PROPOSAL FOR PRELIMINARY EXPLORATION (G-3) FOR LIMESTONE IN HONNAL BLOCK, KALABURAGI DISTRICT,KARNATAKA UNDER NMEDT PROGRAM

COMMODITY:LIMESTONE

(PROPOSED BLOCK AREA = 6.60 Sq.km;

TOPOSHEET NO: 56D/13)

By

GEO EXPLORATION AND MINING SOLUTIONS

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PLACE : Salem

DATE : 2026

Summary of the Proposed Honnal Block(G-3) for Limestone
General Information of the block

Features	Details
BlockID	Honnal Block(G-3)
Current Exploration Agency	**GEO EXPLORATION AND MINING SOLUTIONS** SF No .92/3A2, Geetha Nagar, Alagapuram Periyaputhur, Salem, Tamil Nadu 636016, India
PreviousExploration Agency	Geological Survey of India
Geological Report (Previous Stage GeologicalReport)	Previously, no exploration work had been carried out in the proposed HonnalBlock. However, the Bhima Basin as a whole has been systematically mapped by the Geological Survey of India (GSI), and exploration at various stages has been undertaken at several locations in a scattered manner. In the adjoining Nalwar and North Kadaboor Blocks, GSI carried out exploration activities during 2023 - 2024.
Commodity	Limestone
MineralBelt	Bhima Basin
Budget& Time Scheduletocomplete the project	10-month time period
Objectives	Based on the available geological information the proposed exploration programme has been formulated with the following objectives: 1. To carry out a detailed topographical survey and geological mapping on a 1:4,000 scale over an area of 6.60 sq. km in the proposed Honnal Block. 2. To delineate the strike and depth continuity and quality parameters of limestone bands by drilling 10 vertical boreholes in the HonnalBlocks, with an average borehole depth of 100 m. 3. To carry out exploration in accordance with the Minerals (Evidence of Mineral Contents) Rules, 2015 and the Mineral (Auction) Rules, 2015 (amended up to 2021). 4. To demarcate the zones of various limestone grades within the block as per UNFC norms and estimating the Inferred (333) resources for cement grade limestone, which will, in turn, facilitate the State Government in auctioning the block.
Whether the work will be carried out by the proposed agency or through outsourcing and	Work will be carried out by the proposed agency.

