Proposal for Gunaur Pali Limestone Block, District Panna, Madhya Pradesh for Reconnaissance Survey (G_4 Stage) Mineral Exploration under NMET

(Industrial Mineral)

By

The MP State Mining Corporation Ltd, Madhya Pradesh

Place- Bhopal

Date- 10th January, 2024.

List of Annexure

Summary of the Block for G_4 Stage Exploration

GENERAL INFORMATION ABOUT THE BLOCK

	Features	**Details**
1	Block ID	Gunaur Pali Limestone Block
2	Exploration Agency	The MP State Mining Corporation Ltd
3	Commodity	Limestone
4	Mineral Belt	Blander Group of rocks of Vindhyan Supergroup
5	Completion Period with entire Time schedule to complete the project	20 months
6	Objectives	The proposed block fall in Panna & Satna district of Madhya Pradesh (Anx-1 Location Plan). The Blander Group of rocks of Vindhyan Supergroup is well known for its limestone deposits. Simrawal (Ganurgarh) Shale, Nagod Limestone (with intervening Sagma Shale member), Sirbu Shale (with interbeds of sandstone and argillaceous limestone) and Maihar Sandstone (with interbeds /of shale/siltstone) Formations in the ascending order. The proposed block covers the Vindhyan Super Group, which further extend both eastern & western part. On the western side of the block, there are two limestone mines:- M/s Jaykeychem Ltd, & M/s Spring Way Mining Ltd. Previous work done by GSI also indicates presence of limestone deposits. Field visits were carried out before taking up this proposal. The analyses are positive & proves existence of cement grade limestone. Sample analysis are shown over the map. The presence of supporting lithology in adjoining GSI Blocks, further positive sign & encourages taking up the G4 Exploration in the area.

		The geological map (Anx-2) & lithological map (Anx-3) are attached for ready reference. On the basis of these evidences of mineralization, the present exploration program has been formulated to fulfill the following objectives. i) To carry out Geological mapping on 1:12,500 scale for demarcation of rocks & mineralization with the structural features to identify the surface manifestations and lateral disposition of the mineralized zones. ii) To collect Surface grab samples, Channel samples and Trench samples & analyze for limestone for further course of Exploration program. iii) Shallow pitting / trenching will be done to expose the concealed host rock and minerals. This will guide for localization of the presence of ore bodies. The exploration will be helpful in estimation reconnaissance resources of limestone in the block area. iv) In case the results of the reconnaissance survey are positive, it will help in planning of general exploration programme, which in turn will facilitate the state govt. for auctioning of block.
7	Whether the work will be carried out by the proposed agency or through outsourcing and details thereof.	Will be carried out by MPSMCL & few components through outsourcing.
8	Name/ Number of Geoscientists	Geologist:- 02
9	Expected Field days (Geology)	Geologist:- 165 field + 75 HQ
1	**Location**	
	Latitude	Anx-4
	Longitude	Anx-4
	Villages	Anx-5
	Tehsil/ Taluk	Gunaur & Pawai

	District	Panna
	State	Madhya Pradesh
2	**Area (hectares/ square kilometres)**	
	Block Area	75.1 sq km
	Forest Area	NIL Sq Km Forest map prepared based on the toposheet is attached as Anx- 6
	Government Land Area	Data not available.
	Private Land Area	Data not available.
3	**Accessibility**	
	Nearest Rail Head	Khajuraho Railway Stationed is 77 km away.
	Road	NH 43 is in western side (26Km) & 49 passes on the eastern side (6Km).
	Airport	Khajuraho airport is 77 km
4	**Hydrography**	
	Local Surface Drainage Pattern (Channels)	The area is a monotonous flat terrain with gentle undulations and isolated hills, bounded to the east and south by gigantic sandstone scarps. In general, it has a gentle slope towards central and western parts. The sandstone scarp has a general ENE-WSW trend, showing narrow, elongated dentations perpendicularly. The general relief of the area is about 373m the maximum (400m) and minimum (359m).
	Rivers/ Streams	No major river flows within the proposed exploration block.
5	**Climate**	
	Mean Annual Rainfall	The normal annual rainfall of Panna district is 1182.9 mm. Panna district receive maximum rainfall during southwest monsoon period i.e. June to November. About 89.5% of annual rainfall is received during monsoon season.
	Temperatures (December) (Minimum) Temperatures (June) (Maximum)	Maximum temperature likely to be 24.3 degrees Celsius and Minimum temperature is 12.0 degrees Celsius. Maximum Relative Humidity likely to be 35% and the Minimum Relative Humidity is 18%.

6	**Topography**	
	Toposheet Number	63D/3 Anx-6
	Morphology of the Area	The block area in general is of undulating terrain. The highest elevation is 372 m while the lowest elevation is 349 m & average is 362 of the proposed block.
7	**Availability of baseline data**	
	Geological Map (1:50K/ 25K)	1:50K Geological Map available
	Geochemical Map	Available
	Geophysical Map (Aeromagnetic, ground geophysical, Regional as well as local scale GP maps)	Available
8	**Justification for taking up Reconnaissance Survey / Regional Exploration**	In view of MMDR Amendments & Mineral Auction Rule, 2015, we have identified this block for exploration of Limestone to take up the work under NMET funding. In the proposed study area, there are geological stratigraphical indications, like presence of Bhander Group of Vindhyan Supergroup which contain several bands of limestone. Block almost covers these lithology & formations. Please refer Anx-2 & 3 for the same. Field visit was carried out. Several limestone exposures were observed. Several samples were taken & analyzed. All samples are positive & are of cement grade & above. Adjoining western part is being explored by GSI. Plus there are several studies carried out by GSI for Limestone in nearby area. GSI is confirming presence of limestone in the area & have recommended for further detailed study for

		delineating the prospective zones for mineralization. The Bhander Group of Vindhyan Supergroup formation occupies a very large area which is to be closely checked for further limestone occurrences. Additional trenching and pitting work has to be resorted to, for deciphering the shape of the different bands. As this sector holds the promise of high grade ore, drilling has to be initiated in this area immediately. The details of the same are discussed in "Previous Work", each case wise. Different studies carried out for Limestone are shown as Anx 7. Two large Limestone mines are running in the nearby area. Anx 8 These 4 points are guiding for the presence of Limestone in the area. The exploration will be helpful in estimation of Preliminary Exploration mineral resources (334) of Limestone & other accessory minerals in the block area. In case the results of the Preliminary Exploration are positive, it will facilitate the state govt. for auctioning of block.

1.0 Detailed description of the block

1.1 Block summary:

1.2 Physiography:

The area is a monotonous flat terrain with gentle undulations and isolated hills, bounded to the east and south by gigantic sandstone scarps. In general, it has a gentle slope towards central and western parts. The sandstone scarp has a general ENE-WSW trend, showing narrow, elongated dentations perpendicularly. Several small isolated humps and mounds occur to the central, west-central and northwestern parts of the area. The general relief of the area is about 372 m the maximum and minimum altitudes being 349m.

The Ken River and its major tributary, Gurne River, constitute the drainage of the area. The Ken River, with a general northwesterly course, drains the southwestern part of the region, and takes a westerly course in the west-central part near Singasar. The Gurne River originates in the southeastern corner of the area near Kalda, flows northerly over a considerable distance, cuts a deep narrow gorge across the sandstone scarp, takes a sharp westerly swing in the east-central part of the region near Chautaraha, flows westerly all along in the central part of join with the Ken River in the west-central part near Murwari. The Bori Nadi along with its southerly flowing tributaries drains the northern part of the area with a general westerly course, takes a southeasterly swing near Karahia, and joins with the Gurne River near Bandhaura. The northwestern part of the area is drained by the Mirhasan Nadi, which has a general west-southwesterly course, and its northerly flowing tributaries. It is obvious from a close study of the drainage pattern of the area that the major rivers have a general westerly course. In all, there are three major drainage basins in the area, viz. (1) Gurne River basin with Bori Nadi sub-basin, (2) Ken River basin with Gurne River basin, and (3) Mirhasan River basin. The most common drainage patterns are angular and dendritic.

The highest elevation is 372 m in while the lowest elevation is 349 m of the proposed block the average is 362 m.

2.0 Background Geology

2.1 Regional Geology

The area under report, a westerly continuation of the main Panna Diamond Belt trending N.N.E. to S.S.W., is chiefly formed of the rocks belonging to the Semri, Kaimur and Rewa groups of the Vindhyan system. They lie unconformably over the Bijawar formation and the Bundelkhand pink granites, both being exposed to the north of the area. To the south, they are overlain by alluvium and the younger members of the system.

Regional Geology of Panna

System	**Lithostratigraphic Unit**	**Lithological Description**
Recent to Pleistocene		Alluvium
Rewa Group	**Bhander** Shale	Bhander Shale
	Sandstone and	Sandstone and
	Limestone	Limestone
.-----Diamond Bearing Conglomerates------		
Kaimur Group	Baghain Sandstone	Sandstone
	and conglomerates	and conglomerates
Semri Group	Porcellanite Stage	Shales
	Basal Stage	Quartzite and
		conglomerates
Archaean	Bundelkhand Granites	Granites

Vindhyan Super Group:

The entire Vindhyan succession is one of the thickest sedimentary basin with maximum thickness estimated to be around 3 km, and comprising mainly sandstone, shale and limestone is assigned as the VindhyanSupergroup. The Vindhyan have been separated into 2 division which, though of very unequal proportions, have been determined by important physical considerations. They are separable as much by an unconformable junction between the two divisions as by the sharp lithological contrast between them. The lower division consists of one group and upper divisions have three groups. The Supergroup is divisible into four groups:

1. Semri Group,
2. Kaimur Group,
3. Rewa Group and

4. Bhander Group,

The Vindhyan Super Group is composed mostly of low dipping formations of sandstone, shale and carbonate, with a few conglomerate and volcanoclastic beds, separated by a major regional and several local unconformities. The regional unconformity occurs at the base of the Kaimur Group and divides the sequence into two units: the Lower Vindhyans (Semri Group) and the Upper Vindhyans (Kaimur, Rewa and Bhander Groups). The outcrop pattern of the Super Group resembles a simple saucer shaped syncline. It is generally believed that the Vindhyan basin was a vast intra-cratonic basin formed in response to intraplate stresses.
The different depositional systems recognized in the Vindhyan succession are: alluvial fan, fan delta, braid delta, braid plain, eolian sand sheet, tidal flat (carbonate as well as siliciclastic), shoreface (tide and storm dominated), storm dominated shelf, homoclinal carbonate ramp, distally steepened carbonate ramp and epeiricperitidal flat (siliciclastic).

