Dr. Dhaval Patel, IAS
Commissioner of Geology & Mining
Industries & Mines Department
Government of Gujarat

सत्यमेव जयते
Government of Gujarat

CGM/NMET/Bolas block/687 to 689 / 24-25

Date: 31 JUL 2024

To,
Director,
National Mineral Exploration Trust
Ministry of Mines, Government of India.
New Delhi, Delhi-110001.

Subject: Allocation of funds Rs 67.90 lakhs (Rupees sixty seven Lakhs ninety Thousand) for G2 level Geological exploration for Limestone in Bolas Block, Gir Somnath District, Gujarat State under NMET.

Respected Sir,

In the past, NMET has sanctioned several Geochemical analysis and Geological exploration projects proposed by CGM - Gujarat. These projects have been successfully executed by CGM - Gujarat. Currently, NMET has also provided funding for three ongoing geological exploration projects in the Kutch district.

The coastal region of Saurashtra, spanning from Okha in the west to Bhavnagar in the east, is a notable area in India characterized by the prevalent presence of Milliolite limestone. These formations extend up to 200 kilometers inland from the coastline. The entire coastal region of Saurashtra holds substantial potential for chemical grade and cement grade limestone deposits. Consequently, various private cement factories and Gujarat Alkalis have established soda ash plants in this area.

Currently, both cement and soda ash plants are encountering a shortage of raw limestone supply from the Saurashtra region. Consequently, they have resorted to importing raw limestone from other regions within the country and even overseas. Given the existing demand for limestone, it is crucial that we explore the remaining promising limestone reserves in the Saurashtra region to ensure efficient sourcing of raw materials from nearby locations.

Therefore, we are presenting a comprehensive proposal for conducting G2 level geological exploration for limestone in Bolas Block with a total cost of Rs 67.90 lakhs funded by NMET. We would greatly appreciate your prompt approval of this proposal.

Thanking You.

For CGM - Gujarat

29/7/24

Dr. Dhaval Patel, IAS
Commissioner of Geology and mining.
Gujarat State, Gandhinagar

Enclosed: As above

Copy to: (1) DDG – SU, GSI – Gujarat.

(2) Joint Secretory, Industries and Mines department, New Sachivalaya, Gandhinagar.

Proposal for Bolas Block, Gir Somanth District, Gujarat State for G2 Stage Mineral Exploration under NMET

Commodity: Limestone

By

Commissioner of Geology and Mining
Gujarat

Place: Gandhinagar **Date: 29 JULY 2024**

Block Id: CGM/NMET/Limestone/09/2024-25
Commissioner of Geology and Mining, Gujarat

Summary of the Block for G2 stage exploration

	Features	Details		
	Block ID	CGM/NMET/Limestone/09/2024-25		
	Current Exploration Agency	Commissioner of Geology & Mining, Gujarat		
	Previous Exploration Agency	Commissioner of Geology & Mining, Gujarat		
	Commodity	Limestone		
	Mineral Belt	Miliolite Formation		
	Completion Period with entire Time schedule to complete the project	06 months		
	Objectives	To assess & identify qualitative and quantitative mineral resource of Limestone mineral at G2 stage in the proposed block area.		
	Whether the work will be carried out by the proposed agency or through outsourcing and details thereof.	The entire work will be carried out through Gujarat Mineral Research & Development society (GMRDS) working under Industries & Mines Department Government of Gujarat.		
	Name/ Number of Geoscientists	Geologist: 1 (Field) + 1(HQ)		
	Expected Field days (Geology, Geophysics, Surveyor)	30 days: Field Geologist 40 days: HQ Geologist 20 days: Surveyor		
1.	**Location**			
	Co-ordinates (Latitude, Longitude) of Block Boundary	**Block corner points**	**Latitude**	**Longitude**
		1	20°56'22.06"N	70°30'0.10"E
		2	20°56'32.20"N	70°30'18.00"E
		3	20°56'6.84"N	70°30'40.54"E
		4	20°56'3.87"N	70°30'29.18"E
		5	20°55'41.96"N	70°30'27.18"E
		6	20°55'43.04"N	70°30'39.49"E
		7	20°55'25.69"N	70°30'38.33"E
		8	20°55'10.54"N	70°30'0.71"E
	Villages	Bolas , Kukras , Nakhada		
	Tehsil/ Taluk	Veraval		
	District	Gir Somnath		
	State	Gujarat		
2.	**Area (hectares/ square kilometres)**			
	Block Area	203 hectares		
	Forest Area	Nil		
	Government Land Area	NA		
	Private Land Area	NA		

