PROPOSAL FOR PRELIMINARY EXPLORATION (G-3) FOR LIMESTONE IN BANDHA BLOCK, SATNA DISTRICT MADHYA PRADESH

(AREA 3.54 Sq. Km)

COMMODITY: LIMESTONE

BY

MINERAL EXPLORATION AND CONSULTANCY LIMITED

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PLACE: NAGPUR

DATE: 30.10.2025

PRELIMINARY EXPLORATION (G-3) FOR LIMESTONE IN BANDHA LIMESTONE BLOCK (3.54 SQ. KM), SATNA DISTRICT MADHYA PRADESH

Features	Details
Block ID	BANDHA LIMESTONE BLOCK
Exploration Agency	Mineral Exploration and Consultancy Limited (MECL) (Formerly Mineral Exploration Corporation Ltd.)
Commodity	Limestone
Previous Exploration Agency	NA
Mineral Belt	Satna–Rewa Limestone Belt (Vindhyan Basin, M.P.)
Completion period with entire Time schedule to complete the project	10 Months
Objectives	Objectives of the proposed exploration in Bandha Limestone Blocks (G3) are as follows: i) To carry out detailed Topographical Survey and Geological mapping on 1:4000 scale over an area of **3.54** Sq. Km. ii) In the Bandha Limestone Blocks, **05** vertical boreholes of about **50 m** depth each will be drilled to know the strike and depth of the limestone. This will help in estimating the limestone resource under the inferred category (UNFC 333). iii) To carry out exploration as per Minerals (Evidence of Mineral Contents) Rule-2015 & Mineral (Auction) Rules-2015 (Amended up to 2021). iv) The proposed exploration programme will be helpful in demarcating zone of various grades of limestone in the block as per **UNFC** norms and estimation of limestone resources which in turn will facilitate the State Govt. for auctioning of the Block.
Whether the work will be carried out by the proposed agency or through outsourcing and details thereof. Components to be outsourced and name of the outsource agency	The work will be undertaken by Mineral Exploration and Consultancy Ltd. (MECL).
Number of Geoscientists	Geologist: 01 HQ (30 days) Geologist: 01 Field (150 days)
Expected Field days(surveyor)	Surveyor: 01 Field (30 days)

1.	**Location**	The proposed Bandha Limestone Block (G3) is located in Rampur Baghelan Tehsil, Satna District, with a total area of 3.54 sq. km. The block falls in Survey of India Toposheet No. 63H3.

Point	Latitude	Longitude
A	24° 29′ 08.11″ N	81° 02′ 19.2″ E
B	24° 29′ 08.38″ N	81° 01′ 35.47″ E
C	24° 28′ 58.21″ N	81° 01′ 16.22″ E
D	24° 27′ 59.60″ N	81° 01′ 35.80″ E
E	24° 28′ 27.40″ N	81° 02′ 49.45″ E

	Villages	Bandha
	Tehsil/Taluk	Rampur Baghelan
	District	Satna
	State	Madhya Pradesh
2.	**Area (hectares/ square kilometres)**	
	Block Area	3.54 sq.km
	Forest Area	NIL
	Government Land Area	Data not available
	Charagaha	Data not available
	Private Land Area	The block area mostly comprises of private land
3.	**Accessibility**	
	Nearest Rail Head	Satna Junction (~20 km from Rampur Baghelan).
	Road	The area is connected by all-weather roads; nearest road head is Rampur Baghelan on NH-75, about 20 km from Satna and 35 km from Rewa.
	Airport	Rewa Airport (20 km from Rampur Baghelan, Satna).
4.	**Hydrography**	
	Rivers/ Streams	The area has a dendritic to sub-dendritic pattern formed by small seasonal streams and channels flowing along the natural slope of the land.
5.	**Climate**	
	Mean Annual Rainfall	Mean annual rainfall in the area (Satna District) is about 1,050 to 1,100 mm.
	Temperatures	Temperatures in Satna range from about 10 °C in January to 41 °C in May, with an annual average of around 26 °C.
6.	**Topography**	
	Toposheet No.	Survey of India Toposheet No. 63H3
	Morphology of the Area	The area has flat to gently sloping ground with an elevation of about 337–354m, mostly covered by agriculture and drained by seasonal streams in a dendritic pattern.
7.	**Availability of baseline geoscience data**	Geological Map of the Vidhyan Basin Part) in Scale-1:50,000. (Bhukosh,GSI)
	Geochemical Map & Geophysical Map	Geochemical Map and Geophysical Map is not available for the proposed block.
8.	**Justification for taking up Reconnaissance Survey/ Regional Exploration**	1. The Government of Madhya Pradesh (DGM) has granted permission for exploration of the Bandha Limestone Block, located in Satna District, covering an area of 3.54 sq. km. The block is free from overlapping issues, making it ideal for systematic exploration under the National Mineral Exploration Trust (NMET) scheme. 2. The area has not been explored earlier, though limestone occurrences are reported regionally. Detailed exploration is required to convert geological resources into mineable reserves, in compliance with the Minerals (Evidence of Mineral Contents) Rules, 2015 (amended 2021). Such exploration will improve the level of confidence in grade and tonnage, thereby enhancing investor interest during

auction.

3. In Satna District, 22 limestone blocks have already been successfully auctioned, with areas ranging from 12 ha to 1,917 ha. The CaO content varies from 34.45% to 52.87%, indicating the presence of both low and high grade limestone. The auction premiums ranging between 1.1% and 200% reflect strong industrial demand and high competition for cement-grade limestone in the region.
4. The Satna region, forming part of the Vindhyan limestone belt, is a major cement-producing hub of India, hosting leading industries such as Birla Corporation and Prism Johnson Ltd. The high auction premiums and continuous industrial expansion indicate robust growth potential and sustained demand for limestone.
5. The Bandha Block, part of the Vindhyan Supergroup, shows surface limestone exposures confirmed during MECL's reconnaissance visit. Preliminary samples and analyses have indicated the presence of good-quality limestone, justifying detailed exploration. Analytical results of the samples are provided below:

Sample No.	**CaO%**	**SiO_2%**	**MgO%**	**Al_2O_3%**	**Fe_2O_3%**
BDH-01	48.03	5.91	2.90	1.51	0.78
BDH-02	50.18	4.33	2.23	1.01	0.56

6. MECL has previously explored and established resources in several nearby blocks Piprahat–Kubri, Naubasta–Kolarad, Jamodi–Mohana, and Gunchihai all of which were successfully auctioned by the Government of Madhya Pradesh.

7. The increasing demand for cement-grade limestone driven by infrastructure, housing, and industrial development including government initiatives like 'Housing for All', 'Smart Cities Mission', and PM Gati Shakti—will further strengthen Satna's position as a key limestone and cement hub in India. Upcoming and proposed cement plant expansions are expected to enhance the industrial importance of this region and justify further resource augmentation through detailed exploration of the Bandha Block.

PROPOSAL FOR PRELIMINARY EXPLORATION (G-3) FOR LIMESTONE BLOCK (3.54 SQ. KM), SATNA DISTRICT MADHYA PRADESH

1. INTRODUCTION

1.1. After the MMDR Amendment Act 2015, Minerals (Evidence of Mineral Contents) Rules 2015, and Mineral Auction Rules 2015 were made, the Government of India asked the State Governments to speed up exploration of different minerals and put them up for auction. Recently, some changes in the MMDR Act allow the State Governments to auction blocks even with lower exploration confidence and put more blocks on auction. Following this, the State Government of Madhya Pradesh gave the location of five (05) limestone blocks were allocated to MECL for further exploration and making the blocks for auction feasible. After detailed geological examination and evaluation which includes field visit, surface sample collection, two Limestone Blocks, namely Bandha (3.54 sq km) & Jamuniya (3.68 sq km) Limestone Blocks have been identified and finalized for undertaking exploration at G3 level.

1.2. Accordingly, this proposal has been prepared for Bandha Limestone Block over an extent of 3.54 sq km and to be discussed in the forthcoming meeting of TCC II, NMEDT on 03rd November 2025.

2. LOCATION AND ACCESSABILITY

2.1. The Bandha Limestone Blocks are located in Rampur Baghelan Tehsil of Satna District, covering a total area of 3.54 sq. km. The location of the block is shown in Plate No. I. It falls under Survey of India Toposheet No. 63H03 and is bounded by the coordinates listed in Table 2.1.

Table-2.1

Co-ordinates of corner points of proposed Bandha Blocks (G-3) for Limestone,

District: Satna, State: Madhya Pradesh

S.No	GCS(DMS)		UTM (M) (Zone: 44N)	
	Latitude	Longitude	Northing	Easting
A	24° 29′ 08.11″ N	81° 02′ 19.2″ E	2707989.797	503917.882
B	24° 29′ 08.38″ N	81° 01′ 35.47″ E	2707997.965	502687.180
C	24° 28′ 58.21″ N	81° 01′ 16.22″ E	2707684.928	502145.410
D	24° 27′ 59.60″ N	81° 01′ 35.80″ E	502696.851	2705882.695
E	24° 28′ 27.40″ N	81° 02′ 49.45″ E	504769.736	2706738.285

2.2 The block is connected to the National Highway No. 45 at a distance of 11 km to the north of the block, which connects Jabalapur (East) and Bhopal (West).

3. PHYSIOGRAPHY AND DRAINAGE

3.1. The area has flat to gently sloping ground with an elevation of about 337–354 m, mostly covered by agriculture and drained by seasonal streams in a dendritic pattern.

3.2. The area has a dendritic to sub-dendritic pattern formed by small seasonal streams and channels flowing along the natural slope of the land.

4. CLIMATE

The climate of the area, represented by Satna District, is characterized by a mean annual rainfall of

about 1,050–1,100 mm. The temperature varies considerably with the seasons, ranging from around 10°C during the winter month of January to approximately 41 °C in the peak summer month of May, while the annual average temperature remains close to 26 °C.

5. FLORA & FAUNA

The area is mostly farmland where crops like wheat, paddy and soybean are grown. Trees like neem, babul, peepal and mango are found. Common domestic animals such as cows, buffaloes, goats are seen in the villages. Wild animals include jackal, fox, hare and wild boar. Snakes and many birds like parrots, mynas and pigeons are also found. No rare or special animals are reported in this block.

6. PREVIOUS WORK

Since the middle of the 19th century, many geologists such as Medlicott (1860), Mellet (1869), and Oldham (1851) have studied the Vindhyan Basin.

Oldham divided the Upper Vindhyans into three parts — Kaimur, Rewa, and Bhander. Later, the Geological Survey of India (GSI) carried out more detailed studies on limestone deposits in the Rewa–Satna region.

The GSI, M.P. Circle, Bhopal, conducted investigations for flux-grade limestone in the Rewa–Satna area during the 1966–67 field season under Shri D.R.S. Mehta, Superintending Geologist, and Shri P.K. Ramam, Geologist. An area of about 425 sq. km was geologically mapped on a 1:63,360 scale (Topo Sheet No. 63H3), and 85 groove samples were collected from outcrops and nala exposures. The study delineated two distinct flux-grade horizons within the Bhander Limestone Formation (Upper Vindhyan) — a Lower Band (8–11 m thick) comprising mainly flux-grade limestone, and an Upper Band (12–21 m thick) showing variable quality from flux to cement grade. The Lower Band extends ~50 km with ~400 m average width, and the Upper Band extends ~53 km with ~300 m average width, both striking ENE–WSW with gentle southerly dips. Based on surface data, inferred resources were estimated at 340 million tonnes in the Lower Band and 190 million tonnes in the Upper Band. The investigation concluded that the area holds substantial reserves of flux-grade limestone (blast-furnace and open-hearth grades) requiring detailed drilling for proving minable reserves. Development of transport connectivity between Satna and Rewa and utilization of upper and purple bands for cement and lime industries were also recommended.

The Directorate of Geology and Mining (DGM), Madhya Pradesh, also conducted surveys to locate good-quality (high-grade) limestone in the Nagod area. When the limestone deposits of the M.P. State Mining Corporation began to decline, the DGM started new detailed exploration work based on the recommendations of S.S. Mishra (1974–75).