Semri Group:

The Semri Group overlies the Bundelkand Granite Gneisses and Bijawar Group of metamorphics. Three major rock formations of Semri group are exposed.

Chorhat Sandstone - It is a major rock formation of Semri group and occurs in the central part of the block in NNE-SSW direction. Chorhat Sandstone formation is represented by gluconitic sandstone & minor shale, pebbly grit, siltstone conglomerate & breccia and thin limestone bands. Ripple marks, small scale cross bedding, mud cracks are abundantly recorded.

Rohtasgarh limestone – This formation overlies Chorhat sandstone in form of thin band and it is exposed near Malar village to near Majora village. Rohtasgarh limestone comprises greyish to greyish black limestone and shales. Dominantly it shows parallel lamination.

Suket Shale- Suket shale overlies Rohtasgarh limestone and underlain by Dhandraul (baghain) sandstone and Ghaghar sandstone of Kaimur group. Suket shale trending NNE-SSW occurs on escarpments of ridges.
A sequence of Chorhat sandstone, Rohtasgarh limestone and Suket shale of semri group is well exposed along the road in Ghat section on SH-51 from Bajana to Shoba villages.

Kaimur Group:

It is an extensively developed argillo- arneceous succession. Lithological formations of kaimur group in are as follows:

Ghaghar sandstone - Ghaghar Sandstone is the lower unit of the Kaimur group. It overlies on Suket shale. Its thickness is 15 m.it is mainly made up of sandstone intercalated with shale. It shows mega ripple bedding, herringbone cross bedding, flaser and lenticular cross bedding, minor channels current and wave ripples. In the lower part

of the unit, the current produced structures dominate and in the upper part wave produced structure are more common. It shows good development of mud cracks.

Bijagarh Shale – Bijagarh shale overlies on Ghaghar sandstone. It is made up of greyish black shale, siltstone and sandstone. It is divided into three units. The lower and upper parts are sandy, and the middle part is made up of black shales which is occasionally pyritiferous. Parallel lamination with low angle discordances, lenticular bedding, ripple marks, wrinkle marks, spring pits, incomplete mud cracks, modified ripples, load structures have been recorded.

Dhandraul Sandstone- this is the upper most unit of Kaimur. It is dominantly made up of white sandstone. It also shows purple staining. The Baghain sandstone carries well preserved cross-bedding and ripple marks, the latter being more prevalent in its upper part. The cross-bedding is of both the types, tabular and trough. These are also mainly developed in the topmost part of the formation. The best cross bedded sections are exposed in the nala gorge sections about 2 km east of Hardua and in the Chakra nala NW of Naipar. Ripples are of also very well preserved in this formation. Both oscillation and interference types of ripples are present. In the nala section east of Rajaphar (665m) and in the nala course south of Sagoria - Jara road bypass on the main nala, mega ripples have been found in this quartzite. The sandstone is highly jointed. The joints are mainly vertical or sometimes show a dip of 70° to 80° south westerly. The common and most persistent joints are N20°W and N50°E both being vertical.

Rewa Group:

This group comprises Jhiri shale & Govindgarh sandstone formation. Details of lithological formations of kaimur group in are as follows-

Jhiri Shale – Jhiri shale is occupying the slopes below the Gahadra Quartzites scarps. This formation lies over the Baghain (Dhandraul) Quartzite of the Kaimur Group. Its contact with the underlying Baghain Quartzite is quite gradational throughout, which is an indication of the slow change of facies in the course of deposition of these formations and no break in sedimentation. This formation is composed of shale with intercalated bands of siltstone and sandstone. The shale is generally of green and chocolate brown colour, the latter is due to oxidation. It is quite compact when fresh and highly fragmented and soft where exposed to weathering. The intercalated bands of siltstone and sandstone vary in thickness from 5 cm to 35 cm and are more frequent in the lower part of the formation. The rocks of this formation have been seen exposed almost all along the strike length of the area mapped except the area near Bakshwaha where its outcrops are covered by trap and calcareous sandstone of post-Vindhyan age (Lametas?).

The Jhiri Shale carries near its basal part thin, discontinuous and most impersistent bands of conglomerates. The linear outcrops of this conglomerate ranging in thickness between 5 cm to 20 cm are exposed in the nala NE of Matipura; along the Mantra nala, north of Nagda; in the main nala N60°E of Banoli; in the Chakra nala near the Rajpura-

Sadpur road crossing; in the Chachi-Semranala NE of Semra and around Pararia. The maximum thickness of upto 20 cm is noticed only in the Chakra nala and Chachi – Semranala outcrops. The conglomerate consists of sub-rounded to well rounded pebbles of red jasper, white vein quartz, blue and brown quartzite, chert along with a few pebbles of porcellanious and shale pellets. The shale pellets are mostly green coloured. The matrix is mainly quartzitic but in certain cases particularly in the upper horizon, it is shaly also. In general, the size of the pebbles varies from a pin-head to as large as 5 cm across. Generally, the large sized pebbles are of quartzite and vein quartz and jasper. A general decrease in the size of the pebbles especially in case of the large size pebbles is noticed westward. Beyond Rajpura, as seen in the Chakra nala and Chachi-Semranala sections, the conglomerate is composed homogeneously of small sized gravels. The size of which is mainly 2 mm across. Jasper is rarely present and the bulk of the rock is made up of the quartzite and vein quartz gravels/pebbles. The matrix is mainly quartzite.

Govingarh Sandstone - Overlying the Jhiri Shale, this formation is ranging in thickness between 45 m and 50 m it is exposed in the scarp and on the main plateau all along the strike length of the area. However, in the area around Jujarpura, Garhi-Semra; south of Sodpur and Northwest of Bari, it is covered by isolated patches of calcareous sandstone (Wilson's lametas) of pre-trap age and basalts of the Deccan Trap. Its southern limit is marked by a thick cover of alluvium. The quartzite is white to light pink in colour, medium to finegrained in texture and thinly bedded. On its weathered surfaces, it is brown to dark brown and at places as seen in the areas near Phurtal , south of Semra, south of Kusmar and SW of Bakshwaha, it is flaggy in nature due to which these are quarried for slabs and sheets for roofing and flooring purposes.

The quartzite is highly cross bedded (both tabular and trough types) as seen in the sections exposed in the scarp, these are more frequently found in the thinly bedded (flaggy) portion of the quartzites. Number of measurements have been taken of these directional structures and after grouping into 30° class interval were plotted, to form a rose diagram in order to deduce the paleocurrent direction. channels on this plateau are aligned in a NW-SE direction. All these above discussed characters of this formation go to recognize this quartzite a typical blanket sand deposit.

2.2 Geology of the Block:

The proposed area comprises the rock formations of Bhander Group of Vindhyan Supergroup. The following is the lithostratigraphic succession observed in the area.

Quarternary or Recent Calc Tufa		
Recent		Laterite and Bauxite
VINDHYAN SUPERGROUP	BHANDER GROUP	Maihar(Upper Bhander) Sandstone Formation with interbeds of shale/siltstone
		Sirbu Shale Formation with interbeds of argillaceous limestone/calcareous sandstone, quartz arenite and siltstone
		Nagod Limestone Formation with „Lower" and "Upper" units of limestone separated by Sagma Shale member.
		Simrawal (Ganurgarh) Shale Formation with interbeds of calcareous sandstone/argillaceous limestone

3.0 Mineral Potentiality

Field visit was carried out. Several limestone exposures were observed. Several samples were taken & analyzed. All samples are positive & all are of cement grade & above. Anx-11, 12 & 13.

GSI, itself carrying exploration in the adjoining western part.

Plus there are several studies carried out by GSI for Limestone in nearby area. Anx-7

GSI is confirming presence of limestone in the area & have recommended for further detailed study for delineating the prospective zones for mineralization. The Bhander Group of Vindhyan Supergroup formation occupies a very large area which is to be closely checked for further limestone occurrences. Additional trenching and pitting work has to be resorted to, for deciphering the shape of the different bands. As this sector holds the promise of high grade ore, drilling has to be initiated in this area immediately.

The proposed block is shown over several GSI Exploration Report maps, which clearly shows that proposed block contains mostly limestone. Anx-7

Two large Limestone mines are running in the nearby area. Anx 8

The list of nearby mines is as follows:-

Sr No	Mine Owner	Mine Name	Mineral	Area (Hect)	District
1	M/s JK Cement	Jakaychem Ltd	Limestone	1729.36431	Panna
2	M/S Spring Way Mining Ltd		Limestone	502.754946	Panna

These 4 points are guiding for the presence of Limestone in the area.

The exploration will be helpful in estimation of Preliminary Exploration mineral resources (334) of Limestone & other accessory minerals in the block area.

4.0 Scope for Proposed Exploration

The proposed block fall in Panna district of Madhya Pradesh (Anx-1 Location Plan).

i. Geological mapping in the said block in 1:12500 scale.
ii. To expose the concealed limestone and check the CaO, Fe_2O_3, Al_2O_3, SiO_2, etc content at shallow depth, trenching/pitting will be done.
iii. To check the extension of orebody in the Gap area as well as below ground level, by drilling scout boreholes.
iv. Sampling & their analysis.
v. To estimate the Reconnaissance Mineral Resources and grade for orebody in the block as per UNFC and MEMC-2015

5.0 Observation and recommendations of previous work

Previous Works

The term Vindhyan was coined by Thomas Oldham in 1876 after the great Vindhyan Mountains of the Bundelkhand and Malwa regions in Central India. Mallet (1869) divided the Vindhyans into "Lower" and "Upper", including the Semri Series in the former and the Kaimur, Rewa and Bhander Series under the latter. The Bundelkhand area, of which the present area forms a part, was first mapped by Oldham in 1854 and subsequently by Wilson during 1873-77, whose geological map is the only source of information regarding his work.

