

**PROPOSAL FOR PRELIMINARY EXPLORATION (G-3) FOR LIMESTONE IN
PIPARIYA-NAYAKHEDA NORTH BLOCK (5.08 Sq. Km.) AND SOUTH BLOCK
(5.52 Sq. Km) TOGETHER OVER AN EXTENT OF 10.60 Sq. Km. AREA**

VINDHYAN BASIN

DISTRICT: NARASIGPUR, MADHYA PRADESH

COMMODITY: LIMESTONE

BY

MINERAL EXPLORATION AND CONSULTANCY LIMITED

DR. BABASAHAAB AMBEDKAR BHAWAN

SEMINARY HILLS

PLACE: NAGPUR

DATE: 13TH APRIL, 2023

Summary of the Proposed Pipariya-Nayakheda North and South Blocks (G-3) for Limestone

Features	Details
Block ID :	Pipariya-Nayakheda North and South Blocks (G3)
Current Exploration Agency	Mineral Exploration and Consultancy Ltd. (MECL) (Formerly Mineral Exploration Corporation Ltd.)
Previous Exploration Agency	Geological Survey of India (GSI)
Geological Report (Previous stage Geological Report)	Nil. However the area is the south-western extension of Limestone Mining Belt.
Commodity	Limestone
Mineral Belt :	Vindyan Basin
Budget & Time Schedule to complete the project	Rs. 128.71 Lakhs, 10 months' time period
Objectives:	Objectives of the proposed exploration in Pipariya-Nayakheda North and South Blocks (G3) are as follows: i) To carry out detailed Topographical Survey and Geological mapping on 1:4000 scale over an area of 10.60 Sq. Km (North Block 5.08 Sq. Km & South Block 5.58 Sq. Km.). ii) To delineate the strike and depth continuity of the limestone by drilling vertical boreholes of 10 numbers of each in Pipariya-Nayakheda North and South Blocks. The average depth of boreholes will be 50.00m. This would help to establish the limestone resource at inferred category (333 category under UNFC) iii) To carry out exploration as per Minerals (Evidence of Mineral Contents) Rule-2015 & Mineral (Auction) Rules-2015 (Amended up to 2021). v) 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	The work will be carried out by Mineral Exploration and Consultancy Ltd. (MECL).

Proposed agency or through outsourcing and details thereof. Components to be outsourced and name of the outsource agency:																																																																
Name/ Number of Geoscientists :	Geologist: 01 HQ (60 days) Geologist: 01 Field (120 days)																																																															
Expected Field days (Geology, Surveyor)	Geologist: 01 HQ (60 days) Geologist: 01 Field (120 days) Surveyor: 01 Field (60 days)																																																															
1. Location:																																																																
Location	The proposed Pipariya-Nayakheda Block (G3) and Simariakalan-Baheriya Block Simariyakala-Baheria Block is located in Nayakheda Taluk of Narasingpur District having a total block areas of 10.60 Sq. Km and 11.00 Sq. Km respectively. These Blocks falls in the Survey of India Toposheet No. 55N/1.																																																															
Block boundary Coordinate	Pipariya-Nayakheda Limestone North Block – 5.08 Sq. Kms <table><tr><th rowspan="2">Points</th><th colspan="2">UTM (M)(Zone: 43N)</th><th colspan="2">GCS (DMS)</th></tr><tr><th>Northing</th><th>Easting</th><th>Latitude</th><th>Longitude</th></tr><tr><td>A</td><td>2525306.22</td><td>297432.34</td><td>22° 49' 23.6560"N</td><td>79° 1' 34.3554"E</td></tr><tr><td>B</td><td>2525479.06</td><td>299617.83</td><td>22° 49' 30.2181"N</td><td>79° 2' 50.9031"E</td></tr><tr><td>C</td><td>2524108.8</td><td>300036.02</td><td>22° 48' 45.8611"N</td><td>79° 3' 6.1999"E</td></tr><tr><td>G</td><td>2522318.81</td><td>298000.00</td><td>22° 47' 47.00"N</td><td>79° 1' 56.00"E</td></tr></table> Pipariya-Nayakheda Limestone South Block – 5.52 Sq Kms. <table><tr><th rowspan="2">Points</th><th colspan="2">UTM (M)(Zone: 43N)</th><th colspan="2">GCS (DMS)</th></tr><tr><th>Northing</th><th>Easting</th><th>Latitude</th><th>Longitude</th></tr><tr><td>C</td><td>2524108.8</td><td>300036.02</td><td>22° 48' 45.8611"N</td><td>79° 3' 6.1999"E</td></tr><tr><td>D</td><td>2524272.82</td><td>300540.29</td><td>22° 48' 51.4080"N</td><td>79° 3' 23.8038"E</td></tr><tr><td>E</td><td>2522478.56</td><td>301660.63</td><td>22° 47' 53.5676"N</td><td>79° 4' 3.9059"E</td></tr><tr><td>F</td><td>2521309.25</td><td>298179.62</td><td>22° 47' 14.0707"N</td><td>79° 2' 2.4210"E</td></tr><tr><td>G</td><td>2522318.81</td><td>298000.00</td><td>22° 47' 47.00"N</td><td>79° 1' 56.00"E</td></tr></table>	Points	UTM (M)(Zone: 43N)		GCS (DMS)		Northing	Easting	Latitude	Longitude	A	2525306.22	297432.34	22° 49' 23.6560"N	79° 1' 34.3554"E	B	2525479.06	299617.83	22° 49' 30.2181"N	79° 2' 50.9031"E	C	2524108.8	300036.02	22° 48' 45.8611"N	79° 3' 6.1999"E	G	2522318.81	298000.00	22° 47' 47.00"N	79° 1' 56.00"E	Points	UTM (M)(Zone: 43N)		GCS (DMS)		Northing	Easting	Latitude	Longitude	C	2524108.8	300036.02	22° 48' 45.8611"N	79° 3' 6.1999"E	D	2524272.82	300540.29	22° 48' 51.4080"N	79° 3' 23.8038"E	E	2522478.56	301660.63	22° 47' 53.5676"N	79° 4' 3.9059"E	F	2521309.25	298179.62	22° 47' 14.0707"N	79° 2' 2.4210"E	G	2522318.81	298000.00	22° 47' 47.00"N	79° 1' 56.00"E
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Villages :	Pipariya-Nayakhed North Block Nayakheda and Baheriya Villages	Pipariya-Nayakhed South Block Nayakheda and Baheriya Villages
Tehsil/ Taluk :	Kareli and Gadarwara -Teshil	Kareli and Gadarwara -Teshil
District :	Narasingpur District	Narasingpur District
State :	Madhya Pradesh	Madhya Pradesh
2. Area (hectares/ square kilometres)		
	Pipariya-Nayakheda North Block	Pipariya-Nayakheda South Block
Block Area :	5.08 Sq. Km	5.52 Sq. Km
Forest Area :	No forest area.	No forest area.
Government Land Area	Data not available	Data not available
Private Land Area	The block area mostly comprises of private land	The block area mostly comprises of private land
3. Accessibility		
Nearest Rail Head :	Both the blocks are about 1km from Nayakheda Village. The nearest railway station is at Gatpindrai at a distance of 4kms from the Blocks. Narasingpur Railway Station at a distance of 8 kms towards the west of the block.	
Road :	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). There is a public road in the south east of the Pipariya-Nayakheda Block which running from Dilhari (South) to Nayakheda (North). The same road is passing in the Northwest corner of the Simariya_Baheriya Block.	
Airport :	The nearest airport is Jabalpur Airport at 81 km from the block towards north east.	
4. Hydrography		
Rivers/ Streams	The drainage of the area is mainly controlled by tributaries of Sher River and Narmada River. Sher River is the nearest river at a distance of around 12 kms from the block flowing from east to west.	
5. Climate		
Mean Annual Rainfall :	The average annual rainfall is around 830 mm and the relative humidity varies from 8% to 81% in summer and 23% to 91% in winter.	
Temperatures	Summer: Min 23°C & Max. 47°C in May- June Winter: Min. 9°C & Max. 30°C in December	
6. Topography		
Toposheet Number	Survey of India Toposheet No. 55N/01	
	The topography in the Pipariya-Nayakheda North and South Blocks: In general the area is flat and sloping up towards southwest. The maximum elevation is approximately 382 m in the south-west and the minimum elevation is 372 m above MSL in the centre and up to north.	
7. Availability of baseline geology data		

