

GOVERNMENT OF RAJASTHAN
DEPARTMENT OF MINES & GEOLOGY
UDAIPUR



INTERIM REPORT
(2020-21)
PROJECT NO. SM/01

PROJECT TITLE: “REGIONAL AND DETAILED GEOLOGICAL MAPPING FOR STRATEGIC MINERALS (R.E.E) AND OTHER ECONOMIC MINERALS NEAR VILLAGES NOSAR,SANPA, TEHSIL SINDHARI, DISTRICT BARMER”

BY

DINESH KUMAR CHAUHAN
(SENIOR GEOLOGIST)

DEVENDRA SINGH
(GEOLOGIST)

OFFICE OF THE SENIOR GEOLOGIST, MINES & GEOLOGY DEPARTMENT
BARMER

CONTENTS

S.No.	CONTENTS	PAGE NO.
	ACKNOWLEDGEMENT	
	ABSTRACT	
1	Introduction	1
2	Location and Communication	2
3	Physiographic, Vegetation and Climate	3
4	Inhabitant	3
5	Ground Water Resources	4
6	Targets and Achievement	4
7	Geology	5
7.1	Regional Geology of Barmer District	6
7.2	Geology of the area	7
8.1	Details of Investigation	10
8.2	Regional Geological Mapping	10
8.3	Detailed Geological Mapping	11
8.4	Sampling	13
8.5	Analysis Result	13
9	Conclusions and Recommendation	14
	<u>List of Tables</u>	
	Table -1- R.G.M Block Area Coordinates	3
	Table -2- D.G.M Block Area Coordinates	3
	Table -3- D.G.M Block Area Coordinates	3
	Table – 4 – Target and Achievements	05
	Table – 5 – Geology of the Area	07
	Table – 6– Sampling of the area	13
	<u>List of Plates/ Maps</u>	
	Plate-1 Regional Geological Mapping (2020-21)	
	Plate-2 Detailed Geological Mapping (2020-21)	

ACKNOWLEDGEMENT

The author is indebted to Director, Mines & Geology Deptt. Additional Director (Geology) HQ & Jodhpur zone for including this project in the departmental fieldwork program for the year 2020-2021.

I express my most sincere appreciation & deep sense of gratitude to Sh. H.C Songara (Additional Director Geology Jodhpur) approved this project in the field sessions 2020-2021.

I extend my sincere thanks to Sh. Dinesh Kumar Chauhan, Sr. Geologist, Barmer for providing valuable suggestions, and guidance during the preparation of the final report writing.

(Devendra Singh)
Geologist,
Project In charge.

ABSTRACT

The Rare earth elements (REE) are a collection of 17 elements in the periodic table , namely scandium, yttrium and lanthanides (15 elements in the periodic table with atomic numbers 57 to 71 namely: lanthanum (La), cerium (Ce), praseodymium (Pr), neodymium (Nd), promethium (Pm), samarium (Sm), europium (Eu), gadolinium (Gd), terbium (Tb), dysprosium (Dy), holmium (Ho), erbium (Er), thulium (Tm), ytterbium (Yb) and lutetium (Lu). In spite of its low atomic weight Yttrium (atomic no. 39) has properties more similar to the heavy lanthanides and is included with this group. Scandium (atomic no.21) is found in a number of minerals although it may also occur with other rare earth elements (REE). Although these elements tend to occur together, the lanthanide elements are divided into two groups. The light rare earth elements (LREE) are those with atomic numbers 57 through 63 (La, Ce, Pr, Nd, Pm, Sm and Eu) and the heavy rare earth elements (HREE) are those with atomic numbers from 64 to 71 (Gd, Tb, Dy, Ho, Er, Tm, Yb and Lu).

Economic concentrations of REE-bearing minerals occur in some alkaline rocks, skarns and carbonate-replacement deposits associated with alkaline intrusions, veins and dikes cutting alkaline igneous complexes and surrounding rocks, and soils and other weathering products of alkaline rocks.

Rare earths are characterized by high density, high melting point, high conductivity and high thermal conductance. These unique properties make them indispensable for a variety of emerging and critical

technology applications relevant to India's energy security i.e. clean energy technology, defence and civilian application etc. rare metals play a significant role in modern day high-technology industries.

One of the easily minable rare earth element deposits of India is hosted by carbonatite located at Dandali area, Barmer district of Rajasthan. Geologically these carbonatite rocks are intruded into Tertiary Alkaline Complex (TAC) formed by the reactivation of Malani Igneous Suite (MIS) which was emplaced during Pan African period. In dandali and nearby area, carbonatites occur as plugs, sills, dykes and veins within the Nephelinite and Ijolite host rocks. Rock association and field evidences show the intrusion of carbonatite rock in the Ijolite occurred near the dandali area.

This project taken up for field season 2020-21 as departmental regular project to search out the REE prospect in the area of the assessment of REE values by ICPMS test and XRF Studies near village Nosar, Undariyasra, Tehsil-Baytu & near village Sanpa Manji, Tehsil-Sindhri, District-Barmer.

The project area is 60 km South East direction of the district head quarter & connected by Tar road. This area falls on part of toposheet No.40 O/13 & 40 O/14.

During the field season 2020-21, total 11.98 Sq.km. area carried out under Regional Geological Mapping (scale 1cm =120mts) nearby village Nosar, Undariyasra, Tehsil-Baytu, District-Barmer & nearby village Sanpa Manji, Tehsil-Sindhri, District-Barmer. Total 2.92 Sq.km area (1.5 Sq.km area covered in nearby village Undariyasra, Tehsil-Baytu & 1.42

Sq.km area covered in nearby village Sanpa Manji, Tehsil-Sindhari) covered and mapped under Detailed Geological Mapping on scale 1cm=40mts. total 03 Samples has been collected and sent to the GSI Lab, Jaipur Rajasthan for ICPMS analysis for further Detailed Study. The ICPMS analysis results awaited from G.S.I.