GSI investigated around Rampur and Ramasthan areas of Satna District from October 1975 to September 1976. About 200 sq. km area was mapped on a 1:63,360 scale. The rocks found in this region belong to the Bhander Group of the Vindhyan Supergroup. In this area, a dark grey limestone bed of 8 to 13.5 meters thickness (known as Lower Nagod Limestone) was identified. The limestone is of flux to cement grade, and an estimated 17.05 million tonnes of limestone reserves were recorded in the Ramasthan Block. At present, mining

activities are being carried out in nearby areas, and the limestone is used for cement manufacturing. The nearest cement plants with working quarries are:

1. Satna Cement Works (30 km)
2. B.P. Birla Cement Plant, Maihar (40 km)
3. Prism Cement Plant (50 km)

The MECL also conducted systematic exploration at G-4, G-3, and G-2 levels in and around Satna District, and submitted geological reports to the Government of Madhya Pradesh and NMET. Between 2016 and 2018, the blocks explored by MECL under NMET funding include Ghunchihai, Naubasta-Kollard, Jamodi-Mahanna and Piparahat-Kubri Blocks which are successfully auctioned. Summary of the works by MECL is presented in the following paragraphs:

The General Exploration (G-2) of the Jamodi-Mahanna Limestone Block (Part-B), Tehsil Raghuraj Nagar, District Satna, Madhya Pradesh, was carried out by Mineral Exploration Corporation Limited (MECL), Nagpur, on behalf of NMET and DGM, Madhya Pradesh, during May 2018 to October 2019. The work included geological and topographical mapping over 9.0 sq. km, systematic core drilling of 2037.50 m in 53 boreholes (17 at G-3 and 36 at G-2 level), and detailed sampling with laboratory studies. Two cement-grade limestone zones (Zone-I and Zone-II) of the Bhander Limestone Formation were delineated, having thicknesses ranging from 2.0 m to 16.0 m and 2.0 m to 14.6 m respectively. The limestone is of cement grade, with average composition of CaO 43.95–44.30%, MgO 1.80–2.54%, and SiO_2 8.82–9.68%. The total in-situ resource is estimated at 90.29 million tonnes (UNFC 332) over an area of 8.66 sq. km. The deposit shows gentle southerly dip (1°–3°) with lateral continuity. MECL recommended upgrading the block to G-1 level through detailed drilling for mineable reserve estimation.

The General Exploration (G-2) of the Naubasta–Kolard Limestone Block, Tehsil Nagod, District Satna, Madhya Pradesh, was carried out by Mineral Exploration Corporation Limited (MECL), Nagpur on behalf of NMET and DGM, Madhya Pradesh during May 2018 to October 2019. The work was executed under the guidance of Shri B.P. Raturi, GM (Exploration & Geological Services), assisted by Shri M.N. Sahay, Shri P.P. Kulkarni, and Shri N.K. Pala with their technical teams. Activities included geological mapping (15.90 sq. km), topographical survey, systematic core drilling of 48 boreholes (2273 m), and extensive chemical, petrographic, and XRD studies. Exploration delineated two cement-grade limestone zones (Zone-I and Zone-II) of the Bhander (Nagod) Limestone Formation, having thicknesses from 0.8 m to 9.0 m. The limestone is of cement grade, averaging CaO 44.78%,

MgO 1.47–2.40%, and SiO_2 9.70–10.65%. The net in-situ resource was estimated at 166.05 million tonnes (UNFC 332) over 15.90 sq. km, with a gentle southerly dip (3°–5°) and lateral continuity. The report recommends upgradation to G-1 level by close-spaced drilling to establish mineable reserves for cement industry utilization.

The block and the surrounding area were covered under NGCM programme of GSI and outcomes of the same is available on the National Geo-Data Repository (NGDR) portal. From the available data no anomalous values of any elements have been observed.

7. REGIONAL GEOLOGY

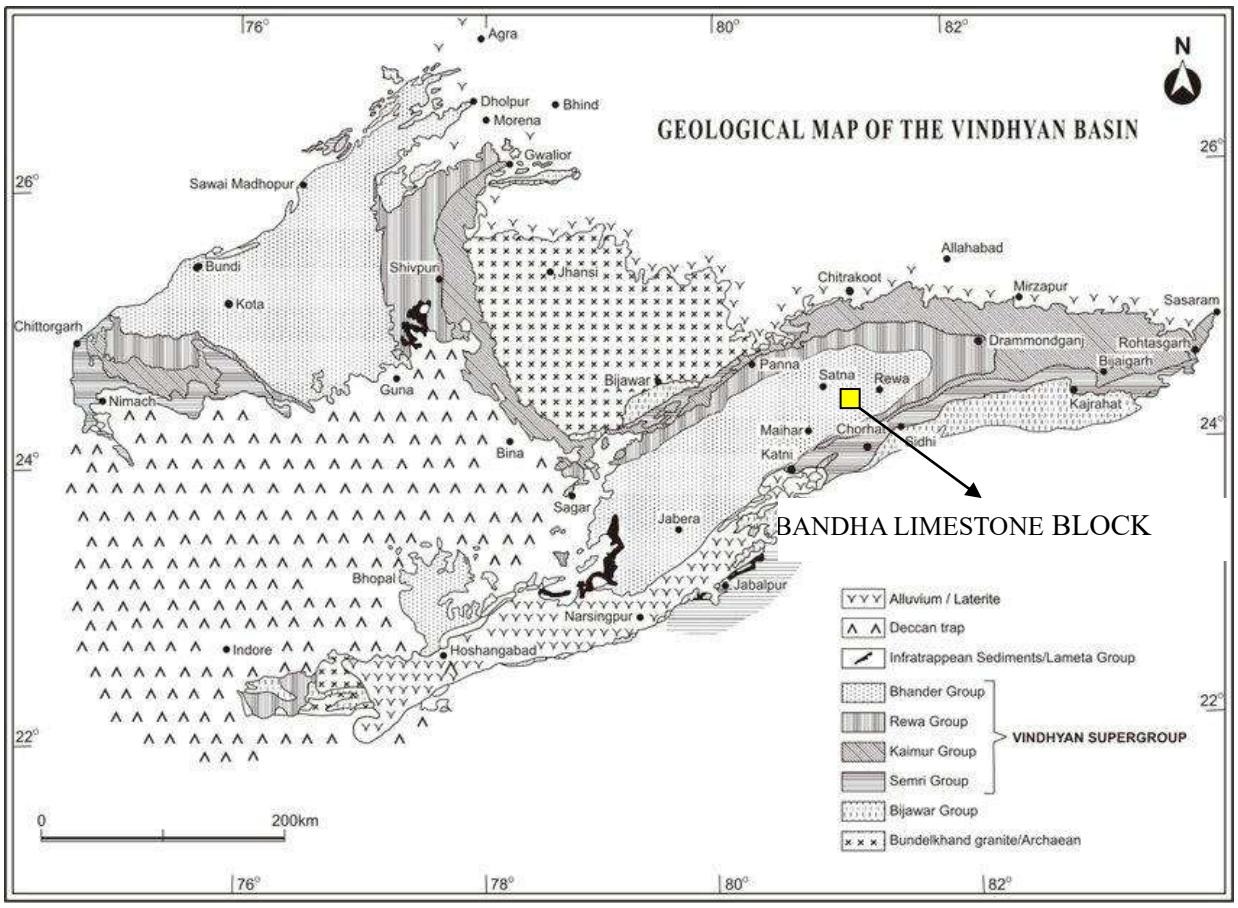


Fig 7.1. Map Showing Vindhyan supergroup area with Proposed Block Location (After Azmi et. Al.)

7.1 Study area comes under district-Satna, which is covered by Upper Vindhyan sediments of Vindhyan Super group (Table 5.01). Vindhyan Super group has been sub-divided into four groups i.e., in the stratigraphic order these are Semri, Kaimur, Rewa & Bhander groups (Table 5.01). Each group is further sub-divided into different formations (Table 5.01).

The Semri Group is generally referred to as the Lower Vindhyan and the Kaimur, Rewa and Bhander groups have been clubbed as the Upper Vindhyan. The Bhander Group is the youngest group of the Vindhyan Supergroup and has been sub-divided into four formations in the Maihar area, Satna district, M.P. In the stratigraphic order, these are the Ganurgarh Shale, the Bhander Limestone, the Sirbu Shale and the Maihar Sandstone (Table 5.01).

The Maihar Sandstone also referred to as the Upper Bhander Sandstone (Bhattacharyya, 1993) is the youngest stratigraphic horizon of the Bhander Group in the Son Valley. The Bhander Limestone is also referred to as the Nagod Limestone (Sastry and Moitra, 1984).
The Semri Group of rocks is represented by an alternating sequence of Sandstone and shale alongwith porcellanite and limestone. The Semri Group of rocks mainly exposed in the southern and northern part of the district.

The Rohtas Limestone of Semri Group is light to grey in colour, fine grained compact and well bedded. The Kaimur Group comprising mainly sandstone which is fine grained; massive and thickly bedded is exposed in the northern and southern part.

The Rewa Group of rocks comprises mainly of sandstone, shale and conglomerate.

The Bhander Group of rocks exposed as a broad band and comprises mainly shale, Nagod limestone and upper Bhander sandstone. Nagod limestone is fine grained, hard, compact thinly bedded to massive with some stromatolitic bands. The upper Bhander Sandstone forms the cliffs of the Bhander plateau is composed of purple to reddish brown, fine to medium grained, flaggy to massive and well sorted sandstone interbedded and splintery shale and siltstone.

Lameta Formation comprising sandstone and shale range in thickness from 15-80m and occurs in the form as clusters on the hillocks of upper Rewa Sandstone. Laterite occurs as capping on the Bhander Group of rocks and on the upper Rewa Sandstone. It has a maximum thickness of 60m.

The stratigraphic column of the area was made using the order of rock layers. The names of the layers were taken by comparing with nearby areas (Shastry & Moitra,

1984). The sequence of rocks in this area is shown in Table 7.1. The regional geology of the area is shown in Plate – II.

Table - 7.1

The Regional Stratigraphic Succession (After GSI)

AGE	GROUP	FORMATION	ASSOCIATED MINERAL DEPOSITS
Recent	Alluvium		--
Pliestocene	Laterite and Bauxite		Bauxite Deposit of Rewa and Satna
----------Unconfirmity--------			
Proterozoic	Bhander Group	Upper Bhander Sandstone	
		Sirbu Shale Formation	
		Nagod Limestone Formation	Limestone deposits of Damoh, Katni, Satna Districts etc,
		Ganurgarh Shale Formation	
	Rewa Group	Upper Rewa Sandstone Formation	
		Jhiri Shale Formation	
	Kaimur Group	Kaimur Sandstone Formation	Diamodiferrous Kimberlites of Panna, Limestone deposits of Mandsaur, Rewa, Satna Districts, Lead zinc deposits of Damoh District
		Bhagwar Shale Formation	
	Semri Group	Rohtas Limestone Formation	
		Kheinjua Group-Rampur Formation Salkhan Formation- Fawn Limestone Koldaha Shale Formation	
		Deonar Formation	Porcellanite Stage
Base Not Seen			

8. Block Geology:

8.1. The block and the surrounding area belong to the Bhander Group of Vindhyan Supergroup. Litho units exposed in the area are limestone, shale. Trend of the limestone and shale is nearly E-W and dipping 3-5° towards south. Most of the block area is covered by soil which under agricultural land. The area shows plain topography. At few places limestone is exposed and of grey in colour.

Age	Group	Formation	Associated Mineral Deposits
Recent	Alluvium		--
Proterozoic	Bhander Group	Sirbu Shale Formation	
		Bhander/Nagod Limestone Formation	Limestone deposits of Damoh, Katni, Satna Districts etc

9. OBJECTIVE:

Objectives of the proposed exploration in Bandha Blocks are as follows:

i. **Topographical Survey and Geological Mapping:** A detailed topographical survey and geological mapping will be undertaken on a 1:4000 scale covering an area of 3.54 sq. km. The mapping will delineate lithological units, structural features, surface manifestations of mineralization, and geomorphological characteristics relevant to limestone occurrence.

ii. **Subsurface Exploration:** To assess the strike continuity, depth persistence, and grade variation of limestone**,** five (05) vertical boreholes are proposed with an average depth of about 50 metres each. The core obtained will be geologically logged and sampled systematically for chemical and physical analyses.

iii. **Sampling and Chemical Analysis:** Representative core and surface samples will be analyzed for major oxides (CaO, SiO_2, Al_2O_3, Fe_2O_3, MgO, LOI, etc.) and relevant minor constituents to evaluate grade and suitability for industrial applications (e.g., cement, flux, or chemical grade).

iv. **Data Integration and Resource Estimation:** Geological and analytical data will be integrated to delineate limestone zones and estimate resources under G3 level of exploration (as per MEMC Rules). The study will categorize the deposit in terms of UNFC codes for geological, feasibility, and economic viability axes**.**

v. **Assessment** of quality and quantity of the resources (333) if any as per UNFC norms & Minerals (Evidence of Mineral Contents) Rules- 2015.

vi. This programme will help to find the quality and quantity of limestone in different zones of the block as per UNFC norms. The result will support the State Government in the auction of the block.

10. METHODOLOGY OF EXPLORATION

The exploration will be carried out as per the Minerals (Evidence of Mineral Contents) Rules, 2015 and Mineral (Auction) Rules, 2015 (Amended up to 2021). In the Bandha Limestone Block, the exploration plan includes three prominent activities. The details of these activities are given below.

DGPS Boundary Corner Pillars Survey, Topographical Survey & Geological Mapping:

DGPS Survey: The limestone block covering 3.54 sq. km will be surveyed using Differential Global Positioning System (DGPS) on the WGS-84 datum and UTM projection to accurately demarcate its boundaries. Permanent concrete pillars will be established at all boundary corners and turning points, each properly numbered and geo-referenced. A closed triangulation or traverse network will be created to maintain positional accuracy by tying all points to a single control benchmark. The DGPS data will then be processed through

standard geodetic software to generate a geo-referenced boundary map, which will serve as the base for subsequent topographical and geological mapping.