3.	**Accessibility**	
	Nearest Rail Head	Veraval railway station – 15.00 km
	Road	NH 51 – 3.00 km
	Airport	Diu airport – 50.00 km
4.	**Hydrography**	
	Local Surface Drainage Pattern (Channels)	Sub-parallel Pattern
	Rivers/ Streams	Small nallas presents in the area.
5.	**Climate**	
	Mean Annual Rainfall	824 mm
	Temperatures (December) (Minimum) Temperatures (June) (Maximum)	Minimum – 16° C Maximum – 43° C
6.	**Topography**	
	Toposheet Number	41L/9
	Morphology of the Area	The proposed area is generally covered by dry barren and agricultural fields. The topography of the proposed region is looking gently slope toward South-east direction. The elevation of the area ranges from 34mts to 57mts above mean sea level.
7	**Availability of baseline geoscience data**	
	Geological Map (1:50K)	Plate-1
	Geochemical Map	Not available
	Geophysical Map	Not available
8.	**Justification for taking up G2 stage mineral exploration**	• The region was primarily investigated by CGM in the year 1965 and 1995 to 1997 by means of Geological mapping using Remote sensing techniques, surface exposure mapping and sample collection of the proposed area. The recommendation of this report indicates Coastal areas of Saurashtra region have milliolitic limestone deposit, these deposits have very less overburden and occurred in form of low ridges and low mounds. So, it can be easily minable deposit. • We have collected 09 grab samples during the recent geological travers survey of CGM / GMRDS geologist, the analysis results of these samples indicated CaO% from 49.64% to 52.15% (Refer Annexure - 1)

		• The proposed block is surrounded by the existing working Limestone leases, so this area can be studied as an extension of the already existing mineable deposits. • Thus, the block is suggested for G2 level of exploration.

Detailed description:

1. Block Summary

Physiography

The study area is located in the Veraval taluka, Gir Somnath district in the western coastal region of Gujarat. The area under investigation is a coastal plain, where major portion is flat agricultural fields leaving patches of limestone out crops in form of small low mounds and ridges more or less parallel to coast line. The limestone ridges are practically covering the sea-coast line. The lying slope of low-lying ridges and mounds generally merges into coastal plain. The rivers Hiran and Saraswati, both perennial flow through the area and are fed by numerous streams all originating in the highlands to the north.

Background Geology (Regional Geology & Geology of the Block).

The three major lithounits, i.e. Gaj, Dwarka and Miliolite Formations occur broadly in three linear belts parallel to the coastline. Chaya Formation, restricted near the coastline, is porous, semi-consolidated limestone rich in fossil fragments. The exposures of Gaj Formation are present farthest from the coast near the exposed Deccan Trap hillocks and Miliolite Formation along the coastline whereas the Dwarka Formation is exposed in between. The Miliolite Formation has covered all the pre-existing lithounits.

The southern coast of Saurashtra from Okha in the west to Bhavnagar in the east is unique in India, being the only place where nearly pure carbonate sedimentation has taken place during the quaternary period under warm shallow and agitating water. These limestones are known as Milliolite limestone. These occurrences are also observed inland upto 200 kms from the coastal line.

The general stratigraphic succession of the region is as follows:

Stratigraphic Unit	Lithology	Age
Recent Deposits	Coastal Sea Sand dunes, soil and alluvium	Holocene
Chhaya Formation	Shelly limestone, Coraline limestone	Holocene to late Pleistocene
Milliolite Formation	Limestones with shell of Milolina	Pleistocene
Dwarka Formation	Fossiliferous Limestone	Pliocene
Gaj Formation	Alternate sequence of clays and limestone	Miocene
Deccan Trap	Basalt dolerite dykes	Cretaceous to Eocene

Gaj Formation

Gaj formation includes an intercalated sequence of marl/clay and limestone, dominated by the former. The marl/clay is light yellow to grey and it is difficult to distinguish between the two in transitional cases. Gaj limestone is light to deep yellow to brown, compact, and cryptocrystalline. At places, this limestone contains very little free silica or is almost devoid of it. The thickness of limestone band is highly variable and often a quite thick band pinches abruptly within short distance., In almost all places, where Gaj Formation is exposed a, thin crust (less than 2 m thick) of compact, dark coloured limestone, which is a secondary leaching product, is present followed downward by Gaj clay/marl. Gaj Formation is rich in marine mega- and micro- fossils. Mega fossils include pelecypods, gastropods, cephalopods, echinoids, alcyonaria, decapoda and bryozoa. Earlier workers have assigned an Upper Miocene age to Gaj Formation but Mathur et al (1980) advocated that the Faj Formation is at least of Mid Miocene age, if not older , as it contains fossils of Taberina malabarica a Lower to Middle Miocene foraminifer.

