PROPOSAL FORPRELIMINARY EXPLORATION (G-3)
FOR LIMESTONE IN
DHUNKI-CHILAI BLOCK
(5.58 SQ.KM AREA)
DISTRICT- YAVATMAL, MAHARASHTRA

COMMODITY: LIMESTONE

BY

MINERAL EXPLORATION AND CONSULTANCY LIMITED

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SEMINARY HILLS

PLACE: NAGPUR

DATE: JANUARY 2025

Summary for Preliminary Exploration (G-3) for limestone in Dhunki-ChilaiBlock (5.58sq.km area), District- Yavatmal, Maharashtra

	Features	**Details**
	Block ID	**Dhunki-Chilai LimestoneBlock**
	Exploration Agency	Mineral Exploration and Consultancy Limited (MECL)
	Commodity	**Limestone**
	Mineral Belt	Penganga Beds or Penganga Series
	Budget & Time schedule to complete the project	98.31 lakhs &10 months
	Objectives	Based on the geological data of 10 (A) 2 (B) cases, provided by DGM, Maharashtra in and around Hiwardhara village and data collected by MECL geologists in around Hiwardhara, Ganeshpura, Dhunki and Chilai village area the present exploration programme for Preliminary Exploration (G-3) for limestone in Dhunki-Chilai Block, Distt- Yavatmal, Maharashtra, has been formulated. The proposed area lies in the east of Hiwardhara lapse lease area. 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 -100 days & HQ-30 days
		Survey Party days: 30 days
		Sampling Party days: 30 days

<table>
<tr><td>1.</td><td>Location</td><td>The proposed exploration block is located in Wani Tehsil of Yavatmal district and about 130 km in south-east of district headquarter Yavatmal and about 35 km from tehsil headquarters Wani. The area falls under the parts of Survey of India Toposheet No 56I/13 and is bounded by latitude 19°50'9.0548"N to 19°51'8.0602"N and longitude 78°55'39.5543"E to 78°57'42.2651"E (Plate No I).</td></tr>
<tr><td></td><td>Latitude and Longitude</td><td>
<table>
<tr><th rowspan="2">Points</th><th colspan="2">UTM (ZONE-44), WGS-84</th><th colspan="2">GEOGRAPHIC (DMS), WGS-84</th></tr>
<tr><th>Easting</th><th>Northing</th><th>Latitude</th><th>Longitute</th></tr>
<tr><td>A</td><td>282983.5613</td><td>2196463.407</td><td>19°51' 8.0602"N</td><td>78°55' 39.5543"E</td></tr>
<tr><td>B</td><td>285737.2419</td><td>2196412.883</td><td>19°51' 7.5107"N</td><td>78°57' 14.1941"E</td></tr>
<tr><td>C</td><td>286532.5898</td><td>2194625.802</td><td>19°50' 9.7223"N</td><td>78°57' 42.2651"E</td></tr>
<tr><td>D</td><td>283067.2945</td><td>2194647.459</td><td>19°50' 9.0548"N</td><td>78°55' 43.1975"E</td></tr>
</table>
</td></tr>
<tr><td></td><td>Villages</td><td>Dhunki, Mundra, Hiradhwara, Ganeshpura, Chilai, Adegaon, Mukutban, Tundra, yedsi, Amlan etc.</td></tr>
<tr><td></td><td>Tehsil/Taluk</td><td>Wani</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>5.58 sq.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 35 km north 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 SH237 and MH SH 234 via Ghatanji and Pandharkawada.</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 general slope of the country is towards south, south-east and east. The southerly and south-easterly flowing drainages are collected by easterly flowing Penganga River. However, the easterly flowing drainages are collected by southerly flowing Vidarbha River, which ultimately goes to Penganga River. The area has got dendritic pattern of drainage.</td></tr>
<tr><td></td><td>Rivers/ Streams</td><td>Vidarbha River towards east of the block and Penganga River towards south 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 100 cm</td></tr>
</table>

	Temperature:	Minimum temperatures: below 13°C (December-January), Maximum temperatures: up to 46°C (April-May)
6.	**Topography**	
	Toposheet Number	55I/13
	Morphology of the Area	The proposed block area covered under undulating terrain (hilly as well as flat terrain) with a gentle southerly, south-easterly and easterly slope. The most of the block area belongs to agriculture land. The average elevation ranges from 220m to 230 m above MSL. The southerly and south-easterly flowing drainages are collected by easterly flowing Penganga River. However, the easterly flowing drainages are collected by southerly flowing Vidarbha River, which ultimately goes to Penganga River. The area has got dendritic pattern of drainage.
7.	**Availability of baseline geoscience data**	
	Geological Map (1:50K/25K)	1:50,000(NGDR)
	Geochemical Map	Not available.
	Geophysical Map (Aeromagnetic, ground geophysical, Regional as well as local scale GP maps)	Not available.
8.	**Justification for taking up Preliminary Exploration**	i) The Dhunki-Chilai Limestone block is formulated on the basis of lapsed lease areas by State Government of Maharashtra in Hiradhwaravillage of Wani Tehsil, Yavatmal, Maharashtra, which was granted as per section 10(A) 2(B) of the MMDR Act-15 and the geological data collected by MECL geologists. 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/1848/2023/260, dated 23/01/2024. The proposed area lies in the east of the Hiwardhara lapse lease area in which limestone was reported by lessee. iii) During 2004-2005, M/s Bajrang Sales Pvt. Ltd, has carried out the prospecting in Hiwardhara area (39.98 hectares) with eight pits. They have established 4.0mt limestone resource in the block area. The proposed block area lies in the east of Hiradhwara lease area. The analysis ranges of the samples in Hiwardhara

area are given below.