Topographical Survey: A total station or DGPS-based topographical survey will be conducted over the entire block to capture contour details at 4 m intervals, drainage, infrastructure, vegetation, and surface features. Borehole collar locations will be marked on the ground, and their latitude, longitude, and reduced levels (RLs) will be recorded precisely.

Geological Mapping: Detailed geological mapping will be carried out on a 1:4000 scale covering the entire 3.54 sq. km area of the limestone block. The mapping will document lithological variations, stratigraphic sequence, and structural features such as strike, dip, joints, faults, and folds. It will also record surface exposures, contacts between limestone and associated formations, soil cover, weathering profiles, and geomorphological characteristics. Representative rock samples will be collected from key locations for petrographic and chemical analyses to evaluate the composition and quality of the limestone. The final geological map, integrating all field observations and analytical data, will be superimposed on the topographical base map and geo-referenced to DGPS coordinates. This integrated map will serve as the base document for planning drilling, sampling, and further exploration activities in the area.

Surface Drilling: In the proposed exploration programme, a total of five (05) boreholes are planned to be drilled to assess the subsurface continuity and grade variation of the limestone. Each borehole will be drilled to a depth of approximately 50 metres, amounting to a total proposed drilling meterage of about 250 metres. All boreholes will be of NQ core size, suitable for obtaining high-quality core samples for detailed geological logging and chemical analysis. The proposed borehole locations are shown in Plate No. III, and their coordinates, elevations, and other details are presented in **Table 10.1**.

Table No.-10.1

Details of Proposed Boreholes in Bandha Limestone Block

Sl. No.	Block Name	Borehole No.	Inclination (°)	Total Depth (m)
1	Bandha Limestone Block	PBH-01	90	50
2		PBH-02	90	50
3		PBH-03	90	50
4		PBH-04	90	50
5		PBH-05	90	50

Drill Core Logging and Sampling: Detailed geological logging of the drill cores will be carried out immediately after core recovery to document lithological and textural variations in the subsurface strata. Each core will be examined for degree of weathering, grain size, fossil content, colour, shale or siltstone partings, stylolites, bedding, and structural features such as joints and fractures. These characteristics are critical for assessing the grade, quality, and uniformity of the limestone and for identifying potential intercalations of shale or impure zones. The recorded information will guide the sampling strategy and grade evaluation. Detailed drill core logging will be done by observing weathering, grain size, fossils, colour, shale partings, stylolite, and structures. These features will help to know the grade of limestone and to select proper samples.

Sampling Procedure: Primary samples will generally be collected at 1.0 metre intervals, with adjustments made in case of changes in lithology, visible impurities, or variable core recovery. Particular attention will be paid to (i) colour and grain size variations, (ii) fossil or bioclastic content, (iii) presence of thin shale or siltstone partings, and (iv) weathered or altered zones. Each sample interval will be clearly marked and documented in the drill log, ensuring correlation with depth and lithological units. A total of 240 Nos of samples is proposed to generate by considering the 1m soil thickness and at places shale cover above limestone.

Sample Preparation: Each drill core will be cut longitudinally into two equal halves using a diamond core cutter. One half will be retained as a permanent reference archive, while the other half will be crushed and pulverized to -100 mesh size for chemical analysis. The pulverized sample will be homogenized thoroughly, and about 100 grams of the representative powder will be taken as the primary analytical sample. The remaining powdered portion will be preserved as a duplicate (check) sample for quality control or future verification.

A total of approximately 240 primary limestone samples are expected to be generated from the proposed drilling. To ensure analytical reliability, about 24 Nos as external check samples will be analysed at NABL accredited laboratories for cross-verification of analytical results covering nine (9) radicals typically CaO, SiO_2, Al_2O_3, Fe_2O_3, MgO, LOI, P_2O_5, SO_3, Na_2O and K_2O.

Chemical Analysis: Chemical analysis of the limestone samples will be carried out using the X-ray Fluorescence (XRF) method, which provides accurate and reliable determination of major oxides. A total of 240 primary samples will be analyzed to assess the chemical composition and grade variation of the limestone across different boreholes and depths. The analysis will include determination of the following nine radicals: CaO, MgO, Al_2O_3, SiO_2, Fe_2O_3, SO_3, P_2O_5, K_2O, and Loss on Ignition (LOI). These parameters are essential for evaluating the suitability of the limestone for various industrial applications, particularly cement manufacturing.

Petrological Studies: Petrological studies will be carried out on 10 selected samples, comprising both drill core and surface specimens, to understand the mineralogical composition, texture, and microstructural characteristics of the limestone. Thin sections of these samples will be prepared and examined under a polarizing microscope to identify the proportion of calcite, dolomite, clay minerals, quartz, and other accessory constituents. The study will also record features such as fossil content, recrystallization, stylolites, micro-fractures, and secondary mineral infillings, which influence the quality and industrial suitability of the limestone. The results of the petrological analysis will complement the chemical data, aiding in the interpretation of depositional environment, diagenetic history, and overall grade characterization of the deposit.

Bulk Density Determination: Bulk density will be determined on five (05) selected drill core samples representing different lithological types of limestone encountered during drilling. The measurements will be carried out using the caliper method (mass-to-volume ratio) to ensure accuracy and representativeness. Each core sample will be carefully cleaned, measured for its dimensions (length and diameter) using a vernier caliper to calculate the volume, and then weighed using a precision electronic balance to obtain the mass. The bulk density (g/cm^3) will be calculated by dividing the dry mass by the corresponding volume of the core. These results will be used to estimate the tonnage of limestone resources in the block and to support the resource estimation and classification as per UNFC guidelines.

11.0 THE QUANTUM OF WORK PROPOSED

11.1 The Quantum of work proposed is given in Table No. 11.1

Table No. 11.1
Quantum of Work for Proposed Bandha Limestone Block

Sl. No.	Description and Nature of Work	Unit	Proposed Quantum
A	**GEOLOGICAL WORK AND SURVEYING**		
1	Geological Mapping (1:4000 scale)	sq km	3.54
2	Survey Work		
i	Topographical Survey (1:4000 scale)	sq km	3.54
iii	DGPS survey for determination of RL & Co-ordinates of Boreholes and Block boundary corner points	Nos	10
B	**EXPLORATORY DRILLING**		
1	Drilling up to 300m (Soft Rock)	m	250
2	Drill Core Preservation	Per m	240
C	**LABORATORY STUDIES**		
1	Chemical Analysis		
i	Primary Sampling (CaO, MgO, Al_2O_3, SiO_2, Fe_2O_3, SO_3, P_2O_5, K_2O, Na_2O_3, LOI and Acid insoluble) by XRF	Nos.	240
ii	Check Sampling External 10% (CaO, MgO, Al_2O_3, SiO_2, Fe_2O_3, SO_3, P_2O_5, K_2O, Na_2O_3, LOI and Acid insoluble) by XRF	Nos.	24
2	Petrological Studies (Surface & BH Core Samples)		10
	Digital Photomicrographs		10
i	Bulk Density	Nos.	5
D	Report Preparation (5 Hard copies with a soft copy)	Nos.	1
E	Preparation of Exploration Proposal (5 Hard copies with a soft copy)	Nos.	1

12.0 COST ESTIMATE

Cost has been estimated based on actual schedule of rates mandated in the circular OM No. 61/1/2018/NMET dated 31st March 2020 for NMET funded Projects. The total estimated cost is Rs. 88.57 lakh. The summary of cost estimates for this reconnaissance survey (G3) is given below:

Sl. No.	Item	Total
1	Geological Work	31,62,156
2	Drilling	29,73,640
3	Laboratory Studies	8,68,490
	Sub total	**70,04,286**
4	Report	3,50,214
5	Peer Review	30,000
6	Proposal Prepration	1,40,085.72
	Total	**75,24,586**
8	GST (18%)	13,54,425.48
Total cost including 18% GST		**88,79,012**
SAY, in Lakhs		**88.79**

13.0 TIMELINE

The entire project is planned tentatively for 10 months.

Table No. 13.1

Tentative Time schedule / Action plan of G-3 exploration in Bandha Block for Limestone, District- Satna, Madhya Pradesh, Extent- 3.54 sq km;

Estimated time schedule for Preliminary Exploration (G-3) for Limestone in Bandha Block (3.54 sq km) Districts: Satna, State: Madhya Pradesh [Schedule timeline- 10 months]												
Sl. No.	**Particulars**	**Months**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1	Camp Setting/ mobilization	Months										
2	Geologist days (1 party)	days										
3	Survey Days (1 party)	days										
4	Drilling (01rig)	m										
5	Sampling days (1 party)	days										
6	Camp winding	Months										
7	Laboratory Studies	days										
8	Geologist days, HQ	days										
9	Report Writing with Peer Review	days										

Justification for Exploration of Bandha Limestone Block, Satna District, Madhya Pradesh

1. The Government of Madhya Pradesh (DGM) has granted permission for exploration of the Bandha Limestone Block, located in Satna District, covering an area of 3.54 sq. km. The block is free from overlapping issues, making it ideal for systematic exploration under the National Mineral Exploration Trust (NMET) scheme.
2. The area has not been explored earlier, though limestone occurrences are reported regionally. Detailed exploration is required to convert geological resources into mineable reserves, in compliance with the Minerals (Evidence of Mineral Contents) Rules, 2015 (amended 2021). Such exploration will improve the level of confidence in grade and tonnage, thereby enhancing investor interest during auction.
3. In Satna District, 22 limestone blocks have already been successfully auctioned, with areas ranging from 12 ha to 1,917 ha. The CaO content varies from 34.45% to 52.87%, indicating the presence of both low and high grade limestone. The auction premiums ranging between 1.1% and 200% reflect strong industrial demand and high competition for cement-grade limestone in the region.
4. The Satna region, forming part of the Vindhyan limestone belt, is a major cement-producing hub of India, hosting leading industries such as Birla Corporation and Prism Johnson Ltd. The high auction premiums and continuous industrial expansion indicate robust growth potential and sustained demand for limestone.
5. The Bandha Block, part of the Vindhyan Supergroup, shows surface limestone exposures confirmed during MECL's reconnaissance visit. Preliminary samples and analyses have indicated the presence of good-quality limestone, justifying detailed exploration. Analytical results of the samples are provided below:

Sample No.	**CaO%**	**SiO_2%**	**MgO%**	**Al_2O_3%**	**Fe_2O_3%**
BDH-01	48.03	5.91	2.90	1.51	0.78
BDH-02	50.18	4.33	2.23	1.01	0.56

6. MECL has previously explored and established resources in several nearby blocks Piprahat–Kubri, Naubasta–Kolarad, Jamodi–Mohana, and Gunchihai all of which were successfully auctioned by the Government of Madhya Pradesh.

7. The increasing demand for cement-grade limestone driven by infrastructure, housing, and industrial development including government initiatives like 'Housing for All', 'Smart Cities Mission', and PM Gati Shakti—will further strengthen Satna's position as a key limestone and cement hub in India. Upcoming and proposed cement plant expansions are expected to enhance the industrial importance of this region and justify further resource augmentation through detailed exploration of the Bandha Block.

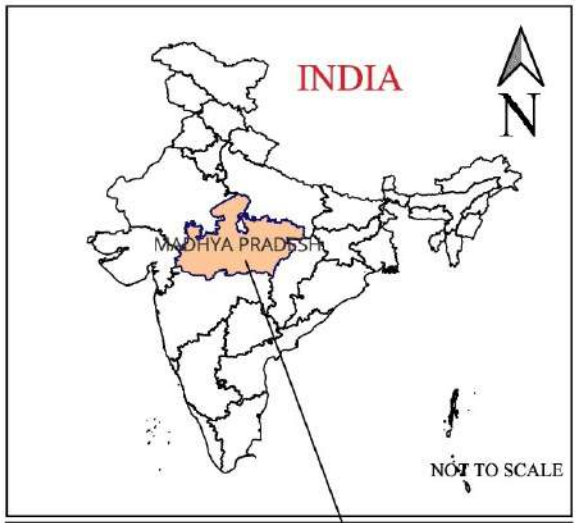
List of Plates:

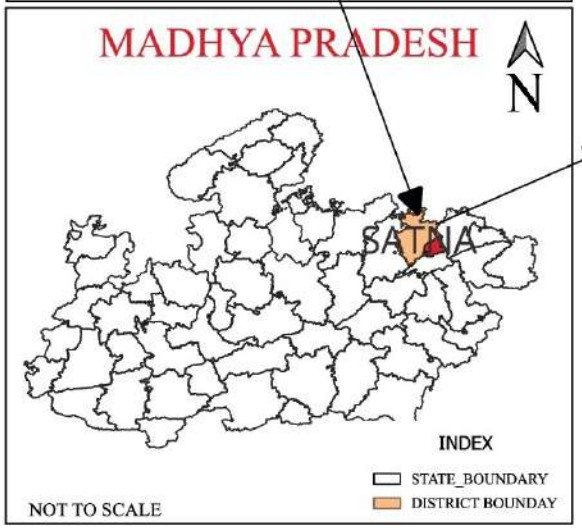
Estimated cost for Preliminary Exploration (G-3) for Limestone in Bandha Block (3.54 sq km) District: Satna, Madhya Pradesh. [Nos. of Borehole- 05; Borehole depth range: 50m; Schedule timeline- 10 months]							
S. No.	**Item of Work**	**Unit**	**Rates as per NMET SoC 2020-21**		**Estimated Cost of the Proposal**		**Remarks**
			SoC-Item -Sl No.	**Rates as per SoC**	**Qty.**	**Amount (Rs)**	
A	**GEOLOGICAL WORK**						
1	**Geological Mapping (1:4000), Borehole logging, sampling & Report writing**						
i	Charges for Geologist- Field (1 party)	day	1.2	11,000	150	16,50,000	
ii	Charges for one Geologist - HQ	day	1.2	9,000	30	2,70,000	
iii	2 labours/ party (Rs 522/day/labour) (As per rates of Central Labour Commissioner)	day	5.7	541	300	1,46,160	Amount will be reimbursed as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higher
iv	Core Sampling -01 Samplers Labour charge not included	day	1.5.2	5,100	33	1,68,300	
v	4 labours/ party (As per rates of Central Labour Commissioner)	day	5.7	541	132	4,21,776	Amount will be reimburse as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higher
2	**Survey**						
i	Topographical Survey including geological mapping	day	1.6.1a	8300	30	249000	
ii	4 labours/ party (As per rates of Central Labour Commissioner)	day	5.7	541	120	64,920	
iii	Bore Hole Fixation and determination of co-ordinates & Reduced Level of the boreholes by DGPS and boundary coordinates	Per Point of observation	1.6.2	19,200	10	1,92,000	05 BHs and 05 boundary points
				Sub Total- A		**31,62,156**	
B	**DRILLING**						
i	Drilling upto 300m (1 rig)-Soft Rock	m	2.2.1.4a				05 BHs and 05 boundary points

				7,168	250	17,92,000	
ii	Land / Crop Compansation	per BH	5.6	20,000	5	1,00,000	Amount will be reimburse as per actuals or max. Rs. 20000 per BH with certification from local authorities
iii	Construction of concrete Pillar (12"x12"x30")	per borehole	2.2.7a	2,000	10	20,000	
iv	Transportation of Drill Rig & Truck associated per drill (1 rig)	Km	2.2.8	36	1,000	36,000	Certification in this regard is required to be provided
v	Monthly Accomodation Charges for drilling Camp (up to 1 Rig)	month	2.2.9	50,000	2	1,00,000	
vi	Drilling Camp Setting Cost (1 rig)	Nos	2.2.9a	2,50,000	1	2,50,000	
vii	Drilling Camp Winding up Cost (2 rigs)	Nos	2.2.9b	2,50,000	1	2,50,000	
viii	Approach Road Making (Flat Terrain)	Km	2.2.10a	22,020	2	44,040	Road Making will be considered as per the requirement and Road Making Charges will be reimbursed later
ix	Core Preservation: One complete borehole plus mineralised cores of all the remaining Bhs	m	5.3	1,590	240	3,81,600	
					Sub Total- B	**29,73,640**	
C	**LABORATORY STUDIES**						
1	**Chemical Analysis**						
i	**Primary & Check samples for Graphite**						
	Borehole Primary samples for 9 radicals i.e., CaO, MgO, SiO2, Fe2O3, Al2O3, SO3, P2O5, K2O, Na2O & LOI	Nos	4.1.16	3,000	240	7,20,000	
	External(10%) Check samples from NABL Lab for 9 radicals i.e., CaO, MgO, SiO2, Fe2O3, Al2O3, SO3, P2O5, K2O, Na2O & LOI	Nos	4.1.16	3,000	24	72,000	
2	**Physical & Petrological Stusies**						
i	Preparation of thin section	Nos	4.3.1	2,353	10	23,530	
ii	Complete petrographic study report	Nos	4.3.4	4,232	10	42,320	

iii	Digital Photographs	Nos	4.3.7	280	10	2,800	
iv	Density studies	Nos	4.8.3	1,568	5	7,840	
					Sub Total- C	**8,68,490**	
D					**Total A to C**	**70,04,286**	
E	**Geological Report Preparation**		**5.2**	Preliminary exploration exceeding Rs. 50 lakh but less than Rs. 150 lakhs - A minimum of Rs. 2.5 lakh or 5% of the work whichever is more and Rs. 3000 per each additional copy		**3,50,214**	Reimbursement will be made after submission of the final Geological Report in Hard Copies (5 Nos) and the soft copy to NMET.
F	**Peer review Charges**		**As per EC decision**			**30,000**	
G	**Preparation of Exploration Proposal (5 Hard copies with a soft copy)**	**5 Hard copies with a soft copy**	**5.1**	2% of the Cost or Rs. 5 Lakhs whichever is lower		**1,40,086**	
H	**Total Estimated Cost without GST**					**75,24,586**	
I	**Provision for GST (18% of I)**					**13,54,425**	GST will be reimburse as per actual and as per notified prescribed rate
J	**Total Estimated Cost with GST**					**88,79,012**	***or Say Rs. 88.76 Lakh***
Note:							
1	If any part of the project is outsourced, the amount will be reimbursed as per the Paragraph 3 of NMET SoC and Item no. 6 of NMET SoC. In case of execution of the project by NEA on its own, a Certifiate regarding non outsourcing of any component/project is required.						

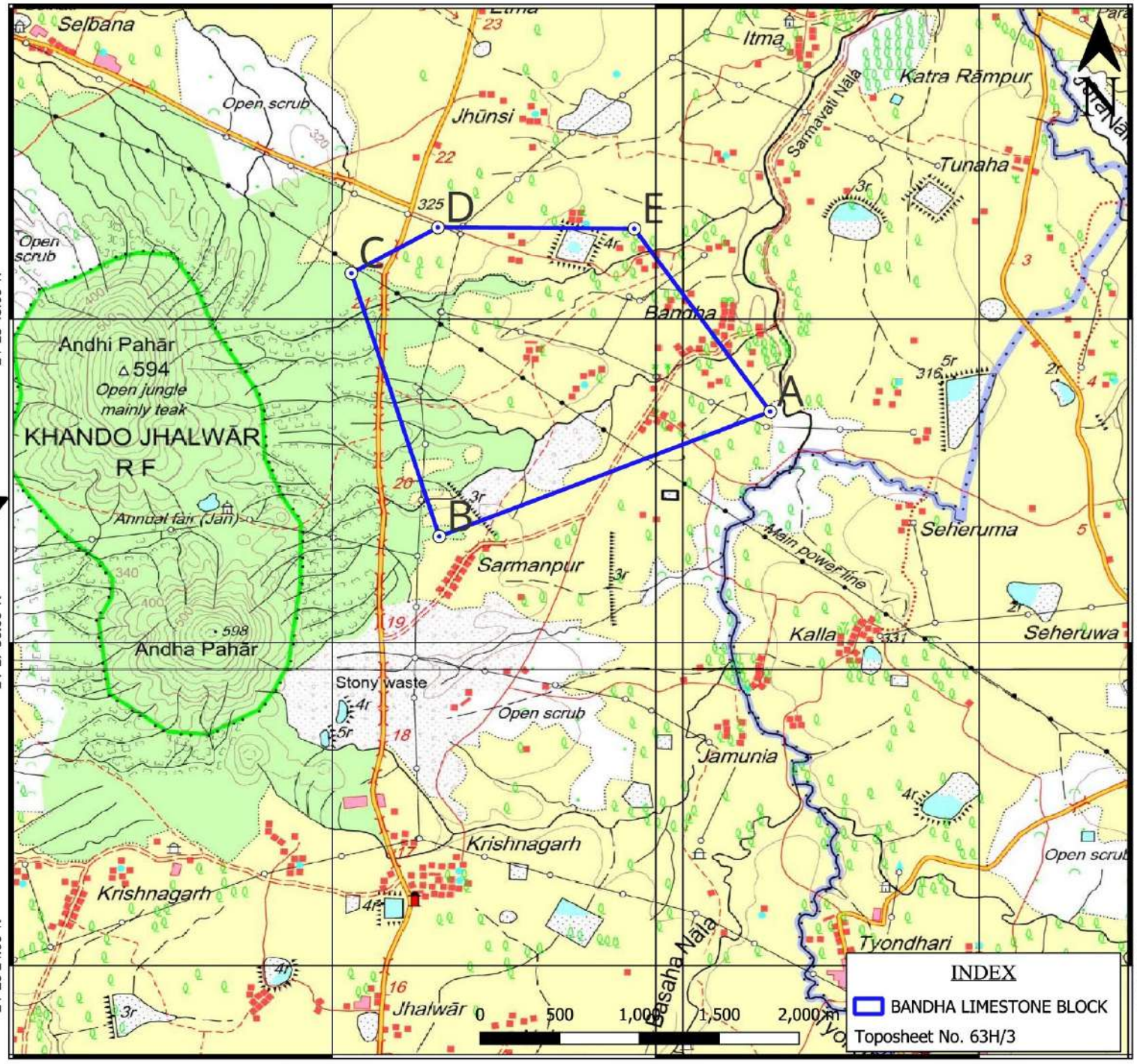
LOCATION MAP OF PROPOSED BANDHA LIMESTONE BLOCK, DISTRICT - SATNA, MADHYA PRADESH, AREA - 3.54 SQ.KM.





Co-ordinates of corner points of proposed Bandha Blocks (G-3) for Limestone, District: Satna, State: Madhya Pradesh

S.No	GCS(DMS)	
	Latitude	Longitude
A	24° 29′ 08.11″ N	81° 02′ 19.2″ E
B	24° 29′ 08.38″ N	81° 01′ 35.47″ E
C	24° 28′ 58.21″ N	81° 01′ 16.22″ E
D	24° 27′ 59.60″ N	81° 01′ 35.80″ E
E	24° 28′ 27.40″ N	81° 02′ 49.45″ E



81°0′0.00″E

81°6′0.00″E

REGIONAL GEOLOGICAL MAP OF THE PROPOSED BANDHA LIMESTONE BLOCK, SATNA DISTRICT, MADHYA PRADESH

N

24°30′0.00″N

D

E

A

B

C

INDEX

BLOCK BOUNDARY

COORNER POINT

LITHOLOGY

LATERITE

MAIHAR SANDSTONE

SIRBU SHALE

NAGOD LIMESTONE

SCALE - 1:50,000

0 2.5 5 7.5 10 km

81°0′0.00″E

81°6′0.00″E

24°30′0.00″N

GEOLOGICAL MAP SHOWING PROPOSED BANDHA BLOCK, DISTRICT: SATNA, STATE: MADHYA PRADESH

81°1′12.00″E 81°1′48.00″E 81°2′24.00″E 81°3′0.00″E

24°28′48.00″N

24°28′12.00″N

N

S1 E A D B S1' C

CaO-50.18, MgO-2.23

CaO-48.03, MgO-2.90

PBH-1 PBH-2 PBH-3 PBH-4 PBH-5

INDEX

- BLOCK BOUNDARY
- SAMPLE LOCATION
- CORNER POINT
- SECTION LINE
- PBH LOCATION

LITHOLOGY

- LATERITE
- MAIHAR SANDSTONE
- SIRBU SHALE
- NAGOD LIMESTONE

SCALE - 1:4000

0 250 500 750 1,000 m

PROPOSED BOREHOLE LOCATION PLAN IN BANDHA LIMESTONE BLOCK, SATNA DISTRICT, MADHYA PRADESH

81°1′12.00″E
81°1′48.00″E
81°2′24.00″E
81°3′0.00″E
24°28′48.00″N
24°28′12.00″N

N

S1
E
A
D
B
C
S1'
PBH-1
PBH-2
PBH-3
PBH-4
PBH-5

INDEX

- BLOCK BOUNDARY
- PBH LOCATION
- CORNER POINT
- SECTION LINE

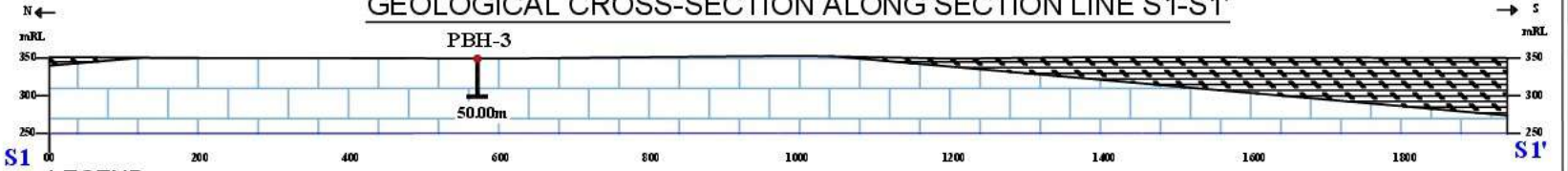
LITHOLOGY

- LATERITE
- MAIHAR SANDSTONE
- SIRBU SHALE
- NAGOD LIMESTONE

SCALE - 1:4000

0 250 500 750 1,000 m

GEOLOGICAL CROSS-SECTION ALONG SECTION LINE S1-S1'



Scale - 1:5,000

PROPOSAL FOR PRELIMINARY EXPLORATION (G-3) FOR LIMESTONE IN JAMUNIYA BLOCK, SATNA DISTRICT MADHYA PRADESH

(AREA 3.68Sq. Km)