In recent past, officers of Geological Survey of India have carried out systematic geological mapping of Vindhyan Supergroup of rocks in the areas adjoining to the present area. Rao and Chamanlal (1972, 1973 and 1974) carried out systematic geological mapping in the adjoining areas in Survey of India Toposheet Nos 63D/10, Toposheet Nos. 63D/13 &Toposheet Nos. 63D/14. Mathur et al. (1971) mapped the area falling in Toposheet Nos 63D/01, Toposheet Nos. 63D/03, Toposheet Nos. 63D/05, Toposheet Nos 63D/06, Toposheet Nos. 63D/09 and Toposheet Nos. 63D/10 on the base maps prepared from aerial photographs in connection with Panna Diamond Investigation. Rao and Gupta (1978) carried out systematic geological mapping in parts of Toposheet Nos. 63D/05 &Toposheet Nos. 63D/09. Rao (1979) carried out mapping in parts of Toposheet Nos. 63D/06 & Toposheet Nos. 63D/07 in continuation with the earlier work.

Sr No	1	2
Accession No	CR-014081	CR-014320
Report Title	Report On Geological Mapping Of The Vindhyan Supergroup Of Rocks In Parts Of Panna And Satna Districts, Madhya Pradesh	Report On Photogeological Mapping Of The Vindhyan Super Group Of Rocks In Parts Of Panna And Satna Districts, M.P.
Authoe	T.KAMESWARA RAO	SAMBHU CHAKRABORTY
Mission	Geological and Geophysical Mapping	Remote Sensing and Aerial Survey, Geomorpholocial Mapping and Hyperspectral Surveys
Theme	Systematic Geological Mapping	Photogeological & Remote Sensing
Toposheet No	63D03, 63D07	63D03, 63D07, 54P14, 54P15, 54P16, 63D11
FSP Year From	1979	1980
FSP Year To	1980	1981
Extract	Summary avaialable, no direct recommendations.	Summary avaialable, no direct recommendations.

6.0 Planned Methodology

Work will start with geological mapping of the block on 1:12500 scale.
Core drilling will be carried out at G4 level of exploration as per "The Minerals (Evidence of Mineral Contents) Rule 2015.

Surface sampling along with Groove sampling will be done during the course of mapping.

Pitting & trenching will carried out at G4 level of exploration as per "The Minerals (Evidence of Mineral Contents) Rule 2015.

Chemical analysis (CaO, MgO, Fe2O3, Al2O3, SiO2 & LOI) of all the samples will be done from departmental laboratory as well as NABL accredited laboratories.

Samples will checked in several ways. They are listed below:-

Sr No	Sample Check Type		Percentage
1	Internal Check	:-	5%
2	External Check	:-	10%
3	Composite Samples	:-	10%
4	Moisture absorption & Bulk Density	:-	2%
5	Mineralogical analysis	:-	5%

These activities will be followed by data interpretation and report writing work.

7.0 Nature Quantum and Target

Components	G4 Stage	Proposed Quantum
Aerial reconnaissance	Remote sensing, airborne geophysical survey etc.	Not needed
Geological Survey	i 1.25K/ 12.5K ii Assessment of lithology, structure, surface mineralisation and analysis of old history of mining, if any.	Detailed mapping on 1.25K scale – 75.1 Sq Km
Geochemical Survey	i Regional Grab / chip / Stream Sediment / Soil Sampling ii Recording of broad geomorphology, drainage, etc.	NIL
Geophysical Survey	Aero-geophysical / Regional ground geophysical survey (Refer another table below)	NIL
Pitting/ Trenching	Five to ten to expose mineralised zone. The location of Pitting and trenching should be judiciously planned to cover the entire mineralised body, to delineate the strike extension and also for planning scout boreholes. Sample length to be specified (m3)	20 (40m3)
Drilling / Systematic drilling	Few boreholes if required along the positive profiles delineated by surface sampling/pitting trenching (Mts)	8 (200 meterage)
Groove Sampling /Grab and Chip Sampling	A few samples from bed rock (few representative samples from all the exposed rocks in the area for first-hand information and more samples from rocks which host the mineralization).	475
Core sample	Sample from mineralised zones as well as hanging wall/footwall Side to be collected. Sample length to be specified (Mts)	150
Petrographic and mineragraphic studies	Principal rock types, mineral assemblage, identification of minerals of interest (Numbers)	39
Synthesis of all available data	i) Integration of regional geophysical, geological and geochemical data. ii) Synthesis of all available data and Report writing	As required

Anx-10

Time schedule

Sr No	Activities	Unit	Months																			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	Camp Mobilization & Setting	Months																				
2	Geological & Toporaphical Survey Work	Months																				
3	Pitting & Trenching	Months																				
4	Core Drilling, Core Logging,	Months																				
5	Sample Preparation & Analysis	Months																				
6	Geological Report preparation	Months																				
7	Report Study, enlisting of various modification & Final Copy of the report	Months																				

Note:-

Commencement of Project may be reworked from the day of exploration area is available with all Statutory Clearance.

Time loss due to monsoon / agricultural activity / forest clearance / local law & order problem(s) may be additional to the above time line.

8.00 Manpower Deployment

For Geologist	
Area (Sq Km)	75.1
Field Work Days	165
HQ Work Days	75
Labour	330
Core Drilling	
No of Boreholes	8
Drilling Depth (18 to 24)	25
Meterage	200
Let 75% be analyzed (Numbers)	150
Pitting & Trenching	
Numbers of pits / Trenching	20
Length (Mts)	1
Breath (Mts)	1
Depth (Mts)	2
Total Volume (M3)	40
Number of Samples & Analysis	
From BH	150
Surface Sample numbers	475
Total Samples	625
Internal Check @ 5%	31
External Check @ 10%	63
Composit Samples @ 10%	63
Total Samples	**781**
For Preparation	
One Person/ Nos of Samples / Day	2
No of samples	781
Sample Man days	391
Labour	781
Logging	
Logging per day (Mts/Day)	50
Meterage	200
BH Logging	4
Pit / Trench Logging per day (Pits/Day)	2
Number of Pits / Trenches	20
Man days for pit logging	10
Total Logging Man days	15
For HQ Man days	7
Petrological Study	
Mineralogical Study @ 5%	39

9.0 Break-up of Expenditure

Cost Estimate for G4 Exploration - Gunaur Pali Limestone Block, Panna, MP.							
Sr No	**Work / Activity**	**SoC Para**	**Unit**	**Charges / Cost (Rs)**	**Qunatity**	**Amount (Rs)**	**%**
1	Large scale Geoloical mapping (1:12500)		Charges for one Geologist per day				
a	Geologist (Field) per day	1.2a	Field	11000	165	1817200	16.89
b	Labour for Geologist	5.7		494	330	163218	1.52
c	Geologist (HQ) per day	1.2b	HQ	9000	75	675000	6.27
2	Pitting & Trenching	2.1					
a	Excavation of Pit / Trench upto 2m depth	2.1.1	per Cu. M	3330	40	133200	1.24
3	Drilling in soft rock (Outsourced)	2.2.1.1b	per m	11500	200	2300000	21.38
4	Sampler	1.5.2	Charges for one sample per day	5100	391	1993463	18.53
5	Labour for sampler	5.7		494	781	385938	3.59
6	Laboratory Studies	4.0					
a	Chemical analysis of rock (Wet) ((CaO, MgO, Al2O3, SiO2, Fe2O3 & LOI)	4.1.9	per sample	2900	625	1812500	16.85
b	Check Sample (Internal 5%)	4.1.9	per sample	2900	31	90625	0.84
c	Check Sample (External 10% & NABL)	4.1.9	per sample	2900	63	181250	1.68
d	Composite Samples (10%) (CaO, MgO, Al2O3, SiO2, Fe2O3, SO3, P2O5, Mn2O3, TiO2, K2O, Na2O & LOI)	4.1.9	per sample	2900	63	181250	1.68
e	Additional 2 radicals SO3 & P2O5	4.1.7b	per sample	670	31	20938	0.19
g	XRF Studies (Major oxides) - Composite Samples	4.1.15a	per sample	4200	63	262500	2.44
7	Petrological Studies	4.3					
(i)	Preparation of standard thin section of rock	4.3.1	per sample	2353	39	91914	0.85
(ii)	Digital photomicrograph of thin polished section	4.3.7	per sample	280	39	10937.5	0.10
(iv)	Complete Petrographic / Ore Microscopic Study / Mineragraphic report of rock samples	4.3.4	per sample	4232	39	165313	1.54
8	Geotechnical Studies	4.80	per sample				
a	Insitu Bulk density	4.1.10	per sample	3540	39	138281	1.29
b	Bed moisture determination	4.11a	per sample	1246	39	48672	0.45
c	Decrepitation test for limestone/dolomite	4.7.3	per sample	1200	39	46875	0.44
9	Drill Core Preservation	5.3	per m	1590	150	238500	2.22
	Sub Total					**10757572**	**100.00**
10	Preparation of Exploration Proposal	5.1	One Number (5 Hard Copies) alon with soft copy	2% or 380000, whichever is low	1	380000	
11	Geological Report Preparation	5.2	Cost per 5 hard copies of report along with soft copy	1.5 lakh or 5% of the work, whichever is more & Rs 3000/- per each additional copy	1	537879	
12	Tendering Process (2% or 5 lakhs, whichever is less)	2.3				**500000**	
13	Operational Charges	6.0				**230000**	
14	Peer Review		**As per EC decision**			**30000**	
	Sub Total					**12435451**	
	GST @ 18%					2238381	

