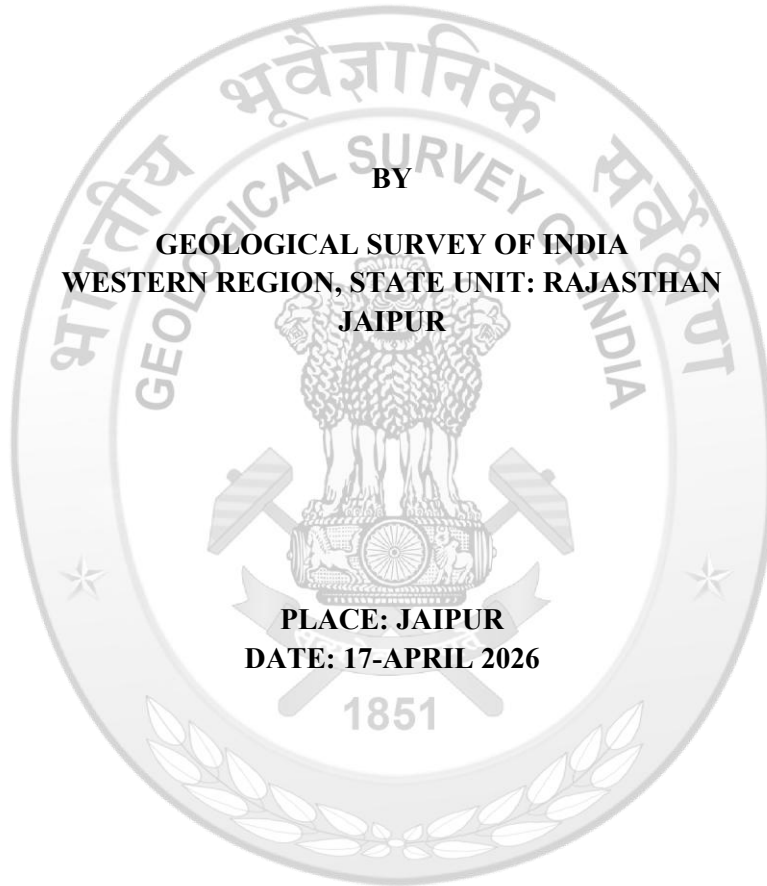


**PROPOSAL FOR PRELIMINARY) EXPLORATION (G-3 FOR REE AND ASSOCIATED
MINERALISATION IN NORTHEAST OF MUTHLI BLOCK, BALOTRA DISTRICT,
RAJASTHAN**

COMMODITY: RARE EARTH ELEMENTS (REE) AND ASSOCIATED MINERALS



Summary of the Block for G3 Level Exploration

GENERAL INFORMATION ABOUT THE BLOCK

Features	Details
Block ID	North East of Muthli Block
Exploration Agency	Geological Survey of India, Western Region, State Unit: Rajasthan
Commodity	Rare Earth Elements (REE) and associated minerals
Mineral Belt	Siwana Ring Complex
Completion period with entire time schedule to complete the project	One year (FS 2026-27)
Objectives	<ol style="list-style-type: none"> 1. To establish subsurface continuity of REE and associated mineralisation. 2. To delineate mineralised zones through detailed mapping, sampling and drilling. 3. To estimate preliminary resource at G3 stage for REE and associated minerals.
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	25°42'24.79" N	72°17'23.27" E
B	25°43'14.93" N	72°18'34.45" E
C	25°42'54.47" N	72°18'52.23" E
D	25°42'04.31" N	72°17'40.99" E
Tehsil/Taluk	Siwana	
District	Balotra	
State	Rajasthan	

Topo sheet number	45C/06
Villages	Muthli

2. Area

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

3. Accessibility

Nearest town	Siwana town, about 13 km to the southeast
District headquarters	Balotra, about 35 km northwest of Siwana area
Nearest Rail head	Balotra, about 35 km northwest of Siwana area
Nearest Airport	Jodhpur, 100 km

4. Hydrography

Small seasonal streams

5. Climate

Arid.

6. Topography

Flat aeolian sand covered area with small hills.

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 rhyolites, felsic dykes and channel samples in and around the block, NGCM
Geophysical data	NGPM. NAGMP

8. Justification for taking up G3 level exploration

1. The block forms part of the Siwana Ring Complex of the Malani Igneous Suite, a recognised peralkaline igneous province with encouraging REE and associated rare metal potential.
2. Earlier GSI investigations in Siwana reported anomalous total REE+Y values in rhyolites, felsic dykes, granites and associated rock units, along with encouraging Zr, Nb, U, Th and Hf values.
3. Flow units and felsic dykes in the northern part of the complex, including the proposed area, have yielded strong surface geochemical anomalies and therefore warrant subsurface testing.