Geological Map	Geological Map of the Vidhyan Basin Part) in Scale-1:50,000. (Bhukosh,GSI)
Geochemical Map and Geophysical Map	Geochemical Map and Geophysical Map is not available for the proposed block.
8. Justification for taking up G4 stage mineral exploration	1 The proposed area had not been explored in the past. Though the area is already reported for Limestone occurrences, conversion of Geological resource to mineable reserves is a necessity. Exploration increases the level of confidence on quantity and quality of reserve/resource which will attract the investors. 2 Most of the limestone deposits in India vary in grade. Silica and MgO in limestone play an important role towards chemical parameters of raw feed for cement manufacturing. In sedimentary limestone, the said radicals along with CaO vary consistently in lateral and vertical direction, in a small area. Estimation of quantity and quality based on the interpretation from nearby data is not possible especially for important factors like silica, MgO and others, which have a key role in the quality of the limestone to be used by cement and other industries. Limestone having high silica and MgO cannot be utilized for cement manufacturing process without blending with high grade limestone and the same may not be suitable for clinker manufacturing process. Exploration will locate and quantify the different grade of limestone based on the requirement for the different industries. 3 The proposed Pipariya-Nayakheda North and South Block lies along the south-west extension of Bhandar Group of Vindhyan Super Group formation. Field visit carried by MECL Geologist, confirmed the occurrences of limestone exposures within the blocks, samples were collected and analysis is in progress. In addition to this few samples were collected from nearby working mines along the strike. 4 Due to the high demand of limestone, Naubasta Kolarad Limestone Block explored by MECL is under auction platform. Jamodi Mohana and Gunchihai Limestone blocks, were explored by MECL and these two Blocks were successfully auctioned. The proposed exploration block is the south-western extension of these explored blocks. 5 Augmentation of limestone resource which is the base of the infrastructure development and makes these blocks auctionable in accordance with the existing Rules & Regulations. 6 Demand for cement in construction industry will increase in coming years that will further increase the demand for limestone. The infrastructural projects like rail, water, transport, electricity, telecom, etc. will have increased investments and that also arise the need of limestone. In the union budget 2021 it was announced for "Housing for all" and "Smart Cities" which is steadily increasing the demand for cement and subsequently limestone. The development of civil structure such as hospitals and schools throughout the state are influencing the cement industries growth in the State.

1.0 INTRODUCTION

- 1.1 On enactment of MMDR Amendment Act 2015, Minerals (Evidence of Mineral Contents) Rules 2015 and Mineral Auction Rules 2015, Govt. of India directed State Governments to speed up exploration work for different Mineral Commodities in the respective states and put them for auction. Recently, some rules in the MMDR ACT have been amended which facilitates the state Govt. to auction the blocks with lower confidence level of exploration and put more and more blocks on auction. Accordingly, State Government of Madhya Pradesh provided location of 2 prospective Limestone blocks in Narasingpur District to MECL and directed to verify the same for feasibility of exploration along with field work. Based on the outcome of field visit conducted by MECL, submitted proposal proposals for the limestone exploration under NMET funding.
- 1.2 In view of the above, MECL has prepared the exploration proposal involving G-3 level exploration in proposed Pipariya-Nayakheda North and South Blocks for Limestone.
- 1.3 At present MECL intends to carry out exploration for limestone in the proposed Pipariya-Nayakheda North and South Blocks for Limestone. Consent from Department of Mines & Geology, Govt. of Madhya Pradesh has been accorded to carry out exploration in the proposed Pipariya-Nayakheda North and South Blocks.

2.0 LOCATION AND COMMUNICATION

- 2.1 The Pipariya-Nayakheda North and South Blocks are located in Kareli and Gadarwara - Teshils of Narasingpur District having a total block area of 10.60 Sq. Km (North Block 5.08 Sq. Km & South Block 5.52 Sq. Km.). The location of the Block is shown in **PLATE No-I**. The Blocks fall in the Survey of India Toposheet No. 55N/01 and is bounded by the co-ordinates as listed in the **Table-2.1**

Table-2.1

Co-ordinates of corner points of proposed Pipariya-Nayakheda North and South Blocks (G-3) for Limestone, District: Narasingpur, State: Madhya Pradesh

Block Name	Sl. No.	Points	UTM (M) (Zone: 43N)		GCS(DMS)		Area (Sq. Km.)
			Northing	Easting	Latitude	Longitude	
Pipariya-Nayakheda North	1	A	2525306.22	297432.34	22° 49' 23.6560"N	79° 1' 34.3554"E	5.08
	2	B	2525479.06	299617.83	22° 49' 30.2181"N	79° 2' 50.9031"E	
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Pipariya-Nayakheda South	1	C	2524108.8	300036.02	22° 48' 45.8611"N	79° 3' 6.1999"E	5.52
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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).

2.3 Madhya Pradesh is bestowed with number of Cement Manufacturers and some of them are as follows:

- Kymore Cement Works
- Birla Corporation, Satna
- Cement Corporation Ltd, Nayagaon
- Cement Corporation Ltd, Mandhar
- Heidelberg Cements, Damoh
- J,K White, Katni
- Jaypee Cement, Bhilai
- K.J.S. Cement Ltd
- Prism Cement – I
- Ultratech Cement Ltd, Bala Cement works
- Manigarh Cement and Manighar Cement – Unit 2
- Sidhi Cement Works
- Ultra Tech-Vikram Cement Works

3.0 PHYSIOGRAPHY AND DRAINAGE

3.1 **Pipariya-Nayakheda Block:** In general the topography of the block area is almost flat terrain with sloping up towards southwest. The maximum elevation is approximately 382 m above MSL in the south-west part of the block and the minimum elevation is approximately 372 m above MSL..

3.2 The drainage of the area is mainly controlled by tributaries of Sher River and Narmada River. Sher River is the nearest river at a distance of around 12 kms from the block flowing from east to west.

4.0 CLIMATE

4.1 The climate of the area has semi-arid type climate. Dry climate prevails for most part of the year. December is the coldest month with mean daily maximum and minimum temperatures being 23⁰C and 9⁰ C respectively. During peak summer, temperature rise up to 43⁰ C. The climatic information of the area is as given below:

Temperature Minimum: 23⁰C Max. 43⁰C in May- June

Temperature Minimum: 9⁰C Max. 30⁰C in October- December

The average annual rainfall is around 830 mm and the relative humidity varies from 8% to 81% in summer and 23% to 91% in winter.

5.0 FLORA & FAUNA

No forest, sanctuaries, national park, etc., exist in the vicinity of the Blocks. The general floras are Teak, Sal, Bamboo and shrubs. While several fauna like deer, wild boar, sloth bear, dholes (wild dogs) and a few other smaller carnivores has been reported in the area.

6.0 PREVIOUS WORK

- 6.1. Wilson (1869-1870) mapped the area on 1:253,440 scale in Vindhyan Supergroup of Rocks and classified them into different parts.

F. R. Mallet (Mem. Geol. Survey. Vol. 7, pt. I, 1871) first mapped the region comprising Rewa and Satna districts. A fairly comprehensive account of the geology of this area is given in the Memoirs, Geological Survey of India, Volume VII, page 1 to 130 (1871) by Fred R. Mallet under the title 'On the Vindhyan Series, as exhibited in the north-western and Central Provinces of India.'

S. Sanyal., K Sanyal, K C Bandyopadhyay and S Parasher (1986-1987) mapped the area in 1:50000 scale. A.B. Dutt and G. C. Chatterjee (1942-43) of the Geological Survey of India, investigated limestones of Maihar and Satna region to assess their suitability for use in calcium carbide industry.

