PROPOSAL FORPRILIMINARY EXPLORATION (G-3)
FOR LIMESTONE IN
AKAPURBLOCK
(6.52 SQ.KM AREA)
DISTRICT- YAVATMAL, MAHARASHTRA

COMMODITY: LIMESTONE

BY

MINERAL EXPLORATION AND CONSULTANCY LIMITED
DR. BABASAHAB AMBEDKAR BHAWAN
SEMINARY HILLS

PLACE: YAVATMAL

DATE: 27th AUGUST2024

Summary for Preliminary Exploration (G-3) for limestone in Akapur Block(6.52sq.km area), District- Yavatmal, Maharashtra

	Features	Details
	Block ID	**Akapur Limestone Block**
	Exploration Agency	Mineral Exploration and Consultancy Limited (MECL)
	Commodity	**Limestone**
	Mineral Belt	Penganga Beds or Penganga Series
	Budget & Time schedule to complete the project	106.41 lakhs &12 months
	Objectives	Based on the geological data of 10(A) 2(B) cases, provided by DGM, Maharashtra in and around Akapur Block, Dist-Yavatmal, Maharashtra, the present exploration programme for Preliminary Exploration (G-3) has been formulated. The objectives of the present Preliminary Exploration (G-3) are as follows: i) To carry out Topographical Survey and Geological & Structural mapping on 1:4000 scale. ii) To delineate depth continuity of limestone by drilling on 800m strike interval up to a vertical depth of 50m. iii) To assess the quality and quantity of the resources (333) as per UNFC norms & Minerals (Evidence of Mineral Contents) Rules- 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	Work will be carried out by the proposed agency.
	Name/Number of Geoscientists	
	Expected Field days (Geology, Geophysics, Surveyor)	Geologist Party days: Field -120 days & HQ-60 days
		Survey Party days: 30 days
		Sampling Party days: 45 days

<table>
<tr><td>1.</td><td>Location</td><td>The proposed exploration block is located in Maregaon Tehsil of Yavatmal district and about 110km in south-east of district headquarter Yavatmal and about 12km from tehsil headquarter Maregaon. Thearea falls under the parts of Survey of India Toposheet No 55L/16and is bounded by latitude 20º 08' 24" Nto 20º 09' 34" Nand longitude 78° 50' 56" E to 78° 53' 04" E (Plate No I).</td></tr>
<tr><td></td><td>Latitude and Longitude</td><td>
<table>
<tr><td colspan="3">UTM, Zone-44, WGS-84</td><td colspan="2">Geographic (Lat/Long), WGS-84</td></tr>
<tr><td>Points</td><td>Eastings</td><td>Northings</td><td>LONGITUDE</td><td>LATITUDE</td></tr>
<tr><td>A</td><td>275201.8927</td><td>2230340.7592</td><td>78° 50' 57.2249" E</td><td>20° 09' 26.2168" N</td></tr>
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<tr><td>C</td><td>278866.0373</td><td>2228391.9893</td><td>78° 53' 04.2185" E</td><td>20° 08' 24.3928" N</td></tr>
<tr><td>D</td><td>277555.7145</td><td>2228353.5318</td><td>78° 52' 19.1316" E</td><td>20° 08' 22.5992" N</td></tr>
<tr><td>E</td><td>275188.4742</td><td>2229266.6064</td><td>78° 50' 57.2414" E</td><td>20° 08' 51.2921" N</td></tr>
</table>
</td></tr>
<tr><td></td><td>Villages</td><td>Akapur, Chinchala, Pandharkawada, and Dol.Dongargaon</td></tr>
<tr><td></td><td>Tehsil/Taluk</td><td>Maregaon</td></tr>
<tr><td></td><td>District</td><td>Yavatmal</td></tr>
<tr><td></td><td>State</td><td>Maharashtra</td></tr>
<tr><td>2.</td><td>Area (hectares/ square kilometres)</td><td></td></tr>
<tr><td></td><td>Block Area</td><td>6.52sq.km</td></tr>
<tr><td></td><td>Forest Area</td><td>Forest and Non-Forest area</td></tr>
<tr><td></td><td>Government Land Area</td><td>Data not available</td></tr>
<tr><td></td><td>Charagaha</td><td>Data not available</td></tr>
<tr><td></td><td>Private Land Area</td><td>Data not available</td></tr>
<tr><td>3.</td><td>Accessibility</td><td></td></tr>
<tr><td></td><td>Nearest Rail Head</td><td>The nearest railhead is Wani in Central Region which is about 25 km South East of the block.</td></tr>
<tr><td></td><td>Road</td><td>The block area is well connected to district headquarter Yavatmal, by all weather metalled road from the MH SH236 and MH SH 06 via Vadki and Karanji respectively.</td></tr>
<tr><td></td><td>Airport</td><td>The nearest airport is Dr. Babasaheb Ambedkar International Airport, Nagpur (about 170km).</td></tr>
<tr><td>4.</td><td>Hydrography</td><td></td></tr>
<tr><td></td><td>Local Surface Drainage Pattern (Channels)</td><td>The proposed Block is mostly in plain terrain with small mound in North central portion of the block. The general slope of the area is towards SW direction. Drainage is controlled by seasonal nalla flowing in SW direction. Area exhibits dendritic drainage pattern.</td></tr>
<tr><td></td><td>Rivers/ Streams</td><td>Wardha River flowstowards east of the block.</td></tr>
<tr><td>5.</td><td>Climate</td><td></td></tr>
<tr><td></td><td>Mean Annual Rainfall</td><td>Average annual rainfall is about 85cm to 110 cm.</td></tr>
<tr><td></td><td>Temperature:</td><td>Minimum temperatures: upto15.1°C (December-January),
Maximum temperatures: up to 41.8°C (April-May)</td></tr>
<tr><td>6.</td><td>Topography</td><td></td></tr>
</table>