1.0 INTRODUCTION

Economic concentrations of REE-bearing minerals occur in some alkaline rocks, skarns and carbonate-replacement deposits associated with alkaline intrusions, veins and dikes cutting alkaline igneous complexes and surrounding rocks, and soils and other weathering products of alkaline rocks.

A wide spectrum of calciocarbonatites and associated alkaline rocks are exposed around near village Kamthai,dandali area,so find the extention of the rock in near village Sanpa Manji,Nosar,Undariyasra for the exploration. The REE minerals are hosted by magmatic carbonatites or as hydrothermal deposits formed by replacement and even supergene enrichment of in-situ weathering of carbonatite bodies (Le Bas, 1999). The other rocks hosting either LREE or HREE minerals are pegmatites, alkali syenite, phonolite,bauxite, laterites, metamorphic rocks, phosphorite, clay,placers and heavy mineral beach sands. The major REE bearing minerals are bastnaesite, ion-adsorption clays,monazite, xenotime and laporite.

Carbonatite occur as magmatic, intrusive or extrusive,hydrothermal or replacement bodies which contain more than 50% by volume, primary igneous carbonate minerals derived from, carbonatite magma (Streckeisen, 1980, Woolley 1982). Calciocarbonatites are either coarse grained Sovite (C1) or medium to fine grained alvikite (C2) type (LeBas, 1999). According to Tuttle and Gittins (1966), carbonatite complexes are always associated with ijolites, nephelinites and other alkaline rocks indicating origin of carbonatites from an alkaline magma.

The area explored by M/s Ramgarh Minerals and Mining Ltd for rare earth elements near Kamthai village, in Sindhari tehsil of Barmer district. Details of the work carried out are as Under.DGM-1.9475 Sq km and Drilling- 2415mt REE value reported from 111m to 170m in depth. The thick carbonatite dyke have been observed in SE part of Kamthai area showing altered bands of Fe and REE with calc carbonatite. REE value near Kamthai are in Calcio carbonatite and ferro carbonatite dyke up to 3.47% (La,Ce,Dy,Pr,Nd). A total 5.4 Million tons of geological resources of REE were reported by company.Keeping in view the economic importance of the mineral REE, the department started the exploration work of REE from the year 2016 near village-bambdi nadi,Tehsil-Sindhari,District-Barmer.

During the field season 2020-21, total 11.98 Sq.km. area carried out under Regional Geological Mapping (scale 1cm =120mts) nearby village Nosar,Undariyasra,Tehsil-Baytu,District-Barmer & nearby village Sanpa Manji,Tehsil-Sindhari,District-Barmer.Total 2.92 Sq.km area(1.5 Sq.km area covered in nearby village Undariyasra,Tehsil-Baytu & 1.42 Sq.km area covered in nearby village Sanpa Manji,Tehsil-Sindhari) covered and mapped under Detailed Geological Mapping on scale 1cm=40mts. total 03 Samples has been collected and sent to the GSI Lab,Jaipur Rajasthan for ICPMS analysis for further Detailed Study. The ICPMS analysis results awaited from G.S.I.

2.0 LOCATION AND APPROACH :

The area of R.G.M & D.G.M under consideration falls on the survey of India toposheet No. No.40 O/13 & 40 O/14 and extending between

Latitude 25°44'8"- 25°46'20.00" and Longitude 71°50'26.91" - 71°52'17.58"& one part of the D.G.M falls on the survey of India toposheet No. No.40 O/14 and extending between Latitude 25°41'40.65"- 25°42'21.40" and Longitude 71°49'19.13" - 71°50'1.76". The project area is 60 km South-Eastern direction of the District headquarter & connected by State Highway-16 with Tar road. Tar road connecting with Nausar-Sanpa road. This state highway connects National Highway 112 in Chawa and also connected to the Tehsil headquarter Sindhari. The nearest railway station from the area is Balotra (45km from the area) which is well connected by broad gauge lines. The nearest airport from the area is Jodhpur(155km). The coordinates of Block covered under R.G.M & D.G.M is given below the table :-

Table-01- Showing R.G.M Block Coordinates near village Undariyasra,Nosar,Sanpa Manji :-

R.G.M AREA BLOCK COORDINATES, NEAR VILLAGE-UNDARIYASRA,NOSAR,TEHSIL-BAYTU, & SANPA MANJI,TEHSIL-SINDHARI, YEAR-2020-21			
S.NO	PILLAR NO	LATITUDE	LONGITUDE
1	A	25°46'20.00"N	71°50'30.00" E
2	B	25°46'17.88"N	71°52'17.58"E
3	C	25°44'08.00"N	71°52'14.45"E
4	D	25°44'10.12"N	71°50'26.91"E
TOTAL BLOCK AREA : 11.98 Sq.km			

Table-02- Showing D.G.M Block Coordinates near village Undariyasra,Sanpa Manji :-

D.G.M AREA BLOCK COORDINATES, NEAR VILLAGE-UNDARIYASRA,SANPA MANJI,TEHSIL-BAYTU, YEAR-2020-21			
S.NO	PILLAR NO	LATITUDE	LONGITUDE
1	A	25°45'27.99"N	71°51'00" E
2	B	25°45'27.27"N	71°51'36.62"E
3	C	25°44'39.35"N	71°51'35.47"E
4	D	25°44'40.06"N	71°50'58.90"E
TOTAL BLOCK AREA : 1.5 Sq.km			

Table-03- Showing D.G.M Block Coordinates near vilage Sanpa Manji :-

D.G.M AREA BLOCK COORDINATES NEAR VILLAGE SANPA MANJI, YEAR-2020-21			
S.NO	PILLAR NO	LATITUDE	LONGITUDE
1	A	25°42'21.40"N	71°49'20.07"E
2	B	25°42'20.59"N	71°50'1.76"E
3	C	25°41'40.65"N	71°50'00"E
4	D	25°41'41.46"N	71°49'19.13"E
TOTAL BLOCK AREA : 1.42 Sq.km			

3.0 PHYSIOGRAPHY, VEGETATION, AND CLIMATE:

The area is part of arid climatic region. Rainfall in the area is very low as the mean annual rainfall is only 307.7 mm. Almost 90% of the total annual rainfall is received during the southwest monsoon, which enters the area in the first week of July and withdraws by the mid of September.