Dwarka Formation

Dwarka Formation is equivalent to the Dwarka bed of Fedden (1884). It overlies the Gaj Formation. Although there are pebbly or conglomeratic bands at the contacts, in most places the relation is conformable. The Dwarka Formation, as exposed in this area, generally comprises grey and gritty to sandy limestone almost devoid of megafossils. Near Dwarka, the Dwarka formation was divided into Upper and Lower Dwarka Member by Jain and Agarwal (1989-90). The lower Member, which overlies Gaj Formation, is an intercalated sequence of clay and kankar, friable/compact sandstone, yellow and red marl beds and yellow ferruginous and grayish sandy limestone. The Upper Dwarka is mainly bioclastic limestone, often cavernous and contains very little silica. In the mapped area the exposed Dwarka Formation is mostly represented by Lower Dwarka Member of Jain and Agarwal (1990), although there are some pockets, which are less in free silica.

Milliolite Limestone

The consolidated Quaternary deposits are termed as Miliolite Formation because of preponderance of tests of foraminifer Miliolidae. This is the most widespread lithounit in the coastal belt overlapping in all earlier lithounits. The colour of the limestone varies from white to pale yellow to pink. In majority of places the miliolitic limestone varies from white to pale yellow, relatively soft, friable, thinly laminated with alternate bands rich in foraminiferal tests and micrite. The Milliolite occur as whitish, buff coloured, current bedded limestone in the form of coastal ridge This Limestone primarily comprise of broken shells of foraminifer-milioline around which calcite grains have been formed. However, this is not a pure limestone and thin horizons of sandstone, grit and conglomerate are also found within Milliolites. The

Milliolite are thought to be windblown deposits and are also found occurring along the hill slopes further inland.

Chhaya Formation

This is a semi-consolidated highly porous limestone occurring near the present day coast line and rich in both mega and micro-fossils. The thickness shows wide variation decreasing away from the coast. It is generally a bit ferruginous particularly below the ground level.

Soil and Alluvium

Major portion of the area is covered with soil or alluvium. This can be divided as the type formed due to weathering of limestone and the type formed due to deposition of clays brought by rivers. The soil formed due to weathering of limestone is regur soil and that of river is sticky black clayey soil.

Mineral potentiality based on geology, geophysics, ground geochemistry etc.

It was noted that the Milliolite limestone is the only rock formation which is exposed as outcrops in the entire sea-coast and especially in the area of investigation. It is exposed on the surface in forms of low mounds.

The typical characteristic of this limestone formation is its erosional feature. Due to chemical and differential weathering, solution holes, channels, cavities with alternate groove and ridge formation giving the area honeycomb appearance. This topography is known as Karst topography.

The limestone found is mostly light coloured, mostly white with shades of grey, buff, brown and yellow. The presence of impurities mostly iron is responsible for this colour variation. The rock is hard and compact. The texture of rock is mostly fine to medium grained at times ranging into coarse grade also. At places false and current beddings are also observed. In this limestone deposit the thickness is variable due to its topography.

Scope for proposed exploration

1. Location: - Village: Bolas , Kukras , Nakhada Tehsil:Veraval, District: Gir Somnath, State: Gujarat.
2. Quantum of work: The approximate core drilling work is 240 meters.
3. Rock formations to be drilled: Various types of soil, sub-soil, Limestone, Marl, clay, etc.
4. The boreholes shall be in depth range of approximately 20 m. However, this is indicative only and may vary as per actual geological conditions.
5. Type of Drilling: Core drilling by Hydraulic Drilling Rigs.
6. Borehole size: The holes shall be derived in NQ sizes.
7. The core recovery in all the formation should be at least 90% except in fault zone, weathered zone, soil, sand and structurally disturbed area

8. CGM will provide proposed borehole location plan of all the areas to be covered under exploration.
9. Sampling: There will be 1 one mineral/rock sample for each 1-meter run of economically viable mineral. Each sample should be cut by core splitter. Each run shall be marked properly by plastic cards and the core boxes shall be numbered properly. Each sample shall be reduced to an approximate quantity by following the standard sampling procedures such as homogenizing, coning, quartering and pulverizing into 100/200 mesh and be prepared into two packets of 100-200 gm each. The final sample pockets shall be properly labelled with BH number, sample run.

Recommendations of G4 Stage Mineral Exploration Report.

S.D. Kapse and Y.C. Patel,1997 has concluded that the Satellite imagery of the area is found extremely useful for delineating geological boundaries of different litho units. The study of the surveyed area revealed that limestone of Gaj and Dwarka formations are continuing to occur in adjacent sheets along-with laterite patches. So it is recommended to cover these areas under Pre-detailed survey.

U. D. G. Rao, 1965-66 had recommended that by virtue of Limestone deposit occurrence in the form of low ridges and mounds, these limestone deposits are eminently suited for economic exploration, by the simplest methods of quarrying. Other factors such as roads, transport facilities, availability of water and labour etc. present and can be arranged within reasonable costs, for the commercial exploration of any group of patches in the region examined.

J.V. Bhatt and B.S. Nadhamuni, 1971-72 recommended that Good grade limestone is light and fine-grained and with solution holes, in wet drilling it has given poor recovery so in future if drilling is resorted to for detail assessment it is advisable to go for dry drilling. All the chemical grade limestone pockets should be marked for the industrial use.