<table>
<tr><td>details thereof.
Components to be outsourced and name of the outsource agency</td><td></td></tr>
<tr><td>Name /Numberof Geoscientists</td><td>Geologist:01Headquarters (60 days)
Geologist:02Field(120 days)</td></tr>
<tr><td>ExpectedFielddays (Geology,Surveyor)</td><td>Geologist:01Headquarters(60 days)
Geologist:01Field(120 days)
Surveyor:01Field(45days)</td></tr>
<tr><td colspan="2">1. Location</td></tr>
<tr><td>Location</td><td>The proposed Honnal Block covers part of Chitapur taluk of Kalaburagi District and cover a total area of 6.60 sq. km. The blocks fall within the Survey of India Toposheet No. 56D/13.</td></tr>
<tr><td>Block boundary Coordinate</td><td><table><tr><th>Point ID</th><th>Latitude</th><th>Longitude</th></tr><tr><td>A</td><td>16°54'0.46"N</td><td>76°55'3.12"E</td></tr><tr><td>B</td><td>16°54'0.19"N</td><td>76°55'54.24"E</td></tr><tr><td>C</td><td>16°56'23.62"N</td><td>76°55'52.71"E</td></tr><tr><td>D</td><td>16°56'21.85"N</td><td>76°55'2.52"E</td></tr></table></td></tr>
<tr><td>Villages</td><td>The exploration block is located 600m west of Honnal village and 1.6 km East of Biral village (a small town). Some of the nearby villages include Kadaboor, Malag, Tunnur, Kulkundi, Nalwar, etc. All these villages fall under the administrative jurisdiction of Chittapur Taluk, Kalaburagi District, Karnataka.</td></tr>
<tr><td>Tehsil / Taluk</td><td>The exploration block forms part of Chittapur Taluk in Kalaburagi District. The land is freehold, and the patta holders possess surface rights over the land. The District Collector, Kalaburagi District, Karnataka, is the land title authority and administers the area with the assistance of the Mandal Revenue Officers (MROs) of Chittapur.</td></tr>
<tr><td>District</td><td>Kalaburagi (Gulbarga)</td></tr>
<tr><td>State</td><td>Karnataka</td></tr>
<tr><td colspan="2">2. Area (hectares / square kilometres)</td></tr>
<tr><td>Block Area</td><td>6.60 sq. km</td></tr>
<tr><td>Forest Area</td><td>No forest area.</td></tr>
<tr><td>Government Land Area</td><td>Data not available</td></tr>
<tr><td>Private Land Area</td><td>The exploration block is freehold belonging to different individuals of the adjacent villages, namely Wadi, Kadaboor, Nalwar, Kolkunda, Turnur and Kulkundi etc.</td></tr>
<tr><td colspan="2">3. Accessibility</td></tr>
<tr><td>Nearest Rail Head</td><td>The Bengaluru - Mumbai railway line passes through Nalwar Railway Station, which is the nearest railway station to the block area. The</td></tr>
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	exploration block is located about 10 km south of Wadi Railway Junction, a major railhead on the Bengaluru - Mumbai rail route. Other nearby railway stations include Chittapur Railway Station (≈25 km), Shahabad Railway Station (≈24 km), and Kalaburagi (Gulbarga) Railway Junction (≈50 km) from the block area.
Road	The Honnal Block is situated at a distance of about 500m from National Highway 150, connecting Solapur and Devasugur. The interior villages within the block area are well connected by all season motorable roads. The block area is accessible from the State headquarters, Bengaluru, via Kalaburagi - Yadgir - Lingsugur - Hosapete - Chitradurga - Bengaluru Road.
Airport	The nearest airport is Kalaburagi (Gulbarga) Airport, located approximately 50 km northeast of the block. The block has air connectivity through daily flights from Bengaluru to Kalaburagi Airport.
4.Hydrography	
Rivers/ Streams	The area exhibits a flat to very gently undulating terrain. The highest elevations occur in the eastern part of the block, while comparatively lower elevations are observed towards the western part; however, the overall elevation difference is negligible. Regionally, the area forms part of the floodplains of the Bhima River. The study of the drainage system is essential for understanding the geomorphology and structural fabric of the area. A major portion of the block is covered by soil, with only a few first order streams observed within the area, most of which flow westward. Regionally, streams flow predominantly towards the south, exhibiting a parallel drainage pattern. All the streams in the area are ephemeral in nature and carry water only during the monsoon season. The Bhima River flows southward with respect to the block and takes a south westerly turn before finally turning southeast to join the Krishna River near Sangam.
5. Climate	
Mean Annual Rainfall	Wadi in Arabic means a dry riverbank, and the present block is located near Wadi town. The explored area receives relatively low rainfall throughout the year. January is the driest month, with an average precipitation of about 2 mm, while September records the maximum rainfall of approximately 190 mm. The rainy season extends from June to September. The average annual rainfall ranges between 750 and 880 mm, and relative humidity varies from about 26% during summer to 62% in winter. The maximum recorded rainfall is around 70 mm within a 24 hour period.
Temperatures	The average temperature of the area is about 27°C. May is the hottest month, with temperatures rising up to 45°C, while December is the coolest month, with an average temperature of around 22°C. In