The temperature reaches to maximum during summer time up to 44^o to 48^o C and the minimum temperature is recorded as 2^oC during winter. The relative humidity ranges from less than 20% to 60 %. Generally moderate winds prevail throughout the year with slight strengthening during early monsoon period.

Vegetation is sparse consisting of thorny shrubs and bushes likewise Babool, Khejari, Aak, Ber, etc. due to the result of low rainfall in the area, Kharif crops comprising predominantly, Bajra, Moth, Til, and Gwar are shown with the commencement of first rains usually around the middle of July to August. In the winter season at some places, Rabi crop is also seen in the area, comprising predominantly mustered wise Tara Mira & Raida.

4.0 INHABITANT

The people are in the area mainly depended on cultivation and husbandry. Major part of habitations is live in scattered Dhani.

5.0 GROUND WATER RESOURCES

Being located in arid zone, both ground water and sub-surface water resources are poor. Ground water occurs under unconfined to confined condition in the semi consolidated. The ground water level in the area generally varies 80m to 120m. In Barmer District Tertiary and Mesozoic formations are the productive formations are the Lathis, Barmer sand stones and the quaternary sediments.

6.0 TARGETS AND ACHIEVEMENTS

The assigned targets of Regional Geological Mapping and Detailed Geological mapping kept under the project in the year 2020-21. The assigned targets is fully achieved. The details of targets and achievement are given in the table

Table-04 Showing status of assigned targets and physical achievements-

S. No.	Nature of work	Assigned annual target	Achievement	Total Achievement
1.	R.G.M (Sq.km.)	10.0	11.98	Total 03 Samples has been collected and sent to the GSI Lab,Jaipur Rajasthan for ICPMS analysis. The ICPMS analysis report awaited from G.S.I.
2.	D.G.M (sq.km.)	2.00	2.92	

7.0 GEOLOGY

7.1 REGIONAL GEOLOGY OF THE AREA :

The Tertiary Alkaline Complex (TAC) of Sarnu-Dandhali; Rajasthan was first reported by Narayan Das (1973) followed by Udas et al., (1974), Chaube et al., (1974), Wall et al., (1993). Chandrasekharan, 1987 and Chandrasekharan et al., (1990), described ultramafic alkaline rocks including ijolites, melanephelenite, phonolite, alkali basalt and carbonatites of the area. Srivastava et al., (1993), Simonetti et al., (1998), Bell (2001), Ernst and Bell (2010). Bhushan and Chandrasekharan (2002) gave detailed account of geology and geochemistry of the TAC rocks. Bhushan and Kumar (2013) reported the first carbonatite hosted LREE deposit from India.

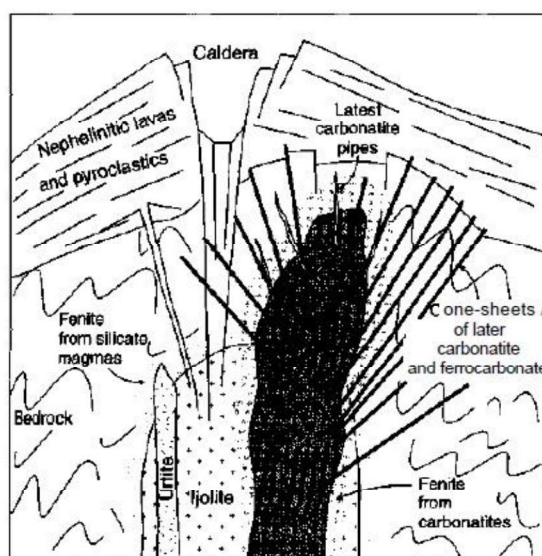


Figure 19-11 Idealized cross section of a carbonatite-alkaline silicate complex with early ijolite cut by more evolved urtite. Carbonatite (most commonly calcitic) intrudes the silicate plu-ton, and is itself cut by later dikes or cone sheets of carbonatite and ferrocarbonatite. The last events in many complexes are late pods of Fe and REE-rich carbonatites. A fenite aureole surrounds the carbonatite phases and perhaps also the alkaline silicate magmas. After Le Bas (1987). Copyright © reprinted by permission of John Wiley & Sons, Inc.

Reference : reference figure collected from the book An introduction to igneous and metamorphic petrology by J.d. Winter.

The area falls in the Malani Igneous Province in the western Rajasthan. The area forms a part of the Sarnu-Dandali Alkaline complex region which consists of an assembly of mildly alkaline-Alkaline-mafic rock units of primarily of Tertiary age that intruded into Rhyolites of Malani Igneous Province (MIS) of late proterozoic age. The main litho-units of the complex are alkali olivine basalt, Hawaiite, Trachyandesite, Syenodiorite and alkaline syenite.