Mr. G.V. Rao (1947-48, 1949) surveyed the Maihar area during the field season 1947-48. Mr. Rao in 1949 revisited the area and carried out investigation of limestone in Satna and Maihar area for cement manufacturing. K. Rajarajan (1952-53, 1960-61), also investigated the limestone occurrences in Satna District.

G. Venkateswara Rao (1954-55) carried out the mapping in the T.S. 63D/16 and widely recognised as a source of building material and limestone. Limestone occurrences are very common in Khenjua, Rohtasgarh and Nagod Formation. Besides, clay is also extensively quarried near Nadawan and Rohnian villages. Limestone is mainly used for 12 manufacturing cement, lime and in cement industry. Rewa Sandstone is quarried near Bhadanpur, used as building stone and reported Khenjua sandstone, though felspathic, may prove to be a good building stone owing to its hardness and generally even-grained nature.

K.V.J.R. Krupanidhi et.al. (1963) carried out investigation for flux grade limestone deposits in Maihar area and reported three grey limestone horizons in the Bhandar limestone formation, namely the Upper, Middle and Lower grey limestone bands (2 to 4 metres each in thickness). Besides these, there is a purple to grey limestone band 2 to 3 metres in thickness; mostly cement to blendable cement grade and a thin flux grade limestone band, associated with dolomitic limestones. Of the first three flux grade limestone bands, the middle one is the most promising one; it, however, has intercalated bands of flaggy limestone of cement grade- This band is being quarried extensively in many localities in the area. The upper grey limestone band shows variation in quality from east to west in the area while the lower grey limestone band is mostly concealed. Deposits of flux grade limestone confined to one or more of the above grey limestone bands are located in the area between Emlia (24°15': 80°48').

In pursuance of field season programme, during FSP 1985-86, an area of 1600 sq km comprising Vindhyan and Post-Vindhyan Sediments, has been covered by systematic mapping in 1:50,000 scale in parts of Toposheets 63D/12, 63D/16 and 64A/09. The area is defined by lat 23°55'-24°15' and long 80°30':81°00'. The objective was mapping of the rocks of Vindhyan Super Group together with tracing their facies variation and lateral correlation to establish the stratigraphy, structure, tectonics and evolutionary history of Vindhyan basin, and to search for evidence of life and mineralization.

During FS 2017-18, the Obvious Geological Potential (OGP) areas were taken up for geochemical mapping during 12th five year plan in Toposheet no. 63D/16.

- 6.2 Previously no work has been carried out in the proposed Pipariya-Nayakheda North and South Blocks. However, the entire Vindhyan basin was mapped by GSI and exploration at different stages was carried out in a scattered manner.
- 6.3 Previously, in Satna District, MECL has done G2 Level Exploration in Naubasta Kolard, Jamodi Mohanna and Gunchihahi Limestone block under NMET funding. Due to the high demand of limestone; Jamodi Mohanna Block and Gunchihahi Block have been successfully auctioned.
- 6.4 Mining activities are currently ongoing in the east of the block areas and limestone being excavated for manufacturing of cement.

7.0 REGIONAL GEOLOGY

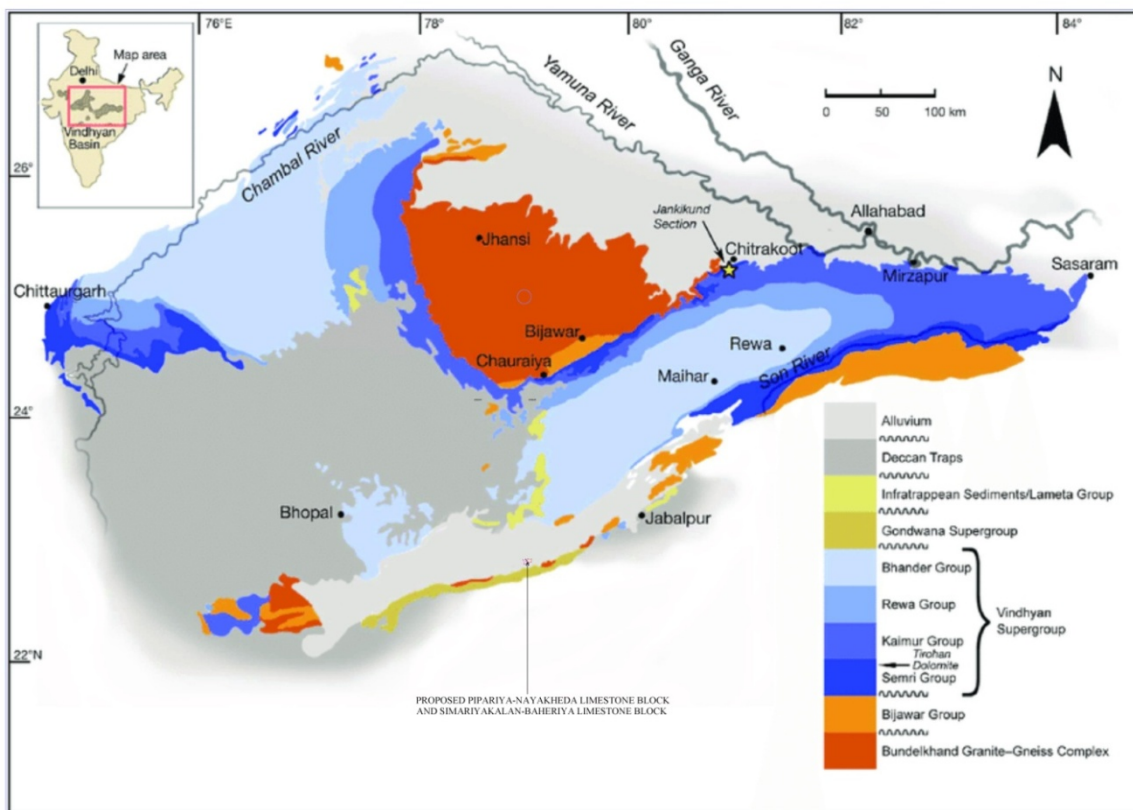


Fig 1.1. Map Showing Vindhyan supergroup area with Proposed Block Location (After Azmi et. Al.)

- 7.1 The Vindhyan Formations of Central India form an ENE-WSW trending syncline. The northern limb of the syncline shows Bundelkhand granite overlain by Vindhyan Formations dipping imperceptibly towards SSE. The southern limb shows sub vertical NNW dipping formations in faulted contact with Mahakoshal/Sidhi Group of rocks. Semri Group is well developed and well exposed in the eastern half of the area, and continues into adjoining areas eastward which exposes several well developed sections along Son valley region. In the adjoining westward areas, around Katni, Semri Group is almost entirely concealed under post-Vindhyan cover; consequently it is not possible to estimate the thickness. Available literature suggests decreasing thickness from east to west (Ghosh, 1981; Shastry & Moitra, 1984). As a result of decreasing thickness and facies variation

along strike and particularly because of scarcity of exposures, Semri rocks west of Katni can no longer be correlated, formation wise with the Son valley succession (with the exception of Rohtas Limestone at the top Semri Group, and a vertically dipping conglomerate exposure at Sarra which, in terms of lithology, attitude and stratigraphic position corresponds to the conglomerate at the base of Semri Group). Further west, Semri and Kaimur Groups are indistinguishable and together they constitute a linear ridge of steep newly dipping beds along Bahuriband-Biriya tract. Thickness of Kaimur Group, too, decreases from east to west. Upper half of Kaimur group shows a monolithic, cross-bedded orthoquartzite which forms a prominent south facing escarpment on Kaimur Hill; the thickness of this orthoquartzite and its scarp forming nature diminishes westward along strike; eventually the orthoquartzite disappears under scree cover in the adjoining westward area.