<table>
<tr><td></td><td>Toposheet Number</td><td>55L/16</td></tr>
<tr><td></td><td>Morphology of the Area</td><td>The proposed block area covered under undulating terrain (hilly as well as flat terrain) with a gentle southerly, easterly, and westerlyslope. The majority of the block area belongs to agriculture land. The average elevation ranges from 241m to 263 m above MSL.The area has got dendritic pattern of drainage.</td></tr>
<tr><td>7.</td><td>Availability of baseline geoscience data</td><td></td></tr>
<tr><td></td><td>Geological Map (1:50K/25K)</td><td>1:50,000(GSI-BHUKOSH)</td></tr>
<tr><td></td><td>Geochemical Map</td><td>Not available.</td></tr>
<tr><td></td><td>Geophysical Map (Aeromagnetic, ground geophysical, Regional as well as local scale GP maps)</td><td>Not available.</td></tr>
<tr><td>8.</td><td>Justification for taking up Preliminary Exploration</td><td>i) The AkapurLimestone block is formulated on the basis of lapsed lease areas by State Government of Maharashtra in and around Akapur village of Maregaon Tehsil, Yavatmal, Maharashtra, which was granted as per section 10(A) 2(B) of the MMDR Act-15.

ii) The Directorate of Geology and Mining (DGM), Government of Maharashtra, Yavatmal requested MECL to take up the exploration in lapsed 10(A) 2(B) mining lease areas vide letter no. Tech/1848/2023/3938, dated 22/12/2023.

iii) During 1997, M/s Ku. Shailaja D. Dahule and Ku. Varsha Prabhakar Thakre has carried out the prospecting in Akapur area (20.15 hectares) with Five pits and One trench. They have established 4.0mt limestone resource in the block area. Theanalysis ranges of the samples are given below.

<table>
<tr><th rowspan="2">Constituents</th><th colspan="2">Percentage %</th></tr>
<tr><th>From</th><th>To</th></tr>
<tr><td>CaO</td><td>46.52</td><td>50.69</td></tr>
<tr><td>MgO</td><td>2.66</td><td>3.43</td></tr>
<tr><td>SiO_2</td><td>2.2</td><td>4.3</td></tr>
</table>

iv) Considering the request of DGM, Maharashtra, available exploration data and demand of limestone, MECL has planned to carry out exploration in the Akapur Block and proposed Preliminary Exploration (G-3) exploration in block to fulfil the</td></tr>
</table>

		demand of limestone in the country. v) There are 5 nos. of samples have been collected by MECL geologist oin the proposed block. The analyses are under process.

PROPOSAL FOR PRELIMINARY EXPLORATION (G-3) FOR LIMESTONE IN AKAPUR BLOCK (6.52 SQ. KM AREA) DISTRICT- YAVATMAL, MAHARASHTRA

1.0.0 INTRODUCTION

1.1.0 Preamble:

1.1.1 Limestone is a sedimentary rock composed mainly of calcium carbonate ($CaCO_3$) in the form of the mineral calcite. About 10% of sedimentary rocks are limestone and most cave systems are through limestone bedrock. Limestone often contains magnesium carbonate, either as dolomite [$CaMg(CO_3)_2$] or magnesite [MgCO3] mixed with calcite. Such rocks are termed as 'dolomitic' or 'magnesian' limestone.

1.1.2 The total reserves/resources of limestone of all categories and grades as per NMI database based on UNFC system as on 1.4.2020 has been estimated at 2,27,589 million tonnes, of which 19,028 million tonnes (8%) are placed under Reserves category and 208,560 million tonnes (92%) are under Remaining Resources category. Karnataka is the leading State having 24% of the total resources followed by Andhra Pradesh (13%), Rajasthan (12%), Gujarat (10%), Meghalaya (10%), Telangana (7%), Chhattisgarh (5%) and Madhya Pradesh (4%). The remaining 15% is shared by other states. Grade-wise, Cement grade (Portland) has leading share of about 68% followed by Unclassified grades (11%) and BF grade (6%). The remaining 15% is shared by various other grades (Mineral Year Book-2022).

1.1.3 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-15 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 Maharashtra, requested to MECL to take up exploration through National Mineral Exploration Trust (NMET) funding mechanism in the lapsed lease areas by state govt.granted as per section 10(A) 2(B) of the MMDR Act-15 in and around Akapurvide letter no. Tech/1848/2023/3938, dated 22/12/2023 and Tech/1848/2023/260, dated 23/01/2024.

1.1.4 Considering the request of DGM, Maharashtra, available data and demand of limestone, MECL has proposed Preliminary Exploration (G-3) exploration in Akapur Block to fulfil the demand of limestone in the country.

1.2.0 Background:

1.2.1 In view of the enactment of the MMDR Amendment Act, 2015 and Mineral Auction Rule, 2015 by the Govt. of India, the State administration of Maharashtra desired that some mineral prospects of the State be explored on priority basis through National Mineral Exploration Trust (NMET) fund so that those could be auctioned and thereby earn revenue for the state along with the augmentation of reserve and resource of the country. Limestone occurrence areas in Yavatmal district ofMaharashtra are among them.

1.2.2 The Akapur Limestone block covers the lapsed lease area by State Government of Maharashtra, which was granted as per section 10(A) 2(B) of the MMDR Act-15. The Directorate of Geology and Mining (DGM), Government of Maharashtra, Yavatmal requested to MECL to take up the exploration in lapsed 10(A) 2(B) mining lease areas vide letter no. Tech/1848/2023/3938, dated 22/12/2023and Tech/1848/2023/260, dated 23/01/2024.

1.2.3 Based on the request of DGM, Maharashtra, available data and demand of limestone, MECL has proposed Preliminary Exploration (G-3) exploration in Akapur Block.