The general stratigraphic succession of the area considered as per prospected by the Geological Survey of India may be as under:

Table-05 :showing Geology of the region

Litho unit	Formation	Age
Blown sand & alluvium	--	Recent to Sub-recent
Carbonatite ,Olivene Basalt,Phonolite	Sarnu-Dandali Alkaline Suite	Cretaceous to Paleocene age
Granite with acid & basic dykes, rhyolite. Ultramafic rocks	Malani suite of Ingenious rock	Pre-Cambrian

7.2 GEOLOGY OF THE AREA

The TAC of Sarnu-Dandali comprises of ultrabasic alkaline rocks, Aegirine Phonolite, Phonolite, Trachy Andesite, Trachyte,Hawaiite, Carbonatite,Rhyolite flow & Rhyolite. The TAC is intrusive into the Neoproterozoic Malani rhyolites and lower Cretaceous sandstone, (Chandrashekar et al., 1990) around the Sanpa-Nausar area. the Malani Rhyolite occurring as basement rock. Alkaline & Rhyolite are the host rocks of these carbonatites. Rhyolite, Nepheline syenites are the components of Malani igneous province which is cut later by phonolite intrusions.

Rhyolite :

Rhyolite is an extrusive igneous rock, formed from magma rich in silica that is extruded from a volcanic vent to cool quickly on the surface rather than slowly in the subsurface. It is generally light in color due to its low content of mafic minerals, and it is typically very fine-grained (aphanitic) or glassy.

Hawaiite

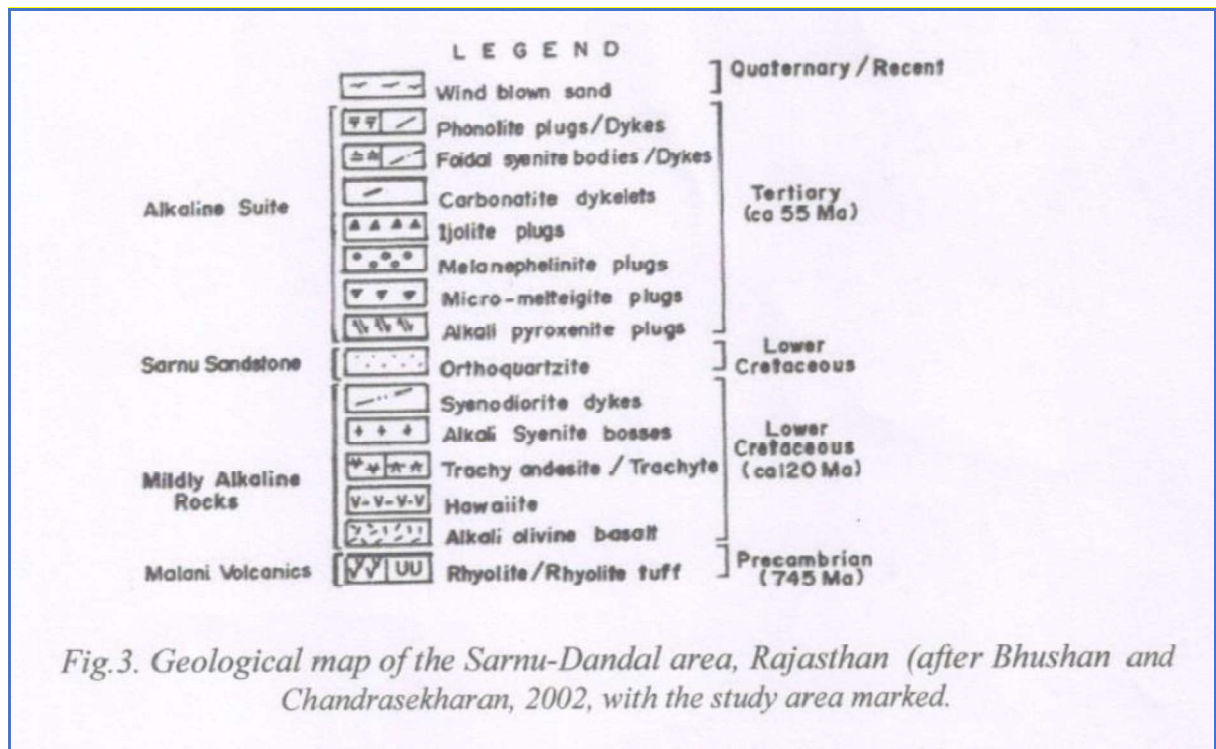
Hawaiite is an aphanitic (fine-grained) volcanic rock produced by rapid cooling of lava moderately poor in silica and enriched in alkali metal oxides (potassium oxide plus sodium oxide). It is often impractical to determine the mineral composition of such a fine-grained rock, and so hawaiite is defined chemically.

Trachyandesite

Trachyandesite is an extrusive igneous rock with a composition between trachyte and andesite. It has little or no free quartz, but is dominated by sodic plagioclase and alkali feldspar. It is formed from the cooling of lava enriched in alkali metals and with an intermediate content of silica.

Trachyte

Trachyte is an extrusive igneous rock composed mostly of alkali feldspar. It is usually light-colored and aphanitic (fine-grained), with minor amounts of mafic minerals, and is formed by the rapid cooling of lava (or shallow intrusions) enriched with silica and alkali metals. It is the volcanic equivalent of syenite.



Carbonatite :

Carbonatites, by definition, contain more than 50 modal % carbonate minerals. an igneous rock composed principally of carbonate (most commonly calcite, ankerite, and/or dolomite), and often with any of clinopyroxene alkalic amphibole, biotite, apatite, and magnetite. The Ca-Mg-rich carbonatites are technically not alkaline, but are commonly associated with, and thus included with, the alkaline rocks.

Phonolite :

Extrusive igneous rocks that are rich in nepheline and potash feldspar. The typical phonolite is a fine-grained, compact igneous rock that splits into thin, tough plates which make a ringing sound when struck by a hammer.