Constituents	Grade (%)	
	From	To
CaO	30.50	51.00
MgO	2.00	19.30
SiO_2	2.8	8.0

The proposed exploration block lies in the east of the Hiwardhara lease area.

iv) MECL studied the data provided by the DGM, Maharashtra and carried out the field visit in and around the Hiradhwara, Ganeshpura, Dhunki and Chilai area. The geologist team studied the area and observed the surface indication of the limestone in the paddy field of the block area.

v) There are 4 nos. of samples have been collected by MECL geologist in the proposed block. The analysis ranges of the samples are given below.

Constituents	Grade (%)	
	From	To
CaO	18.99	50.52
MgO	1.36	8.22
SiO_2	4.85	34.53

vi) Considering the available exploration data, field visit by MECL geologists and demand of limestone, MECL has planned to carry out exploration in the Dhunki-Chilai Block and proposed Preliminary Exploration (G-3) exploration in block to fulfil the demand of limestone in the country.

PROPOSAL FOR PRELIMINARY EXPLORATION (G-3) FOR LIMESTONE IN DHUNKI-CHILAIBLOCK (5.58 SQ. KM AREA) DISTRICT- YAVATMAL, MAHARASHTRA

1.0.0 INTRODUCTION

1.1.0 Preamble:

1.1.1 Limestoneis 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 MineralContents) 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 Hiwardhara and Ganeshpura villages vide letter no. Tech/1848/2023/260, dated 23/01/2024. The Hiwardhara lapsed lease area lies in the west of the proposed block area.

1.1.4 The geologists of MECL have visited the area in and around the lapse lease in Hiwardhara village and collected geological data as well as limestone samples. The analysis of the samples is in process.

1.1.5 Considering the request of DGM, Maharashtra, available data, data collected by MECL geologists and demand of limestone, MECL has proposed Preliminary Exploration (G-3) exploration in Dhunki-Chilai 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 of Maharashtra are among them.

1.2.2 The Dhunki-Chilai Limestone block lies in the east of the lapsed Hiwardhara 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/1848/2023/260, dated 23/01/2024.The geologists of MECL have visited the area in and around the lapse lease in Hiwardhara village and collected geological data as well as limestone samples and demarcated potential area for limestone exploration in the east of lapsed lease area.

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

1.3.0 Location& Accessibility of the Area

The proposed exploration block is located in Wani Tehsil of Yavatmal district and about 130 km in south-east of district headquarter Yavatmal and about 35 km from tehsil headquarters Wani. The area falls under the parts of Survey of India Toposheet No 56I/13 and is bounded by latitude 19°50' 9.0548"Nto 19°51' 8.0602"Nand longitude 78°55' 39.5543"Eto 78°57' 42.2651"E(Plate No I).

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

Points	UTM (ZONE-44), WGS-84		GEOGRAPHIC (DMS), WGS-84	
	Easting	Northing	Latitude	Longitute
A	282983.5613	2196463.407	19°51' 8.0602"N	78°55' 39.5543"E
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The block area is well connected to district headquarter Yavatmal, by all weather metalled road from the MH SH237 and MH SH 234 via Ghatanji and Pandharkawada. The nearest railhead is Wani in Central Region which is about 35 km north 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, south-easterly and easterly slope. The most of the block area belongs to agriculture land. The average elevation ranges from 220m to 230 m above MSL. The southerly and south-easterly flowing drainages are collected by easterly flowing Penganga River. However, the easterly flowing drainages are collected by southerly flowing Vidarbha River, which ultimately goes to Penganga River. Vidarbha River lies towards east of the block and Penganga River towards south of the proposed block. 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 46°C during April-May. The winter sets from November and lasts upto February. Winter is moderate, temperature dropping below 13°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 100 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 cattles 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 M/s Bajrang Sales Pvt. Ltd, Distt: Yavatmal was granted a prospecting Licence for Limestone over an area of 39.98 Ha. in the village Hiwardhara, Tehsil- Wani, District Yavatmal, Maharashtra. 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 eight pits have been carried out for exploration in the area. The analysisof the samples is given below.