PROPOSAL FOR PRELIMINARY (G-3) EXPLORATION FOR REE AND ASSOCIATED MINERALISATION IN NORTH EAST OF MUTHLI BLOCK, BALOTRA DISTRICT, RAJASTHAN

1.0 INTRODUCTION

Rare Earth Elements are critical minerals of strategic importance because of their applications in clean energy technologies, high-performance magnets, advanced electronics, batteries, defense systems and a range of high-technology manufacturing sectors.

Peralkaline igneous complexes are among the important geological environments for REE and associated rare metal mineralisation. The Siwana Ring Complex of western Rajasthan is one such province where earlier investigations have repeatedly indicated anomalous enrichment of REE and associated elements.

2.0 BACKGROUND INFORMATION

Preliminary sampling of rhyolites and associated tuffs of the Siwana Ring Complex by GSI during 2013-14 indicated anomalous REE values, with total REE ranging from 1334 to 2692 ppm in Bhimgoda Pahar and 1075 to 3319 ppm in Koiliyasar-ka-Pahar.

Lal and Ghosh, 2021 carried out large scale geological mapping (1:12500 scale) at the norther periphery of the Siwana Ring Complex, stretching from Sainji ki Beri to Meli area. They marked 32nos. of rhyolitic flows along with several felsic dykes in the area. Several flows are found to be highly enriched in tREE concentration. Chemical analysis data from rhyolite samples of study area yielded $\Sigma\text{REE}+\text{Y}$ values ranging from 91.76ppm to 9764.68ppm, with average value of 1844.84ppm. $\Sigma\text{HREE}/\Sigma\text{LREE}$ ratio of the same is 0.15. 22 BRS samples from felsic/rhyolite dykes yielded $\Sigma\text{REE}+\text{Y}$ values ranging from 144.77ppm to 7678.75ppm, with average value of 1400.14ppm. $\Sigma\text{REE}+\text{Y}$ value in channel samples ranging from 261.73 to 6224.81ppm, with $\Sigma\text{HREE}/\Sigma\text{LREE}$ ratio of 0.19.

The proposed NE of Muthli block is situated within this REE-fertile peralkaline igneous environment and is therefore suitable for systematic G3 exploration. In the proposed block has small outcrops of rhyolite with surface samples yielding $\Sigma\text{REE}+\text{Y}$ between 2386 ppm to 3565ppm. Only 5% of the area has outcrop, rest is under aeolian sand cover of variable thickness.

3.0 OBJECTIVES

1. To establish subsurface continuity of REE and associated mineralisation in the North East of Muthli block.
2. To delineate mineralised zones through detailed geological mapping and systematic bedrock, channel, and core sampling.
3. To determine depth continuity, thickness and grade of the mineralised zones by systematic drilling and borehole logging.
4. To generate sufficient primary data for G3 stage resource appraisal of REE and associated minerals.

4.0 BLOCK DESCRIPTION

4.1 Location and extent

The North East of Muthli block is situated in the northern part of toposheet no. 45C/06, about 13 km northwest of Siwana town. Siwana is stated in the source proposal to lie about 132 km east of district headquarters Barmer and about 35 km southeast of Balotra. The proposed block is defined by four corner coordinates as given below.

Point	Latitude	Longitude
A	25°42'24.79" N	72°17'23.27" E
B	25°43'14.93" N	72°18'34.45" E
C	25°42'54.47" N	72°18'52.23" E
D	25°42'04.31" N	72°17'40.99" E

5.0 METHODOLOGY / WORK PLAN

Detailed mapping on 1:2,000 scale is proposed for the block along with collection of surface samples, including bedrock and channel samples, in order to delineate REE and associated rare metal mineralised zones. Depth continuity, grade and thickness of these zones will be assessed by drilling 26 vertical boreholes on a 400 m x 200 m grid. The tentative depth of each first-level borehole is 100 m, while two boreholes are proposed to be drilled up to 200 m depth.