8.1 DETAILS OF INVESTIGATIONS :

During the field season 2020-21, total 11.98 Sq.km. area carried out under Regional Geological Mapping (scale 1cm =120mts) nearby village Nosar,Undariyasra,Tehsil-Baytu,District-Barmer & nearby village Sanpa Manji,Tehsil-Sindhari,District-Barmer.Total 2.92 Sq.km area(1.5 Sq.km area covered in nearby village Undariyasra,Tehsil-Baytu & 1.42 Sq.km area covered in nearby village Sanpa Manji,Tehsil-Sindhari) covered and mapped under Detailed Geological Mapping on scale 1cm=40mts. total 03 Samples has been collected and sent to the GSI Lab,Jaipur Rajasthan for ICPMS analysis for further Detailed Study.

8.2 REGIONAL GEOLOGICAL MAPPING :

A total of 11.98 Sq km area was mapped under the Regional Geological Mapping nearby village Nosar,Undariyasra,Tehsil-Baytu,District-Barmer & nearby village Sanpa Manji,Tehsil-Sindhari,District-Barmer.The mapped area lies on survey of India Toposheet No. 40 O/13 & 40 O/14. Most of the area covered by fine Aeolian sand and Silt with occasional Kankar & other part of mapped area comprises by Alkaline rocks,Aegirne Phonolite,carbonatite rocks of Sarnu -Dandali Alkaline suite & Rhyolite,Rhyolite flow of Malani Igneous Suite.

Area around Nausar Village :- In the part of Regional Geological Mapping, Light green color fine grain Aegirine Phonolite Dyke (25°46'9.37"N 71°52'9.74"E) has been marked which gives information to possibility of other alkaline rocks availability nearby area. It is running in North West -South East direction and its visible length is around 7 to 8 meter

and width is around 1 meter. Some Rhyolite rock exposure also found in the area.

Area around Near Village Undariyasra, Nausar-Sanpa Road : In the addition of the Regional Geological Mapping, excavated pit area marked nearby Nosar Sanpa village Road. In the pit, dark brownish color fine grain Rhyolite and altered alkaline rock (Ijolite ?) are found in scattered form. In pit some clayish weathered rock also identified in which may be altered due to the weathering. it is associated with the alkaline suit of rock. some Rhyolite rock exposures seen in the area. other part of the area is covered by fine aeolian sand & silit with kankar.

Area around Sanpa-Manji : In the addition of the Regional Geological Mapping, dark mehroon color and pale-yellow color Alkaline rock (Hawaiiite ?) ($25^{\circ}42'24.72''N$ $71^{\circ}49'37.59''E$) seen in the excavated pit near village-Sanpa Manji . The area lies S-W direction of the Sanpa manji village.

8.3 DETAILED GEOLOGICAL MAPPNIG :

A total 2.92 sq km area was mapped under detailed geological mapping in which 1.5 Sq.km area covered in nearby village Undariyasra Meghawalo ki dhani, Tehsil-Baytu & 1.42 Sq.km area covered in nearby village Sanpa Manji, Tehsil-Sindhari . The area mapped on the scale 1:4000. The mapped area falls on survey of India toposheet no 40 O/13 & 40 O/14. On the basis of the remote sensing (Landsat Thematic mapper satellite imagery), the composite map interpretation, this

segment of mapped area covered to find out the promising zone for R.E.E in the area.

(A) Area around Meghawalo ki dhani, Near Village-Undariyasra :- A

total 1.5 Sq.km area covered under detailed geological mapping in nearby village Undariyasra Meghawalo ki dhani, Tehsil-Baytu, District-Barmer. the area falls in toposheet no 40-O/13 & 40-O/14. In this area, most of the part is covered by Shrub and bushes. Chocolate brown color Carbonatite vein (25°45'8.09"N, 71°51'14.66"E) intrusion found in the maroon color fine grain Rhyolite rock exposure in the excavated pit. The vein is exposed in S-W direction of near Government school, Meghawalo ki dhani on Sanpa-Nosar road. The dimension of the Carbonatite vein is around 40 meters in length and 15 cm in thick. In the carbonatite vein light violet color mineral (R.E.E mineral?) seen in the ground mass. The dimension of the excavated pit is around 200-250 m x 50-60 m x 2m. The General litho trend of the carbonatite vein is 318° (NNW direction). Other rock exposure in the pit is found brownish color altered, fractured weathered rock. Pale yellow color whitish color veins intruded in the rock in zigzag pattern.

The carbonatite rock released effervescence with the dilute Hydrochloride acid. The mafic minerals (maybe clinopyroxene, alkalic amphibole, biotite, apatite, and magnetite) are seen in the groundmass of the carbonatite rock.

The rocks belong to Sarnu- Dandali alkaline complex and the age of the rock is cretaceous to Paleocene.

The total three samples has been collected from the area and sent to the G.S.I for the ICPMS analysis for the R.E.E. The analysis result awaited from the G.S.I. samples details is given below the table no 06.

(B) Area around Near Village-Sanpa Manji :- A total 1.42 Sq.km area covered under detailed geological mapping in nearby village Sanpa Manji, Tehsil-Sindhari, District-Barmer. the area falls in toposheet no 40-O/14. In the South West part of the Sanpa village, a Phonolite rock exposed in the excavated pits. In the western side of the village, Trachy andesite, Trachyte (light-colored fine grained with mafic minerals rock), Hawaiiite (fine-grained volcanic rock) rock exposed in the excavated pits. on the surface study, Carbonatite rock is not found in the studied area so samples has been not collected from the area.