9.0 Break-up of Expenditure

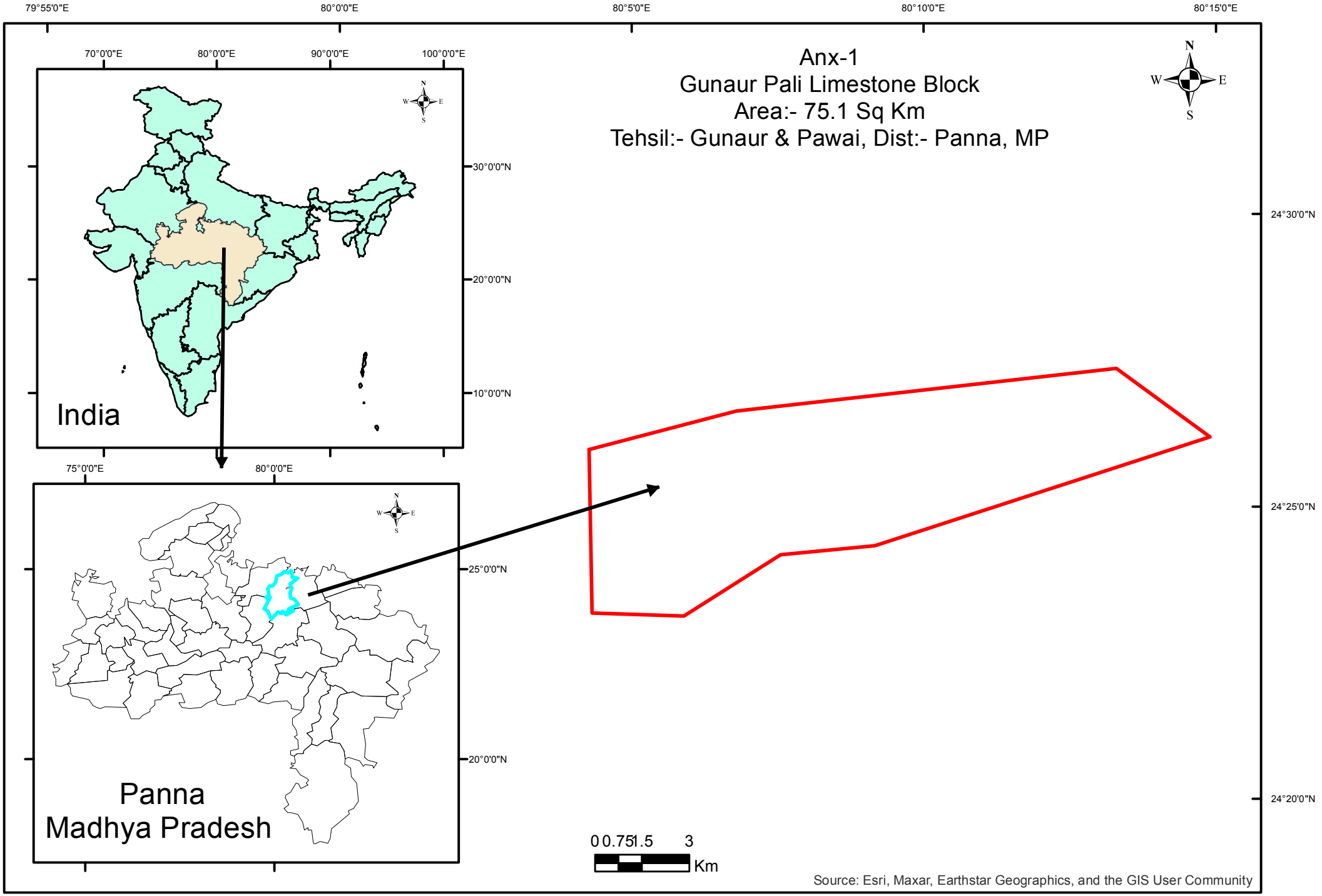
Cost Estimate for G4 Exploration - Gunaur Pali Limestone Block, Panna, MP.							
Sr No	**Work / Activity**	**SoC Para**	**Unit**	**Charges / Cost (Rs)**	**Qunatity**	**Amount (Rs)**	**%**
	Total					**14673832**	
						146.74	Lakhs
						1.47	Cr

10.00 Refrences

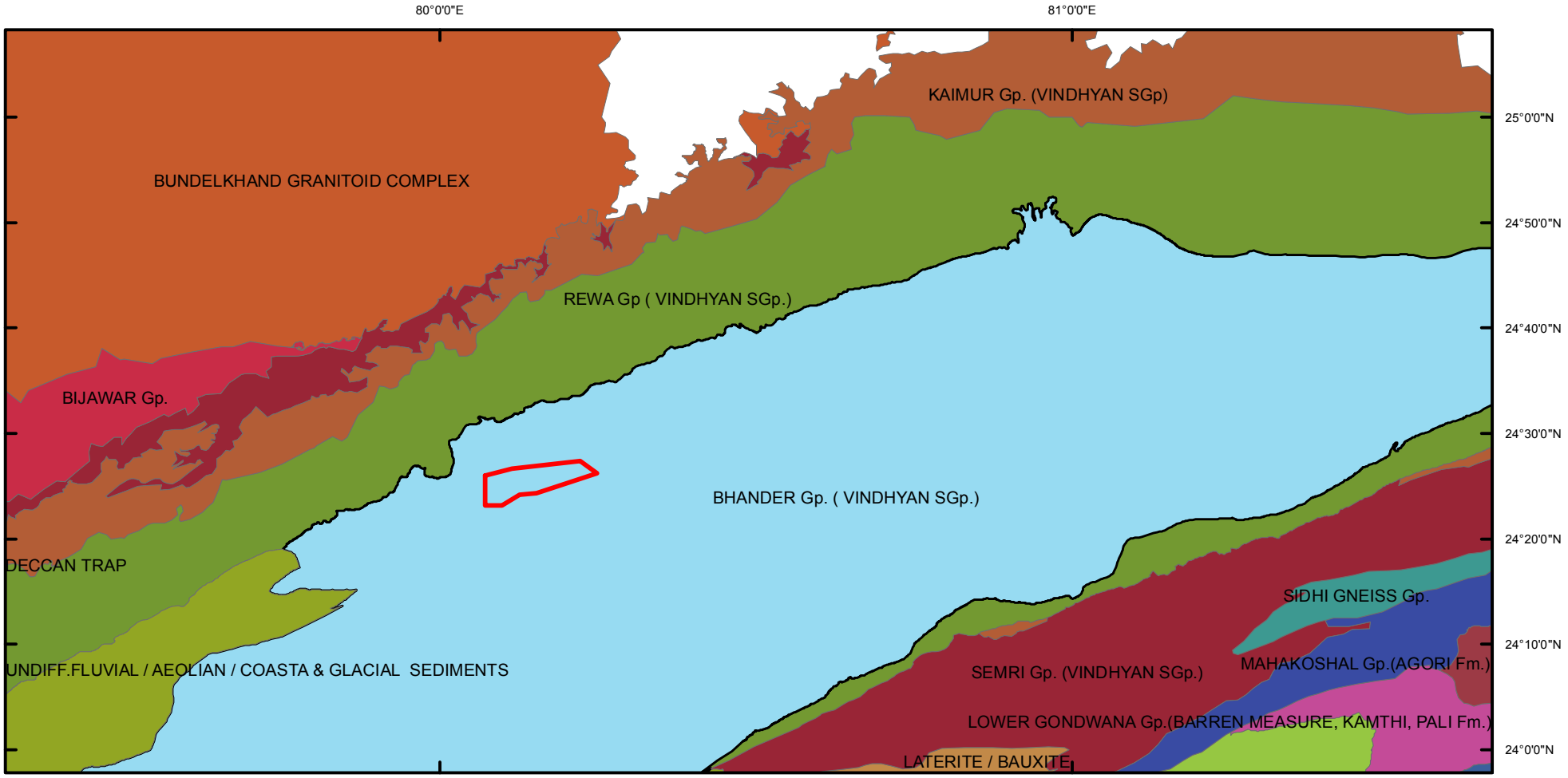
Sr No	Accession No	Report Title	Authoe	Mission	Theme	Toposheet No	FSP Year From	FSP Year To
1	CR-014081	Report On Geological Mapping Of The Vindhyan Supergroup Of Rocks In Parts Of Panna And Satna Districts, Madhya Pradesh	T.KAMESWARA RAO	Geological and Geophysical Mapping	Systematic Geological Mapping	63D03, 63D07	1979	1980
2	CR-014413	Interim Report On Diamond Investigation In The Eastern Partof The Baghain Valley Jabalpur Disttt, Madhya Pradesdh	R.N.GHOSH, A.N.SINGH	Mineral Assessment-Precious Metals, Diamond and Gem Stones	Precious Metals and Minerals (Gold, PGE, Diamond, Precious Stones)	63D09, 63D03, 63D05, 63D06, 54P14, 54P14	1979	1980
3	CR-015129	Interim Report On The Study Of Stromatolites From The Vindhyan Supergroup Of Rocks Of Satna, Rewa And Panna Districts Of Madhya Pradesh	SUMANT GUPTA	Fundamental Geosciences and Research	Palaeontological Studies	63D14, 63H02, 63D06, 54P13, 63D11, 63H06, 63D09, 63D10, 63D15, 63D01, 63D05, 63D03	1981	1982
4	CRO_14865	Report On The Petrological Mapping Of The Majhgawan Kimberlite Diatreme, Panna District (M.P.)	R.N. Ghosh	Fundamental Geosciences and Research	Petrological Studies	63D03	1981	1982
5	CR-023138	Majhgaon medium tank project, distt. Panna	Arun Kumar	Geotechnical and Geohazards Management	Engineering Geology	63D03, 63D07	2015	2016
6	CR-014320	Report On Photogeological Mapping Of The Vindhyan Super Group Of Rocks In Parts Of Panna And Satna Districts, M.P.	SAMBHU CHAKRABORTY	Remote Sensing and Aerial Survey, Geomorpholocial Mapping and Hyperspectral Surveys	Photogeological & Remote Sensing	63D03, 63D07, 54P14, 54P15, 54P16, 63D11	1980	1981

7	CR-014842	Geological Mapping Of The Area Around Simaria, Salaiya, Part Of Jabalpur, Damoh And Panna Districts, M.P	S.SANYAL,, K.SANYAL,, S. CHAKRABORTY, P.K.NANDA	Geological and Geophysical Mapping	Systematic Geological Mapping	54P15, 54P16, 55M04, 55M13	1982	1983
9	CRO-107663	Geological Mapping On Aerial Photographs In Parts Of Panna And Chhattarpur Districts Of Madhya Pradesh	SEVA DASS	Remote Sensing and Aerial Survey, Geomorpholocial Mapping and Hyperspectral Surveys	Photogeological & Remote Sensing	54P11, 54P14, 54P15	1970	1971
10	CRO-23051	Geochemical Mapping In Parts Of Toposheets 54P/11 And 54P/15 In Chhatarpur, Damoh And Panna Districts, Madhya Pradesh.	DEEPU T.R.,NAGENDRA KUMAR GAUTAM	Geochemical Survey	Geochemical Mapping	54P11, 54P15	2014	2015
11	CR-006822	Report On The Systematic Mapping And Investigation Of Base Metal Minerlisation In Chhattarpur, Sagar And Tikamgarh Districts, Madhya Pradesh	G. MANI	Geological and Geophysical Mapping	Systematic Geological Mapping	54P11, 54P14, 54P15, 54P06, 54P07, 54P10	1971	1972

Annexure


Anx-1
Gunaur Pali Limestone Block
Area:- 75.1 Sq Km
Tehsil:- Gunaur & Pawai, Dist:- Panna, MP
79°55'0"E
80°0'0"E
80°5'0"E
80°10'0"E
80°15'0"E
24°30'0"N
24°25'0"N
24°20'0"N
70°0'0"E
80°0'0"E
90°0'0"E
100°0'0"E
30°0'0"N
20°0'0"N
10°0'0"N
India
75°0'0"E
80°0'0"E
25°0'0"N
20°0'0"N
Panna
Madhya Pradesh
N
W
E
S
0 0.75 1.5 3
Km
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Anx-2
Geological Map
Gunaur Pali Limestone Block
Area:- 75.1 Sq Km
Tehsil:- Gunaur & Pawai, Dist:- Panna, MP.