Pit No.	SiO_2	CaO	MgO	Fe_2O_3	Al_2O_3	LOI
1	5.1	31.90	17.30	0.20	0.80	43.91
2	6.5	47.20	3.50	0.13	0.68	41.00
3	2.8	50.50	2.60	0.10	0.50	42.55
4	3.2	51.00	2.00	0.15	0.65	42.30
5	3.0	30.50	19.30	0.20	0.70	45.00
6	8.0	44.50	5.40	0.30	1.00	40.50
7	7.0	46.10	4.10	0.25	0.90	40.70
8	4.5	48.20	4.60	0.15	0.75	41.80

The proposed block area lies in the east of the Hiwardhara lease area.

1.5.3 There is a field conducted by MECL geologists in the proposed area. They have reported the limestone in the area and collected 4 nos. of samples. The analysisof the samples is given below.

Sample No.	CaO%	MgO%	Al_2O_3%	SiO_2%	Fe_2O_3%	SO_3%	P_2O_5%	K_2O%	LOI%
S-10	18.99	8.22	5.42	34.53	3.91	0.04	0.07	2.35	25.70
S-11	50.52	1.36	1.17	4.85	0.79	0.08	0.04	0.42	40.53
S-12	36.86	6.29	3.05	13.48	1.61	0.02	0.04	0.90	37.45
S-13	40.72	2.90	3.13	16.15	1.09	0.04	0.03	0.94	34.65

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 (Chaudhuri 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)			

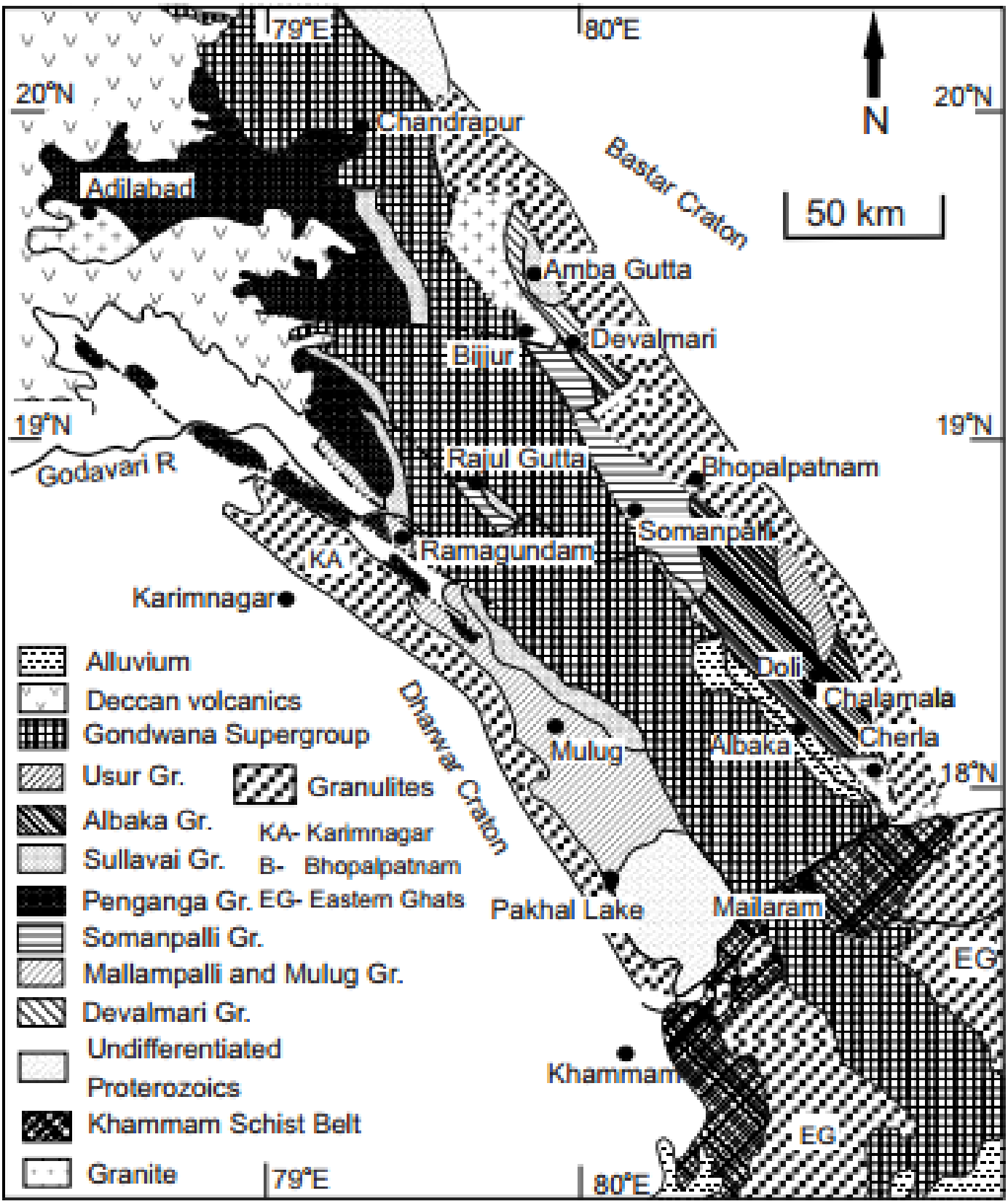


Figure-1: Generalised Geological Map of the Pranhita Godavari (PG) Valley (After Chaudhuriet.al., 2012)

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 areoverlained 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 proposedPreliminary Exploration (G-3 stage) program comprisestopographical 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 Dhunki-ChilaiLimestone block is formulated on the basis of lapsed lease areas by State Government of Maharashtra in Hiwardhara village of Wani Tehsil, Yavatmal, Maharashtra, which was granted as per section 10(A) 2(B) of the MMDR Act-15 and the field data collected by geologists of MECL. The proposed area lies in the east of the Hiwardhara lapse lease area in which limestone was reported by lessee.