The lower half of Kaimur Group shows a shale-porcellanite-clay assemblage, which in some places begins with an orthoquartzite in sharp contact with the underlying Rohtas Limestone Formation. The shale-porcellanite is well exposed around Kaimur and becomes increasingly scarce along strike on either side. West of Kaimur, around Kanchhagawan region shale-Porcellanite is thinner and banded clay appears in the sequence. East of Kaimur, although exposures are rare because of scree cover, the shale- towards east. It needs mentioning in the context that the shale-porcellanite assemblage is designated as Bhagwar Shale Formation, overlying Rohtasgarh Limestone Formation; and the two Formations, together, constitute Rohtas Subgroup at the top of Semri Group (Shastri & Moitra op.cit).

Semri Group comprises shale-limestone-sandstone formations in which medium to coarse sand facies are largely restricted to the basal parts, (i.e. in Deoland Formation of Mirzapur Subgroup). The overlying parts i.e. Kheinjua Subgroup and Rohtas Subgroup are dominated by argillite-limestone facies. Deonar Formation (Porcellanite Stage) defines a well known stratigraphic marker, but in terms of thickness the porcellanite beds represent a narrow period of time during Semri deposition.

- 7.2 The most conspicuous feature of Semri Group that distinguishes it from the overlying Kaimur, Rewa and Bhandar Groups, is recurrent appearance of limestone bands throughout the sequence, culminating in the thick and virtually monolithic Rohtas Limestone towards the end of Semri deposition. The advent of Kaimur sedimentation marks a sharp change in depositional environment which led to the alternating sequence of thick, cross-bedded sandstone and shale formations of Kaimur, Rewa and Bhandar Groups. Limestone bands reappear, after a long time-interval, in the lower parts of Bhandar Group. In the northern limb of Vindhyan syncline, limestone bands appear in the lower parts of Rewa Group as well. But in-spite of the calcareous occurrences, Rewa and Bhandar Groups, in both limbs, are dominated by shale-sandstone facies. It bears emphasizing that the aforesaid discussion refers to the Semri succession of the southern limb, known from Son Valley region. The development of Semri Group in the northern limb cannot be immediately correlated with the Son Valley succession. Thus, in the southern limb, the contact between Rohtas Limestone and the overlying sandstone-Shale-porcellanite marks turning point from predominance of shale-limestone facies, to the dominance of shale-sandstone facies.

- 7.3 The stratigraphic column of the area mapped was derived from the order of superposition and the nomenclature was obtained from correlation with known successions in adjoining areas (after Shastri & Moitra, 1984). The stratigraphic succession of the area mapped is given below in Table 7.1. Regional Geology Map of the area is given as 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
-----Unconformity-----			
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
		Bhagwar Shale Formation	Mandsaur, Rewa, Satna Districts, Lead Zinc deposits of Damoh District
	Semri Group	Rohtas Limestone Formation	
		Kheinjua Group-Rampur Formation	
		Salkhan Formation- Fawn Limestone	
		Koldaha Shale Formation	
	Deonar Formation	Porcellanite Stage	
Base Not Seen			

8.0 Block Geology:

Pipariya-Nayakheda Limestone Block (North & South): The proposed exploration blocks belong to Bhandar Group. As per the source from Bhukosh, GSI, Dolomitic Limestone is seen the south of the proposed block and rest of the area is covered by silt.

Table - 8.1
Stratigraphic Succession of the block area (After GSI)

Age	Group	Formation	Associated Mineral Deposits
Recent	Alluvium		--
Pleistocene	Laterite and Bauxite		Bauxite Deposit of Rewa and Satna
-----Unconformity-----			
Proterozoic	Bhander Group	Upper Bhander Sandstone	
		Sirbu Shale Formation	
		Bhander/Nagod Limestone Formation	Limestone deposits of Damoh, Katni, Satna Districts etc,
		Ganurgarh Shale Formation	

With reference to the block geology of Pipariya-Nayakheda North and South Blocks the dolomite-limestone outcrops are earmarked in the south side of South Block. As the terrain is almost flat but far raising topography in the southwest. The occurrence of limestone may be possible beneath the silt, however the same shall be confirmed after the few exploratory boreholes during the ensuing exploration.

Regional Geological map of proposed Pipariya-Nayakheda North and South Blocks are shown in the Geological Map and enclosed as **Plate-II**.

- 8.1 Block Structure:** The rock formations within the Blocks are horizontally disposed and mostly concealed under top soil. At places, limestone beds dip 2° to 3° due East. The area is geologically undisturbed.

9.0 OBJECTIVE:

- 9.1 Objectives of the proposed exploration in Pipariya-Nayakheda North and South Blocks are as follows:

- i) To carry out detailed Topographical Survey and Geological mapping on 1:4000 scale over an extent of 10.60 Sq. Km. area for proposed 2 blocks together (North 5.08 + South 5.52).
- ii) To delineate the strike and depth continuity of the limestone by drilling vertical boreholes of 10 numbers (5 in each Pipariya-Nayakheda North and Pipariya-Nayakheda South Blocks. The average depth of boreholes will be 50.00 m.
- iii) To carry out exploration as per Minerals (Evidence of Mineral Contents) Rule-2015 & Mineral (Auction) Rules-2015 (Amended up to 2021).
- v) 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.

10.0 METHODOLOGY OF EXPLORATION

Present exploration scheme for the proposed Pipariya-Nayakheda North and South Blocks are as follows: Pipariya-Nayakheda North and Pipariya-Nayakheda South Blocks, geological mapping, topographical survey and exploratory drilling (G-3) is planned. The proposed activities are described below.

10.1 DGPS Boundary Corner Pillars Survey & Geological Mapping.

10.1.1 The Blocks boundary shall be surveyed by DGPS in WGS-84 datum for demarcation of block boundary/corner points. Triangulation network will be laid down in the proposed study area of 10.60 Sq. Km (5.08+5.52). 10 Boreholes will be fixed on the ground whose RL's and co-ordinates of survey and exploration points will be determined. Detailed Geological Mapping will be done in the proposed block and all the geological features will be recorded and litho-contacts will be plotted for finalization of Geological map. This map will be used as base map for future work.

10.2 Surface Drilling

10.2.1 The present exploration scheme is prepared by proposing total core drilling of 500.00m in 10 boreholes of NQ size with a vertical depth of 50.00 m each. The borehole location map is enclosed as **PLATE No.III** and the details of proposed boreholes at G-3 level are listed as in **Table-10.1**

Table No.-10.1
Details of Proposed Boreholes in proposed
Pipariya-Nayakheda Limestone Blocks (North & South)

Sl. No.	Block Name	Borehole No.	Inclination (°)	Total Depth (m)
1	Pipariya-Nayakheda North	PBH-01	90	50
2		PBH-02	90	50
3		PBH-03	90	50
4		PBH-04	90	50
5		PBH-05	90	50
6	Pipariya-Nayakheda South	PBH-01	90	50
7		PBH-02	90	50
8		PBH-03	90	50
9		PBH-04	90	50
10		PBH-05	90	50

10.3.1 Drill Core Logging and Sampling

10.3.1 Detailed drill core logging will be done with consideration of weathering, grain size, fossil contents, and colour of various formations, intercalation / parting of shale, stylolite, and structure. On the basis of these parameters, grade of limestone can be broadly presented and it will also be helpful in sampling.

Primary samples will be drawn at 1m interval subject to change in lithology and core recovery. The following parameters shall be considered while sampling the drill cores.

- 1) Colour, grain size.
- 2) Fossil variation.
- 3) Thin intercalations of shale/siltstone.
- 4) Partially weathered zone.

For preparation of samples the borehole core will be longitudinally split into two equal halves by using core splitter. One half will be powdered to -100 mesh size and the other half will be kept for future studies. The powdered material will be mixed thoroughly and about 100 gm of samples will be taken for chemical analysis by successive coning and quartering as primary samples and rest of the material (-100 mesh size) will be kept as duplicate half for future reference.

Total number of primary samples shall likely to generate about 350 for Limestone, internal check samples (5% of primary samples) of 18 Nos. and 10% of primary samples i.e. 35 Nos. will be prepared as external check samples and will be sent to NABL accredited Labs for analysis of 9 radicals.