1.3.0 Location& Accessibility of the Area

The proposed exploration block is located in Maregaon Tehsil of Yavatmal district and about 110 km in south-east of district headquarter Yavatmal and about 12 km from tehsil headquarter Maregaon. The area falls under the parts of Survey of India Toposheet No 55L/16and is bounded by latitude 20º 08' 24" N to 20º 09' 34" N and longitude 78° 50' 56" E to 78° 53' 04" E (Plate No I).

The coordinate of cardinal points of block boundary are as follows:

UTM, Zone-44, WGS-84			Geographic (Lat/Long), WGS-84	
Points	Eastings	Northings	LONGITUDE	LATITUDE
A	275201.8927	2230340.7592	78° 50' 57.2249" E	20° 09' 26.2168" N
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The block area is well connected to district headquarter Yavatmal, by all weather metalled road from the MH SH236 and MH SH 06 via Vadki and Karanji respectively. The nearest railhead is Wani in Central Region which is about 25 km South East of the block. The nearest airport is Dr. Babasaheb Ambedkar International Airport, Nagpur (about 170 km in north).

1.4.0 Physiography, Drainage, Climate and Vegetation

1.4.1 The proposed block area covered under undulating terrain (hilly as well as flat terrain) with a gentle southerly, easterly, and westerly slope. The majority of the block area belongs to agriculture land. The average elevation ranges from 241m to 263 m above MSL.The area has got dendritic pattern of drainage.

1.4.2 The area experiences moderately dry and wet climate. The temperature rises from March onwards, reaching maximum up to 41.8°C during April-May. The winter sets from November and lasts upto February. Winter is moderate, temperature dropping below 15.1°C with occasional colder days. The monsoon sets in July and continues up to September, most of the rainfall occurs during the months of July and August. The annual rainfall in the area is about 85 cm to 110 cm.

1.4.3 The local verities like Shal, Babul and thorny bushes, shrubs are main vegetation in the area. Apart from the above agricultural lands are there where one time crop is being cultivated. Wildlife in the area includes fox, wolf, monkeys, hare (Lepusreficaudatus) and both poisonous and non-poisonous snakes. Domesticated cattle are ox, buffalo, cow, sheep and goat are in villages in and around the block. Birds like myna, parrot, sparrow, cuckoo and owl are seen in the area.

1.5.0 Previous Work

1.5.1 The earliest mention of limestone is by Jenkin (1833) and Voysey (1833) dealing with the geology and mineralogy of the Yavatmal area, Central provinces.The geology of the area was first studied by T.W.H. Hughes, in the year 1877 who mapped the limestone bands as Penganga beds in south of Yavatmal district as Vindhyans. B.N. Sinha mapped the toposheet no 56 I/13. Later workers like A.K.R. Hemmady (1964) considered the Penganga beds to be representing transitional state between Vindhyan and Cuddapah. R.K. Agarwal and V Subba Rao of Geological Survey of India, carried out systematic geological mapping in parts of toposheet no 56 I /09, 56 I/13 and 56 I/14 in field season 1984-85 and mapped the limestone bands as Penganga beds.

1.5.2 Ku Shailaja D. Dahule& Ku Varsha Prabhakar Thakre, Distt: Yavatmal was granted a prospecting Licence for Limestone over an area of 60.27 Ha. In the village Akapur, Tehsil- Maregaon, District Yavatmal, M.S. vide Govt. of Maharashtra order No. PLS-1396/56511/(7163)/ IND-9 dated 19.07.1997. Prospecting work was conducted in the area includes reconnaissance survey followed by mapping and pitting. Preliminary survey and geological mapping have indicated the potentiality of the limestone deposit in the area which has been confirmed by the prospecting carried out. Total five pits and one trench has been undertaken for exploration in the said area. The analysis ranges of the samples are given below.

Constituents	Percentage%	
	From	To
CaO	46.52	50.69
MgO	2.66	3.43
SiO_2	2.20	4.30

1.5.3 The Lithologs of different pits undertaken during prospecting operations are as following:

Pit/Trench No.	Dimension in Mts.			Geological Formations in mts	
	Length (m)	Width (m)	Depth (m)		
I	2.80	2.40	2.60	1.80	Black cotton soil
				0.50	Sand
				0.30	Limestone
II	2.40	2.40	1.50	0.90	Black Cotton Soil
				0.60	Black limestone siliceous in nature
III	4.20	2.50	1.20	1.20	Black limestone exposed from the surface
IV	2.80	2.80	0.60	0.20	Soil
				0.40	Greyish white siliceous dolomite
V	4.00	2.00	0.60	0.60	Dolomitic limestone with calcareous and siliceous matter
Trench	30.00	1.00	0.75		Greyish black limestone in soil cover throughout the trench

1.5.4 The Statement of analysis which were found encouraging during the exploration work in the prospecting area is as following: -

Statement of Analysis							
Sample Location	Constituents						
	SiO_2	Fe_2O_3	Al_2O_3	CaO	MgO	P_2O_5	LOI
Pit No. -II	4.3	0.92	1.96	46.52	2.85	0.05	40.77
Pit No. -III	3.67	0.9	2.17	49.2	3.16	0.05	41.5
Pit No. -IV	6.48	0.87	1.9	42.35	8.8	0.05	39.54
Surface Sample	3.89	0.96	1.55	48.72	3.43	0.05	40.37
Trench	2.2	0.93	2.07	50.69	2.66	0.05	41.9