Objectives of Exploration

- To know the continuity of the mineral body both along the strike and dip.
- To map the extent of the ore body and lithology of the area.
- To ascertain the grade of Limestone deposit.
- Ore resource/reserve estimation in accordance with MEMC Rule-2015

2. Previous Work

Previous Exploration in proposed block area as well as adjoining area: All the sample (bed rock/trench/ groove/soil), borehole location should be plotted on the geological map and analytical data should be discussed briefly

S.D. Kapse, Y. C. Patel (Field Season -1995-96-97) has done part of the Junagadh and Jamnagar districts of Saurashtra were taken up for geological mapping on 1:50,000 scales covering an area about 2580 sq. kms. by using Remote Sensing Techniques. The geological maps were prepared using False Colour Composite (F.C.C) OF "LANDSAT" and "SPOT" Satellite data. This area falls under the Survey of India topographical map 41 G/5, 41 G/10, 41 G/6, 41 K/4, 41G/15, 41 G/11, 41 L/5, 41 L/1, 41 L/9, 41 L/10.

U.D.G.Rao (Field Season 1965-66) has done the investigation of the limestone deposits in the eastern parts of Veraval Taluka, Junagadh District. An area of about 200 sq.kms. between Kodinar and veraval was examined. The area was Geologically mapped and sampled taken. The survey was done by chain and compass and the outcrops mapped on a scale of 1:10,000.

A.A. Waheed (Field Season – 1967-68) has done the investigation for limestone deposits in North-West of Prachi, District- Junagadh. This scheme was taken up with a view to explore the area by examining the quality and quantity of limestone underground with the help of drilling. Limestone found belongs to miliolite variety, white and medium to fine grained. The thickness of limestone horizon varies from 0.50 m to 8.61 meters.

R.N. Goswami (Field Season – 1969-70) has done the drilling work near the proposed region. A total of 650.87 meters of actual drilling was done for these 30 numbers of boreholes. The limestone occur in borehole suggesting a High grade limestone is deposited in the region.

J.V. Bhatt, Geologist and B.S. Nadhamuni (Field Season- 1971-72) was taken up for drilling operation in continuation of the previous exploration for detailed chemical grade limestone assessment in pranchi-Ranavav belt of Saurashtra coast. Total of 694 meters of actual drilling was done in 25 bore holes covering an area of 13sq. meters. Bore holes were fixed on the grid intersections of 1000 meters.

Gujarat Heavy Chemicals mining lease is adjoining in west direction to proposed block. So, these lease areas are surrounding areas of the proposed block which testify the limestone prospectivity of this block.

CGM/GMRDS officials has also carried out field in current year survey of the proposed area and taken grab samples 09 Nos and done the chemical analysis of that samples. So chemical analysis also suggests that good quality limestone present in the study area, it was recommended to more sampling of the area. Chemical analysis data is given as per Annexure-1.

3. Block description

Block corner points	Latitude	Longitude
1	20°56'22.06"N	70°30'0.10"E
2	20°56'32.20"N	70°30'18.00"E
3	20°56'6.84"N	70°30'40.54"E
4	20°56'3.87"N	70°30'29.18"E
5	20°55'41.96"N	70°30'27.18"E
6	20°55'43.04"N	70°30'39.49"E
7	20°55'25.69"N	70°30'38.33"E
8	20°55'10.54"N	70°30'0.71"E

4. Planned Methodology

1. Preparation of Geological map. Field traverse and collection of grab/ channel samples from outcrop/ river cutting/ old dug wells.
2. To carry out DGPS survey and identified location of Road, River, Settlement, Electric line, Telephone line or any other permanent structure.
3. Preparation of Landuse, Landpattern map along with ownership details.
4. Preparation of proposed borehole location plan based on the previous work, grab sampling report and feasibility of drilling.
5. Carry out systematic & scientific core drilling activity along with preparation of Lithounits, core drilling registers, sampling and preparation of samples for further physical, chemical and petrographic analysis.
6. Carry out physical, chemical and petrographic analysis and interpretation of their result in borehole lithology.
7. Preparation of draft Geological report as per specified format of NMET as per MEMC Rules,2015 & its amendments.
8. Submission of draft Geological report to designated Geological expert for peer review.
9. Submission of final Geological Report incorporating comments of peer review to NMET for final approval.
10. Submission of Geological reports to state auction cell for further auction process.