COMMODITY: LIMESTONE

BY

MINERAL EXPLORATION AND CONSULTANCY LIMITED

DR. BABASAHAB AMBEDKAR BHAWAN SEMINARY HILLS NAGPUR, MAHARASHTRA

PLACE: NAGPUR

DATE: 30.10.2025

PRELIMINARY EXPLORATION (G-3) FOR LIMESTONE IN JAMUNIYA LIMESTONE BLOCK (3.68SQ. KM), SATNA DISTRICT MADHYA PRADESH

Features	Details
Block ID	JAMUNIYA LIMESTONE BLOCK
Exploration Agency	Mineral Exploration and Consultancy Limited (MECL) (Formerly Mineral Exploration Corporation Ltd.)
Commodity	Limestone
Previous Exploration Agency	NA
Mineral Belt	Satna–Rewa Limestone Belt (Vindhyan Basin, M.P.)
Completion period with entire Time schedule to complete the project	10 Months
Objectives	Objectives of the proposed exploration in Jamuniya Limestone Blocks (G3) are as follows: i) To carry out detailed Topographical Survey and Geological mapping on 1:4000 scale over an area of **3.68**Sq. Km. ii) In the Jamuniya Limestone Blocks, **05** vertical boreholes of about **50 m** depth each will be drilled to know the strike and depth of the limestone. This will help in estimating the limestone resource under the inferred category (UNFC 333). iii) To carry out exploration as per Minerals (Evidence of Mineral Contents) Rule-2015 & Mineral (Auction) Rules-2015 (Amended up to 2021). iv) The proposed exploration programme will be helpful in demarcating zone of various grades of limestone in the block as per **UNFC** norms and estimation of limestone resources which in turn will facilitate the State Govt. for auctioning of the Block.
Whether the work will be carried out by the proposed agency or through outsourcing and details thereof. Components to be outsourced and name of the outsource agency	The work will be undertaken by Mineral Exploration and Consultancy Ltd. (MECL).
Number of Geoscientists	Geologist: 01 HQ (30 days) Geologist: 01 Field (150 days)
Expected Field days(surveyor)	Surveyor: 01 Field (30 days)

1.	**Location**	The proposed Jamuniya Limestone Block (G3) is located in Rampur Baghelan Tehsil, Satna District, with a total area of 3.68sq. km. The block falls in Survey of India Toposheet No. 63H3.				
			Point	**Latitude**	**Longitude**	
			A	24°27'59.60"	81°1'35.80"	
			B	24°28'27.40"	81°2'49.45"	
			C	24°27'24.43"	81°2'51.92"	
			D	24°27'0.50"	81°1'55.55"	
	Villages	Jamuniya 158, 159, Krishnagarh & Bandha				

	Tehsil/Taluk	Rampur Baghelan
	District	Satna
	State	Madhya Pradesh
2.	**Area (hectares/ square kilometres)**	
	Block Area	3.68sq.km
	Forest Area	NIL
	Government Land Area	Data not available
	Charagaha	Data not available
	Private Land Area	The block area mostly comprises of private land
3.	**Accessibility**	
	Nearest Rail Head	Satna Junction (~20 km from Rampur Baghelan).
	Road	The area is connected by all-weather roads; nearest road head is Rampur Baghelan on NH-75, about 20 km from Satna and 35 km from Rewa.
	Airport	Rewa Airport (20 km from Rampur Baghelan, Satna).
4.	**Hydrography**	
	Rivers/ Streams	The area has a dendritic to sub-dendritic pattern formed by small seasonal streams and channels flowing along the natural slope of the land.
5.	**Climate**	
	Mean Annual Rainfall	Mean annual rainfall in the area (Satna District) is about 1,050 to 1,100 mm.
	Temperatures	Temperatures in Satna range from about 10 °C in January to 41 °C in May, with an annual average of around 26 °C.
6.	**Topography**	
	Toposheet No.	Survey of India Toposheet No. 63H3
	Morphology of the Area	The area has flat to gently sloping ground with an elevation of about 339–355m, mostly covered by agriculture and drained by seasonal streams in a dendritic pattern.
7.	**Availability of baseline geoscience data**	Geological Map of the Vidhyan Basin Part) in Scale-1:50,000. (Bhukosh,GSI)
	Geochemical Map & Geophysical Map	Geochemical Map and Geophysical Map is not available for the proposed block.
8.	**Justification for taking up Reconnaissance Survey/ Regional Exploration**	1. The Government of Madhya Pradesh (DGM) has granted permission for exploration of the Jamuniya Limestone Block, located in Satna District, covering an area of 3.68sq. km. The block is free from overlapping issues, making it ideal for systematic exploration under the National Mineral Exploration Trust (NMET) scheme. 2. The area has not been explored earlier, though limestone occurrences are reported regionally. Detailed exploration is required to convert geological resources into mineable reserves, in compliance with the Minerals (Evidence of Mineral Contents) Rules, 2015 (amended 2021). Such exploration will improve the level of confidence in grade and tonnage, thereby enhancing investor interest during auction. 3. In Satna District, 22 limestone blocks have already been

successfully auctioned, with areas ranging from 12 ha to 1,917 ha. The CaO content varies from 34.45% to 52.87%, indicating the presence of both low and high grade limestone. The auction premiums ranging between 1.1% and 200% reflect strong industrial demand and high competition for cement-grade limestone in the region.

4. The Satna region, forming part of the Vindhyan limestone belt, is a major cement-producing hub of India, hosting leading industries such as Birla Corporation and Prism Johnson Ltd. The high auction premiums and continuous industrial expansion indicate robust growth potential and sustained demand for limestone.
5. The Jamuniya Block, part of the Vindhyan Supergroup, shows surface limestone exposures confirmed during MECL's reconnaissance visit. Preliminary samples and analyses have indicated the presence of good-quality limestone, justifying detailed exploration. Analytical results of the samples are provided below:

Sample No.	**CaO%**	**SiO_2%**	**MgO%**	**Al_2O_3%**	**Fe_2O_3%**
JAM-01	50.86	5.75	0.69	1.09	1.17
JAM-02	51.08	4.89	0.72	1.17	1.13
JAM-03	47.28	9.67	1.29	2.35	1.41

6. MECL has previously explored and established resources in several nearby blocks Piprahat–Kubri, Naubasta–Kolarad, Jamodi–Mohana, and Gunchihai all of which were successfully auctioned by the Government of Madhya Pradesh.

7. The increasing demand for cement-grade limestone driven by infrastructure, housing, and industrial development including government initiatives like 'Housing for All', 'Smart Cities Mission', and PM Gati Shakti—will further strengthen Satna's position as a key limestone and cement hub in India. Upcoming and proposed cement plant expansions are expected to enhance the industrial importance of this region and justify further resource augmentation through detailed exploration of the Jamuniya Block.

PROPOSAL FOR PRELIMINARY EXPLORATION (G-3) FOR LIMESTONE BLOCK (3.68SQ. KM), SATNA DISTRICT MADHYA PRADESH

1. INTRODUCTION

1.1. After the MMDR Amendment Act 2015, Minerals (Evidence of Mineral Contents) Rules 2015, and Mineral Auction Rules 2015 were made, the Government of India asked the State Governments to speed up exploration of different minerals and put them up for auction. Recently, some changes in the MMDR Act allow the State Governments to auction blocks even with lower exploration confidence and put more blocks on auction. Following this, the State Government of Madhya Pradesh gave the location of five (05) limestone blocks were allocated to MECL for further exploration and making the blocks for auction feasible. After detailed geological examination and evaluation which includes field visit, surface sample collection, two Limestone Blocks, namely Jamuniya (3.68sq km) & Jamuniya (3.68 sq km) Limestone Blocks have been identified and finalized for undertaking exploration at G3 level.

1.2. Accordingly, this proposal has been prepared for Jamuniya Limestone Block over an extent of 3.68sq km and to be discussed in the forthcoming meeting of TCC II, NMEDT on 03rd November 2025.

2. LOCATION AND ACCESSABILITY

2.1. The Jamuniya Limestone Blocks are located in Rampur Baghelan Tehsil of Satna District, covering a total area of 3.68sq. km. The location of the block is shown in Plate No. I. It falls under Survey of India Toposheet No. 63H03 and is bounded by the coordinates listed in Table 2.1.

Table-2.1

Co-ordinates of corner points of proposed Jamuniya Blocks (G-3) for Limestone,

District: Satna, State: Madhya Pradesh

S.No	GCS(DMS)	
	Latitude	**Longitude**
A	24°27'59.60"	81°1'35.80"
B	24°28'27.40"	81°2'49.45"
C	24°27'24.43"	81°2'51.92"
D	24°27'0.50"	81°1'55.55"

2.2 The block is connected to the National Highway No. 45 at a distance of 11 km to the north of the block, which connects Jabalapur (East) and Bhopal (West).

3. PHYSIOGRAPHY AND DRAINAGE

3.1. The area has flat to gently sloping ground with an elevation of about 339–355 m, mostly covered by agriculture and drained by seasonal streams in a dendritic pattern.

3.2. The area has a dendritic to sub-dendritic pattern formed by small seasonal streams and channels flowing along the natural slope of the land.

4. CLIMATE

The climate of the area, represented by Satna District, is characterized by a mean annual rainfall of

about 1,050–1,100 mm. The temperature varies considerably with the seasons, ranging from around 10°C during the winter month of January to approximately 41 °C in the peak summer month of May, while the annual average temperature remains close to 26 °C.

5. FLORA & FAUNA

The area is mostly farmland where crops like wheat, paddy and soybean are grown. Trees like neem, babul, peepal and mango are found. Common domestic animals such as cows, buffaloes, goats are seen in the villages. Wild animals include jackal, fox, hare and wild boar. Snakes and many birds like parrots, mynas and pigeons are also found. No rare or special animals are reported in this block.

6. PREVIOUS WORK

Since the middle of the 19th century, many geologists such as Medlicott (1860), Mellet (1869), and Oldham (1851) have studied the Vindhyan Basin.

Oldham divided the Upper Vindhyans into three parts — Kaimur, Rewa, and Bhander. Later, the Geological Survey of India (GSI) carried out more detailed studies on limestone deposits in the Rewa–Satna region.

The GSI, M.P. Circle, Bhopal, conducted investigations for flux-grade limestone in the Rewa–Satna area during the 1966–67 field season under Shri D.R.S. Mehta, Superintending Geologist, and Shri P.K. Ramam, Geologist. An area of about 425 sq. km was geologically mapped on a 1:63,360 scale (Topo Sheet No. 63H3), and 85 groove samples were collected from outcrops and nala exposures. The study delineated two distinct flux-grade horizons within the Bhander Limestone Formation (Upper Vindhyan) — a Lower Band (8–11 m thick) comprising mainly flux-grade limestone, and an Upper Band (12–21 m thick) showing variable quality from flux to cement grade. The Lower Band extends ~50 km with ~400 m average width, and the Upper Band extends ~53 km with ~300 m average width, both striking ENE–WSW with gentle southerly dips. Based on surface data, inferred resources were estimated at 340 million tonnes in the Lower Band and 190 million tonnes in the Upper Band. The investigation concluded that the area holds substantial reserves of flux-grade limestone (blast-furnace and open-hearth grades) requiring detailed drilling for proving minable reserves. Development of transport connectivity between Satna and Rewa and utilization of upper and purple bands for cement and lime industries were also recommended.

The Directorate of Geology and Mining (DGM), Madhya Pradesh, also conducted surveys to locate good-quality (high-grade) limestone in the Nagod area. When the limestone deposits of the M.P. State Mining Corporation began to decline, the DGM started new detailed exploration work based on the recommendations of S.S. Mishra (1974–75).

GSI investigated around Rampur and Ramasthan areas of Satna District from October 1975 to September 1976. About 200 sq. km area was mapped on a 1:63,360 scale. The rocks found in this region belong to the Bhander Group of the Vindhyan Supergroup. In this area, a dark grey limestone bed of 8 to 13.5 meters thickness (known as Lower Nagod Limestone) was identified. The limestone is of flux to cement grade, and an estimated 17.05 million tonnes of limestone reserves were recorded in the Ramasthan Block. At present, mining

activities are being carried out in nearby areas, and the limestone is used for cement manufacturing. The nearest cement plants with working quarries are:

1. Satna Cement Works (30 km)
2. B.P. Birla Cement Plant, Maihar (40 km)
3. Prism Cement Plant (50 km)

The MECL also conducted systematic exploration at G-4, G-3, and G-2 levels in and around Satna District, and submitted geological reports to the Government of Madhya Pradesh and NMET. Between 2016 and 2018, the blocks explored by MECL under NMET funding include Ghunchihai, Naubasta-Kollard, Jamodi-Mahanna and Piparahat-Kubri Blocks which are successfully auctioned. Summary of the works by MECL is presented in the following paragraphs:

The General Exploration (G-2) of the Jamodi-Mahanna Limestone Block (Part-B), Tehsil Raghuraj Nagar, District Satna, Madhya Pradesh, was carried out by Mineral Exploration Corporation Limited (MECL), Nagpur, on behalf of NMET and DGM, Madhya Pradesh, during May 2018 to October 2019. The work included geological and topographical mapping over 9.0 sq. km, systematic core drilling of 2037.50 m in 53 boreholes (17 at G-3 and 36 at G-2 level), and detailed sampling with laboratory studies. Two cement-grade limestone zones (Zone-I and Zone-II) of the Bhander Limestone Formation were delineated, having thicknesses ranging from 2.0 m to 16.0 m and 2.0 m to 14.6 m respectively. The limestone is of cement grade, with average composition of CaO 43.95–44.30%, MgO 1.80–2.54%, and SiO_2 8.82–9.68%. The total in-situ resource is estimated at 90.29 million tonnes (UNFC 332) over an area of 8.66 sq. km. The deposit shows gentle southerly dip (1°–3°) with lateral continuity. MECL recommended upgrading the block to G-1 level through detailed drilling for mineable reserve estimation.