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 Hiwardhara village and data collected by MECL geologists in around Hiwardhara, Ganeshpura and Chilai village area the present exploration programme for Preliminary Exploration (G-3) for limestone in Dhunki-Chilai Block, Distt- Yavatmal, Maharashtra, has been formulated. The proposed area lies in the east of Hiwardhara lapse lease area.

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 5.58sq.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 11 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 limestoneexploration 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 strikeinterval 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, textureetc. 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 corerecovery. The following parameters shall be considered while sampling the drillcores.

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 two equal halves by using core splitter. One half will be powdered to -200 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 (-200mesh size) will be kept as duplicate half for future reference. All primary and check samples will be analysed for 10 radicals i.e., CaO, MgO, SiO_2, Fe_2O_3, Al_2O_3, SO_3, P_2O_5, K_2O, Na_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 10 radicals i.e., CaO, MgO, SiO_2, Fe_2O_3, Al_2O_3, SO_3, P_2O_5, K_2O, Na_2O & LOI as 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 2 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 Dhunki-Chilai Limestone (G-3) Block is given in Table-5.1.

Table-5.1: Proposed Quantum of Exploratory Work in Dhunki-Chilai Limestone Block, District-Yavatmal, Maharashtra

Sl. No.	Item of Work	Unit	Proposed Quantum of work
1	Topographical Survey (1:4000)	sq. km	5.58
2	Geological Mapping (1:4000)	sq. km	5.58
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,	Nos.	320

Sl. No.	Item of Work	Unit	Proposed Quantum of work
	Al_2O_3, SO_3, P_2O_5, K_2O, Na_2O & LOI		
	ii) External Check sample (10% of Primary samples) for 10 radicals i.e., CaO, MgO, SiO_2, Fe_2O_3, Al_2O_3, SO_3, P_2O_5, K_2O, Na_2O & LOI	Nos.	32
6	Petrographic Studies	Nos	5
8	Bulk Density Determination	Nos	2
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 Dhunki-Chilai Block, District-Yavatmal, Maharashtra

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	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. 98.31 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 Dhunki-Chilai Limestone Block, District-Yavatmal, Maharashtra

SL. NO.	ITEM	ESTIMATED COST (Rs.)
1	Drilling	39,46,100
2	Geology & Survey	22,93,884
3	Laboratory	15,18,405
Sub Total (1 to 3)		**77,58,389**
4	Exploration Report	3,87,919
5	Proposal Preparation	1,55,168
6	Peer Review Charges	30,000
Grand Total		**83,31,476**
GST 18%		14,99,666
Total:		**98,31,142**
Say Rs. in Lakhs		**98.31**

8. 0.0 Justification:

i) The Dhunki-Chilai Limestone block is formulated on the basis of lapsed lease areas by State Government of Maharashtra in Hiradhwara village of Wani Tehsil, Yavatmal, Maharashtra, which was granted as per section 10(A) 2(B) of the MMDR Act-15 and the geological data collected by MECL geologists.

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/1848/2023/260, dated 23/01/2024. The proposed area lies in the east of the Hiwardhara lapse lease area in which limestone was reported by lessee.

iii) During 2004-2005, M/s Bajrang Sales Pvt. Ltd, has carried out the prospecting in Hiwardhara area (39.98 hectares) with eight pits. They have established 4.0mt limestone resource in the block area. The proposed block area lies in the east of Hiradhwara lease area.The analysis ranges of the samples in Hiwardhara area are given below.

Constituents	Grade (%)	
	From	To
CaO	30.50	51.00
MgO	2.00	19.30
SiO_2	2.8	8.0

The proposed exploration block lies in the east of the Hiwardhara lease area.

iv) MECL studied the data provided by the DGM, Maharashtra and carried out the field visit in and around the Hiradhwara, Ganeshpura, Dhunki and Chilai area. The geologist team studied the area and observed the surface indication of the limestone in the paddy field of the block area.

v) There are 4 nos. of samples have been collected by MECL geologist in the proposed block. The analyses are under process. The analysis ranges of the samples are given below.

Constituents	Grade (%)	
	From	To
CaO	18.99	50.52
MgO	1.36	8.22
SiO_2	4.85	34.53

vi) Considering the available exploration data, field visit by MECL geologists and demand of limestone, MECL has planned to carry out exploration in the Dhunki-Chilai Block and proposed Preliminary Exploration (G-3) exploration in block to fulfil the demand of limestone in the country.