5. Nature Quantum and Target

Components	G2
Aerial reconnaissance	NA
Geological Survey	NA
Systematic drilling	Refer below (Plate-2)
Petrographic and mineral graphic studies	Specific Gravity studies
Synthesis of all available data	i) Integration of regional/ detailed geophysical, geological and geochemical data, if not done earlier. ii) Synthesis of all available data and Report writing

Borehole spacing (As per MEMC, 2015)

Type of deposit	**Bedded Stratiform and Tabular deposit of regular habit (Minerals to be identified)**	**Bedded stratiform and tabular deposits of irregular habit (Minerals to be identified)**	**Lenticular bodies occurring en echelon Lenses, pockets. (Different minerals)**
G2 Stage	400 m	Not applicable	Not applicable
	(Vertical depth of intersection of mineralised zone for different level boreholes should be specified, number of boreholes (first, second, third), borehole spacing, approximate length of different level of boreholes may also be specified)		

6. Exploratory Drilling

- The boreholes shall be in depth range of approximately 20 m. However, this is indicative only and may vary as per actual geological conditions.
- Type of Drilling: Core drilling by Hydraulic Drilling Rigs.
- Borehole size: The holes shall be derived in in NQ sizes.
- While drilling, wherever water table is encountered, depth of the water table should be recorded and to be mentioned in the driller logs.
- The core recovery in all the formation should be at least 90% except in fault zone, weathered zone, soil, sand and structurally disturbed area.

7. Manpower deployment

Sl. No.	Activities	Unit	MONTHS					
			1	2	3	4	5	6
1	Camp Setting	Month						
2	Surface Drilling	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.

8. Break-up of expenditure

The cost has been estimated based on actual schedule of rates mandated in the circularOM No. 61/1/2018/NMET dated 31st March 2020 for NMET funded projects which is **Rs. 67.90 Lakhs.** The detailed cost sheet for G-2 exploration for Limestone in proposed Bolas Block is given below:

SL. NO.	Item	Estimated Cost (Rs.)
1	Drilling	1626000
2	Geology and Survey	1574520
3	Laboratory	1218530
	Sub Total (1 to 3)	**4419050**
4	Miscellaneous	1335577
	Total	**5754627**
	GST 18%	1035833
	Grand Total (including GST)	**6790459**
	Say Rs. In Lakhs	**67.90 Lakhs**

9. References

- "Geological report of southern part of Saurashtra covered under Toposheet Nos. 41 G/5, 41 G/10, 41 G/6, 41 K/4, 41G/15, 41 G/11, 41 L/5, 41 L/1, 41 L/9, 41 L/10 (Based on Interpretation of Satellite Imagery with Limited Field Checks)" (Field Season 1995-96 and 1996-97) by S.D. Kapse, Y. C. Patel, Commissioner of Geology and Mining, 1997.
- "Report of the Limestone Deposits in the Eastern parts of Veraval taluka" by U.D.G. Rao, Directorate of Geology and Mining, 1965-66.
- "Report of Limestone Deposit in North West of Prachi Junagadh District" by A.A. Waheed, Commissioner of Geology and Mining,Gujarat, 1967-68.
- " An interim report on the drilling operation carried out in Gorakhmundi block on Veraval Taluka, Junagadh District for Chemical grade Limestone" (Field Season-1969-70) by R.N. Goswami, Senior Geologist, Directorate of Geology and Mining, Gujarat.
- "A report on Ajotha-Veraval sector Limestone deposits of Junagadh District, Gujarat State" (Field Season- 1971-72) by J.V. Bhatt, B.S. Nadhamuni, Directorate of Geology and Mining, Gujarat.

List of Annexures

Annexure-1: Chemical analysis data of collected samples.

Annexure-2: Detailed Cost Estimation Sheet

List of Plates

Plate 1: Proposed block boundary over existing Geological map.

Plate 2: Proposed Borehole Location Map.

Plate 3: Proposed block boundary over topographic map.

Plate 4: Satellite image of the proposed block showing surrounding existing Limestone leases.

Annexure-1

Sr. No	Sample ID	Location		SIO2	AL203	Fe2o3	TiO2	CaO	MgO	Na2O	K2O	P2O5	S03	LOI	TOTAL
		Latitude	Longitude	%	%	%	%	%	%	%	%	%	%	%	%
1	**BOLAS-01**	20°55'43.701"	70°30'19.373"	3.55	0.88	1.73	0.13	50.56	0.44	0.00	0.13	0.04	0.06	41.65	99.17
2	**BOLAS-02**	20°55'44.523"	70°30'18.277"	4.66	0.65	1.01	0.12	50.90	0.39	0.00	0.11	0.03	0.00	41.96	99.83
3	**BOLAS-03**	20°56'02.176"	70°30'28.964"	3.00	0.79	1.60	0.12	51.81	0.38	0.05	0.12	0.05	0.04	41.45	99.41
4	**BOLAS-04**	20°56'11.309"	70°30'17.112"	3.52	0.63	1.28	0.08	51.79	0.37	0.00	0.11	0.06	0.03	41.97	99.84
5	**BOLAS-05**	20°56'10.546"	70°30'11.404"	3.92	0.58	1.28	0.12	50.95	0.37	0.00	0.09	0.07	0.06	41.83	99.27
6	**BOLAS-06**	20°56'05.662"	70°30'09.133"	4.82	1.06	2.82	0.18	50.35	0.30	0.00	0.13	0.02	0.00	40.15	99.83
7	**BOLAS-07**	20°56'04.662"	70°30'09.456"	4.55	1.03	2.97	0.16	49.64	0.28	0.00	0.13	0.01	0.02	40.32	99.11
8	**BOLAS-08**	20°56'24.306"	70°30'17.332"	4.55	1.17	3.13	0.15	50.19	0.29	0.00	0.13	0.02	0.00	40.17	99.80
9	**BOLAS-09**	20°55'43.662"	70°30'30.037"	4.70	1.40	3.21	0.21	52.15	0.33	0.00	0.16	0.06	0.02	37.46	99.70