Total 403 nos. of samples would be prepared including primary samples, internal check sample and external check samples.

10.4 Laboratory Studies

10.4.1 Chemical Analysis: Primary samples (350 Nos.) will be analyzed for 9 radicals, CaO, MgO, Al₂O₃, SiO₂, Fe₂O₃, SO₃, P₂O₅, K₂O and LOI by XRF method. 5% of primary samples around 18 nos. will be analyzed as internal check for 9 radicals CaO, MgO, Al₂O₃, SiO₂, Fe₂O₃, SO₃, P₂O₅, K₂O and LOI. 10% of primary samples i.e. 35 Nos. will be sent to NABL external labs as external check samples for analysis of 9 radicals CaO, MgO, Al₂O₃, SiO₂, Fe₂O₃, SO₃, P₂O₅, K₂O and LOI.

10.4.2 Petrological Studies: Petrological studies will be done on 10 nos. of drill core and surface specimen.

10.4.3 Bulk Density Determination: Bulk Density will be determined on 05 nos. drill core samples.

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 Pipariya-Nayakheda North and South Blocks

Sl. No.	Description and Nature of Work	Unit	North Block	South Block	Combined
A	GEOLOGICAL WORK AND SURVEYING				
1	Geological Mapping (1:4000 scale)	Sq. km	5.08	5.52	10.60
2	Survey Work				
	i) Topographical Survey (1:4000 scale)	Sq. km	5.08	5.52	10.60
	ii) Bore Hole Fixation	Nos	5	5	10
	iii) RL & Coordinate Determination by DGPS	Nos	4	4	8
B	EXPLORATORY DRILLING				
1	Drilling up to 300m (Soft Rock)	m	250	250	500
2	Drill Core Preservation	Per m	400		400
C	LABORATORY STUDIES				
1	Chemical Analysis				
	i) Primary Sampling (8 radicals CaO, MgO, Al ₂ O ₃ , SiO ₂ , Fe ₂ O ₃ , SO ₃ , P ₂ O ₅ , K ₂ O and LOI.) by XRF	Nos.	150	150	300
	ii) Check Sampling Internal 5% (8 radicals CaO, MgO, Al ₂ O ₃ , SiO ₂ , Fe ₂ O ₃ , SO ₃ , P ₂ O ₅ and LOI.) by XRF	Nos.	9	9	18
	iii) Check Sampling External 10% (8 radicals CaO, MgO, Al ₂ O ₃ , SiO ₂ , Fe ₂ O ₃ , SO ₃ , P ₂ O ₅ and LOI.)	Nos.	17	18	35
	iv) Composite Samples (12 radicals, CaO, MgO, Fe ₂ O ₃ , SiO ₂ , Al ₂ O ₃ , SO ₃ , P ₂ O ₅ , K ₂ O, MnO ₂ , Na ₂ O, Cl & LOI.)	Nos.	0		0
2	Petrological samples (Surface & BH Core Samples)				
	i) Preparation of thin section	Nos.	5	5	10
	ii) Study of Thin Section	Nos.	5	5	10
3	Bulk Density Determination				
	i) Bulk Density	Nos.	2	3	5
D	Report Preparation (5 Hard copies with a soft copy)	Nos.	1	1	2
E	Preparation of Exploration Proposal (5 Hard copies with a soft copy)	Nos.	1		1

12.0 COST ESTIMATE

- 12.1 The 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 which is **Rs. 128.71 Lakhs**. The detailed cost sheet for G-3 exploration for Limestone in proposed Naddisinur-1 and 2 Blocks are given in **Table No. 1** of Excel Workbook.

Table 12.1

Summary of Cost Estimates of Proposed Pipariya-Nayakheda North and South Blocks of Vindhyan Basin in Narasingpur District, Madhya Pradesh.

SL. NO.	ITEM	ESTIMATED COST (Rs.)
1	Drilling	50,03,180
2	Geology & Survey	29,41,680
3	Laboratory	17,76,150
Sub Total (1 to 3)		97,21,010
4	Exploration Report	9,72,101
5	Proposal Preparation	1,94,420
6	Peer Review Charges	20,000
Grand Total		1,09,07,531
GST 18%		19,63,356
Total:		1,28,70,887
Say Rs. in Lakhs		128.71

13.0 TIME SCHEDULE

- 13.1 The proposed exploration programme envisages geological mapping, topographic survey, exploratory drilling, laboratory studies and geological report preparation which will be completed within 10 months. Therefore, all activities have been planned with overlapping and tentative timeline has been worked out for total 10 months for the proposed project completion.

Table No. 13.1

**Time Schedule /Action plan for G-3 exploration for Limestone in proposed in
Pipariya-Nayakheda North and South Blocks of Vindhyan Basin in Narasingpur District, Madhya Pradesh.**

Sl. No.	Activities	Unit	MONTHS									
			1	2	3	4	5	6	7	8	9	10
1	Camp Setting	Month										
2	Surface Drilling (2 rigs)	m.										
3	Survey Party days (1 Party)	day										
4	Geologist Party days in field (1 Party)	day										
5	Sampling Party days, Core Sampling (1 party)	day										
6	Laboratory Studies	Nos.										
7	Camp Winding	Month										
8	Geologist Party days in HQ (1 Party)	day										
9	Geological Report Writing with Peer Review	Month										
Note: 1. Commencement of project may be reckoned from the day the exploration acreage is available along with all statutory clearances.												
2. Time loss on account of monsoon/agricultural activity/forest clearance/local law & order problem may be additional to above time line.												

14.0 JUSTIFICATION FOR TAKING UP EXPLORATION FOR LIMESTONE IN PROPOSED PIPARIYA-NAYAKHEDA NORTH AND SOUTH BLOCKS OF VINDHYAN BASIN, DISTRICT NARASINGPUR, MADHYA PRADESH.

- 14.1 The area where exploration of Limestone is being proposed has not been explored in the past. Though the area is already established of Limestone occurrences, conversion of Geological resource to mineable reserves is a necessity. Exploration increases the level of confidence on quantity and quality of reserve/resource which will attract the investors.
- 14.2 Most of the limestone deposits in India vary in grade. Silica and MgO in limestone play an important role towards chemical parameters of raw feed for cement manufacturing. In sedimentary limestones, the said radicals along with CaO vary consistently in lateral and vertical direction, in a small area. Estimation of quantity and quality based on the interpretation from nearby data is not possible especially for important factors like silica, MgO and others, which have a key role in the quality of the limestone to be used by cement and other industries. Limestone having high silica and MgO cannot be utilized for cement manufacturing process without blending with high grade limestone and the same may not be suitable for clinker manufacturing process. Exploration will locate and quantify the different grade of limestone based on the requirement for the different industries.
- 14.3 The proposed Pipariya-Nayakheda North and South Blocks lies in the south-west extension of Bhander Formation of Vindhya Super Group. In addition to this there is a working lime stone mine within 5 kms east of proposed Simariyakala-Baheriya Block and another mine in the north-east of proposed Simariyakala-Baheriya Block.
- 14.4 Field visit carried by Geologist, confirmed the occurrences of limestone exposures within the blocks, samples were collected and analysis is in progress. In addition to this few samples are taken from nearby working mines along the strike. Thus it can be assumed that the limestone would be well-developed in these two blocks.