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.

Chaudhuri, A.K., Deb, G.K., Deb, S.P., Sarkar, S.,2012, "The Palaeozoic and Tectonic Evolution of the Pranhita- Godavari valley, Central India: A stratigraphic perspective", American Journal of Science, Vol. 312, pp. 766-815.

Guntiwar V.S., Samji R.N. 1986, Report on prospecting for limestone in Jawra-Tulsi area, TahRajura, Chandrapur District Maharashtra, Directorate of Geology and Mining, Maharashtra

Mukhopadhyay Joydip, Chaudhuri Asru K., 2003, "Stratigraphy of the Chanda limestone of the Proterozoic Penganga Group, Adilabad, Andhra Pradesh: New light on Depositional setting and Paleogeography",Journal Geological Society of India, Vol.62, Sept 2003, pp. 356-358.

M/s Bajrang Sales Pvt. Ltd; Geological & Prospecting Report of Limestone and Dolomite deposit in the area over 39.98 Ha. in Village: Hiwardhara, Tehsil-Wani, Dist-Yavatmal, Maharashtra.

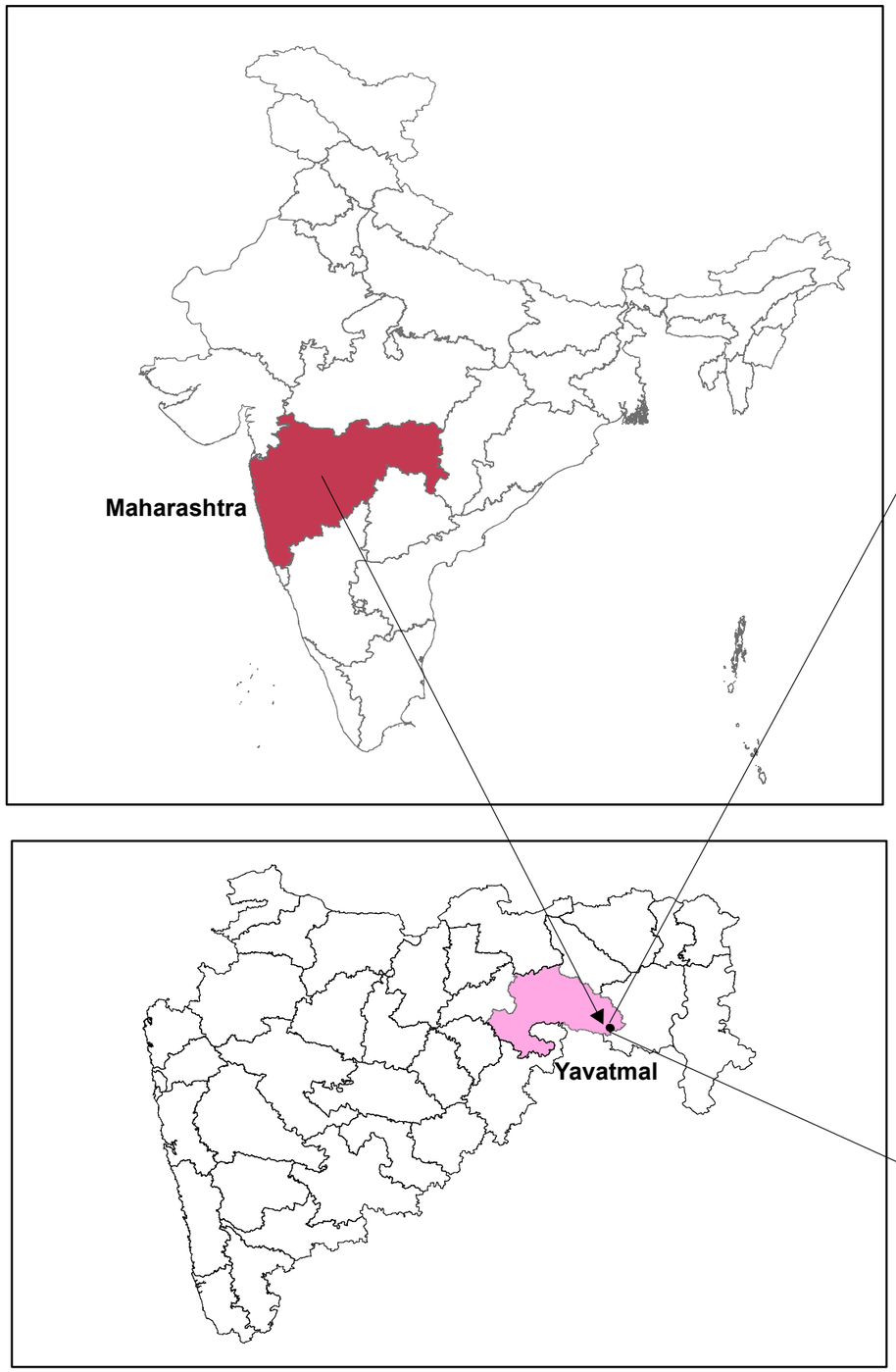
List of Plates:

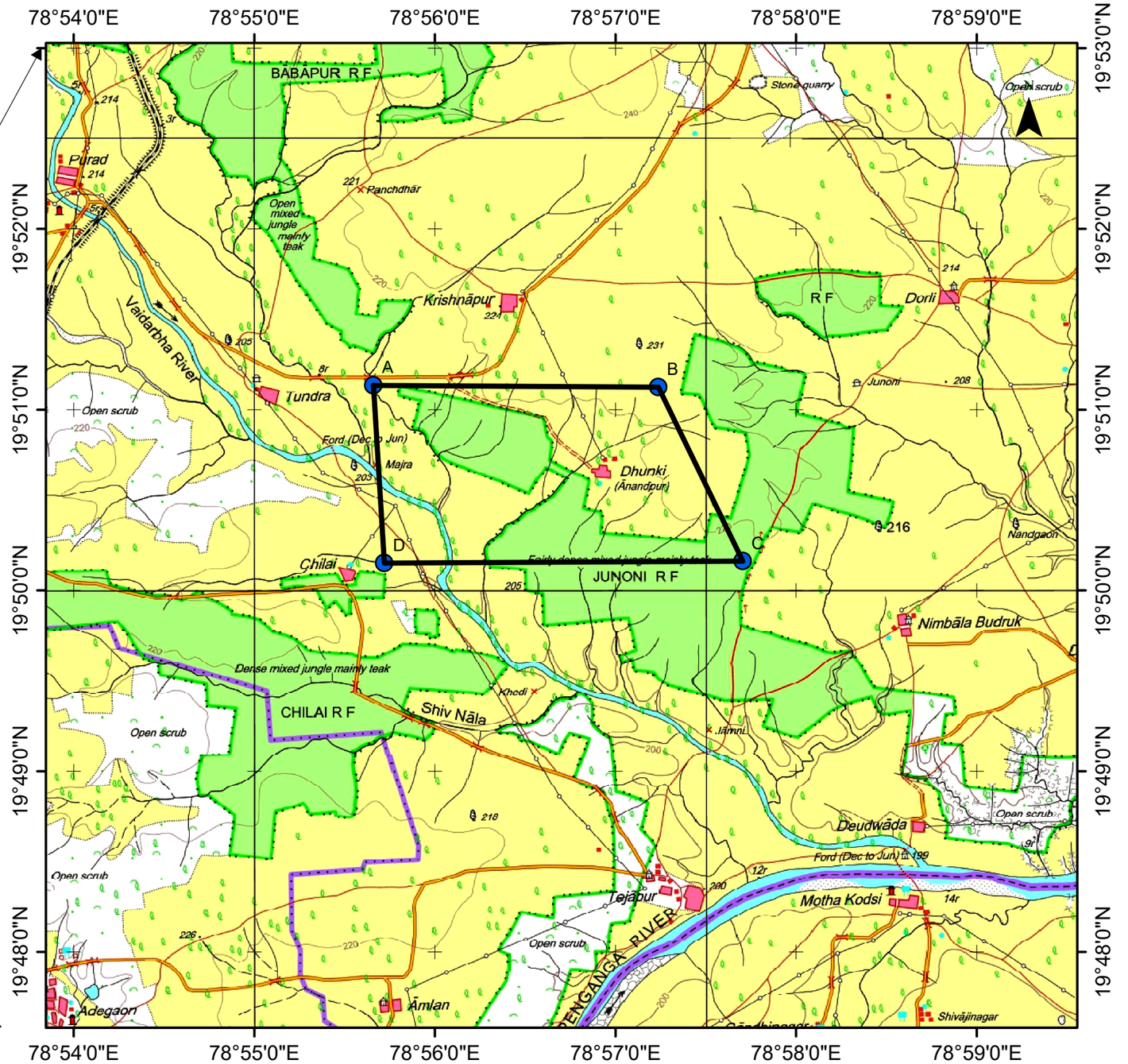
1. Plate-I: Block Location Map of Dhunki-ChilaiBlock in Toposheet no. 56I/03, District-Yavatmal, Maharashtra.
2. Plate-II: Regional Geological Map of the area (Scale 1: 50,000)
3. Plate-III: Geological Map of the block (Scale 1: 25,000)
4. Plate-IV: Borehole plan along with Geological Map of the block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

List of Annexures:

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

Location Map of Proposed Dhunki-Chilai Block (5.58 sq Km), in Wani Tehsil, Yavatmal District, Maharashtra





Cardinal Points of Dhunki Chilai Block			
S. No.	Points	Latitude	Longitude
1	A	19°51' 8.0602"N	78°55' 39.5543"E
2	B	19°51' 7.5107"N	78°57' 14.1941"E
3	C	19°50' 9.7223"N	78°57' 42.2651"E
4	D	19°50' 9.0548"N	78°55' 43.1975"E