8.4) SAMPLING:- Total 03 Samples has been collected in which one sample has been prepared for Petrographical study. Samples has been sent to the G.S.I for the ICPMS analysis. Details of samples is given below in the table :

Table-06 : The table showing samples details of the area

SAMPLE DETAILS NEAR VILLAGE NAUSAR FOR ICPMS ANALYSIS				
S.N O	SAMPLE NAME	LAT. LONG	LOCATION	ANALYSIS
6	BMR/NS/01	25°45'8.09"N, 71°51'14.66"E	NOSAR	ICPMS
7	BMR/NS/02	25°45'12.79"N, 71°51'18.65"E	NOSAR	PETROGRAPHICAL STUDY
8	BMR/NS/03	25°45'12.08"N, 71°51'16.71"E	NOSAR	ICPMS

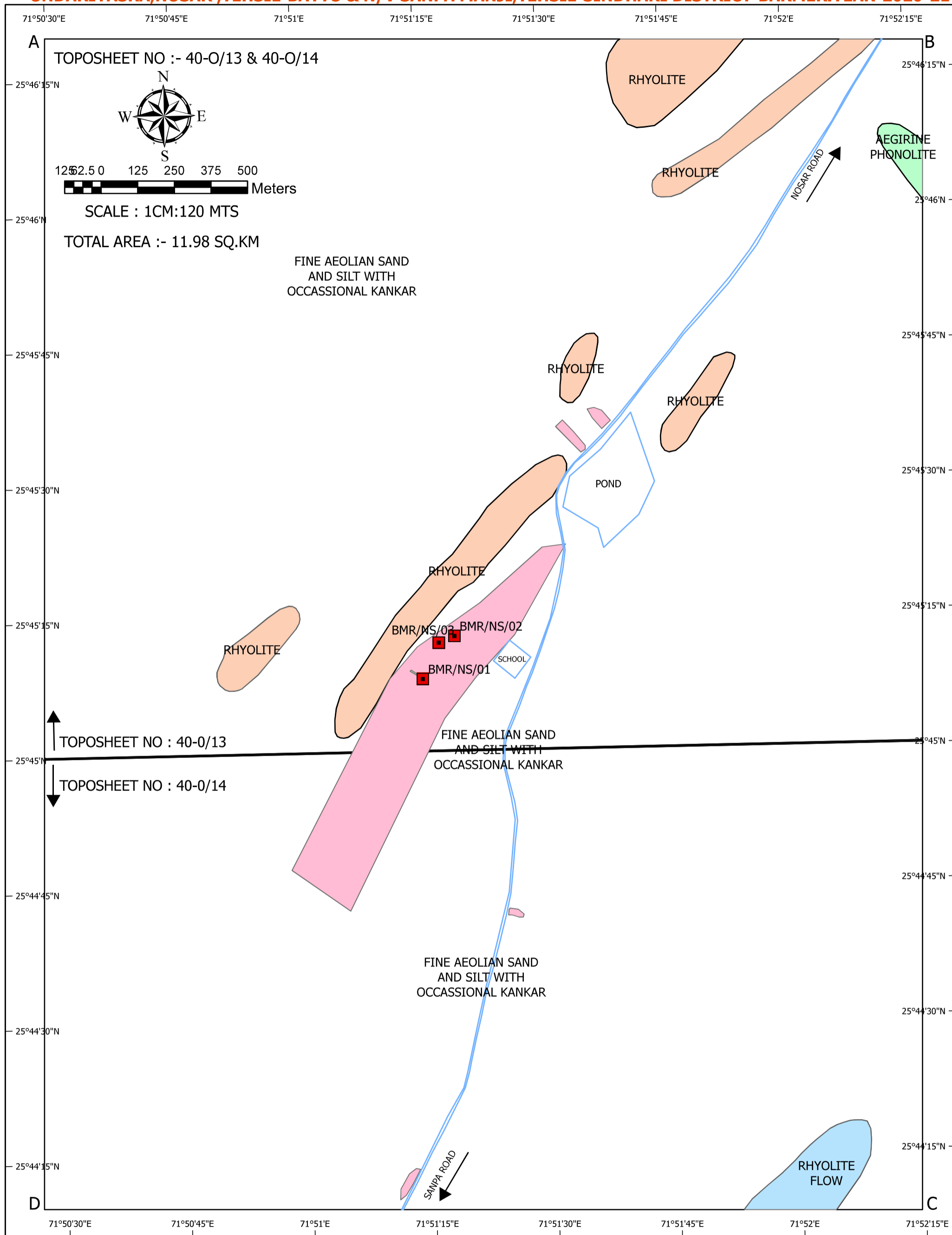
8.5) ANALYSIS RESULTS:-
Analysis result awaited from the G.S.I.

9. CONCLUSION AND RECOMMENDATION :

Over the last two decades, the global demands of REE have significantly increased with their sudden expansion into high technological, environmental, and economical environments. The prominent industries where REEs find applications are catalysts (24%), magnets (23%), polishing (12%), other applications (9%), (8%) each in metallurgy and batteries, glass (7%), ceramics (6%) and phosphors and pigments (3%). Rare earth materials are utilized in a wide range of critical products enabling many emerging green energy technologies, high tech applications and defence systems etc. The lanthanide elements as a group have magnetic, chemical and spectroscopic properties that have led to their application in wide range of end-uses. At present, India obtains its REE raw materials from foreign sources, from Canada, Russia and China.

On surface study, it was found that Carbonatite rock in vein form has been identified in the area and samples have been sent for ICPMS analysis in G.S.I. Due to the presence of Carbonatite vein, the area is promising for LREE, So Geophysical study (Magnetic & Gravity Method) pitting & Channel sampling are required in the area. After the analysis result, further detailed exploration study is required in the area. The final report has been submitted after the found of analysis report of the samples.