Annexure-2

Sr. No.	Item of Work	Unit	Rates as per NMET SoC 2020-21		Estimated Cost of the Proposal	
			SoC- Item S.No.	Rates as per SoC	Qty.	Total Amount (Rs.)
A	DRILLING					
1	Surface Drilling	m.	2.2.1.1b	6775	240	1626000
	Sub Total A					1626000
B	Geological Work					
1	Survey Days	day	1.6.1a	8300	20	166000
	Labour (3 labour for survey)	day	5.7	504	60	30240
2	Geologist (Field)	day	1.3b	11000	30	330000
3	Geologist (HQ)	day		9000	40	360000
4	Core Sampling Days	day	1.5.2	5100	30	153000
	Labour (3 labour)	day	5.7	504	70	35280
5	Drilling camp setting/ winding cost	per drill	2.2.9a & 2.2.9b	250000	2	500000
	Sub-Total B					1574520
C	LABORATORY STUDIES					
a	Chemical Analysis					
1	Primary Analysis	Nos.	4.1.15a	4200	240	1008000
2	External Check Samples	Nos.	4.1.15a	4200	24	100800
B	Physical Analysis					
1	Preparation of Thin Section	Nos.	4.3.1	2353	10	23530
2	Petrographic Studies	Nos.	4.3.4	4232	10	42320
3	Digital Micro Photographs	Nos.	4.3.7	280	5	1400
4	Specific Gravity	Nos.	4.1	3540	12	42480
	Sub-Total C					1218530
	Total (A+B+C)					4419050
D	Miscellaneous Charges					
1	Geological Report - 5%		5.2			220953
2	Proposal Preparation- 2% of approved project cost or 3.8 lakh (whichever is lower)		5.1			100432
3	Drill Core Preservation	m.	5.3	1590	240	381600
4	Peer Review Charges			30000		30000
5	Tender Process					100432
6	Operational Charges					502160
	Total					5754627
	GST 18%					1035833
	GRAND TOTAL					6790459
	Rs. In Lakhs					**67.90 lakhs**

Geological map of Bolas Limestone Block, Gir-Somnath District, Gujarat

70°25'30"E 70°27'0"E 70°28'30"E 70°30'0"E 70°31'30"E 70°33'0"E 70°34'30"E

20°57'0"N

20°55'30"N

20°54'0"N

20°52'30"N

N

1:50,000

Legend

- Proposed Block Boundary
- BASALT
- CALARENITE, CALCIRUDITE WITH SHELL FRAGMENTS
- CALCARENITE, MARL, GRAVEL AND CONGLOMERATE
- CALCAREOUS SANDSTONE / CALCARENITE
- FLAGGY AND SHELLY LIMESTONE
- FOSSILIFEROUS LIMESTONE, MARL, CLAY
- GRAVEL,PEBBLE,COBBLE AND SAND WITH SHELL FRAGMENT
- MILIOLITE LIMESTONE
- OXIDIZED, CALCAREOUS FINE TO COARSE SAND
- PLASTIC CLAY
- SAND WITH BIOFRAGMENTS
- SAND, GRAVEL AND KANKAR
- UNMAPPED

Block Id: CGM/NMET/Limestone/09/2024-25
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Plate - 1
Geological Map