	general, Kalaburagi (Gulbarga) district experiences a hot semi-arid climate, bordering on a tropical wet and dry climate. The climate is predominantly dry, with temperatures ranging from approximately 8°C to 45°C.
6. Topography	
Toposheet Number	Survey of India Toposheet No. 56D/13
	The topography around the Honnal Block is generally flat to gently sloping. Overall, the area slopes towards the southwest and east. The maximum elevation is approximately 450 m, while the minimum elevation is about 420 m. The northern and central parts of the block represent the highest elevations. The investigated area is characterized by a predominantly flat terrain with sparse limestone outcrops and thick soil cover at places.
7. Availability of baseline geology data	
GeologicalMap (1:50K / 25K)	Available
GeochemicalMap	NGCM data of Toposheet no 56D/13 is available.
Geophysical map (Aeromagnetic, ground geophysical, Regional as well as local scale GP maps)	Not available for the proposed area.
8. Justification for taking up G3 stage mineral exploration	
Justification	1. The proposed area has not been explored in the past. Although the occurrence of limestone in the area is already established, conversion of geological resources into mineable reserves is essential. Systematic exploration enhances the level of confidence in the quantity and quality of resources/reserves, thereby making the area more attractive to potential investors. 2. Limestone deposits in India generally exhibit wide variations in grade. Silica and MgO contents in limestone play a crucial role in determining the chemical suitability of raw feed for cement manufacturing. In sedimentary limestone formations, these constituents along with CaO vary laterally and vertically even within small areas. Therefore, estimation of quantity and quality based solely on extrapolation from nearby data is unreliable, particularly for critical parameters such as silica and MgO, which significantly influence limestone quality for cement and other industries. Limestone with high silica and MgO content cannot be directly used for cement manufacture without blending with high-grade limestone and may also be unsuitable for clinker production. Detailed exploration is therefore necessary to locate, delineate, and quantify limestone of different grades to meet the

	requirements of various industries. 3. The proposed Honnal Block is located 3.4km west of the Kadaboor and Nalwar Limestone Blocks, which were explored by GSI and have already been successfully auctioned. In the North Kadaboor Block, limestone resources were classified into four grades Blast Furnace grade, Portland Cement grade, Blendable Cement grade, and Limestone above threshold (high alkali) based on analytical results and industrial requirements. A total inferred limestone resource of 217.118 million tonnes (UNFC 333) was estimated within an effective area of 2.55 sq. km. Similarly, in the Nalwar Block, a total inferred limestone resource of 224.31 million tonnes (UNFC 333) was estimated within an effective area of 2.522 sq. km, comprising the same four industrial grades. 4. Augmentation of limestone resources is essential, as limestone forms the foundation of infrastructure development. Such augmentation will also render these blocks auctionable in accordance with the prevailing rules and regulations. 5. Demand for cement in the construction industry is expected to increase in the coming years, which will consequently raise the demand for limestone. Large-scale infrastructure projects in the railways, water supply, transportation, power, and telecommunications sectors are witnessing increased investments, further intensifying the requirement for limestone. Additionally, initiatives such as “Housing for All” and “Smart Cities,” announced in the Union Budget 2021, are steadily boosting cement consumption and, in turn, limestone demand. Metro rail projects in Bengaluru and the expansion of civil infrastructure such as hospitals and schools across the state are also significantly contributing to the growth of the cement industry in Karnataka. 6. Neighbouring states that lack sufficient cement manufacturing facilities procure cement from cement plants located in Karnataka, further underscoring the importance of augmenting limestone resources within the state. 7. Opening of new mines would enhance the socio-economic development of the backward areas of the district. It would also attract investments for setting up new cement plants, resulting in overall economic growth of the region, generation of employment, and fulfillment of the ever-increasing cement demand of the State and the country.

Proposal for Preliminary Exploration (G-3) for Limestone in Honnal block, Kalaburagi District,Karnataka