Limestone exposures within the blocks

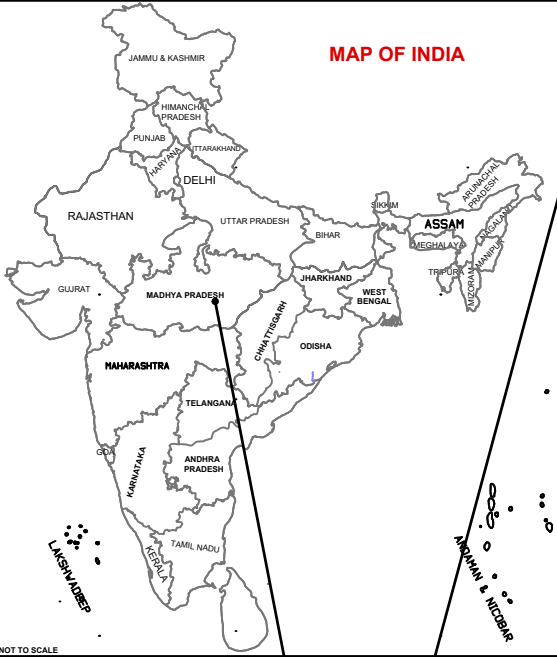
- 14.5 Due to the high demand of limestone, Naubasta Kolarad Limestone Block explored by MECL is under auction platform. Jamodi Mohana and Gunchihai Limestone Block,

- were explored by MECL and these two Blocks were successfully auctioned. The proposed exploration block is the south-western extension of these explored blocks.
- 14.6 Augmentation of limestone resource which is the base of the infrastructure development and makes these blocks auctionable in accordance with the existing Rules & Regulations.
- 14.7 Demand for cement in construction industry will increase in coming years that will further increase the demand for limestone. The infrastructural projects like rail, water, transport, electricity, telecom, etc. will have increased investments and that also arise the need of limestone. In the union budget 2021 it was announced for “Housing for all” and “Smart Cities” which is steadily increasing the demand for cement and subsequently limestone. The development of civil structure such as hospitals and schools throughout the state are influencing the cement industries growth in the state.

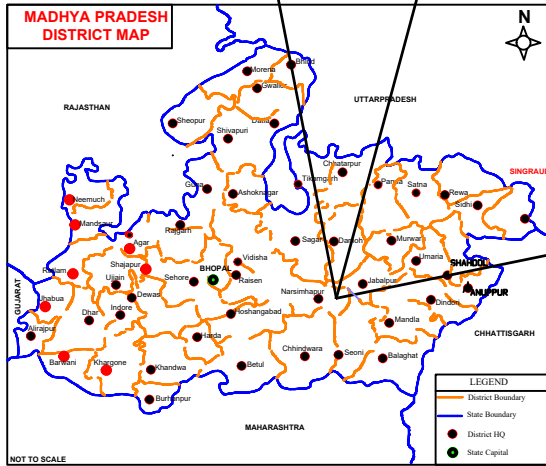
LIST OF PLATES

1. Location Map of Proposed Pipariya-Nayakheda Limestone Blocks (North and South), Narasingpur District, Madhya Pradesh in 1: 60,000 Scale as Plate-I.
2. Geological Map showing the location of Proposed Pipariya-Nayakheda Limestone Blocks (North and South) as Plate-II in 1: 50,000 Scale.
3. Proposed Borehole Location Plan of Pipariya-Nayakheda Limestone Blocks (North and South) in Scale 1:20,000 as Plate-III

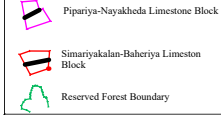
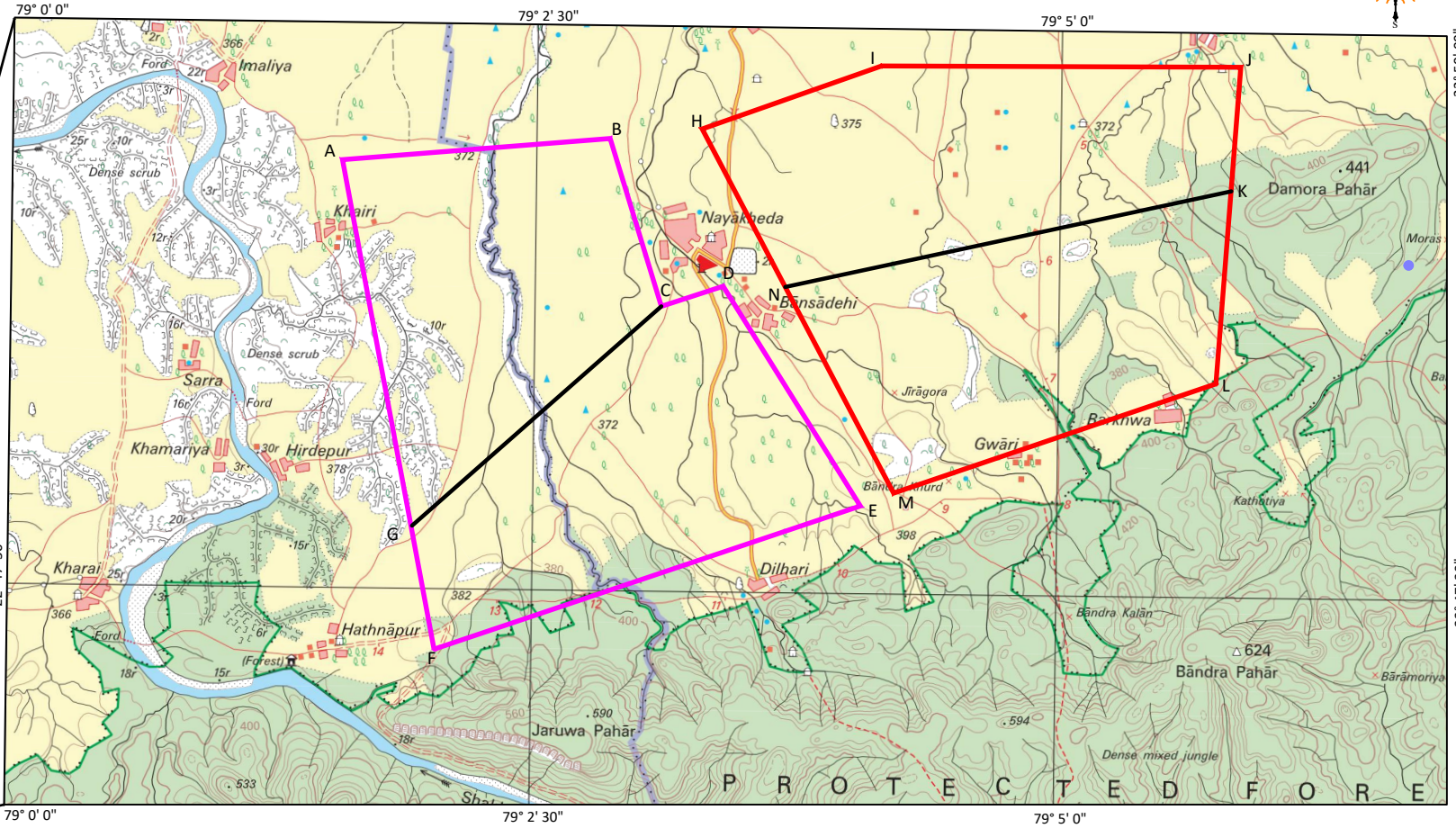
MAP OF INDIA



MADHYA PRADESH DISTRICT MAP



SCALE 1 : 60,000



Pipariya-Nayakheda Limestone Block				
North Block				
Cardinal Points	Northing	Easting	Longitude	Latitude
A	2525306.22	297432.34	79° 1' 34.3554"E	22° 49' 23.6560"N
B	2525479.06	299617.83	79° 2' 50.9031"E	22° 49' 30.2181"N
C	2524108.8	300036.02	79° 3' 6.1999"E	22° 48' 45.8611"N
G	2522318.81	298000	79° 01' 56"E	22° 47' 47"N
South Block				
C	2524108.8	300036.02	79° 3' 6.1999"E	22° 48' 45.8611"N
D	2524272.82	300540.29	79° 3' 23.8038"E	22° 48' 51.4080"N
E	2522478.56	301660.63	79° 4' 3.9059"E	22° 47' 53.5676"N
F	2521309.25	298179.62	79° 2' 2.4210"E	22° 47' 14.0707"N
G	2522318.81	298000	79° 01' 56"E	22° 47' 47"N