1.6.0 RegionalGeology

1.6.1 Geologically, the area presents a variety of geological units right from Archean to Recent. The Proterozoic Pakhal basin extends in NW-SE direction for ~350 km along the Pranhita-Godavari valley from Telangana state in SE to Maharashtra in NW. The Proterozoic sedimentary rocks in the Pranhita-Godavari (PG) valley are exposed along two NW-SE trending parallel belts separated by a medial strip of Gondwana rocks. The south-western belt extends from Khammam in the southeast to Adilabad in the northwest and extends further into Maharashtra state. (Amarsinghe et al., 2015). The north-eastern belt extends from the north of Bhadrachalam in the southeast to beyond Chandrapur, Maharashtra in the north-west Heron (1949) defined the succession that straddles the northern part of the outcrop belt along the southwestern flank of the valley as Pengnaga Series. Chaudhuri et al; (1989) redefined it as Penganga Group, and established its stratigraphic succession in the type area around Adilabad (Table 4.1) The Penganga group comprises of a shallow-marine siliciclastic and a deep-water carbonate-shale dominated succession in the vicinity of Adilabad town, and has been classified in to three formations, the Pranhita sandstone, Chanda Limestone and the Satnala shale, in the ascending order (Chaudhuri et al; 1989). The Pakhal basin includes unmetamorphosed and unfossiliferous sediments of the Pakhal supergroup, unconformably overlain by the rocks of Penganga and Sullavai groups. Conglomerates, arkose, shale, dolomite and quartzites characterize the Pakhals, while arkose and limestone characterize the Pengangas and sandstone characterizes the Sullavais.

Stratigraphic succession of the Penganga Group around Adilabad, Andhra Pradesh (Chadhuri et al. 1989)

	Formations	Lithology	Internal structure
Deccan Traps —Unconformity— Penganga Group:			
	Sat Nala Shale	Reddish brown shale	Very persistent thin laminations
	Chanda Limestone	Micritic limestone with thin shale interbeds. Glauconitic sandstone, Manganese oxide ore, Bedded chert and dolomite are minor constituents	Thin persistent lamination; varve-like alternation of limestone and shale; limeclast conglomerates, either chaotic or graded-bedded; massive beds in coarse-grained glauconitic sandstone with large limeclasts
	Pranhita Sandstone	Coarse- to medium-grained quartzose/subarkosic sandstone with subordinate amount of greenish mudstone	Cross-bedding; ripple marks
—Unconformity— Basement Complex (Undifferentiated)			

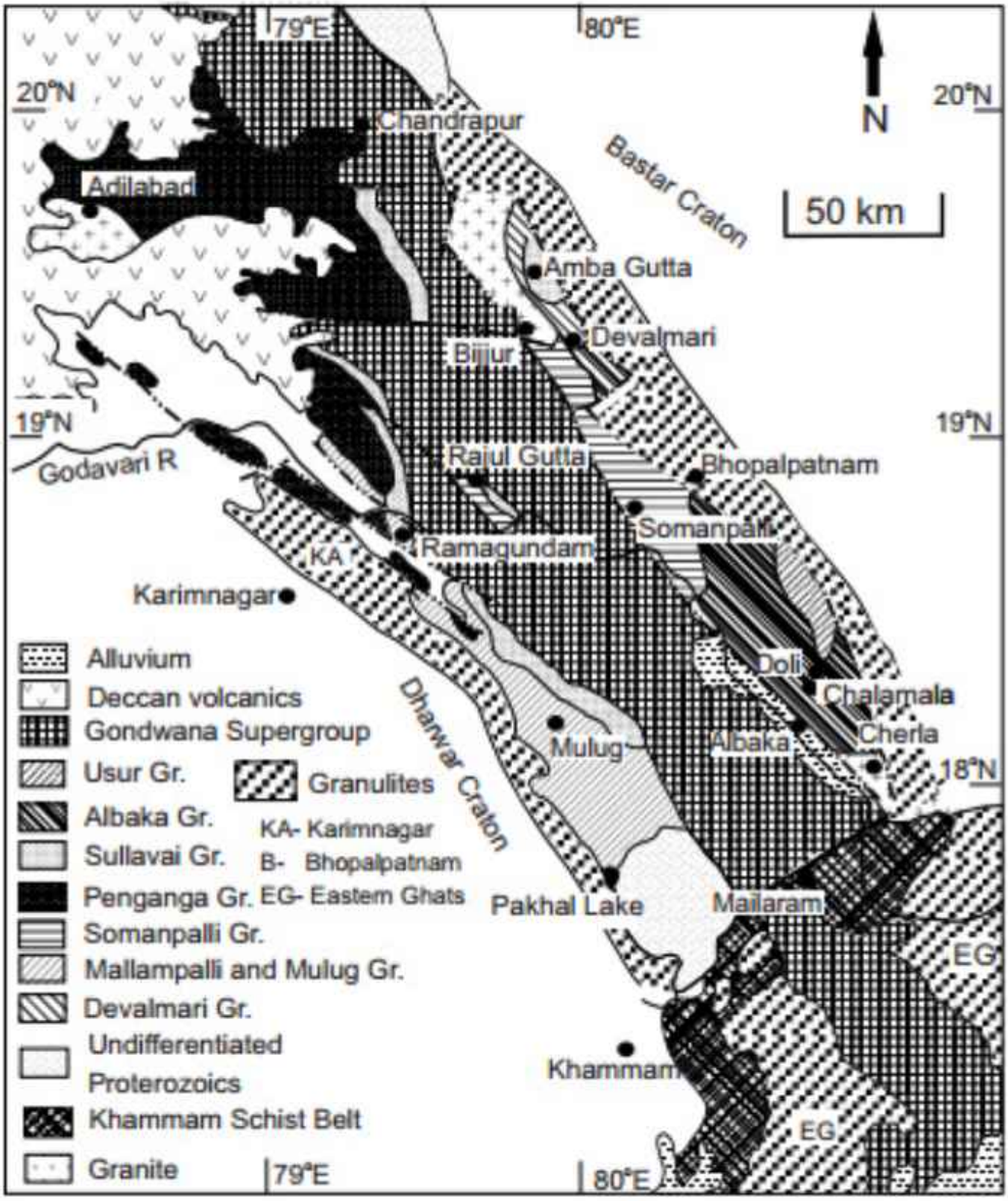

Figure-1: Generalised Geological Map of the Pranhita Godavari (PG) Valley (After Chaudhuriet al. 2012)

1.6.5 Geology of the block area

The rock type of the block area mainly belongs to Penganga group of Meso to Neo Proterozoic age. Geologically the area is represented by pre-cambrian rocks consisting of limestone and dolomites of Penganga group (Lower Vindhyan Formations) followed by Kamthi sandstone which areoverlaned by Deccan Trap. General strike of the Limestone body is NNE-SSW (also NE-SW) with dips 10° to 20° towards south.