REGIONAL GEOLOGICAL MAP FOR MINERAL RARE EARTH ELEMENTS(R.E.E) & OTHER ECONOMIC MINERALS,N/V UNDARIYASRA,NOSAR ,TEHSIL-BAYTU & N/V SANPA MANJI,TEHSIL-SINDHARI DISTRICT-BARMER.YEAR-2020-21



INDEX

ALKALINE ROCK	RHYOLITE
CARBONATITE	RHYOLITE FLOW
AEGIRINE PHONOLITE	INHABITANT
FINE AEOLIAN SAND AND SILT WITH OCCASSIONAL KANKAR	SAMPLE_NOSAR

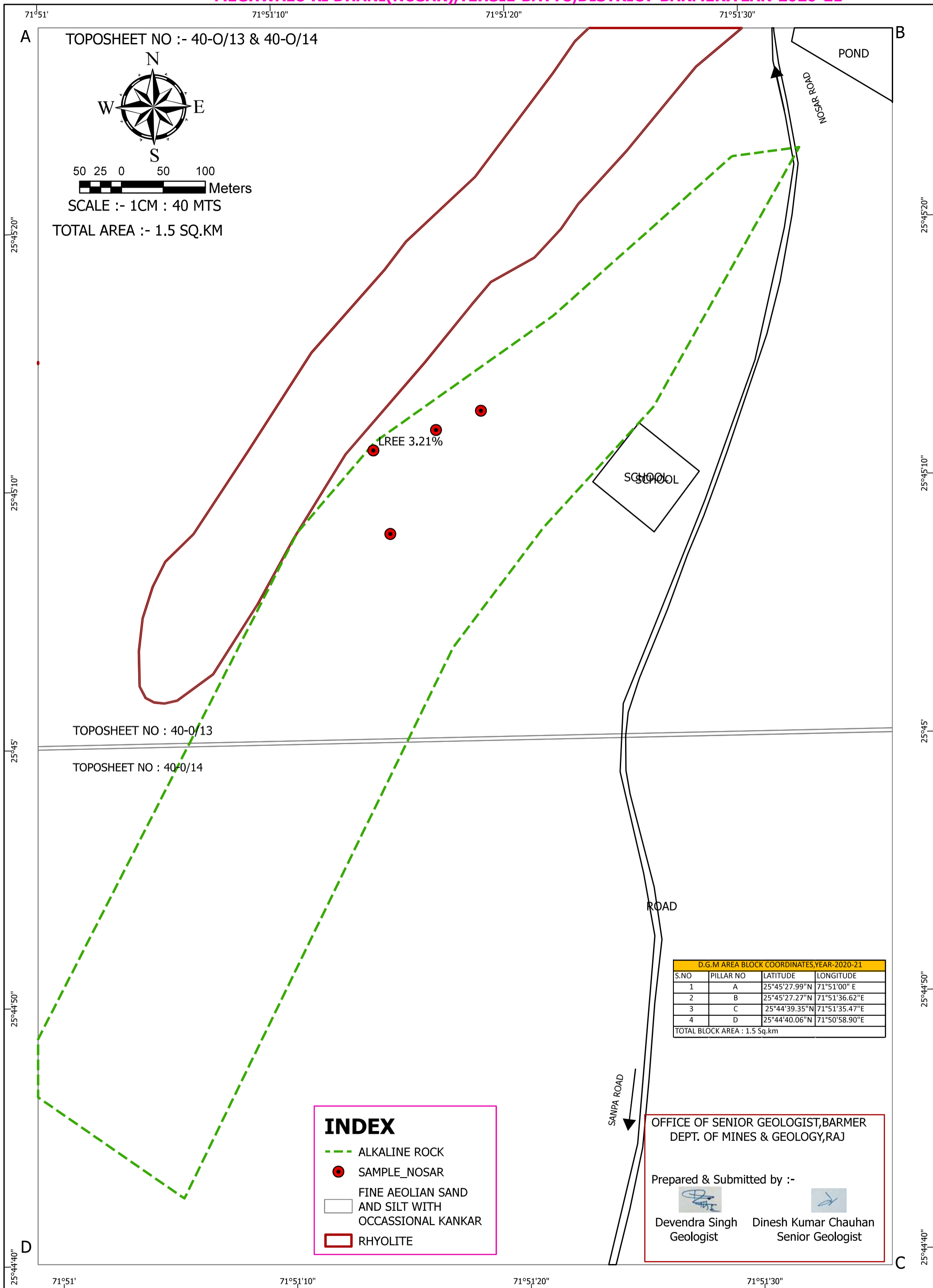
R.G.M AREA BLOCK COORDINATES, YEAR-2020-21			
S.NO	PILLAR NO	LATITUDE	LONGITUDE
1	A	25°46'20.00"N	71°50'30.00"E
2	B	25°46'17.88"N	71°52'17.58"E
3	C	25°44'8.0"N	71°52'14.45"E
4	D	25°44'10.12"N	71°50'26.91"E
TOTAL BLOCK AREA : 11.98 Sq.km			

OFFICE OF SENIOR GEOLOGIST, BARMER
DEPT. OF MINES & GEOLOGY, RAJ

Prepared & Submitted by :-

Devendra Singh
Geologist

DETAILED GEOLOGICAL MAP FOR MINERAL RARE EARTH ELEMENTS(R.E.E) & OTHER ECONOMIC MINERALS,NEAR VILLAGE MEGHWALO KI DHANI(NOSAR),TEHSIL-BAYTU,DISTRICT-BARMER.YEAR-2020-21





D.G.M AREA BLOCK COORDINATES, YEAR-2020-21			
S.NO	PILLAR NO	LATITUDE	LONGITUDE
1	A	25°45'27.99"N	71°51'00" E
2	B	25°45'27.27"N	71°51'36.62"E
3	C	25°44'39.35"N	71°51'35.47"E
4	D	25°44'40.06"N	71°50'58.90"E
TOTAL BLOCK AREA : 1.5 Sq.km			