The General Exploration (G-2) of the Naubasta–Kolard Limestone Block, Tehsil Nagod, District Satna, Madhya Pradesh, was carried out by Mineral Exploration Corporation Limited (MECL), Nagpur on behalf of NMET and DGM, Madhya Pradesh during May 2018 to October 2019. The work was executed under the guidance of Shri B.P. Raturi, GM (Exploration & Geological Services), assisted by Shri M.N. Sahay, Shri P.P. Kulkarni, and Shri N.K. Pala with their technical teams. Activities included geological mapping (15.90 sq. km), topographical survey, systematic core drilling of 48 boreholes (2273 m), and extensive chemical, petrographic, and XRD studies. Exploration delineated two cement-grade limestone zones (Zone-I and Zone-II) of the Bhander (Nagod) Limestone Formation, having thicknesses from 0.8 m to 9.0 m. The limestone is of cement grade, averaging CaO 44.78%,

MgO 1.47–2.40%, and SiO_2 9.70–10.65%. The net in-situ resource was estimated at 166.05 million tonnes (UNFC 332) over 15.90 sq. km, with a gentle southerly dip (3°–5°) and lateral continuity. The report recommends upgradation to G-1 level by close-spaced drilling to establish mineable reserves for cement industry utilization.

The block and the surrounding area were covered under NGCM programme of GSI and outcomes of the same is available on the National Geo-Data Repository (NGDR) portal. From the available data no anomalous values of any elements have been observed.

7. REGIONAL GEOLOGY

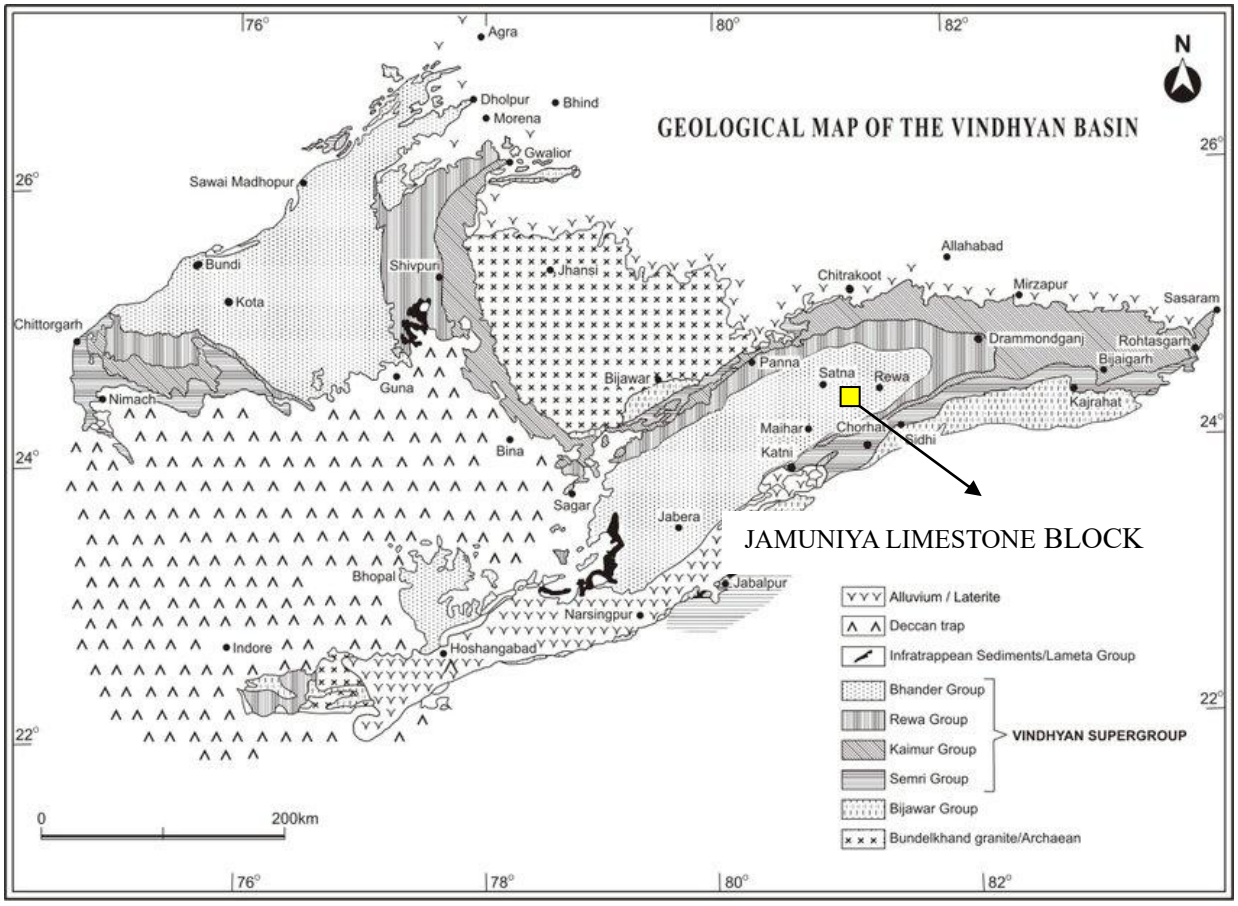


Fig 7.1. Map Showing Vindhyan supergroup area with Proposed Block Location (After Azmi et. Al.)

7.1 Study area comes under district-Satna, which is covered by Upper Vindhyan sediments of Vindhyan Super group (Table 5.01). Vindhyan Super group has been sub-divided into four groups i.e., in the stratigraphic order these are Semri, Kaimur, Rewa & Bhander groups (Table 5.01). Each group is further sub-divided into different formations (Table 5.01).

The Semri Group is generally referred to as the Lower Vindhyan and the Kaimur, Rewa and Bhander groups have been clubbed as the Upper Vindhyan. The Bhander Group is the youngest group of the Vindhyan Supergroup and has been sub-divided into four formations in the Maihar area, Satna district, M.P. In the stratigraphic order, these are the Ganurgarh Shale, the Bhander Limestone, the Sirbu Shale and the Maihar Sandstone (Table 5.01).

The Maihar Sandstone also referred to as the Upper Bhander Sandstone (Bhattacharyya, 1993) is the youngest stratigraphic horizon of the Bhander Group in the Son Valley. The Bhander Limestone is also referred to as the Nagod Limestone (Sastry and Moitra, 1984).
The Semri Group of rocks is represented by an alternating sequence of Sandstone and shale alongwith porcellanite and limestone. The Semri Group of rocks mainly exposed in the southern and northern part of the district.

The Rohtas Limestone of Semri Group is light to grey in colour, fine grained compact and well bedded. The Kaimur Group comprising mainly sandstone which is fine grained; massive and thickly bedded is exposed in the northern and southern part.

The Rewa Group of rocks comprises mainly of sandstone, shale and conglomerate.

The Bhander Group of rocks exposed as a broad band and comprises mainly shale, Nagod limestone and upper Bhander sandstone. Nagod limestone is fine grained, hard, compact thinly bedded to massive with some stromatolitic bands. The upper Bhander Sandstone forms the cliffs of the Bhander plateau is composed of purple to reddish brown, fine to medium grained, flaggy to massive and well sorted sandstone interbedded and splintery shale and siltstone.

Lameta Formation comprising sandstone and shale range in thickness from 15-80m and occurs in the form as clusters on the hillocks of upper Rewa Sandstone. Laterite occurs as capping on the Bhander Group of rocks and on the upper Rewa Sandstone. It has a maximum thickness of 60m.

The stratigraphic column of the area was made using the order of rock layers. The names of the layers were taken by comparing with nearby areas (Shastry & Moitra,

1984). The sequence of rocks in this area is shown in Table 7.1. The regional geology of the area is shown in Plate – II.

Table - 7.1

The Regional Stratigraphic Succession (After GSI)

AGE	GROUP	FORMATION	ASSOCIATED MINERAL DEPOSITS
Recent	Alluvium		--
Pliestocene	Laterite and Bauxite		Bauxite Deposit of Rewa and Satna
----------Unconfirmity--------			
Proterozoic	Bhander Group	Upper Bhander Sandstone	
		Sirbu Shale Formation	
		Nagod Limestone Formation	Limestone deposits of Damoh, Katni, Satna Districts etc,
		Ganurgarh Shale Formation	
	Rewa Group	Upper Rewa Sandstone Formation	
		Jhiri Shale Formation	
	Kaimur Group	Kaimur Sandstone Formation	Diamodiferrous Kimberlites of Panna, Limestone deposits of Mandsaur, Rewa, Satna Districts, Lead zinc deposits of Damoh District
		Bhagwar Shale Formation	
	Semri Group	Rohtas Limestone Formation	
		Kheinjua Group-Rampur Formation Salkhan Formation- Fawn Limestone Koldaha Shale Formation	
		Deonar Formation	Porcellanite Stage
Base Not Seen			

8. Block Geology:

8.1. The block and the surrounding area belong to the Bhander Group of Vindhyan Supergroup. Litho units exposed in the area are limestone, shale. Trend of the limestone and shale is nearly E-W and dipping 3-5° towards south. Most of the block area is covered by soil which under agricultural land. The area shows plain topography. At few places limestone is exposed and of grey in colour.

Age	Group	Formation	Associated Mineral Deposits
Recent	Alluvium		--
Proterozoic	Bhander Group	Sirbu Shale Formation	
		Bhander/Nagod Limestone Formation	Limestone deposits of Damoh, Katni, Satna Districts etc

9. OBJECTIVE:

Objectives of the proposed exploration in Jamuniya Blocks are as follows:

i. **Topographical Survey and Geological Mapping:** A detailed topographical survey and geological mapping will be undertaken on a 1:4000 scale covering an area of 3.68sq. km. The mapping will delineate lithological units, structural features, surface manifestations of mineralization, and geomorphological characteristics relevant to limestone occurrence.

ii. **Subsurface Exploration:** To assess the strike continuity, depth persistence, and grade variation of limestone**,** five (05) vertical boreholes are proposed with an average depth of about 50 metres each. The core obtained will be geologically logged and sampled systematically for chemical and physical analyses.

iii. **Sampling and Chemical Analysis:** Representative core and surface samples will be analyzed for major oxides (CaO, SiO_2, Al_2O_3, Fe_2O_3, MgO, LOI, etc.) and relevant minor constituents to evaluate grade and suitability for industrial applications (e.g., cement, flux, or chemical grade).

iv. **Data Integration and Resource Estimation:** Geological and analytical data will be integrated to delineate limestone zones and estimate resources under G3 level of exploration (as per MEMC Rules). The study will categorize the deposit in terms of UNFC codes for geological, feasibility, and economic viability axes**.**

v. **Assessment** of quality and quantity of the resources (333) if any as per UNFC norms & Minerals (Evidence of Mineral Contents) Rules- 2015.

vi. This programme will help to find the quality and quantity of limestone in different zones of the block as per UNFC norms. The result will support the State Government in the auction of the block.

10. METHODOLOGY OF EXPLORATION

The exploration will be carried out as per the Minerals (Evidence of Mineral Contents) Rules, 2015 and Mineral (Auction) Rules, 2015 (Amended up to 2021). In the Jamuniya Limestone Block, the exploration plan includes three prominent activities. The details of these activities are given below.

DGPS Boundary Corner Pillars Survey, Topographical Survey & Geological Mapping:

DGPS Survey: The limestone block covering 3.68sq. km will be surveyed using Differential Global Positioning System (DGPS) on the WGS-84 datum and UTM projection to accurately demarcate its boundaries. Permanent concrete pillars will be established at all boundary corners and turning points, each properly numbered and geo-referenced. A closed triangulation or traverse network will be created to maintain positional accuracy by tying all points to a single control benchmark. The DGPS data will then be processed through

standard geodetic software to generate a geo-referenced boundary map, which will serve as the base for subsequent topographical and geological mapping.

Topographical Survey: A total station or DGPS-based topographical survey will be conducted over the entire block to capture contour details at 4 m intervals, drainage, infrastructure, vegetation, and surface features. Borehole collar locations will be marked on the ground, and their latitude, longitude, and reduced levels (RLs) will be recorded precisely.