Simariyakalan-Baheriya Limestone Block				
Cardinal Points	Northing	Easting	Longitude	Latitude
North Block				
H	2525556.6900	300369.2400	79° 3' 17.2138"E	22° 49' 33.0636"N
I	2526071.3300	301834.0600	79° 4' 8.3392"E	22° 49' 50.4157"N
J	2526060.5100	304767.1400	79° 5' 51.1925"E	22° 49' 51.3019"N
K	2525047.7312	304690.0388	79° 5' 49"E	22° 49' 18"N
N	2524266.7589	301047.4268	79° 3' 13.42"E	22° 48' 51"N
South Block				
K	2525047.7312	304690.0388	79° 5' 49"E	22° 49' 18"N
L	2523475.7500	304564.1000	79° 5' 45.2414"E	22° 48' 27.2041"N
M	2522583.7600	301932.2800	79° 4' 13.3808"E	22° 47' 57.1023"N
N	2524266.7589	301047.4268	79° 3' 13.42"E	22° 48' 51"N

**MINERAL EXPLORATION AND CONSULTANCY LIMITED**
(Formerly Mineral Exploration Corporation Limited)

PROPOSED LOCATION MAP OF
PIPARIYA-NAYAKHEDA NORTH & SOUTH BLOCKS (10.60 SQ.KM)
AND SIMARIYAKALAN-BAHERIYA NORTH & SOUTH BLOCKS
(11.00 SQ. KM)
NARASINGPUR DISTRICT, MADHYA PRADESH

(PART OF TOPOSHEET NO. 55N/01)

R.F. 1:60,000
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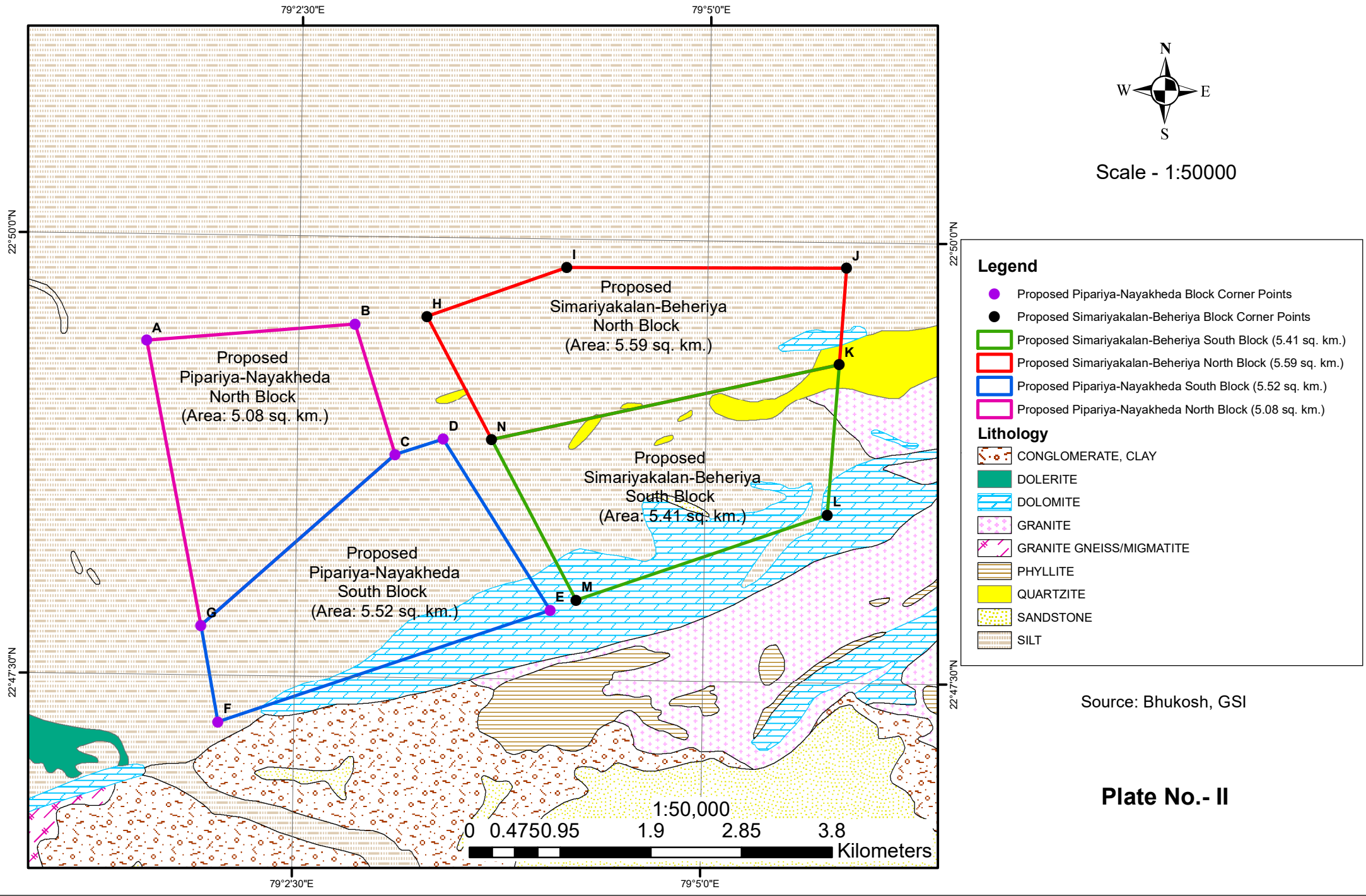
NON-COAL GR CELL,
MECL, NAGPUR

MECL/EXPL./April-2023

PLATE NO.-1

01

GEOLOGICAL MAP OF PROPOSED PIPARIYA-NAYAKHEDA N and S BLOCKS AND PROPOSED SIMARIYAKALAN BAHERIYA N and S BLOCKS, NARASINGPUR DISTRICT, MADHYA PRADESH