1.0		INTRODUCTION
1.1		Limestone is a crucial and versatile low-value mineral commodity with a long history of use as a construction material, dating back to the early days of human civilization. Iconic structures such as the Great Pyramids of Giza and the Golden Fort of Jaisalmer stand as enduring examples of its extensive historical application. In modern times, limestone is predominantly used in the manufacture of cement. However, its applications are no longer confined to the construction sector alone. Owing to its versatility, limestone has become an indispensable raw material for a wide range of industries. In the iron and steel industry, limestone is used as a flux in blast furnaces and steel melting shops (SMS), where hot metal from iron-making units is converted into various grades of steel. In the chemical industry, limestone is utilized in the manufacture of products such as bleaching powder, toothpaste, calcium carbide, and several other chemicals. It also serves as a purifying agent in the sugar industry. In addition, limestone finds extensive use in paper, fertilizer, foundry, and other allied industries.
1.2		Following the enactment of the Mines and Minerals (Development and Regulation) Amendment Act, 2015, along with the Minerals (Evidence of Mineral Contents) Rules, 2015 and the Mineral (Auction) Rules, 2015, the Government of India directed the State Governments to expedite exploration activities for various mineral commodities within their respective jurisdictions and make the identified mineral blocks available for auction. Subsequently, certain provisions of the MMDR Act were amended to facilitate the auctioning of mineral blocks with lower levels of exploration confidence, thereby enabling the States to bring a larger number of blocks under auction. In particular, the amendment to the Minerals (Evidence of Mineral Contents) Rules, 2021 permits State Governments to auction mineral resource blocks established up to the G3 level for the grant of mining leases. These policy interventions have significantly encouraged exploration agencies to undertake enhanced and accelerated exploration activities across various States.
1.3		Karnataka is the leading state in India in terms of limestone resources, accounting for about 27% of the country's total resources, and ranks first in availability. However, with respect to production, the State presently ranks fourth. In order to bridge this gap between resource availability and actual production, it is proposed to undertake detailed exploration of identified limestone resource blocks to convert them into mineable blocks for future development. There is a significant and sustained demand for limestone, as it is a key raw material for the cement industry. Recent auctions of limestone blocks for both Mining Leases (ML) and Composite Licences (CL) in the State have received a highly encouraging response from bidders, reflecting strong industry interest. Further, during the CGPB meeting, it was recommended to undertake exploration of bulk minerals utilizing NMEDT funds, which provides additional justification for the proposed exploration programme.
1.4		The limestone formations in and around Chittapur Taluk of Kalaburagi District, Karnataka, have been identified for detailed exploration with the objective of establishing auction-ready mineral blocks. Limestone, being a low-value bulk mineral, is generally not viable for

		merchant mining in the State and its exploitation is largely dependent on end-use mineral-based industries, particularly the cement industry. In this context, systematic and detailed exploration is essential to delineate the lateral and depth continuity, grade variation, and quality parameters of the limestone horizons, enabling classification of resources as per the UNFC system. The proposed exploration aims to establish Inferred (G3 / UNFC 333) limestone resources, which, in accordance with the Minerals (Evidence of Mineral Contents) Rules, 2015 (amended up to 2021), are sufficient for auctioning of mineral blocks for grant of Mining Leases / Composite Licences. The generation of UNFC compliant resource estimates will facilitate the State Government in bringing the identified limestone blocks under auction, thereby attracting greenfield investment in the cement and allied sectors. This initiative is expected to result in enhanced revenue realization, employment generation, and sustainable mineral development, contributing significantly to the overall socio-economic growth of the region.
1.5		Accordingly, NPEA (Agency Name) has formulated a G3-stage exploration proposal for the Honnal Block. The programme envisages detailed geological mapping on a 1:4,000 scale, topographical surveys using Total Station, core drilling of 10 vertical boreholes, aggregating to 1000 m of drilling. The outcomes of the proposed exploration programme will enable a reliable assessment of the quality and quantity of limestone resources within the block, thereby enhancing resource confidence and attracting prospective bidders by facilitating informed participation in the auction process.
2.0		**LOCATION AND COMMUNICATION**
2.1		The location map of the block is shown in **Fig.1.**
2.2		The Honnal Block is located in Chittapur Taluk of Kalaburagi district and spread over an extent of 6.60 sq. km which can be accessed by National Highway 150 connecting Solapur to Devasuguru. The interior villages within the block area are well connected by all-season motorable roads. The block area is accessible from the State headquarters, Bengaluru, via Kalaburagi - Yadgir - Lingsugur - Hosapete - Chitradurga - Bengaluru Road. The Blocks fall in the Survey of India Toposheet No. 56D/13and is bounded by the coordinates as listed in the table below:

Point ID	Latitude	Longitude
A	16°54'0.46"N	76°55'3.12"E
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2.3		The Chittapur Broad Gauge Railway Station, located at Chittapur town, is situated about 20 km north east of the block area and is easily accessible via State Highway 126 (Satnur -Chittapur Road). The nearest airport is Kalaburagi Airport, which is located about 45 km north of the block area.
2.4		The block area is surrounded by cement manufacturing industries and some of them are as follows:i) Orient Cement Plant, Itgi, Chittapur, ii) Ultratech Cement Plant, Malkhed, iii)

		Vasavadatta Cement plant, Sedam, iv) Jaypee Cement Corporation Ltd. Plant, Shahabad, v) ACC, Cement, Wadi, vi) Shree Cement, Gulbarga.
3.0		**PHYSIOGRAPHY AND DRAINAGE**
3.1		Studying the drainage system is essential for gaining insights into geomorphology and structural fabrics of the area. The predominant portion of the block is covered by soil, with only a single first-order/zero order stream observed in the DM area flowing towards west. Regionally, the investigated area constitutes the floodplain of the Bhima River, characterized by a sub-dendritic and sub-radial drainage pattern involving 1st and 2nd order streams.
4.0		**CLIMATE**
4.1		Kalaburagi has a hot semi-arid climate bordering on a tropical wet and dry climate. The climate of the district is generally dry, with temperatures ranging from 8°C to 45°C and an annual rainfall of about 750 mm. The average temperature in Wadi is 27.4° C. May is the hottest month having average temperature of 45°C. December is the coolest month having average temperature of 22.8°C. Gulbarga typically receives lowest of about 2 mm precipitation during January and 190 mm during September. Thereafter it declines during the monsoon period.
4.2		The rainfall in the area varies from 750 -880 mm and the relative humidity varies from 26% in summer and 62% in winter.
5.0		**FLORA AND FAUNA**
5.1		No forest, sanctuaries, National parks etc., exist within the 5km radius of the proposed block boundary. Most of the area is covered by cultivations of cotton, sorghum, pigeon peas, sugar cane and banana and other vegetables. The common trees include, tamarind, Mango tree and acacia. The fauna consists of wild boar, myna, parrot, hare and poisonous and non-poisonous snakes and scorpions.
6.0		**PREVIOUS WORK**
6.1		The lithostratigraphy of the Bhima Basin has been studied extensively since the late nineteenth century. King (1872) classified the Bhima sediments into lower and upper series based on regional traverses, a framework later corroborated by Foote (1876) with detailed lithological descriptions. Mahadevan (1947) proposed a threefold subdivision of the Bhima succession, distinguishing conglomerate-sandstone-shale of the Lower Bhima, limestone of the Middle Bhima, and sandstone-shale of the Upper Bhima. Subsequent systematic regional mapping by Janardhana Rao et al. (1975) led to a revised lithostratigraphic framework in accordance with the Code of Stratigraphic Nomenclature of India, upgrading the Bhima Series to the Bhima Group and subdividing it into five formations, with the Rabanpalli Formation marking the initial phase of sedimentation. Minor nomenclatural modifications were later suggested by Mathur (1977).