Geological Mapping: Detailed geological mapping will be carried out on a 1:4000 scale covering the entire 3.68sq. km area of the limestone block. The mapping will document lithological variations, stratigraphic sequence, and structural features such as strike, dip, joints, faults, and folds. It will also record surface exposures, contacts between limestone and associated formations, soil cover, weathering profiles, and geomorphological characteristics. Representative rock samples will be collected from key locations for petrographic and chemical analyses to evaluate the composition and quality of the limestone. The final geological map, integrating all field observations and analytical data, will be superimposed on the topographical base map and geo-referenced to DGPS coordinates. This integrated map will serve as the base document for planning drilling, sampling, and further exploration activities in the area.

Surface Drilling: In the proposed exploration programme, a total of five (05) boreholes are planned to be drilled to assess the subsurface continuity and grade variation of the limestone. Each borehole will be drilled to a depth of approximately 50 metres, amounting to a total proposed drilling meterage of about 250 metres. All boreholes will be of NQ core size, suitable for obtaining high-quality core samples for detailed geological logging and chemical analysis. The proposed borehole locations are shown in Plate No. III, and their coordinates, elevations, and other details are presented in **Table 10.1**.

Table No.-10.1

Details of Proposed Boreholes in Jamuniya Limestone Block

Sl. No.	Block Name	Borehole No.	Inclination (°)	Total Depth (m)
1	Jamuniya Limestone Block	PBH-01	90	50
2		PBH-02	90	50
3		PBH-03	90	50
4		PBH-04	90	50
5		PBH-05	90	50

Drill Core Logging and Sampling: Detailed geological logging of the drill cores will be carried out immediately after core recovery to document lithological and textural variations in the subsurface strata. Each core will be examined for degree of weathering, grain size, fossil content, colour, shale or siltstone partings, stylolites, bedding, and structural features such as joints and fractures. These characteristics are critical for assessing the grade, quality, and uniformity of the limestone and for identifying potential intercalations of shale or impure zones. The recorded information will guide the sampling strategy and grade evaluation. Detailed drill core logging will be done by observing weathering, grain size, fossils, colour, shale partings, stylolite, and structures. These features will help to know the grade of limestone and to select proper samples.

Sampling Procedure: Primary samples will generally be collected at 1.0 metre intervals, with adjustments made in case of changes in lithology, visible impurities, or variable core recovery. Particular attention will be paid to (i) colour and grain size variations, (ii) fossil or bioclastic content, (iii) presence of thin shale or siltstone partings, and (iv) weathered or altered zones. Each sample interval will be clearly marked and documented in the drill log, ensuring correlation with depth and lithological units. A total of 240 Nos of samples is proposed to generate by considering the 1m soil thickness and at places shale cover above limestone.

Sample Preparation: Each drill core will be cut longitudinally into two equal halves using a diamond core cutter. One half will be retained as a permanent reference archive, while the other half will be crushed and pulverized to -100 mesh size for chemical analysis. The pulverized sample will be homogenized thoroughly, and about 100 grams of the representative powder will be taken as the primary analytical sample. The remaining powdered portion will be preserved as a duplicate (check) sample for quality control or future verification.

A total of approximately 240 primary limestone samples are expected to be generated from the proposed drilling. To ensure analytical reliability, about 24 Nos as external check samples will be analysed at NABL accredited laboratories for cross-verification of analytical results covering nine (9) radicals typically CaO, SiO_2, Al_2O_3, Fe_2O_3, MgO, LOI, P_2O_5, SO_3, Na_2O and K_2O.

Chemical Analysis: Chemical analysis of the limestone samples will be carried out using the X-ray Fluorescence (XRF) method, which provides accurate and reliable determination of major oxides. A total of 240 primary samples will be analyzed to assess the chemical composition and grade variation of the limestone across different boreholes and depths. The analysis will include determination of the following nine radicals: CaO, MgO, Al_2O_3, SiO_2, Fe_2O_3, SO_3, P_2O_5, K_2O, and Loss on Ignition (LOI). These parameters are essential for evaluating the suitability of the limestone for various industrial applications, particularly cement manufacturing.

Petrological Studies: Petrological studies will be carried out on 10 selected samples, comprising both drill core and surface specimens, to understand the mineralogical composition, texture, and microstructural characteristics of the limestone. Thin sections of these samples will be prepared and examined under a polarizing microscope to identify the proportion of calcite, dolomite, clay minerals, quartz, and other accessory constituents. The study will also record features such as fossil content, recrystallization, stylolites, micro-fractures, and secondary mineral infillings, which influence the quality and industrial suitability of the limestone. The results of the petrological analysis will complement the chemical data, aiding in the interpretation of depositional environment, diagenetic history, and overall grade characterization of the deposit.

Bulk Density Determination: Bulk density will be determined on five (05) selected drill core samples representing different lithological types of limestone encountered during drilling. The measurements will be carried out using the caliper method (mass-to-volume ratio) to ensure accuracy and representativeness. Each core sample will be carefully cleaned, measured for its dimensions (length and diameter) using a vernier caliper to calculate the volume, and then weighed using a precision electronic balance to obtain the mass. The bulk density (g/cm^3) will be calculated by dividing the dry mass by the corresponding volume of the core. These results will be used to estimate the tonnage of limestone resources in the block and to support the resource estimation and classification as per UNFC guidelines.

11.0 THE QUANTUM OF WORK PROPOSED

11.1 The Quantum of work proposed is given in Table No. 11.1

Table No. 11.1
Quantum of Work for Proposed Jamuniya Limestone Block

Sl. No.	Description and Nature of Work	Unit	Proposed Quantum
A	**GEOLOGICAL WORK AND SURVEYING**		
1	Geological Mapping (1:4000 scale)	sq km	3.68
2	Survey Work		
i	Topographical Survey (1:4000 scale)	sq km	3.68
iii	DGPS survey for determination of RL & Co-ordinates of Boreholes and Block boundary corner points	Nos	09
B	**EXPLORATORY DRILLING**		
1	Drilling up to 300m (Soft Rock)	m	250
2	Drill Core Preservation	Per m	240
C	**LABORATORY STUDIES**		
1	Chemical Analysis		
i	Primary Sampling (CaO, MgO, Al_2O_3, SiO_2, Fe_2O_3, SO_3, P_2O_5, K_2O, Na_2O_3, LOI and Acid insoluble) by XRF	Nos.	240
ii	Check Sampling External 10% (CaO, MgO, Al_2O_3, SiO_2, Fe_2O_3, SO_3, P_2O_5, K_2O, Na_2O_3, LOI and Acid insoluble) by XRF	Nos.	24
2	Petrological Studies (Surface & BH Core Samples)		10
	Digital Photomicrographs		10
i	Bulk Density	Nos.	5
D	Report Preparation (5 Hard copies with a soft copy)	Nos.	1
E	Preparation of Exploration Proposal (5 Hard copies with a soft copy)	Nos.	1

12.0 COST ESTIMATE

Cost has been estimated based on actual schedule of rates mandated in the circular OM No. 61/1/2018/NMET dated 31st March 2020 for NMET funded Projects. The total estimated cost is Rs. 88.52 lakh. The summary of cost estimates for this reconnaissance survey (G3) is given below:

Sl. No.	Item	Total
1	Geological Work	31,42,956
2	Drilling	29,71,640
3	Laboratory Studies	8,68,490
	Sub total	**69,83,086**
4	Report	3,49,154
5	Peer Review	30,000
6	Proposal Prepration	1,39,662
	Total	**75,01,902**
8	GST (18%)	13,50,342.36
Total cost including 18% GST		**88,52,244**
SAY, in Lakhs		**88.52**

13.0 TIMELINE

The entire project is planned tentatively for 10 months.

Table No. 13.1

Tentative Time schedule / Action plan of G-3 exploration in Jamuniya Block for Limestone, District- Satna, Madhya Pradesh, Extent- 3.68sq km;

Estimated time schedule for Preliminary Exploration (G-3) for Limestone in Jamuniya Block (3.68sq km) Districts: Satna, State: Madhya Pradesh [Schedule timeline- 10 months]												
Sl. No.	**Particulars**	**Months**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1	Camp Setting/ mobilization	Months										
2	Geologist days (1 party)	days										
3	Survey Days (1 party)	days										
4	Drilling (01rig)	m										
5	Sampling days (1 party)	days										
6	Camp winding	Months										
7	Laboratory Studies	days										
8	Geologist days, HQ	days										
9	Report Writing with Peer Review	days										

Justification for Exploration of Jamuniya Limestone Block, Satna District, Madhya Pradesh

1. The Government of Madhya Pradesh (DGM) has granted permission for exploration of the Jamuniya Limestone Block, located in Satna District, covering an area of 3.68sq. km. The block is free from overlapping issues, making it ideal for systematic exploration under the National Mineral Exploration Trust (NMET) scheme.
2. The area has not been explored earlier, though limestone occurrences are reported regionally. Detailed exploration is required to convert geological resources into mineable reserves, in compliance with the Minerals (Evidence of Mineral Contents) Rules, 2015 (amended 2021). Such exploration will improve the level of confidence in grade and tonnage, thereby enhancing investor interest during auction.
3. In Satna District, 22 limestone blocks have already been successfully auctioned, with areas ranging from 12 ha to 1,917 ha. The CaO content varies from 34.45% to 52.87%, indicating the presence of both low and high grade limestone. The auction premiums ranging between 1.1% and 200% reflect strong industrial demand and high competition for cement-grade limestone in the region.
4. The Satna region, forming part of the Vindhyan limestone belt, is a major cement-producing hub of India, hosting leading industries such as Birla Corporation and Prism Johnson Ltd. The high auction premiums and continuous industrial expansion indicate robust growth potential and sustained demand for limestone.
5. The Jamuniya Block, part of the Vindhyan Supergroup, shows surface limestone exposures confirmed during MECL's reconnaissance visit. Preliminary samples and analyses have indicated the presence of good-quality limestone, justifying detailed exploration. Analytical results of the samples are provided below:

Sample No.	CaO%	SiO_2%	MgO%	Al_2O_3%	Fe_2O_3%
JAM-01	50.86	5.75	0.69	1.09	1.17
JAM-02	51.08	4.89	0.72	1.17	1.13
JAM-03	47.28	9.67	1.29	2.35	1.41

6. MECL has previously explored and established resources in several nearby blocks Piprahat–Kubri, Naubasta–Kolarad, Jamodi–Mohana, and Gunchihai all of which were successfully auctioned by the Government of Madhya Pradesh.

7. The increasing demand for cement-grade limestone driven by infrastructure, housing, and industrial development including government initiatives like 'Housing for All', 'Smart Cities Mission', and PM Gati Shakti—will further strengthen Satna's position as a key limestone and cement hub in India. Upcoming and proposed cement plant expansions are expected to enhance the industrial importance of this region and justify further resource augmentation through detailed exploration of the Jamuniya Block.

List of Plates:

Plate –I: Location Map of Proposed Jamuniya Block, District: Satna, State: Madhya Pradesh.

Plate–II: Regional Geological Map showing Proposed Jamuniya Block, District: Satna, State: Madhya Pradesh. (Source: NGDR Portal, GSI).

Plate–III: Geological Map showing Proposed Jamuniya Block, District: Satna, State: Madhya Pradesh. (Source: NGDR Portal, GSI).

Plate–IV: Proposed Borehole Location Map

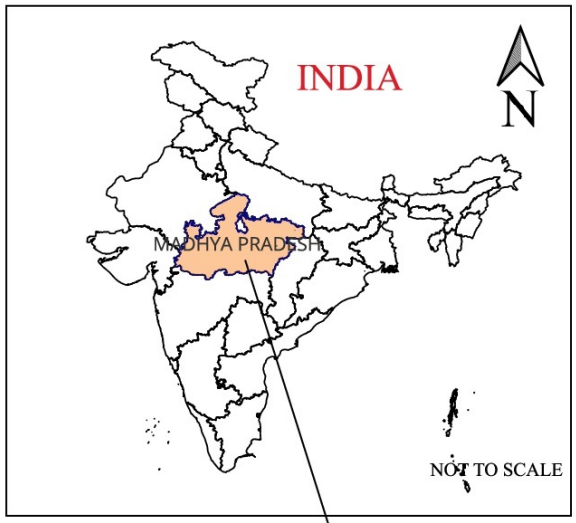
Palte-V: Geological Cross-Section

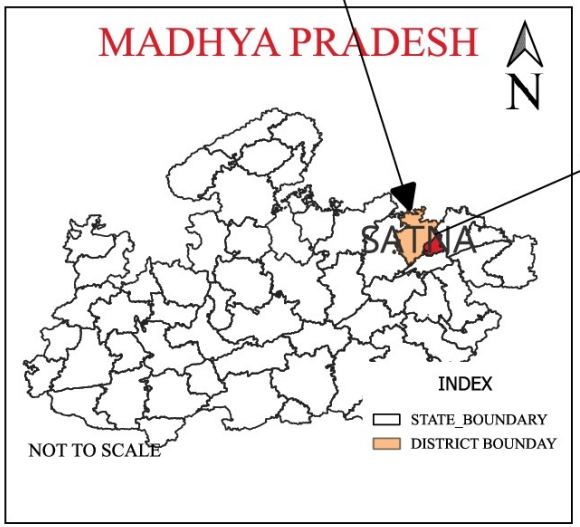
Estimated cost for Preliminary Exploration (G-3) for Limestone in Jamuniya Block (3.68 sq km) District: Satna, Madhya Pradesh. [Nos. of Borehole- 05; Borehole depth range: 50m; Schedule timeline- 10 months]							
S. No.	**Item of Work**	**Unit**	**Rates as per NMET SoC 2020-21**		**Estimated Cost of the Proposal**		**Remarks**
			SoC-Item -Sl No.	**Rates as per SoC**	**Qty.**	**Amount (Rs)**	
A	**GEOLOGICAL WORK**						
1	**Geological Mapping (1:4000), Borehole logging, sampling & Report writing**						
i	Charges for Geologist- Field (1 party)	day	1.2	11,000	150	16,50,000	
ii	Charges for one Geologist - HQ	day	1.2	9,000	30	2,70,000	
iii	2 labours/ party (Rs 522/day/labour) (As per rates of Central Labour Commissioner)	day	5.7	541	300	1,46,160	Amount will be reimbursed as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higher
iv	Core Sampling -01 Sampler Labour charge not included	day	1.5.2	5,100	33	1,68,300	
v	4 labours/ party (As per rates of Central Labour Commissioner)	day	5.7	541	132	4,21,776	Amount will be reimburse as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higher
2	**Survey**						
i	Topographical Survey including geological mapping	day	1.6.1a	8300	30	249000	
ii	4 labours/ party (As per rates of Central Labour Commissioner)	day	5.7	541	120	64,920	
iii	Bore Hole Fixation and determination of co-ordinates & Reduced Level of the boreholes by DGPS and boundary coordinates	Per Point of observation	1.6.2	19,200	9	1,72,800	05 BHs and 04 boundary points
					Sub Total- A	**31,42,956**	
B	**DRILLING**						
i	Drilling upto 300m (1 rig)-Soft Rock	m	2.2.1.4a	7,168	250	17,92,000	