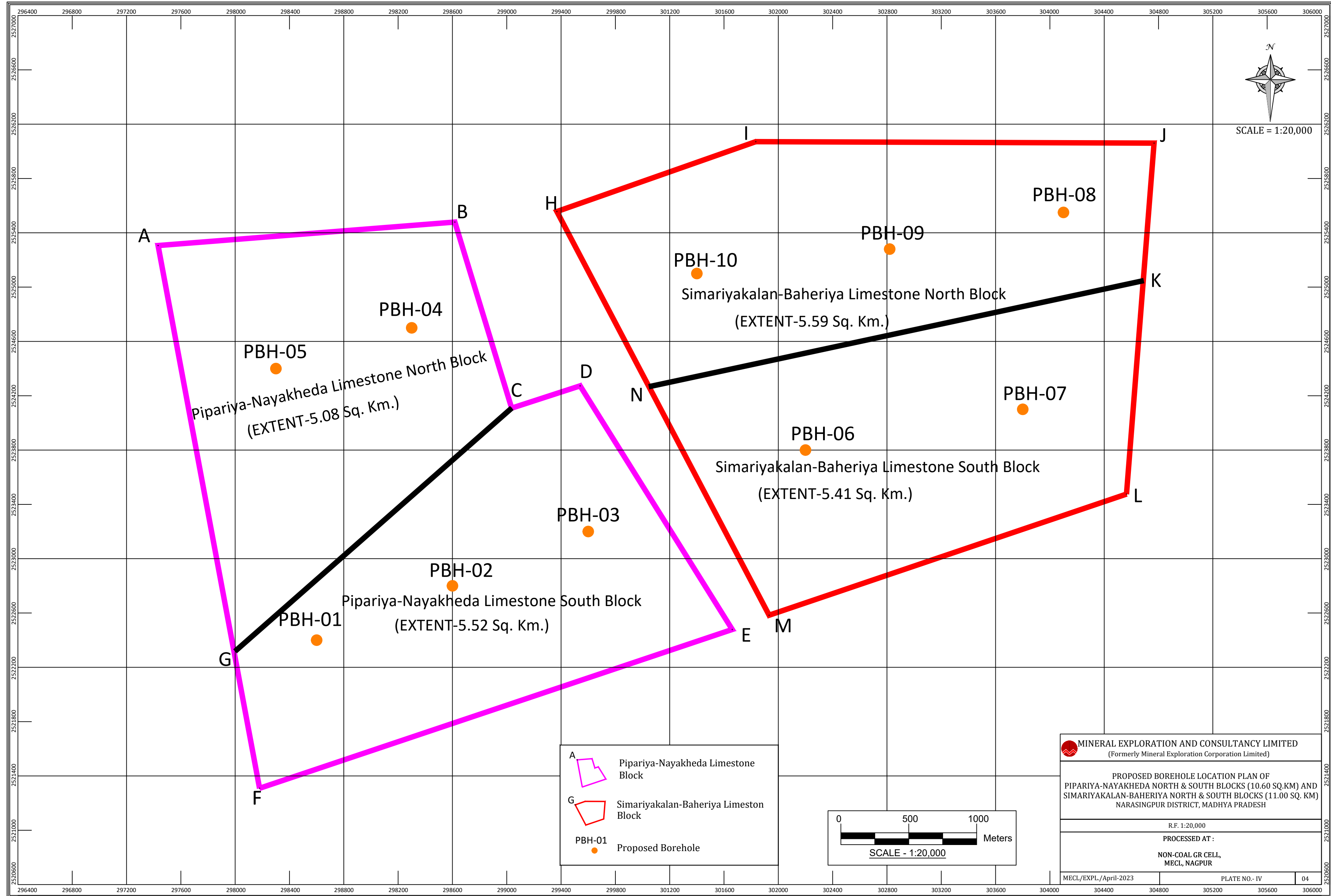


TABLE- 1: COST SHEET FOR G-3 LEVEL EXPLORATION FOR LIMESTONE IN PIPARIYA-NAYAKHEDA NORTH & SOUTH BLOCKS, DISTRICT- NARSINGPUR , MADHYA PRADESH							
Total Area - 10.60 Sq Km; Nos. of Borehole - 10 ; Borehole depth range - 50m (BGL) ; Completion Time - 10 Months							
S.N	Item of Work	Unit	Rates as per NMET SoC 2020-21		Estimated Cost of the		Remarks
			SoC-Item -SI No.	Rates as per SoC	Qty.	Total Amount (Rs)	
A	GEOLOGICAL WORK						
1	Mapping (1:4000), Borhole logging & Sampling & Report writing						
a	Charges for one Geologist per day at HQ	day	1.3	9,000	60	540,000	
b	Charges for one Geologist per day at field	day	1.3	11,000	120	1,320,000	
c	Labour for Geologist (2 Nos)	day	5.7	477	240	114,480	Amount will be reimburse as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higher
d	Charges for one Sampler per day (1 Party)	one sampler per day	1.5.2	5,100	45	229,500	
e	Labours for sampling work (4 Nos)	day	5.7	477	180	85,860	Amount will be reimburse as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higher
2	Survey (on 1:4000 Scale)						
a	Bore Hole Fixation and determination of co-ordinates & Reduced Level of the boreholes and block cardinal points by DGPS	Per Point of observation	1.6.2	19,200	18	345,600	Block cardinal point- 7 Borehole- 10, base station- 1
b	Charges of one Surveyor (1 Party)	one surveyor per day	1.6.1a	8,300	30	249,000	Contouring at 2m interval
c	Labours (4 Nos)	day	5.7	477	120	57,240	Amount will be reimburse as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higher
	Sub-Total A					2,941,680	
B	DRILLING						
1	Drilling -Soft rock	m	2.2.1.1b	6,775	500	3,387,500	MoC Rate
2	Land / Crop Compansation (in case the BH falls in agreeecultural Land)	per BH	5.6	20,000	10	200,000	Amount will be reimburse as per actuals or max. Rs. 20000 per BH with certification from local authorities
3	Construction of concrete Pillar (12"x12"x30")	per borehole	2.2.7a	2,000	10	20,000	
4	Transportation of Drill Rig & Truck associated per drill	Km	2.2.8	36	600	21,600	To & fro
5	Monthly Accommodation Charges for drilling Camp (up to 1 Rigs)	month	2.2.9	50,000	3	150,000	
6	Drilling Camp Setting Cost	Nos	2.2.9a	250,000	1	250,000	
7	Drilling Camp Winding up Cost	Nos	2.2.9b	250,000	1	250,000	
8	Road Making (Flat Terrain)	Km	2.2.10a	22,020	4	88,080	Road Making will be considered as per the requirement and Road Making Charges will be reimbursed accordingly.
9	Drill Core Preservation	per m	5.3	1,590	400	636,000	
	Sub Total B					5,003,180	
C	LABORATORY STUDIES						
1	Chemical Analysis						
i)	Primary samples						
	a. For 9 radicals i.e. CaO, MgO, Al2O3, SiO2, Fe2O3, SO3, P2O5, K2O and LOI by XRF	Nos	4.1.15a	4,200	350	1,470,000	
ii)	Check samples Internal (5%) and External(10%)						
	a. For 9 radicals i.e. CaO, MgO, Al2O3, SiO2, Fe2O3, SO3, P2O5, K2O and LOI by XRF	Nos	4.1.15a	4,200	53	222,600	
iii)	Composite Samples						
	a) For 12 radicals (CaO, MgO, Al2O3, SiO2, Fe2O3, SO3, P2O5 , LOI, MnO2, K2O, Na2O and Cl.)	Nos	4.1.15a	4,200	-	-	
iv)	Petrological samples (Bh Core Samples)						
i	Preparation of thin section	Nos	4.3.1	2,353	10	23,530	
ii	Study of Thin Section	Nos	4.3.4	4,232	10	42,320	
iii	Photmicrographs	Nos	4.3.7	280	-	-	
v)	Bulk Density Determination						
	Bulk Density	No.	4.1	3,540	5	17,700	
	Total - C					1,776,150	
D	Sub Total (A to C)					9,721,010	
E	Geological Report Preparation		5.2	For the projects exceeding Rs. 50 Lakhs but less than 150 Lakhs: A Minimum of Rs. 2.5 lakhs or 5% of the work whichever is more		972,101	2 Separate GRs for two blocks (Naddisinur-1 and Naddisinur-2 Blocks)
F	Preparation of Exploration Proposal (5 Hard copies with a soft copy)	5 Hard copies with a soft copy	5.1/28th EC	2% of the Cost or Rs. 5.0 Lakhs whichever is lower		194,420	
G	Peer review Charges		As per EC decision			20,000	Cost Estimated for two peer review of 2 blocks seperately (Naddisinur-1 and Naddisinur-2 Blocks)
H	Total Estimated Cost without GST					10,907,531	
I	Provision for GST (18% of H)	%				1,963,356	GST will be reimburse as per actual and as per notified prescribed rate
J	Total Estimated Cost with GST					12,870,887	
				or Say Rs. In Lakhs		128.71	
Note - 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 execusion of the project by NEA on its own, a Certifiате regarding non outsourcing of any component/project is required.							

**Table- 2: Time schedule for G-3 Level Exploration for Limestone in Pipariya-Nayakheda 1 & 2 Blocks,
Vindhyan Basin, District: Narsingpur, Madhya Pradesh**

Sl. No.	Activities	Unit	MONTHS									
			1	2	3	4	5	6	7	8	9	10
1	Camp Setting	Month										
2	Surface Drilling (1 rig)	m.										
3	Survey Party days (1 Party)	day										
4	Geologist Party days in field (1 Party)	day										
5	Sampling Party days, Core Sampling (1 party)	day										
6	Laboratory Studies	Nos.										
7	Camp Winding	Month										
8	Geologist Party days in HQ (1 Party)	day										
9	Geological Report Writing with Peer Review	Month										

Note: 1. Commencement of project may be reckoned from the day the exploration acreage is available along with all statutory clearances.

2. Time loss on account of monsoon/agricultural activity/forest clearance/local law & order problem may be additional to above time line.