Legend

- Gunaur_Pali_Limestone_Block

Geology 2M

INDEX_

- BHANDER Gp. (VINDHYAN SGp.)
- BIJAWAR Gp.
- BUNDELKHAND GRANITOID COMPLEX
- CHHOTANAGPUR GNEISSIC COMPLEX
- DECCAN TRAP
- KAIMUR Gp. (VINDHYAN SGp)
- LATERITE / BAUXITE
- LOWER GONDWANA Gp.(BARREN MEASURE, KAMTHI, PALI Fm.)
- MAHAKOSHAL Gp.(AGORI Fm.)
- REWA Gp (VINDHYAN SGp.)
- SEMRI Gp. (VINDHYAN SGp.)
- SIDHI GNEISS Gp.
- UNDIFF.FLUVIAL / AEOLIAN / COASTA & GLACIAL SEDIMENTS
- UPPER GONDWANA Gp. (PACHMARHI / DENWA /BAGRA/ JABALPUR/TIKI / BANDHOGARH Fm.)
- UPPER GONDWANA Gp. (PANCHET, SUPRA PANCHET, PARSORA, Fm.)

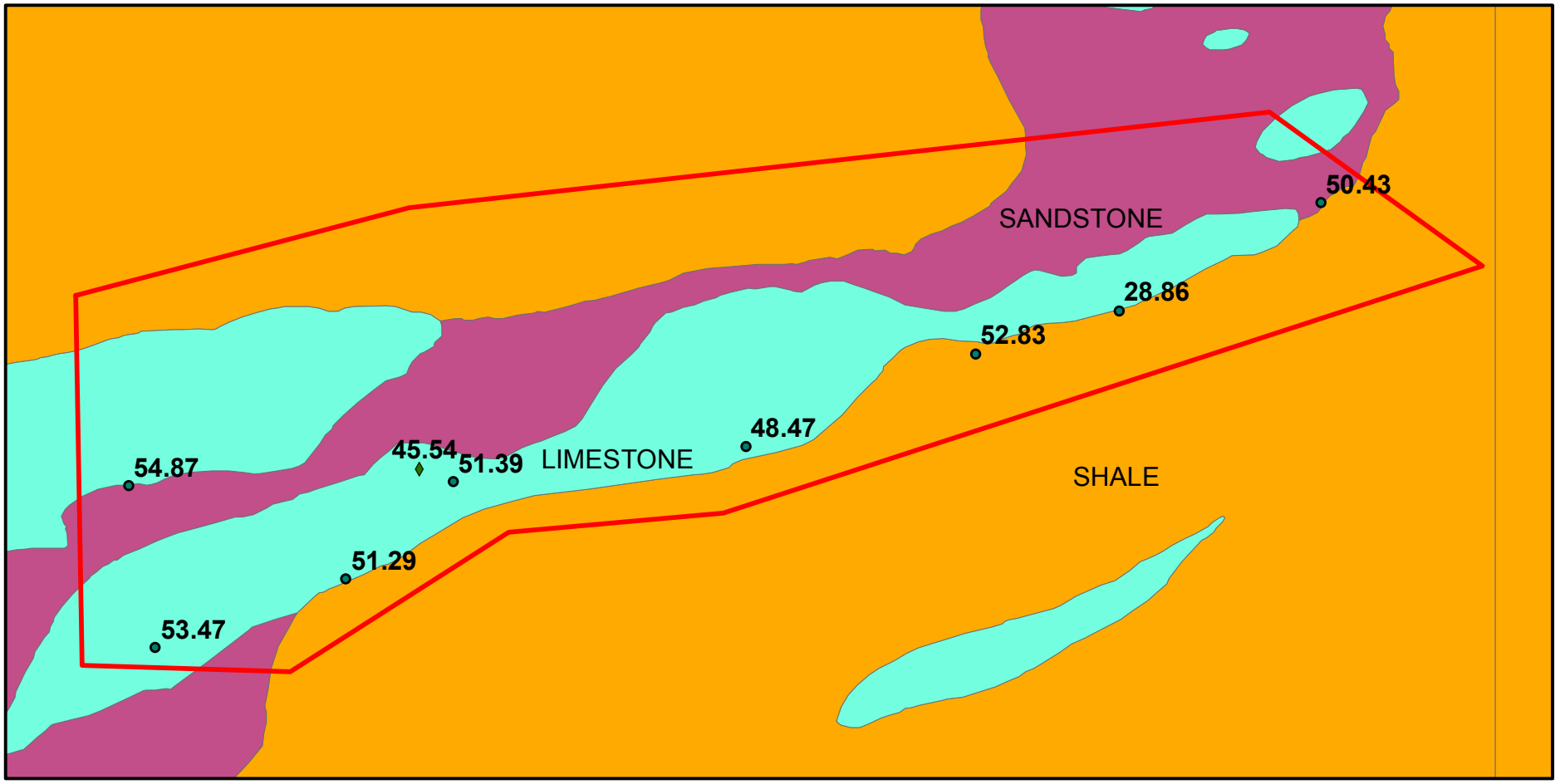
25

Source:- Bhukosh, GSI.

Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree

Km
10 5 0 10 20 30 40

Anx-3
Lithological Map along with BRS Analysis
Gunaur Pali Limestone Block
Area:- 75.1 Sq Km
Tehsil:- Gunaur & Pawai, Dist:- Panna, MP.



Legend

Gunaur_Pali_Limestone_Block

Lithology

LITHOLOGIC

- LIMESTONE
- SANDSTONE
- SHALE

Source:- Bhukosh, GSI.

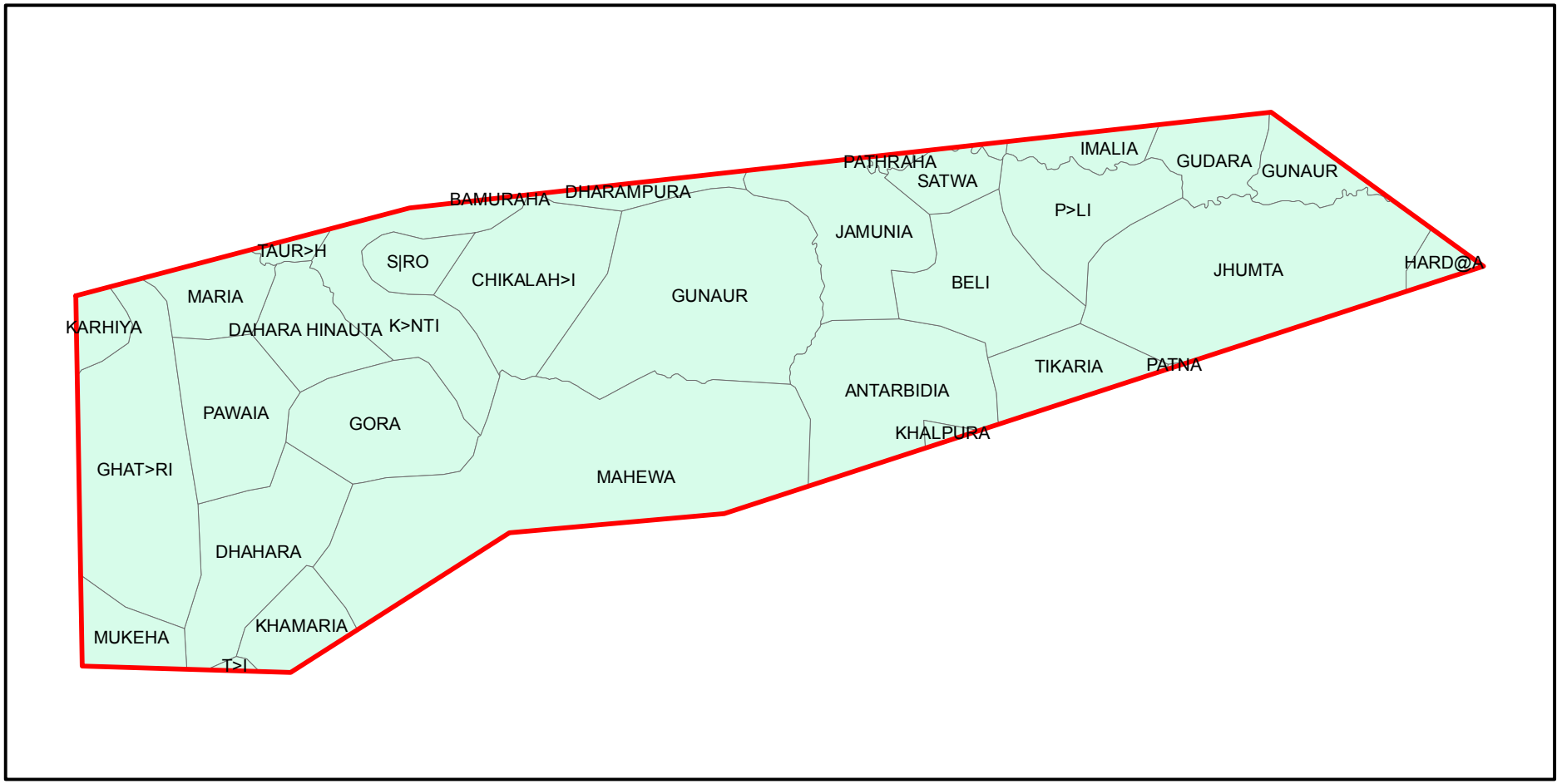
Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree

Km

1 0.5 0 1 2 3 4

Anx-4 Coodrinates of the Block		
BP_ID	**x**	**y**
1	80.07119	24.43286
2	80.11318	24.44387
3	80.22156	24.45596
4	80.24837	24.43651
5	80.15278	24.40539
6	80.12573	24.40295
7	80.09819	24.38539
8	80.07194	24.38623

Anx-5
Villages falling within the Proposed Block
Gunaur Pali Limestone Block
Area:- 75.1 Sq Km
Tehsil:- Gunaur & Pawai, Dist:- Panna, MP.