ii	Land / Crop Compansation	per BH	5.6	20,000	5	1,00,000	Amount will be reimburse as per actuals or max. Rs. 20000 per BH with certification from local authorities
iii	Construction of concrete Pillar (12"x12"x30")	per borehole	2.2.7a	2,000	9	18,000	05 BHs and 04 boundary points
iv	Transportation of Drill Rig & Truck associated per drill (1 rig)	Km	2.2.8	36	1,000	36,000	Certification in this regard is required to be provided
v	Monthly Accomodation Charges for drilling Camp (up to 1 Rig)	month	2.2.9	50,000	2	1,00,000	
vi	Drilling Camp Setting Cost (1 rig)	Nos	2.2.9a	2,50,000	1	2,50,000	
vii	Drilling Camp Winding up Cost (2 rigs)	Nos	2.2.9b	2,50,000	1	2,50,000	
viii	Approach Road Making (Flat Terrain)	Km	2.2.10a	22,020	2	44,040	Road Making will be considered as per the requirement and Road Making Charges will be reimbursed later
ix	Core Preservation: One complete borehole plus mineralised cores of all the remaining Bhs	m	5.3	1,590	240	3,81,600	
					Sub Total- B	**29,71,640**	
C	**LABORATORY STUDIES**						
1	**Chemical Analysis**						
i	**Primary & Check samples for Graphite**						
	Borehole Primary samples for 9 radicals i.e., CaO, MgO, SiO2, Fe2O3, Al2O3, SO3, P2O5, K2O, Na2O & LOI	Nos	4.1.16	3,000	240	7,20,000	
	External(10%) Check samples from NABL Lab for 9 radicals i.e., CaO, MgO, SiO2, Fe2O3, Al2O3, SO3, P2O5, K2O, Na2O & LOI	Nos	4.1.16	3,000	24	72,000	
2	**Physical & Petrological Stusies**						
i	Preparation of thin section	Nos	4.3.1	2,353	10	23,530	
ii	Complete petrographic study report	Nos	4.3.4	4,232	10	42,320	
iii	Digital Photographs	Nos	4.3.7				

				280	10	2,800	
iv	Bulk Density studies	Nos	4.8.3	1,568	5	7,840	
					Sub Total- C	**8,68,490**	
D					**Total A to C**	**69,83,086**	
E	**Geological Report Preparation**		**5.2**	Preliminary exploration exceeding Rs. 50 lakh but less than Rs. 150 lakhs - A minimum of Rs. 2.5 lakh or 5% of the work whichever is more and Rs. 3000 per each additional copy		**3,49,154**	Reimbursement will be made after submission of the final Geological Report in Hard Copies (5 Nos) and the soft copy to NMET.
F	**Peer review Charges**		**As per EC decision**			**30,000**	
G	**Preparation of Exploration Proposal (5 Hard copies with a soft copy)**	**5 Hard copies with a soft copy**	**5.1**	2% of the Cost or Rs. 5 Lakhs whichever is lower		**1,39,662**	
H	**Total Estimated Cost without GST**					**75,01,902**	
I	**Provision for GST (18% of I)**					**13,50,342**	GST will be reimburse as per actual and as per notified prescribed rate
J	**Total Estimated Cost with GST**					**88,52,244**	***or Say Rs. 88.50 Lakh***
Note:							
1	If any part of the project is outsourced, the amount will be reimbursed as per the Paragraph 3 of NMET SoC and Item no. 6 of NMET SoC. In case of execution of the project by NEA on its own, a Certifiate regarding non outsourcing of any component/project is required.						

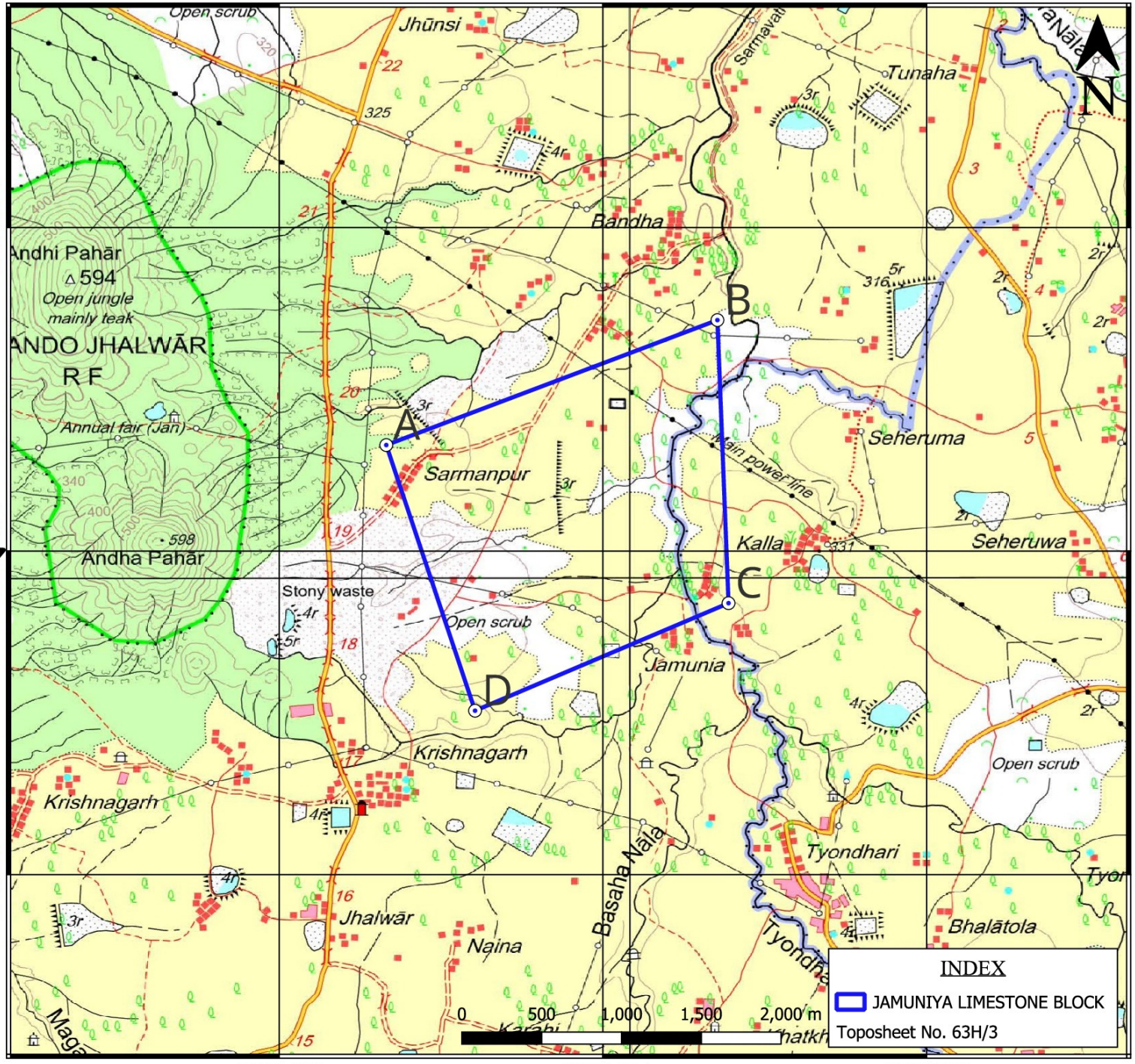
LOCATION MAP OF PROPOSED JAMUNIYA LIMESTONE BLOCK, DISTRICT - SATNA, MADHYA PRADESH, AREA - 3.68 SQ.KM.





Co-ordinates of corner points of proposed Jamuniya Blocks (G-3) for Limestone, District: Satna, State: Madhya Pradesh

Point	Latitude	Longitude
A	24°27'59.6"N	81°1'35.8"E
B	24°28'27.4"N	81°2'49.45"E
C	24°27'24.43"N	81°2'51.92"E
D	24°27'00.5"N	81°1'55.55"E



80°57′36.00″E 81°2′24.00″E 81°7′12.00″E

REGIONAL GEOLOGICAL MAP OF THE PROPOSED JAMUNIYA LIMESTONE BLOCK, SATNA DISTRICT, MADHYA PRADESH

24°33′36.00″N

24°28′48.00″N

N

B

A

C

D

INDEX

BLOCK BOUNDARY

CORNER POINT

LITHOLOGY

LATERITE

MAIHAR SANDSTONE

SIRBU SHALE

NAGOD LIMESTONE

SCALE - 1:50,000

0 2.5 5 7.5 10 km

80°57′36.00″E 81°2′24.00″E 81°7′12.00″E

81°1′12.00″E 81°1′48.00″E 81°2′24.00″E 81°3′0.00″E

PLATE - 03

GEOLOGICAL MAP SHOWING PROPOSED JAMUNIYA BLOCK, DISTRICT: SATNA, STATE: MADHYA PRADESH

24°28′12.00″N

24°27′36.00″N

24°27′0.00″N

N

A

B

C

D

S1

S1'

PBH-1

PBH-2

PBH-3

PBH-4

PBH-5

CaO-50.86, MgO-0.69

CaO-51.08, MgO-0.72

CaO-47.28, MgO-1.29

SCALE - 1:4000

0 250 500 750 1,000 m

INDEX

- BLOCK BOUNDARY
- CORNER POINT
- SAMPLE LOCATION
- SECTION LINE
- PBH LOCATION

LITHOLOGY

- LATERITE
- MAIHAR SANDSTONE
- SIRBU SHALE
- NAGOD LIMESTONE

PROPOSED BOREHOLE LOCATION PLAN IN JAMUNIYA LIMESTONE BLOCK, SATNA DISTRICT, MADHYA PRADESH

81°1′12.00″E
81°1′48.00″E
81°2′24.00″E
81°3′0.00″E
24°28′12.00″N
24°27′36.00″N
24°27′0.00″N

N

S1

S1'

A

B

C

D

PBH-1

PBH-2

PBH-3

PBH-4

PBH-5

INDEX

- BLOCK BOUNDARY
- PBH LOCATION
- CORNER POINT
- SECTION LINE

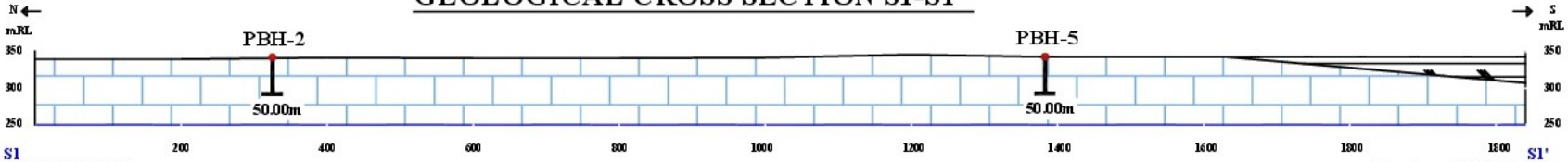
LITHOLOGY

- LATERITE
- MAIHAR SANDSTONE
- SIRBU SHALE
- NAGOD LIMESTONE

SCALE - 1:4000

0 250 500 750 1,000 m

GEOLOGICAL CROSS SECTION S1-S1"



LEGEND-

PBH LOCATION | SHALE | LIMESTONE

Scale - 1:5,000