6.0 NATURE AND QUANTUM OF WORK

Nature of Work	Work proposed for NE of Muthli Block
Geological Survey: Detailed Mapping (1:2,000)	2 sq. km
Subsurface Exploration: Drilling	2800 m
Geophysical Borehole Logging	1400 m
Bedrock Samples (BRS)	20
Channel Samples	30
PCS	15
Core Samples (CS)	800
PS	15
XRD	5
EPMA	5
Chemical Analyses	865

7.0 COST

Summary of the Cost estimate

Sl. No.	Item	Total Estimated Cost (Rs.)	Funding
1	Geology and Survey	0	By GSI
2	Drilling	2,80,00,000.00/-	NMEDT
3	Survey work	11,14,480.00/-	NMEDT
4	Laboratory studies	0	By GSI
5	Geologist at HQ	0	By GSI
	Sub Total (1to 4)	2,91,14,480.00/-	
6	Exploration Report Preparation	0	By GSI
7	Proposal Preparation	0	By GSI
8	Peer review charges	0	By GSI
9	Sub Total (1to8)	2,91,14,480.00/-	By GSI
10	GST18%	52,40,606.40/-	

	Total:	3,43,55,086.40/-
	Say Rs. In Lakh	343.55/-

Item of Work	Unit	SoC-Item -SI 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	30	₹ 7,20,000.00
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	20	₹ 2,10,000.00
	c	Labour Charges for Survey work	Per day	As per Govt rates	556.00	80	₹ 44,480.00
9	d	Drone Topographic Survey	per sq.km	7b	70,000.00	2	₹ 1,40,000.00
Total Cost B (in case of out sourcing)							₹ 11,14,480.00
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 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	2800	₹ 2,80,00,000.00
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	466
20	Land / Crop Compensation (in case the BH falls in agricultural Land)		per BH	5.6	30,000.00	26	₹ 0.00
21	Construction of concrete Pillar (12"x12"x30")		per borehole	2.2.7a	2,000.00	26	₹ 0.00
22	Borehole plugging with cement		per borehole	2.2.8	10,000.00	26	₹ 0.00

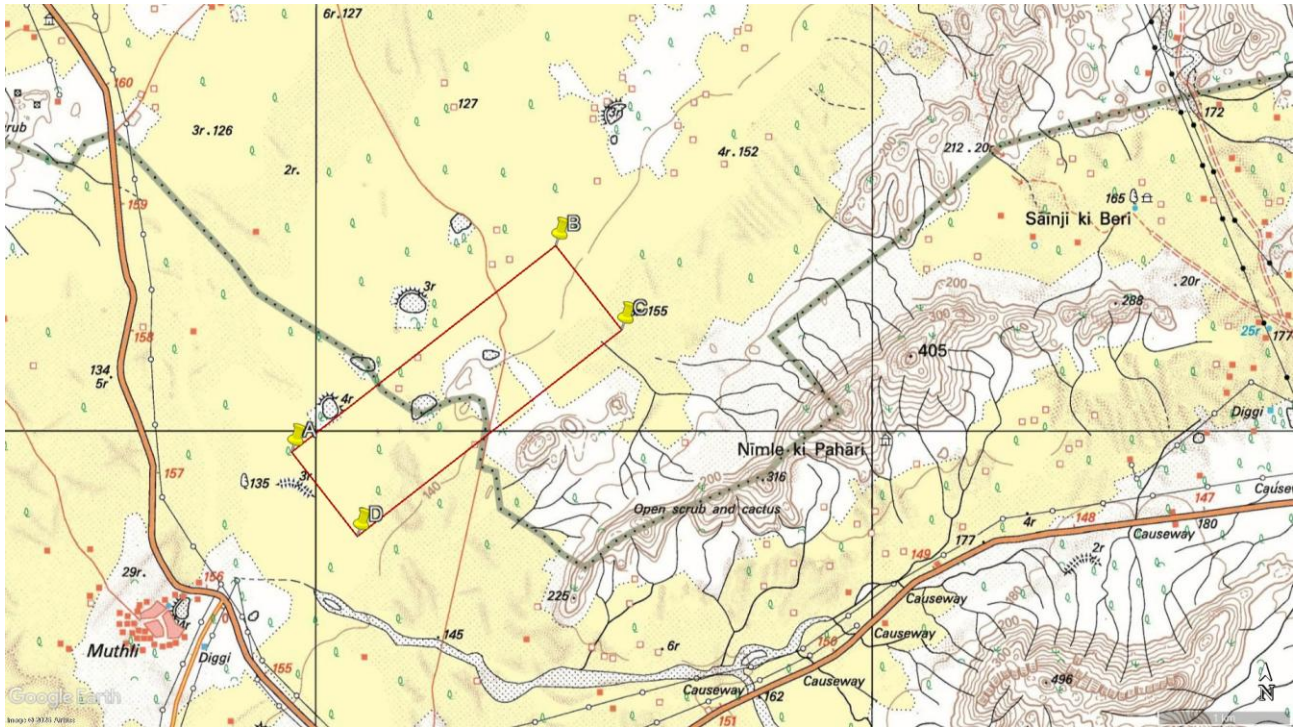
23		Miscellaneous Charges of Drilling Rig, accommodation for Drilling Camp, Camp setting and winding, construction of approach road)	Lumpsum	0	2.2.9.4	For Drilling cost >2 Cr: 10 % of the Drilling Cost with a maximum ceiling of Rs.25 Lkh	2500000	₹ 0.00
24		Drill Core Preservation- One complete BH plus 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	1400	₹ 0.00
Total Cost D- outsourced								₹ 2,80,00,000.00
Total (Survey Work + Drilling)								₹ 2,91,14,480.00
GST 18%								₹ 52,40,606.40
Total Fund Required inclusive of 18% GST								₹ 3,43,55,086.40
								~ 3.44 Cr