The stratigraphic sequence of the rock formations in the region is as follows:

Decccan Trap	Basalt Lava flow
Lameta group (Lower Cretaceous)	Argillaceous sand stoneand cherty limestone
Lower Gondwana (Permo-carboniferous)	Sandstone
Penganga Group (Pre-cambrian)	Limestone and Dolomite

In the proposed area the rocks comprising only the limestone and dolomite of Penganga group arepresent. However, these rocks are covered with 0.5m alluvial soil.

Alluvial Soil:
Alluvial soil is pale brown, and greyish black to black in colour and is formed due to decomposition of Deccan Trap. It is found to occur as a thin layer at places. The average thickness of alluvial soil is varying from 0.20m to 1.80m. Somewhere associated with kankars and also Clayey in nature.

Limestone:
The limestone is fine grained, massive, ash grey to blackish in colour. It occurs mostly in massive beds, compact and jointed in nature. Beds of Limestones are well developed and mostly homogeneous in nature and lacking solution cavities and voids.

The limestone formation in the proposed area exhibits gentle dip maintain a strike line of NNE-SSW (also NE-SW) with dips 10° to 20° towards south. The strikes and angles of dip are measured from the outcrops and as well as from the trial pits. At places the limestone sequence is marked by thinning and thickening of beds. The limestone well jointed with most joints filled with calcareous/clays matter.

Dolomite:
There are also sample exposures of Dolomite deposit in the southern part of the proposed area. The dolomite deposit is also maintaining the same strike line and dip direction as that of limestone deposit in the area. The angle of dip varies from 10° to 20° towards south. The dolomite deposit is also medium to coarse grained with brownish shade in colour.

1.7.0 Scope of Proposed Exploration

1.7.1 The proposed Preliminary Exploration (G-3 stage) program comprises topographical survey (1:4,000 scale), geological mapping (1:4,000 scale), trenching and drilling ofabout 350m with associated survey, chemical analysis& physical analysis and geological report preparation.

1.8.0 Observation and Recommendations of previous work

1.8.1 The Akapur Limestone block is formulated on the basis of lapsed lease areas by State Government of Maharashtra in and around Akapur village of Maregaon Tehsil, Yavatmal, Maharashtra, which was granted as per section 10(A) 2(B) of the MMDR Act-15. The area was earlier explored by the lessees and all the lessees reported the limestone in the area.

2.0.0 Previous Work / Background information

2.0.1 The background information and previous works have been described in para 1.2.0 and 1.5.0 respectively.

3.0.0 Block description

3.0.1 The proposed block details are given in para 1.3.0.

4.0.0 Objective of the proposed Preliminary Exploration (G-3):

4.1.0 Based on the geological data of 10(A) 2(B) cases, provided by DGM, Maharashtra in and around Akapur Block, Dist- Yavatmal, Maharashtra, the present exploration programme for Preliminary Exploration (G-3) has been formulated.

4.2.0 The objectives of the present Preliminary Exploration (G-3) are as follows:

i) To carry out Topographical Survey and Geological & Structural mapping on 1:4000 scale.

ii) To delineate depth continuity of limestone by drilling on 800m strike interval up to a vertical depth of 50m.

iii) To assess the quality and quantity of the resources (333) as per UNFC norms & Minerals (Evidence of Mineral Contents) Rules- 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.

5.0.0 Planned Methodology

5.1.0 In accordance to the objective set for Preliminary Exploration (G-3) of the block, the exploration programme is proposed. The Exploration shall be carried out as per Minerals (Evidence of Mineral Contents) Rule-2015. Accordingly, the following scheme of exploration is formulated in order to achieve the objectives. The details of different activities to be carried out are presented in subsequent paragraphs.

5.2.0 Surveying:

5.2.1 The block area would be tied up with the triangulation network and contouring/topographical survey will be updated in the entire block areaof 6.52sq.km. The surface features in the block area will be picked up and marked on the map on 1:4,000 scale. The reduced levels and co-ordinates of boreholes, trenches and boundary coordinates would be determined. The contouring will be carried out at 2m interval. The exploratory boreholes and block boundary (total 19 points) shall be surveyed byDGPS and total station in WGS-84 datum, for demarcation of block boundary/cornerpoints.

5.3.0 Geological Mapping:

5.3.1 Detailed Geological mapping on 1:4,000 scale will be carried out in the entire block area. The rock types, their contact, structural features, mineralisation etc. will be mapped by taking traverses and will be marked on the map. Surface manifestations of the mineralisation available along with their surface disposition will also be marked on the map.

5.6.0 Exploratory Drilling:

5.6.1 The present scheme for limestone exploration includes 350m drilling in 07 no of boreholes with an average depth of 50 m. In the proposed block, vertical boreholes are planned at 800m strike interval with vertical depth of 50m to establish the subsurface dimension of limestone deposit.

5.7.0 Drill Core Logging

5.7.1 The borehole cores would be logged systematically; viz. details of the litho units, colour, structural feature, texture etc.On the basis of these parameters, grade of limestone can bebroadly presented and it will also be helpful in sampling.