INDEX

- ALKALINE ROCK
- SAMPLE_NOSAR
- FINE AEOLIAN SAND AND SILT WITH OCCASSIONAL KANKAR
- ▭ RHYOLITE

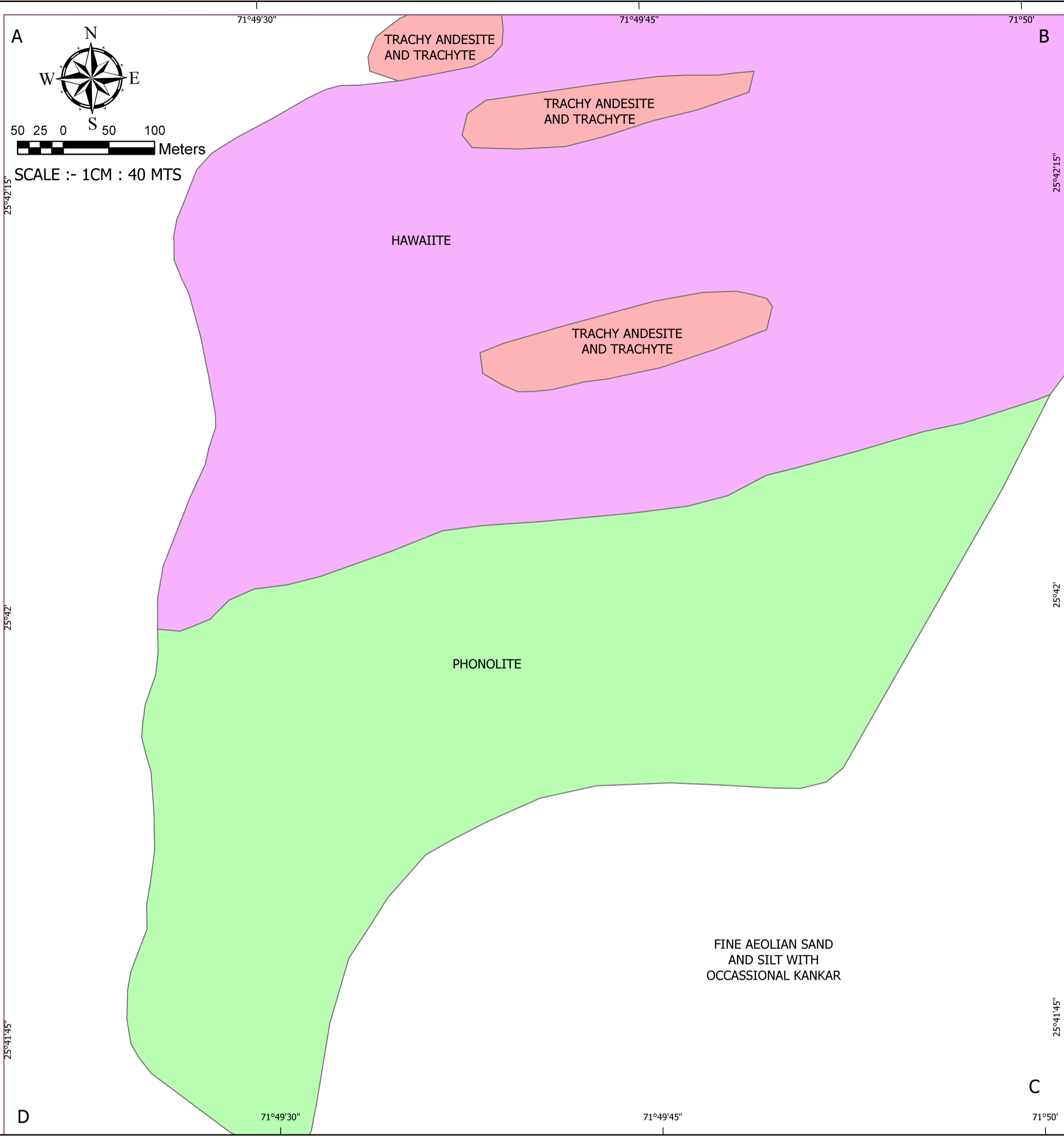
OFFICE OF SENIOR GEOLOGIST, BARMER
DEPT. OF MINES & GEOLOGY, RAJ

Prepared & Submitted by :-

Devendra Singh Geologist Dinesh Kumar Chauhan Senior Geologist

DETAILED GEOLOGICAL MAP FOR MINERAL RARE EARTH ELEMENTS(R.E.E) & OTHER ECONOMIC MINERALS,NEAR VILLAGE SANPA MANJI,TEHSIL-SINDHARI,DISTRICT-BARMER.YEAR-2020-21



INDEX

DGM_SANPA_BOUNDARY
lithologic
 FINE AEOLIAN SAND AND SILT WITH OCCASSIONAL KANKAR
 HAWAIITE
 PHONOLITE
 TRACHY ANDESITE AND TRACHYTE
ROCK
 ALKALINE ROCK

D.G.M AREA BLOCK COORDINATES NEAR VILLAGE SANPA MANJI, YEAR-2020-21

S.NO	PILLAR NO	LATITUDE	LONGITUDE
1	A	25°42'21.40"N	71°49'20.07"E
2	B	25°42'20.59"N	71°50'1.76"E
3	C	25°41'40.65"N	71°50'00"E
4	D	25°41'41.46"N	71°49'19.13"E

TOTAL BLOCK AREA : 1.42 Sq.km

TOPOSHEET NO :- 40-O/14
 TOTAL AREA :- 1.42 SQ.KM

OFFICE OF SENIOR GEOLOGIST, BARMER
 DEPT. OF MINES & GEOLOGY, RAJ

Prepared & Submitted by :-
 Devendra Singh
 Geologist