Proposed Borehole Location plan of Bolas Block, Gir Somnath District

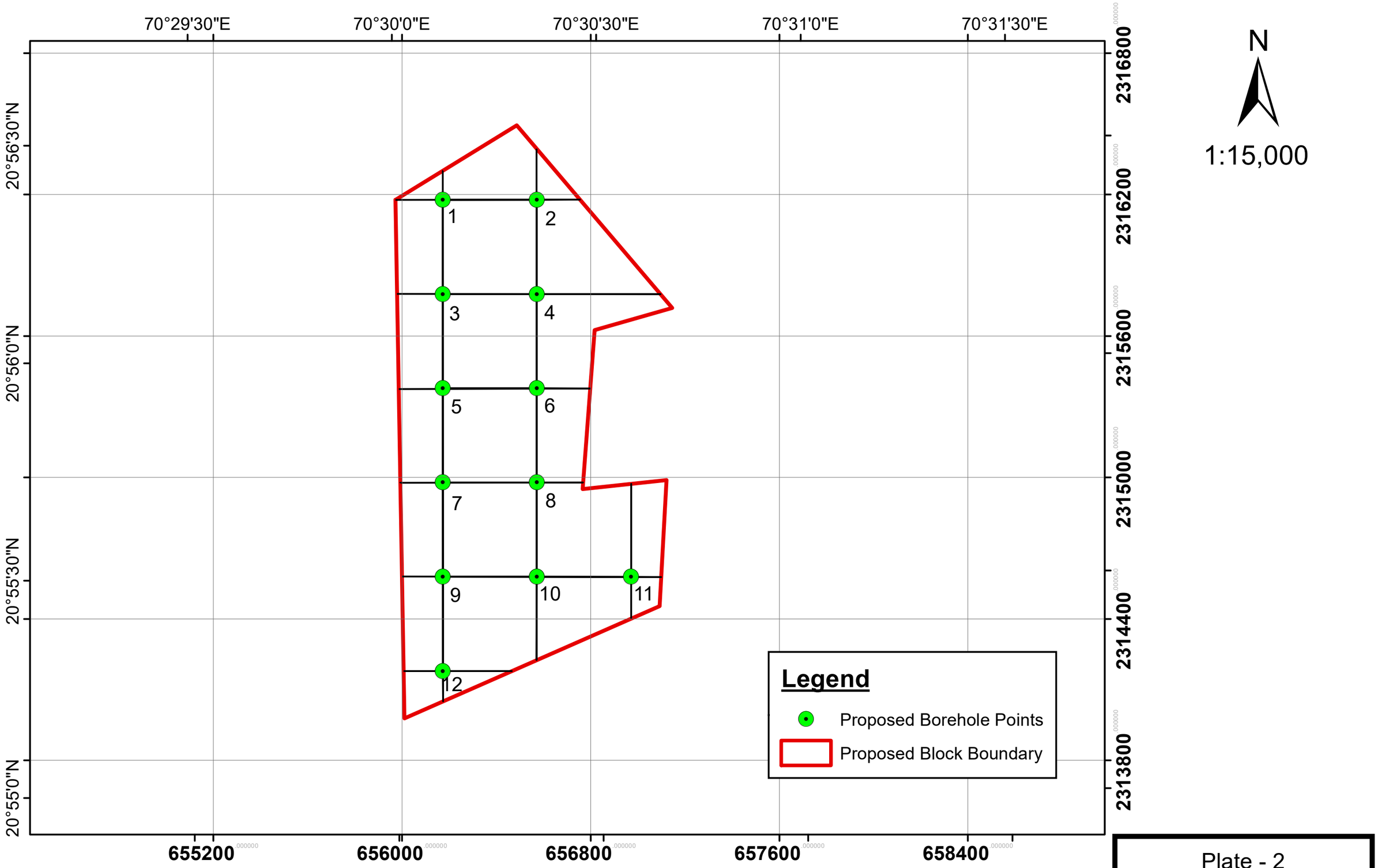

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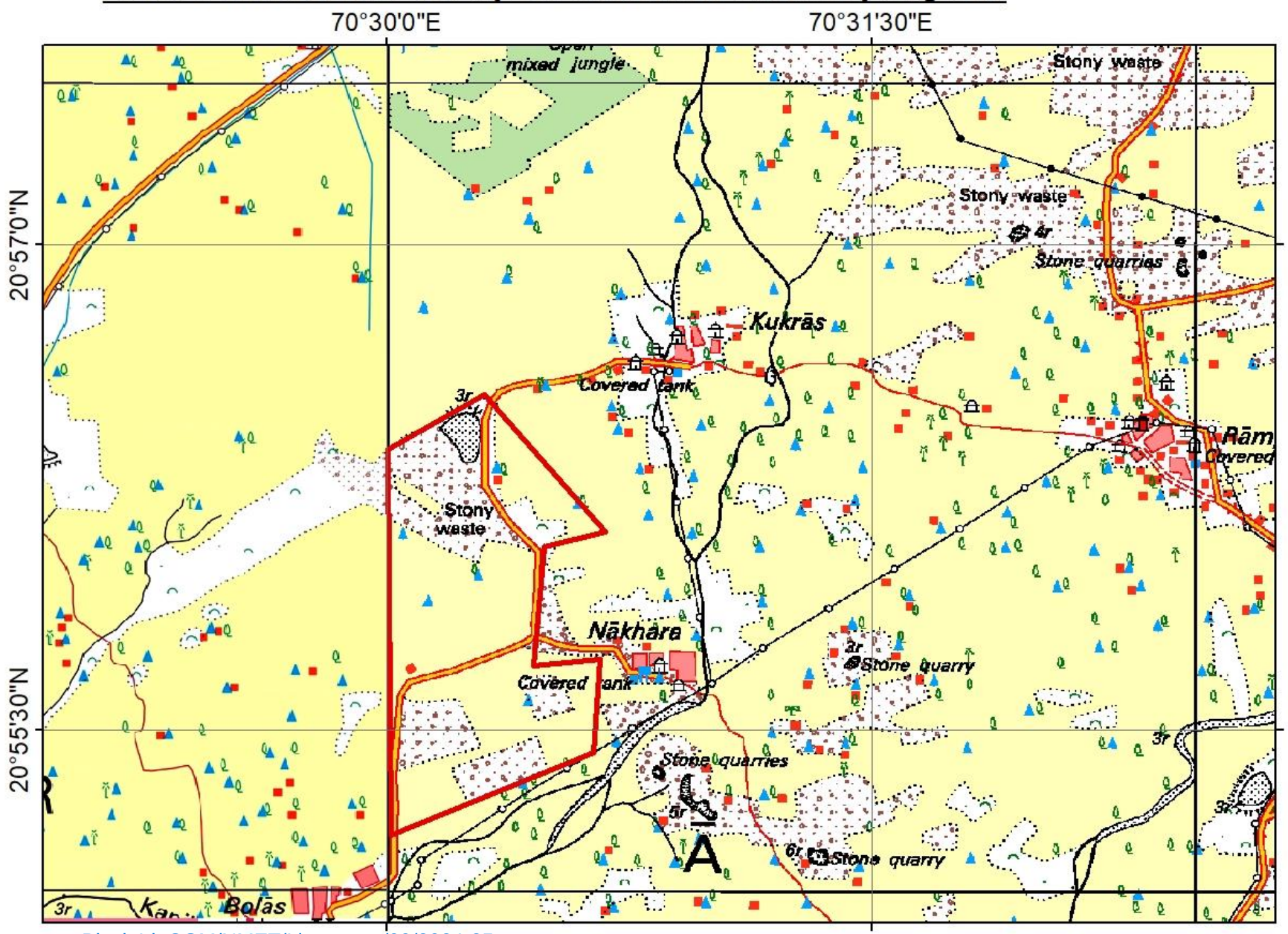
Plate - 2
Borehole Location Plan

Bolas Limestone Block, Gir-Somnath District, Gujarat



N

Not to Scale

Legends

Express Highway: with toll; with bridge; with distance stone . . .
Roads, metalled: according to importance . . . . . .
Double carriageway: according to importance . . . . . .
Unmetalled Road. Cart-track. Pack-track and pass. Foot-path . . .
Streams: with track in bed; undefined. Canal . . . . . .
Dams: masonry or rock-filled; earthwork. Weir . . . . . .
River: dry with water channel; with island & rocks. Tidal river . .
Submerged rocks. Shoal. Swamp. Reeds . . . . . .
Wells: lined; unlined. Tube-well. Spring. Tanks: perennial; dry . . .
Embankments: road or rail; tanks. Broken ground . . . . . .
Railways, broad gauge: double; single with station; under constrn
Railways,other gauges: double; single with distance stone; do. . .
Mineral line or tramway. Kiln. Cutting with tunnel . . . . . .
Contours with sub-features. Rocky slopes. Cliffs . . . . . .
Sand features: (1)flat. (2)sand-hills (permanent). (3)dunes(shifting). .