5.8.0 Drill Core Sampling

5.8.1 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.

5.8.2 For preparation of samples the borehole core will be longitudinally split into twoequalhalves by using core splitter. One half will be powdered to -200 mesh size andthe other half will be kept for future studies. The powdered material will be mixedthoroughly and about 100 gm of samples will be taken for chemical analysis bysuccessive coning and quartering as primary samples and rest of the material (-200mesh size) will be kept as duplicate half for future reference.All primary and check sampleswill be analysed for 09 radicals i.e., CaO, MgO, SiO_2, Fe_2O_3, Al_2O_3, SO_3, P_2O_5, K_2O& LOI.

5.8.3 Total 320 numbers of primary samples are likely to be generated for Limestone.This includes 300 core samples and 20 bedrock samples. Around 10% of Primary samples (32 numbers) will be sent to NABL External Labs for analysis of 9 radicals i.e., CaO, MgO, SiO_2, Fe_2O_3, Al_2O_3, SO_3, P_2O_5, K_2O& LOIas external check samples.

5.9.0 Petrological Studies

5.9.1 Thin section study on drill cores samples would be done for ascertaining the petrographic characteristics. These samples would be drawn from ore zones and host rocks. A provision of 5 specimens for petrographic study has been kept in the block.

5.10.0 Bulk Density Determination

5.10.1 A provision of 5 samples for bulk density determination has been kept.

5.11.0 Quantum of work:

5.11.1 The quantum of work proposed by MECL in AkapurLimestone (G-3) Block is given in Table-5.1.

Table-5.1: Proposed Quantum of Exploratory Work in AkapurLimestoneBlock District-Yavatmal, Maharashtra

Sl. No.	Item of Work	Unit	Proposed Quantum of work
1	Topographical Survey (1:4000)	sq. km	6.52
2	Geological Mapping (1:4000)	sq. km	6.52
3	Core Drilling	m.	350
4	Sample Preparation & Chemical Analysis		
	i) Primary samples for 9 radicals i.e.,CaO, MgO, SiO_2, Fe_2O_3, Al_2O_3, SO_3, P_2O_5, K_2O & LOI	Nos.	320
	ii) External Check sample (10% of Primary samples) for 9 radicals i.e., CaO, MgO, SiO_2, Fe_2O_3, Al_2O_3, SO_3, P_2O_5, K_2O & LOI	Nos.	32

Sl. No.	Item of Work	Unit	Proposed Quantum of work
6	Petrographic Studies	Nos	5
8	Bulk Density Determination	Nos	5
9	Report Preparation (Digital format)	Nos.	1

6.0.0 Manpower Deployment

6.0.1 Manpower deployment List may be provided later.

7.0.0 Break-up of Expenditure

7.1.0 The proposed exploration programme is planned for Preliminary Exploration (G-3). The work activities like camp setting, geological work, survey work, drilling & laboratory work, report writing will be completed within 12 months' time. The bar chart showing activities wise time schedule is placed at **Table-7.1.**

Table-7.1.

Time schedule for G-3 Level Exploration for Limestone in Proposed Akapur Block, Dist-Yavatmal, Maharashtra

Sl. No.	Activities	Unit	MONTHS											
			1	2	3	4	5	6	7	8	9	10	11	12
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	Camp Winding	Month												
7	Laboratory Studies	Nos.												
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.

7.2.0 Tentative cost has been estimated based on Schedule of Charges (SoC) of projects funded by National Mineral Exploration Trust (NMET) w.e.f. 01/04/2020 and the total estimated cost is **Rs. 105.11 Lakh.** The summary of tentative cost estimates for Preliminary Exploration is given in **Table No.-7.2** and details of tentative cost estimates are given as Annexure-I.

Table No-7.2: Summary of Tentative Cost Estimates for Preliminary Exploration (G-3) in Akapur Limestone Block, District-Yavatmal, Maharashtra

SL. NO.	ITEM	ESTIMATED COST (Rs.)
1	Drilling	39,24,080
2	Geology & Survey	29,46,390
3	Laboratory	14,26,005
	Sub Total (1 to 3)	**82,96,475**
4	Exploration Report	4,14,824
5	Proposal Preparation	1,65,930
6	Peer Review Charges	30,000
	Grand Total	**89,07,228**
	GST 18%	16,03,301
	Total:	**1,05,10,529**
	Say Rs. in Lakhs	**105.11**

8. 0.0 Justification:

i) The Akapur Limestone block is formulated on the basis of lapsed lease areas by State Government of Maharashtra in and around Akapur village of Maregaon Tehsil, Yavatmal, Maharashtra, which was granted as per section 10(A) 2(B) of the MMDR Act-15.

ii) The Directorate of Geology and Mining (DGM), Government of Maharashtra, Yavatmal requested MECL to take up the exploration in lapsed 10(A) 2(B) mining lease areas vide letter no. Tech/1848/2023/3938, dated 22/12/2023and Tech/1848/2023/260, dated 23/01/2024.

iii) Ku Shailaja D. Dahule & Ku Varsha Prabhakar Thakre, Distt: Yavatmal was granted a prospecting Licence for Limestone over an area of 60.27 Ha. In the village Akapur, Tehsil- Maregaon, District Yavatmal, M.S. vide Govt. of Maharashtra order No. PLS- 1396/56511/ (7163)/ IND-9; dated 19.07.1997. Prospecting work was conducted in the area includes reconnaissance survey followed by mapping and pitting. Preliminary survey and geological mapping have indicated the potentiality of the limestone deposit in the area which has been confirmed by the prospecting carried out. Total five pits and one trench has been undertaken for exploration in the said area. The analysis ranges of the samples are given below.