Legend

Block Boundary

Cardinal Points of Dhunki Chilai Block

1:50,000

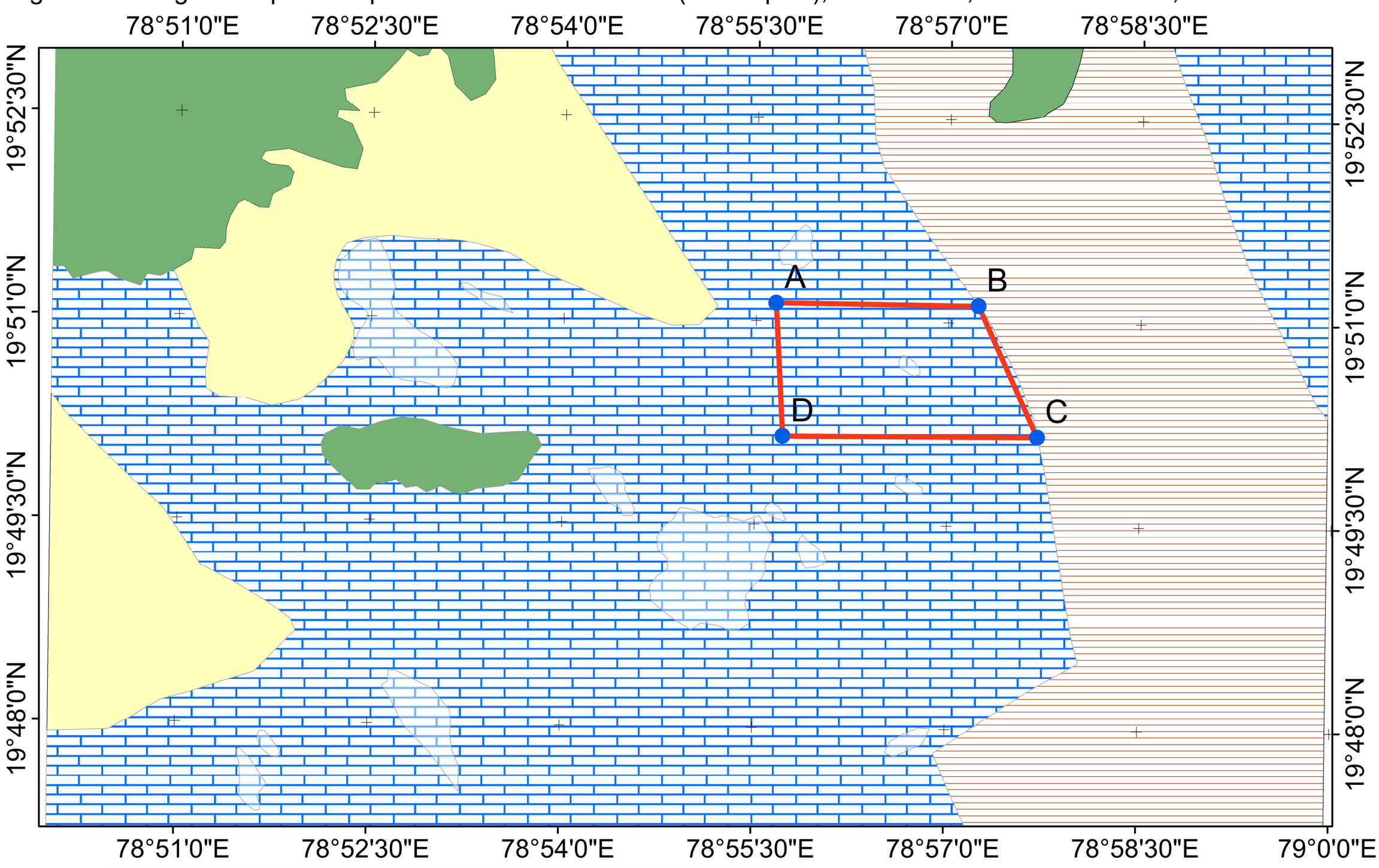
0 0.75 1.5 3 Km

Source: Part of Toposheet No 56 I/13

Plate- I

मिनरल एक्सप्लोरेशन एंड कंसल्टेंसी लिमिटेड
(पूर्व में मिनरल एक्सप्लोरेशन कार्पोरेशन लिमिटेड)
खान मंत्रालय, भारत सरकार का उद्यम, मिनीरत्न-I सीपीएसई
MINERAL EXPLORATION AND CONSULTANCY LTD.
(Formerly Mineral Exploration Corporation Ltd.)
Ministry of Mines, Govt of India Enterprise, MINIRATNA-I CPSE
An ISO 9001:2015, 14001:2015 & 45001:2018 Certified Company
MECL

Regional Geological Map for Proposed Dhunki-Chilai Block (5.58 sq km), Wani Tehsil, Yavatmal District, Maharashtra



Legend

- Cardinal Points
- Block Boundary
- Basalt
- Limestone
- Sandstone
- Satnala Shale
- Stromatolitic Limestone

1:50,000

0 0.5 1 2 3 4 Kilometers

PLATE- II

Borehole plan for Proposed Dhunki-Chilai Block (5.58 sq km), Wani Tehsil, Yavatmal District, Maharashtra