Legend

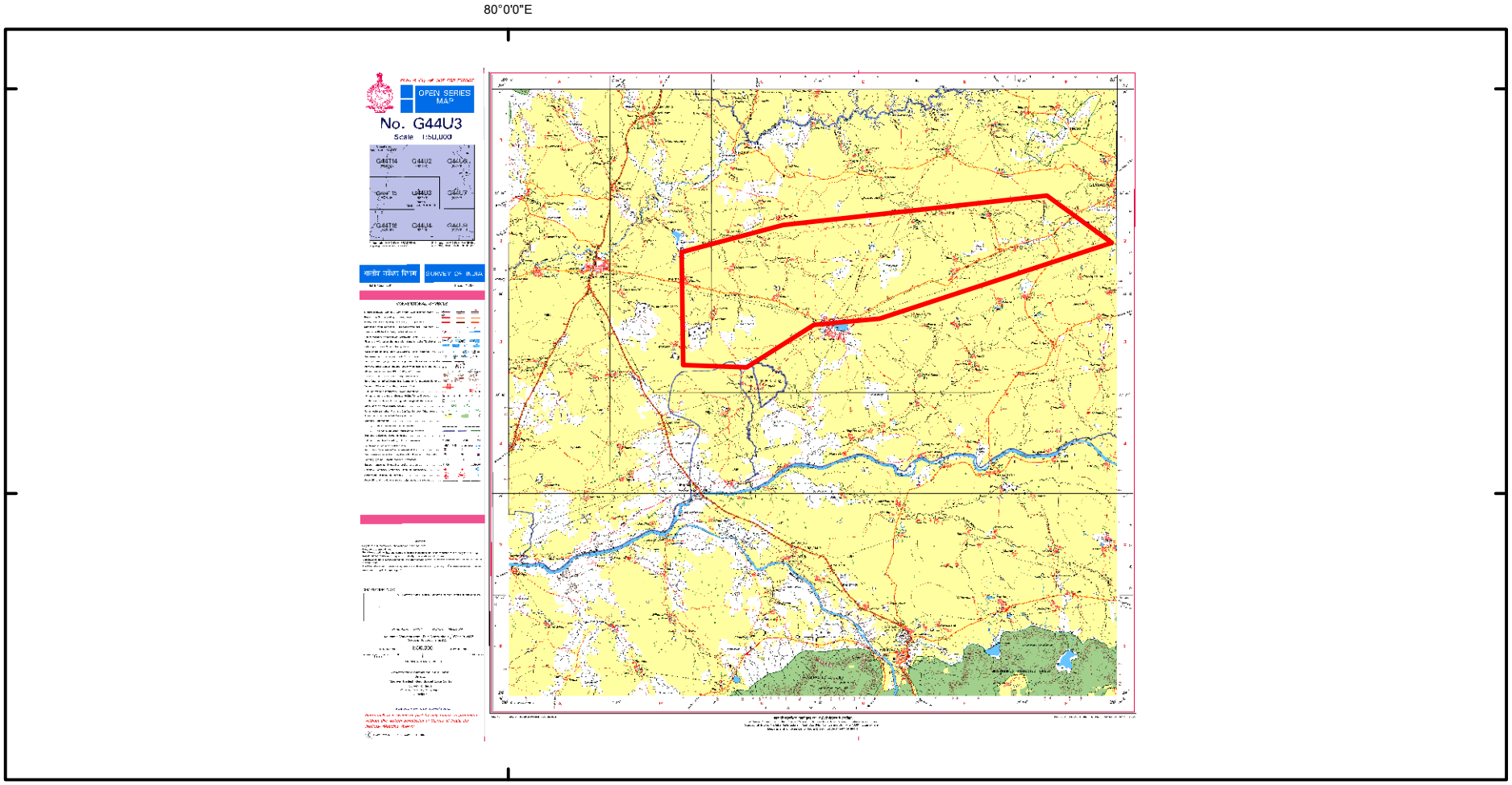
- Gunaur_Pali_Limestone_Block
- Gunaur_Pali_Limestone_Block_Villages

Source:- SOI, Village Boundary Map.

Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree

Km
1 0.5 0 1 2 3 4

Anx-6
Toposheet & Forest Map of the proposed Block
Gunaur Pali Limestone Block
Area:- 75.1 Sq Km
Tehsil:- Gunaur & Pawai, Dist:- Panna, MP.

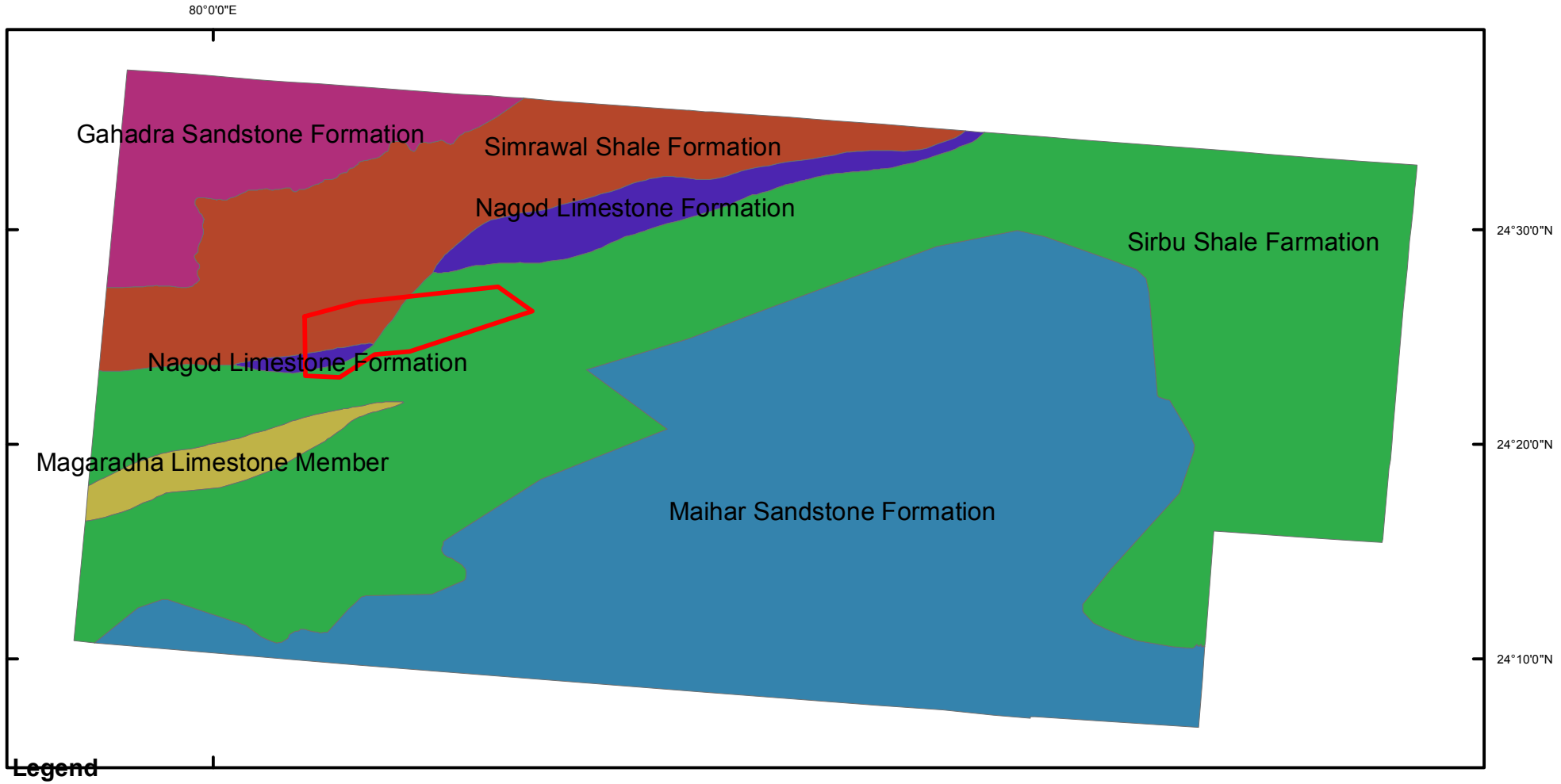


Source:- Bhukosh, GSI.

Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree

Km
4 2 0 4 8 12 16

Anx-7
Block Area Shown over Previous Work
Gunaur Pali Limestone Block
Area:- 75.1 Sq Km
Tehsil:- Gunaur & Pawai, Dist:- Panna, MP.