Constituents	Percentage%	
	From	To
CaO	46.52	50.69

MgO	2.66	3.43
SiO_2	2.20	4.30

iv) The Lithologs of different pits undertaken during prospecting operations are as following:

Pit/ Trench No.	Dimension in Mts.			Geological Formations in mts	
	Length (m)	Width (m)	Depth (m)		
I	2.80	2.40	2.60	1.80	Black cotton soil
				0.50	Sand
				0.30	Limestone
II	2.40	2.40	1.50	0.90	Black Cotton Soil
				0.60	Black limestone siliceous in nature
III	4.20	2.50	1.20	1.20	Black limestone exposed from the surface
IV	2.80	2.80	0.60	0.20	Soil
				0.40	Greyish white siliceous dolomite
V	4.00	2.00	0.60	0.60	Dolomitic limestone with calcareous and siliceous matter
Trench	30.00	1.00	0.75		Greyish black limestone in soil cover throughout the trench

v) The Statement of analysis which were found encouraging during the exploration work in the prospecting area is as following: -

Statement of Analysis							
Sample Location	**Constituents**						
	SiO_2	**Fe_2O_3**	**Al_2O_3**	**CaO**	**MgO**	**P_2O_5**	**LOI**
Pit No. -II	4.3	0.92	1.96	46.52	2.85	0.05	40.77
Pit No. -III	3.67	0.9	2.17	49.2	3.16	0.05	41.5
Pit No. -IV	6.48	0.87	1.9	42.35	8.8	0.05	39.54
Surface Sample	3.89	0.96	1.55	48.72	3.43	0.05	40.37
Trench	2.2	0.93	2.07	50.69	2.66	0.05	41.9

vi) There are 5 nos. of samples have been collected by MECL geologist oin the proposed block. The analyses are under process.

9. 0.0 References:

Agarwal R.K.,V Subbarao 1986; Geology of parts of Yavatmal and Chandrapur district, Maharashtra, Geological Survey of India.

Aparajit, N.M., Ahmad S.A. K.C, 2020;Report on General Exploration for establishing Limestone deposit in Jevra-Tulshi Area (STAGE-G2) Ta: Korpana, Dist: Chandrapur, Maharashtra, Directorate of Geology and Mining, Maharashtra unpublished report.

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M/s. Ku Shailaja D. Dahule & Ku Varsha Prabhakar Thakre; Report on Prospecting of Akapur Limestone Deposit, Village- Akapur, Tehsil-Maregaon, Dist-Yavatmal, Maharashtra.

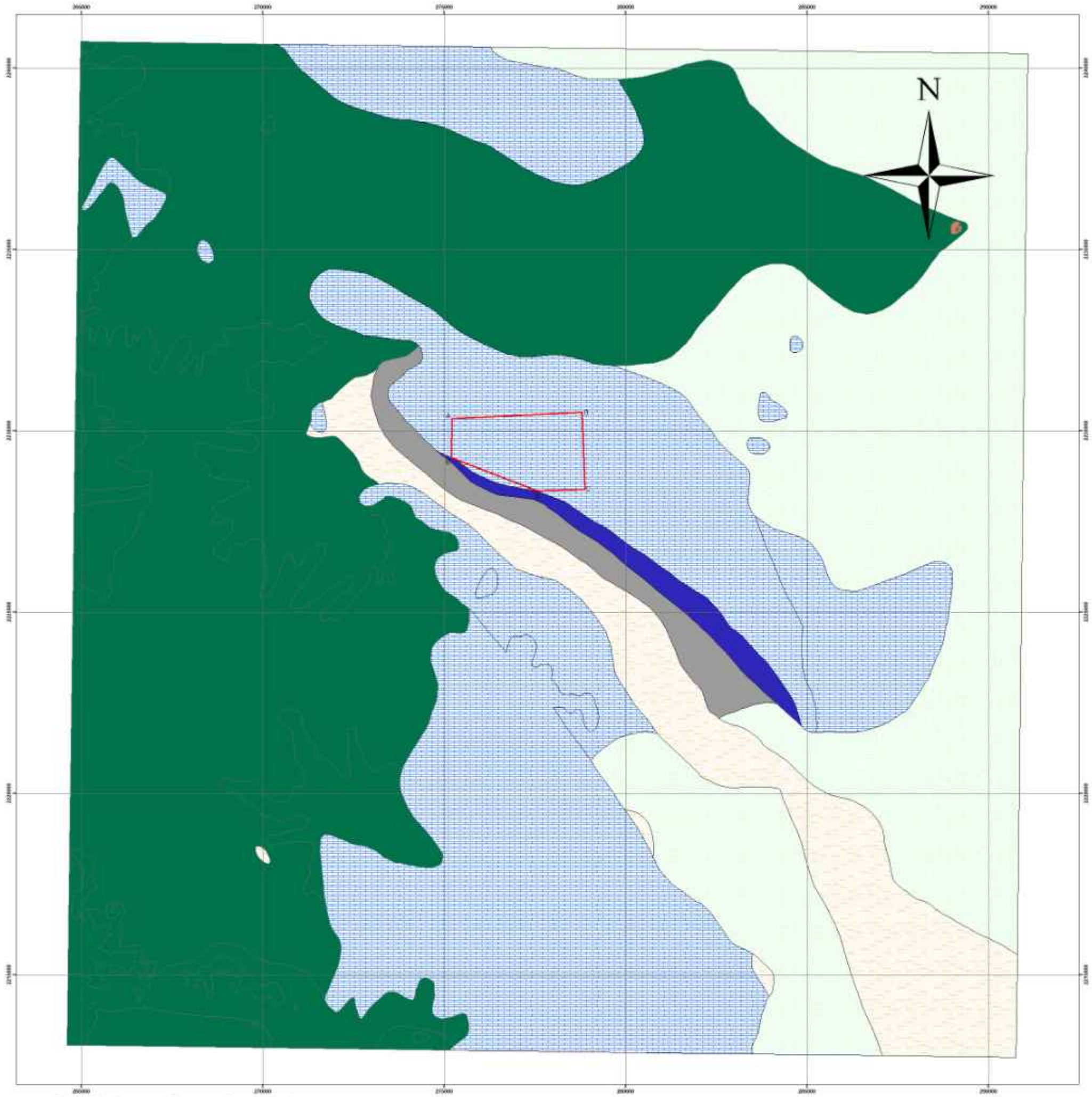
List of Plates:

1. Plate-I: Block Location Map of AkapurBlock in Toposheet no. 56I/03, District-Yavatmal, Maharashtra.
2. Plate-II: Regional Geological Map of the area (Scale 1: 50,000)
3. Plate-III: Geological Map of the block (Scale 1: 25,000)
4. Plate-IV: Borehole plan along with Geological Map of the block (Scale 1: 25,000)

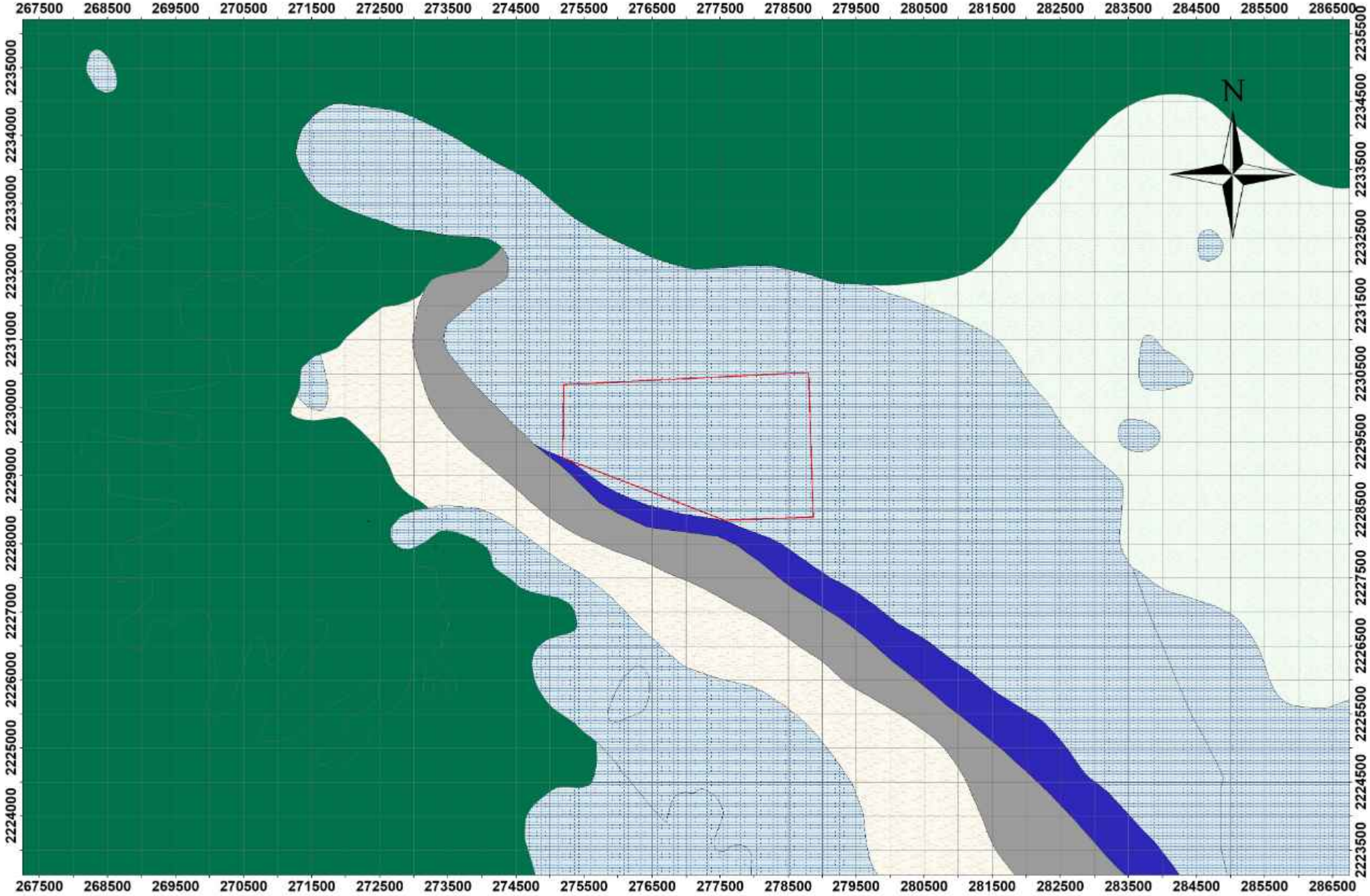
List of Annexures:

1. **Annexure-I:** Details of the total cost estimatedfor the Preliminary Exploration (G-3) in Akapur Block, District-Yavatmal, Maharashtra.

REGIONAL GEOLOGICAL MAP OF AKAPUR BLOCK, DIST. YAVATMAL, MAHARASHTRA



GEOLOGICAL MAP OF THE AKAPUR BLOCK, DIST. YAVATMAL, MAHARASHTRA



Legend

akapur_block_boundary

LEGENDS

<all other values>

LITHOLOGY

ALLUVIUM

BASALT

FINE GRAINED SANDSTONE

LATERITE

LIMESTONE

SANDSTONE

SANDSTONE WITH COAL

Location Map of Akapur Limestone Block (G3), Tehsil: Maregaon, Dist: Yavatmal, Maharashta