N

78°56'0"E 78°56'30"E 78°57'0"E 78°57'30"E

19°51'0"N

19°50'30"N

A

B

C

D

PBH-01

PBH-02

PBH-03

PBH-04

PBH-05

PBH-06

PBH-07

Legend

- Cardinal Points
- Block Boundary
- Basalt
- Limestone
- Sandstone
- Satnala Shale
- Stromatolitic Limestone

1:10,000

0 0.1 0.2 0.4 0.6 0.8 Kilometers

PLATE- IV

Geological Map for Proposed Dhunki-Chilai Block (5.58 sq km), Wani Tehsil, Yavatmal District, Maharashtra

78°56'0"E 78°56'30"E 78°57'0"E 78°57'30"E

19°51'0"N

19°50'30"N

A

B

C

D

N

Legend

- Cardinal Points
- Block Boundary
- Basalt
- Limestone
- Sandstone
- Satnala Shale
- Stromatolitic Limestone

1:10,000

0 0.1 0.2 0.4 0.6 0.8 Kilometers

PLATE- III

TABLE- 1: COST SHEET FOR G-3 LEVEL EXPLORATION FOR LIMESTONE IN PROPOSED DHUNHI-CHILAI BLOCK, DISTRICT- YAVATMAL, MAHARASHTRA

Total Area - 5.58 Sq Km; Nos. of Borehole - 07; 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 -Sl 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	1.3a	9,000	30	2,70,000	
b	Charges for one Geologist per day at field	day	1.3b	11,000	100	11,00,000	
c	Labour for Geologist (2 Nos)	day	5.7	526	200	1,05,200	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	41	2,09,100	
e	Labours for sampling work (4 Nos)	day	5.7	526	164	86,264	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	11	2,11,200	Block cardinal point- 4 Borehole- 7
b	Charges of one Surveyor (1 Party)	one surveyor per day	1.6.1a	8,300	30	2,49,000	Contouring at 2m interval
c	Labours (4 Nos)	day	5.7	526	120	63,120	Amount will be reimburse as per the notified rates by the Central Labour Commissioner or respective State Govt. whichever is higher
	Sub-Total A					**22,93,884**	
B	**DRILLING**						
1	Drilling -Soft rock	m	2.2.1.1b	7,168	350	25,08,800	MoC Rate
2	Land / Crop Compansation (in case the BH falls in agreecultural Land)	per BH	5.6	20,000	7	1,40,000	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	7	14,000	
4	Transportation of Drill Rig & Truck associated per drill	Km	2.2.8	36	400	14,400	To & fro
5	Monthly Accomodation Charges for drilling Camp (up to 1 Rigs)	month	2.2.9	50,000	3	1,50,000	
6	Drilling Camp Setting Cost	Nos	2.2.9a	2,50,000	1	2,50,000	
7	Drilling Camp Winding up Cost	Nos	2.2.9b	2,50,000	1	2,50,000	
8	Road Making (Flat Terrain)	Km	2.2.10a	22,020	5	1,10,100	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	320	5,08,800	
	Sub Total B					**39,46,100**	
C	**LABORATORY STUDIES**						
1	**Chemical Analysis**						
i)	**Primary samples**						
	a. For 10 radicals i.e. CaO, MgO, Al2O3, SiO2, Fe2O3, SO3, P2O5, K2O, Na2O and LOI by XRF	Nos	4.1.15a	4,200	320	13,44,000	
ii)	**External Check samples (10%)**						
	a. For 10 radicals i.e. CaO, MgO, Al2O3, SiO2, Fe2O3, SO3, P2O5, K2O, Na2O and LOI by XRF	Nos	4.1.15a	4,200	32	1,34,400	
iii)	**Petrological samples (Bh Core Samples)**						
i	Preparation of thin section	Nos	4.3.1	2,353	5	11,765	
ii	Study of Thin Section	Nos	4.3.4	4,232	5	21,160	
iv)	**Bulk Density Determination**						

S.N	Item of Work	Unit	Rates as per NMET SoC 2020-21		Estimated Cost of the		Remarks
			SoC-Item -Sl No.	Rates as per SoC	Qty.	Total Amount (Rs)	
	Bulk Density	No.	4.1	3,540	2	7,080	
	Total - C					**15,18,405**	
D	**Sub Total (A to C)**					**77,58,389**	
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**		**3,87,919**	EA has to submit the final Geological Report in Hard Copies (5 Nos) and soft copy to NMET
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**		**1,55,168**	EA has to submit the Hard copies and soft copies of final proposal along with maps and plan as suggested by the TCC-NMET in its meeting while clearing the proposal.
G	**Peer review Charges**		**As per EC decision**			**30,000**	
H	**Total Estimated Cost without GST**					**83,31,476**	
I	**Provision for GST (18% of H)**	**%**				**14,99,666**	GST will be reimburse as per actual and as per notified prescribed rate
J	**Total Estimated Cost with GST**					**98,31,142**	
				or Say Rs. In Lakhs		***98.31***	

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 Certifiate regarding non outsourcing of any component/project is required.