		Limestone exploration in the Bhima Basin has been carried out at various stages by GSI. Preliminary studies by Venkada Rao et al. (1967) indicated cement-grade limestone in the Andola - Maratgi area. During 2017-18, G2-stage investigations in the Kannur and Bahmanhalli Blocks resulted in estimation of substantial limestone resources dominated by BF and cement grades. Subsequent G2 and G3 stage explorations during 2018-19 and 2019-20 in Chittapur, Ravoor, and NE Chamnur Blocks delineated significant limestone resources of Portland Cement, Blendable/Beneficiable, and Blast Furnace grades, with UNFCcompliant resource estimates running into several hundred million tonnes. Most recently, G3-stage exploration was carried out in the North Kadaboor Block during the 2023-24 field season, along with the Nalwar Block, further augmenting the regional limestone resource base. In addition, regional aero-geophysical and geophysical surveys under the National Geophysical Programme (2016-17) and geochemical mapping (2017-18) in parts of Gulbarga District provided valuable subsurface and geochemical baseline data, indicating heterogeneity in substratum conditions and supporting the mineral potential of the Bhima Basin.
6.2		DMG, Karnataka explored the adjoining area in detail in the year 1976 with the purpose of proving cement grade limestone in the area. The exploration could establish the occurrence of large reserves of cement grade limestone in the area. The results of investigation are given in the report entitled “Limestone Deposits immediately to the East of Chittapur, Gulbarga District of Karnataka.” The said work was targeted for feasibility to setup cement industry.
6.3		GSI carried out preliminary investigation for Flux grade Limestone around Wadi, Gulbarga district Karnataka during the year 1974-75. The area is occupied by Shahabad limestone formation of Bhima Group, chip samples were collected from vertical faces of the quarries existing in the area. Chemical analysis shows that the MgO content is always very low. A few beds of grey to dark grey soft limestone areof blast furnace grade and the rest are of cement grade. Flaggy to slabby variegated limestones are always siliceous in composition with the insoluble around 15%.
6.4		Duringthefieldseason1976-77,GSIcarriedoutpreliminaryinvestigationforFlux grade limestone near Wadi, Gulbarga district Karnataka.An area of about 16.75sq. km on1:7,910 scale using the village maps as base map was covered by mapping. A total of 150 samples also collected and analysed. The formations met with here are Rabanapalli shale and flaggy limestone, stylolitic limestone and varigated limestone unitsofShahabadLimestoneFormation.Allthoseformationsareremarkably horizontalandundisturbed.Generally,styloliticlimestonecontainsCaO48%and above and insoluble around 10%. Hence it is categorized as Blast Furnace Grade.The other two units can be utilized in cement manufacture if suitably blended with high gradelimestone.Aninferredreserveof96milliontonnesofBlastFurnacegrade limestone has been estimated over an area of 4.00 sq.kmto a depth of 12 m.
6.5		During the F.S. 1977-78, GSI carried out preliminary investigation for Flux grade Cement grade Limestone in Bhima Basin, Gulbarga district, Karnataka. Preliminary investigation for flux grade and cement grade limestone in parts of Bhima Basin, Gulbarga district, Karnataka

		was taken up an area of 50.5 sq.km area was mappedon1:10,000 scaleusing tapeandcompass anda total of 125 samples were collected, around Wadi and Chitapur. The limestone met with in this area has been classified as fissile limestone stylolitic limestone and variegated limestone. Stylolitic limestoneisofFluxgrade(BlastFurnacegrade)andoccupiesoveranareaof8.5sq.km. Total inferred reserve of B.F. grade limestone has been calculated as 153 million tonnes for the area under investigation.
6.6		GSI had carried out G-2 exploration (FS 2017-18) in Bahmanhalli Limestone Block and estimated a resource of B.F Grade 244.27 MT (Avg 49.83% CaO, 9.92%SiO2, 1.16%Al2O3), PortlandCementGrade18.921MT(Avg47.42%CaO,14.41%SiO2,0.91%Al2O3),154.246MT(Avg41.80%CaO,23.37%SiO2,2.12%Al2O3)and46.488MT(Avg39.12%CaO,27.17%SiO2,1.65%Al2O3)
6.7		GSI had carried out G-2 exploration in Chittapur South Limestone Block and estimated a resource of Portland Cement Grade 89.04 MT (Avg 46.39% CaO,15.65% SiO2, 0.98% Al2O3),Beneficiable Cement Grade 228.16 MT (Avg 39.08% CaO, 27.03%SiO2, 1.66%Al2O3).
6.8		GSI had carried out G-4 level exploration in Chitapura SW Block and SulahalliLimestone Block, estimated a resource of 438 MT of Cement Grade Limestoneand 466 MT of Cement Grade Limestone respectively.
6.9		Mining activities are currently ongoing in surrounding areas and limestone being excavated for manufacturing of cement.
7.0		**REGIONAL GEOLOGY AND STRUCTURE**
7.1		**Regional Geology**
7.1.1		Bhima Basin is the smallest of all Proterozoic Basins of India. They do not actually come in contact with the Kaladgi Group and are believed to be younger. They are in close resemblance to the Kurnool Group of the Cuddapah Super Group. The Bhima Basin is covered by latitude N 16°20' to 17°35' and longitude N 76°15' to 77°40'E.
7.1.2		Captain New Bold (1842-1845) was first to record the Talikote flaggy limestone and Muddebihal red sandstone. R.Bruce Foote (1876) had divided the Bhima Group (mainly of limestone) into lower clastic represented by sandstone and shale and upper mainly of limestone and shales. Further, Mahadevan (1947), Janardhana Rao et.al (1973), Mathur (1977), Mudholkar and Kale (1982) and Mishra et.al (1987) classify Bhima Group. However, Vivek S. Kale, V.G. Phansalkar et.al (1991) classify Bhima Group into Rabanapalli (clastic) formation and Shahabad (limestone) formations.
7.1.3		Bhima Basin is one of the smallest and youngest among the Purana sedimentary basins of Peninsular India, named after Bhima River. It is a sigmoidal shaped basin consisting dominantly of limestone and covers an area of 5200 sq. km and is situated to the NW of Cuddapah basin and NE of Kaladgi basin resting on the Archean crystallines. The Bhima Basin sediments stretch linearly in N -S for about 160 km with varying width and the maximum being 40 km.In the northern part, it is overlain by the Deccan Traps and due to which the northern extent is not exactly known. The sediments have an aggregate thickness of about 270m. The basin is well known for its large resources of limestone and the newly