Legend

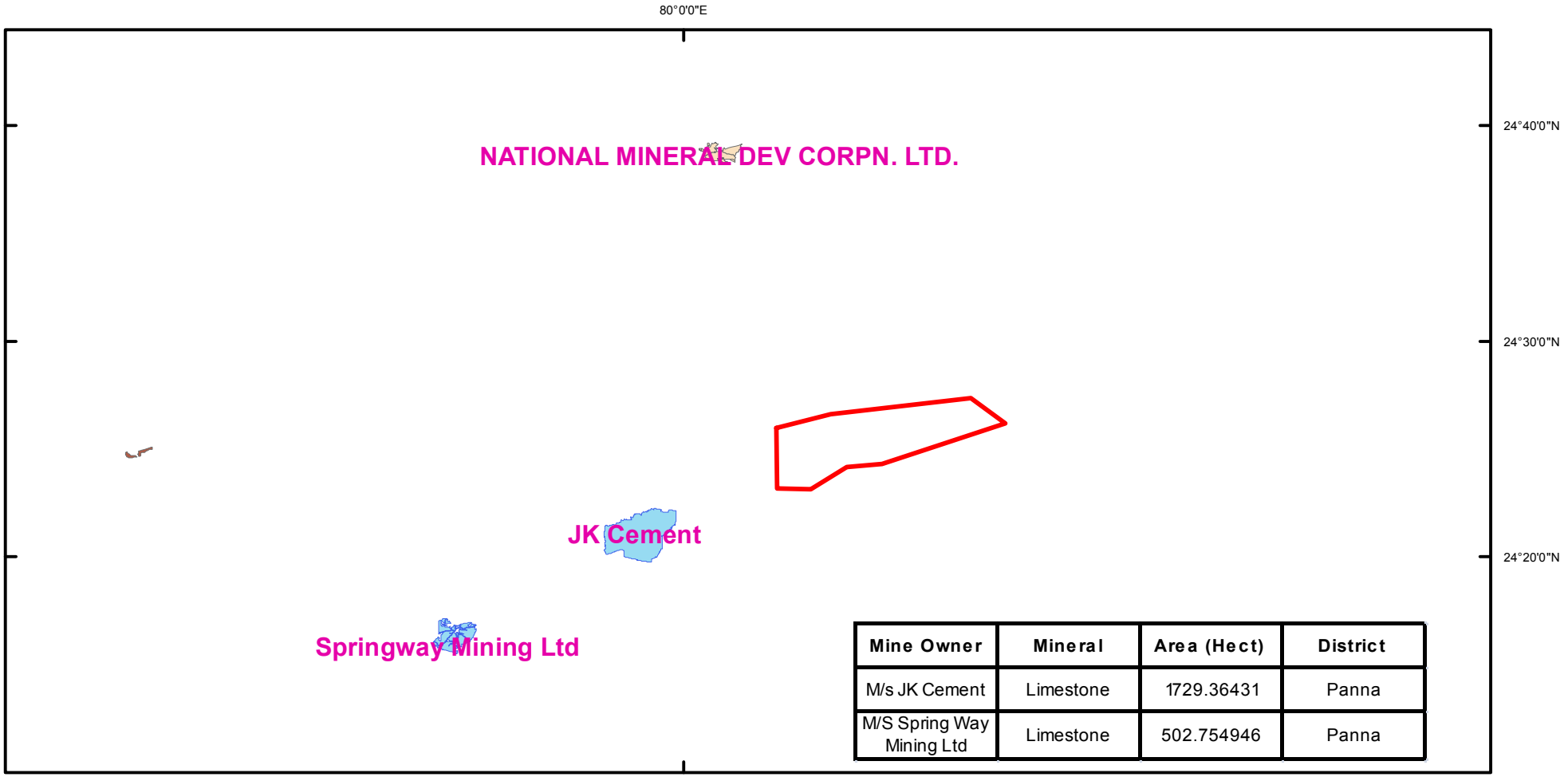
- Gunaur_Pali_Limestone_Block
- **CR_014320_01_LIT_1**
- **LITHO_UNIT**
- Gahadra Sandstone Formation
- Magaradha Limestone Member
- Maihar Sandstone Formation
- Nagod Limestone Formation
- Simrawal Shale Formation
- Sirbu Shale Farmation

Source:- GSI_CR_014320.

Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree

Km
7 3.5 0 7 14 21 28

Anx-8
Nearby Mines
Gunaur Pali Limestone Block
Area:- 75.1 Sq Km
Tehsil:- Gunaur & Pawai, Dist:- Panna, MP.



Mine Owner	Mineral	Area (Hect)	District
M/s JK Cement	Limestone	1729.36431	Panna
M/S Spring Way Mining Ltd	Limestone	502.754946	Panna

Source:- DGM, Bhopal.

Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree

Km
7 3.5 0 7 14 21 28

Legend

Gunaur_Pali_Limestone_Block

Anx-9

Time schedule

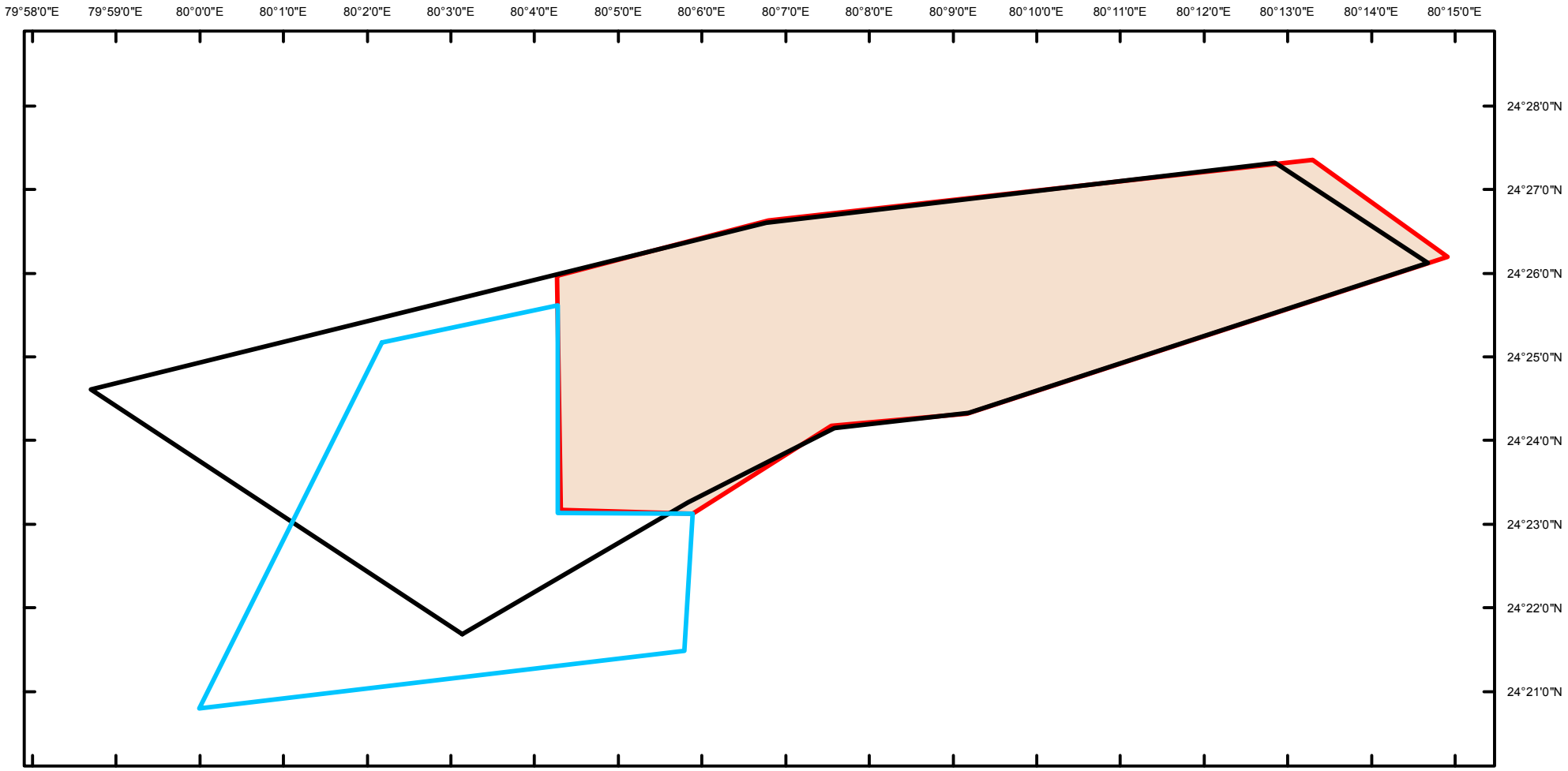
Sr No	Activities	Unit	Months																			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	Camp Mobilization & Setting	Months																				
2	Geological & Toporaphical Survey Work	Months																				
3	Pitting & Trenching	Months																				
4	Core Drilling, Core Logging,	Months																				
5	Sample Preparation & Analysis	Months																				
6	Geological Report preparation	Months																				
7	Report Study, enlisting of various modification & Final Copy of the report	Months																				

Note:-

Commencement of Project may be reworked from the day of exploration area is available with all Statutory Clearance.

Time loss due to monsoon / agricultural activity / forest clearance / local law & order problem(s) may be additional to the above time line.

Anx-10
GSI - Re-conciliated & Final Modified Proposed Block
Gunaur Pali Limestone Block
Area:- 75.1 Sq Km,
Tehsil:- Gunaur & Pawai, Panna, MP.



Source:- GSI, Bhopal.

Legend

- Reconciliated_&_Final_Modified_Proposed_Block_(Gunaur_Pali_Limestone_Block)
- GSI_LImestone_Maheba_Block_FS2023-24
- Panna_NMET_1

Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree

Km
1.5 0.75 0 1.5 3 4.5 6

RESULT OF SPOT INSPECTION

No.4477/Geo/F.No./2023, Jabalpur Date -13.12.2023
Area: - Distt. Tikamgar, Chhatarpur& Satna
From - R/H Jabalpur

S.No.	Sample Name	Al/SiO2 %	Fe2O3%	Al2O3%	CaCO3%	P2O5%	LOI%
1	PR-01	41.02	2.50	ND	4.28	20.72	1.26
2	PR-02	57.82	4.00	ND	7.30	19.20	0.88
3	PR-03	55.88	6.00	ND	1.78	21.52	1.19

S.No.	Sample Name	Al/SiO2 %	R2O3%	Fe2O3%	Al2O3%	CaO%	MgO%	CaCO3%	LOI%
1	LS-04	4.22	2.50	1.51	0.99	37.01	12.58	66.04	43.35
2	LS-05	7.38	2.56	0.90	1.66	38.81	9.52	69.08	40.98
3	LS-08	5.94	2.56	1.30	1.26	47.33	2.74	84.24	41.00
4	LS-09	47.68	3.08	0.82	2.26	24.68	1.94	43.93	22.29
5	LS-10	14.22	1.96	1.05	0.91	45.54	0.97	81.06	36.38
6	LS-11	6.10	1.26	0.58	0.68	47.78	2.90	85.04	41.36

S.No.	Sample Name	Al/SiO2 %	Fe2O3%	Al2O3%	MnO2%	CuO%	ZnO%	LOI%
1	BM-06	95.30	1.82	0.05	0.03	0.02	0.01	0.26
2	BM-07	96.22	1.60	ND	0.02	0.01	ND	0.07

PR= Phosphate Rock
LS= Limestone Rock
BM= Base Metal

कार्यालय क्षेत्रीय प्रमुख
संचालनालय भौमिकी तथा खनिकर्म
क्षेत्रीय कार्यालय, जबलपुर (म.प्र.)
आवक क्र. 2797
दिनांक 27-12-2023