Towns or Villages: Inhabited; deserted. Fort . . . . . .
Huts: permanent; temporary. Tower. Antiquities . . . . . .
Temple. Chhatri. Church. Mosque. Idgāh. Tomb. Graves . . . . . .
Lighthouse. Lightship. Buoys: lighted; unlighted. Anchorage . . . .
Mine. Vine on trellis. Grass. Scrub . . . . . .
Palms: palmyra; other. Plantain. Conifer. Bamboo. Other trees . .
Areas: cultivated; wooded. Surveyed tree . . . . . .
Boundary, International . . . . . .
„ state: demarcated; undemarcated . . . . . .
„ district; subdivision; tahsil or tāluk; forest . . . . . .
Boundary Pillars: surveyed; unlocated . . . . . .
Heights, triangulated: station; point; approximate. . . . . .
Bench-mark: geodetic; tertiary; canal . . . . . .
Post office ; Overhead tank . . . . . .
Rest House or Inspection Bungalow. Circuit House. Police Station .
Camping ground. Forest: reserved; protected . . . . . .
Spaced names: administrative; locality or tribal . . . . . .
Hospital. Dispensary. Veterinary: Hospital / Dispensary . . . . . .
Aerodrome. Helipad. Tourist site . . . . . .
Power line: with pylons surveyed; with poles unsurveyed . . . . .

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Plate – 3
Toposheet Map

Bolas Block

Satellite image of the proposed block showing surrounding existing limestone Leases.

Plate-4