8.0 TIMELINE

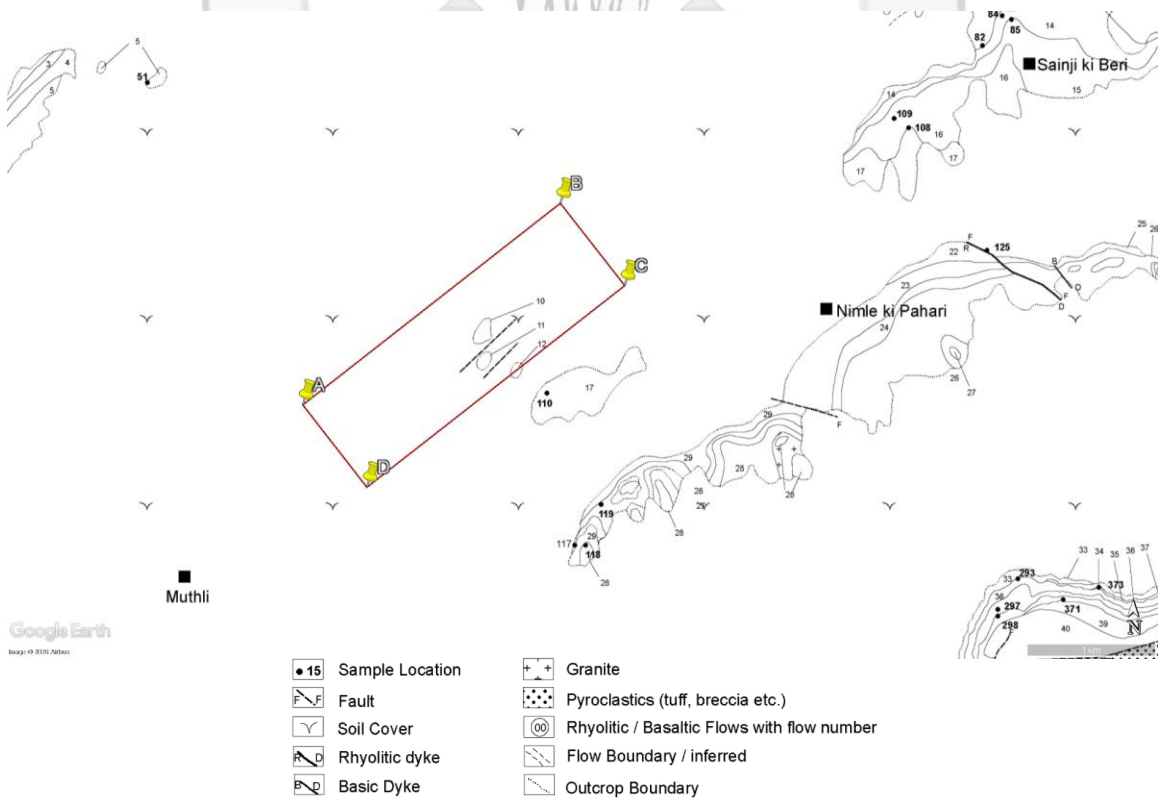
The proposed exploration programme is planned in such a way that all the activities like mapping, surface sampling, drilling, logging, core sampling and associated geological work and laboratory work will be completed within 10 months. Report writing will take 4 months with 2 months overlapping with 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	MA Y2026	JUN 2026	JUL 2026	AUG 2026	SEP 2026	OCT 2026	NOV 2026	DEC 2026	JAN 2027	FEB 2027	MA R 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.													





The proposed North East of Muthli block for shown on the 1:50K toposheet 45C/6



The proposed North East of Muthli block for shown on the 1:25K STM Map