27/12/23

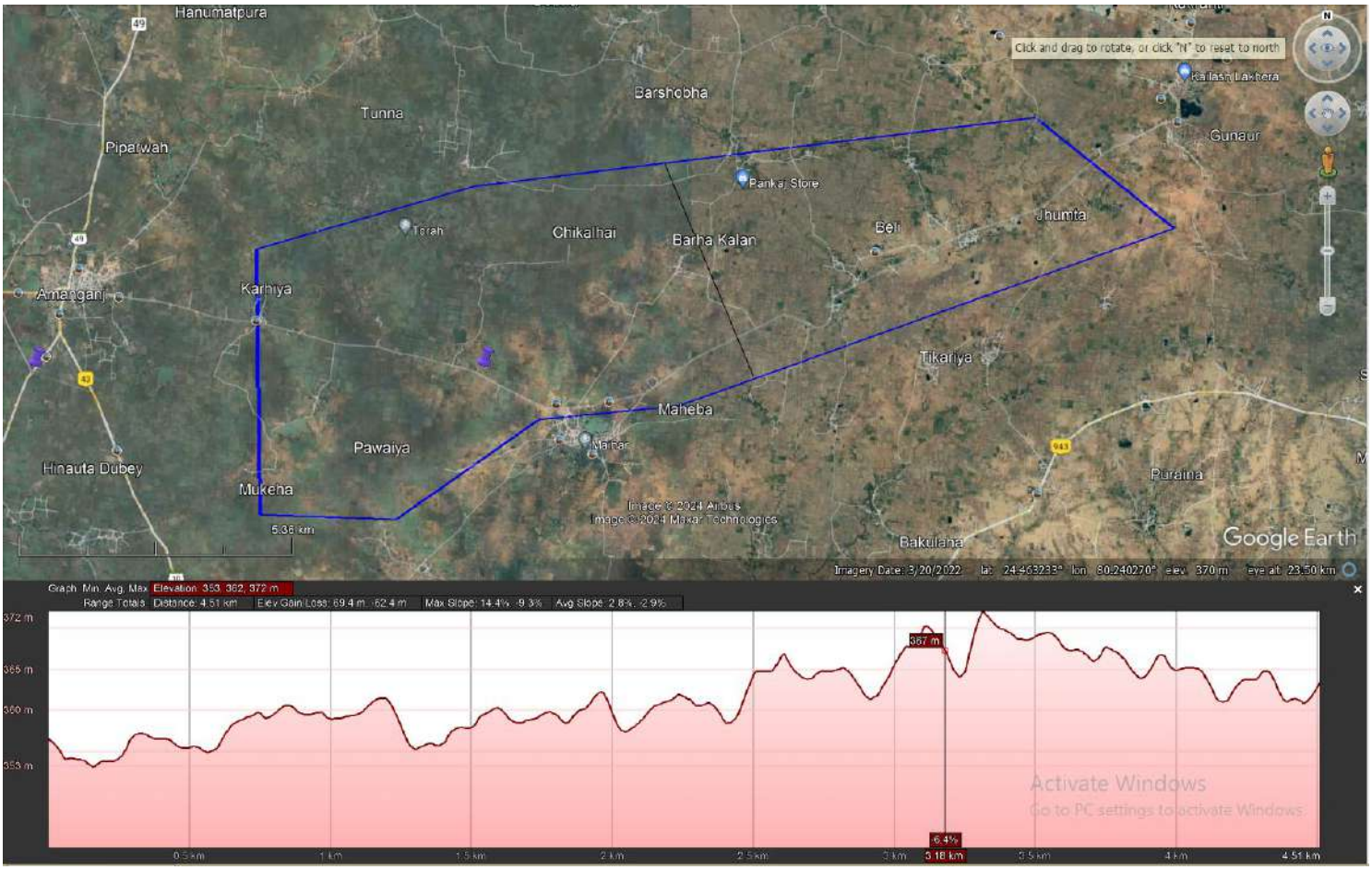
Chief Analyst
D'rate of Geology & Mining
Regional Office Jabalpur

Anx-12

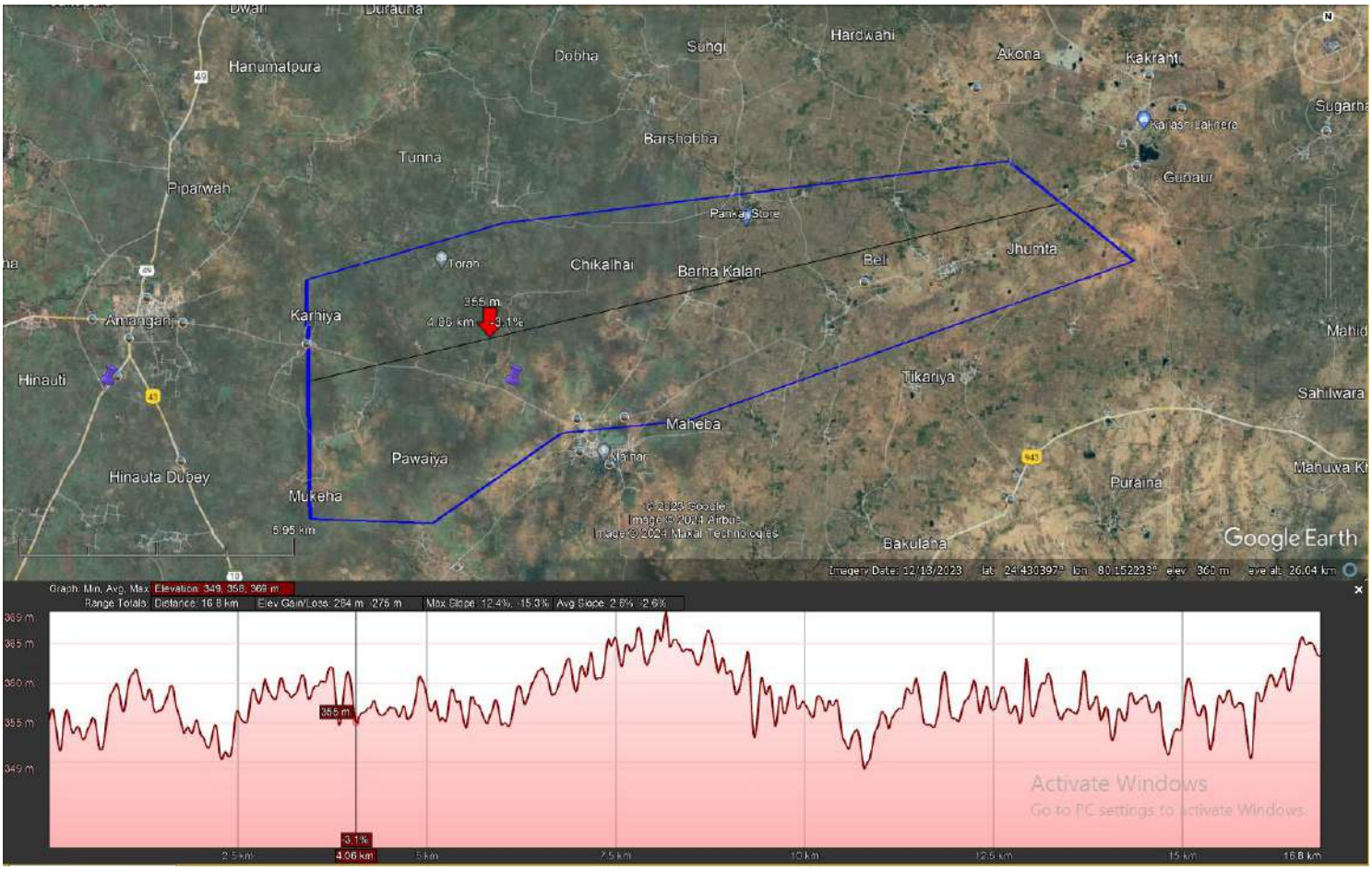
Field Sample Analysis

Sr No	x	y	Village	CaO	MgO	SiO2	R2O3	LOI
1	80.44572	24.51853	Silgi	51.41	2.4	4.39	2.66	38.69
2	80.38994	24.52558	Tigra	51.83	1.89	5.84	2.2	37.81
3	80.357	24.54444	Chaba Bangra	52.99	1.87	2.83	1.16	40.84
4	80.22806	24.44444	Jhumta Patna	50.43	2.3	5.83	2.61	38.39
5	80.20267	24.43086	Jhumta Patna (crusher) (outside area)	28.86	3.92	42.92	9.65	14.27
6	80.18456	24.42542	Beli Hainouti	52.83	1.93	4.56	1.85	38.29
7	80.15561	24.41378	Maheba	48.47	2.83	7.88	1.8	38.36
8	80.11881	24.40931	Gora	51.39	2.45	4.23	1.76	39.78
9	80.07789	24.40878	Pawariya	54.87	1.19	1.51	0.9	41.15
10	80.10525	24.39706	Khamariya	51.29	1.58	4.61	1.75	40.56
11	80.08125	24.38842	Mukeha	53.47	2.02	4.65	1.81	37.65
12	80.06947	24.36792	Taee	51.07	2.86	4.34	1.65	39.65
13	80.04281	24.36094	Jharkuwa	53.14	2.01	3.17	1.17	40.22

Anx-13


Hanumatpura
Tunna
Barshobha
Pipatwah
Bankai Store
Chikalhai
Barha Kalan
Beli
Jhumta
Amanganj
Karhiya
Tikariya
Maheba
Pawaiya
Hinauta Dubey
Mukena
Puraina
Bakulaha
Gunaur
Click and drag to rotate, or click "N" to reset to north
Google Earth
Graph Min Avg Max Elevation: 353, 362, 372 m
Range Totals Distance: 4.51 km Elev Gain Loss: 69.4 m, -62.4 m Max Slope: 14.4%, -9.3% Avg Slope: 2.8%, -2.9%
372 m
365 m
360 m
353 m
367 m
-6.4%
5.18 km
0.5 km
1 km
1.5 km
2 km
2.5 km
3 km
3.5 km
4 km
4.51 km
Activate Windows
Go to PC settings to activate Windows

Anx-14


Durauna
Hanumatpura
Dobha
Sungi
Hardwani
Akona
Kakrant
Sugarha
Barshobha
Tunna
Piparwah
Gunaur
Pankaj Store
Toran
Chikalhai
Barha Kalan
Bel
Jhumta
Karhiya
Amlangan
Hinauti
Tikariya
Sahilwara
Maheba
Pawaiya
Hinauta Dubey
Mukeha
Puraina
Bakulana
5.95 km
Google Earth
Graph: Min, Avg, Max Elevation: 349, 358, 369 m
Range Totals: Distance: 16.8 km Elev Gain/Loss: 284 m -275 m
Max Slope: 12.4%, -15.3% Avg Slope: 2.8%, -2.6%
365 m
-3.1%
4.06 km
Activate Windows

Thank You