		discovered uranium occurrence near Gogi. Bhima Group is further divided/classified into different stratigraphic units by various workers based on the litho assemblage. Bruce Foote (1876) classified them into lower Bhima series and upper Bhima series comprising conglomerates-sandstone-shales and cyclic limestone-shales respectively. This classification was revised by Mahadevan (1947) who divided this series into three units, namely, the lower conglomerate-shale-sandstone, middle limestone and upper shale-limestone. Janardhana Rao et al. (1975) diagnosed three separate formations from Mahadevan's upper Bhimas but retained his middle and lower Bhimas as independent Formations. Mathur (1977) suggested minor nomenclatural changes to the preceding fivefold classification.
7.1.4		The lower unit of this Group consists of quartzite, grit, sandstone and red, purple and green shale and shaly sandstone. The upper unit consists of limestone, quartzite, shale and flaggy limestone. These sediments are mostly undeformed except along faults. Pink shale of the Rabanpalli Formation is the lowermost unit of the Bhima Group exposed in the area in nala sections and artificial cuttings like wells and quarries. The variegated limestone, stylolitic limestone and fissile limestone of the Shahabad limestone Formation were demarcated in the area. The colour of the fissile limestone varies from light brown to pale blue and grey to bottle green. The fissility gradually decreases towards the top and grades into medium to thickly bedded stylolitic limestone. Stylolitic limestone is medium to thickly bedded, dark grey to blue in colour. Relatively, it is more brittle than the fissile and variegated limestone. This unit otherwise known as siliceous limestone forms the upper member of the Shahabad limestone Formation in this area and occupies relatively higher ground level. The Bhima Group is remarkably horizontal except a few local places showing tectonic disturbance where the beds show shallow to moderate dip.
7.1.5		The Bhima Group is represented by Rabanpalli, Shahabad, Hulkal, Katamdevarahalli and Harwal Formations. The Rabanpalli Formation consists of conglomerate, sandstone, green shale with siltstone and purple shale. The basement of Bhima Group is represented along the fringes of the basin by conglomerate. It lies above granite unconformably at 1.5 km east of Halkatta (probably part of the eparchean unconformity). The conglomerate contains clasts of vein quartz, pink/grey granite, feldspars and rounded quartz. The sandstone occurring at 1 km east of Halkatta lies above conglomerate. The sandstone is brown, white and light green, fine to coarse grained and mainly composed of quartz and feldspars. The sandstone grades to siltstone and green shale. It occurs at 2 km NW of Chitapur and at 1.5 km east of Halkatta. It is green to greenish yellow, fissile and friable with thin flakes of siltstone. Purple shale is purple to brown, fissile and friable and is exposed around Halkatta and Chitapur. This shale is the younger variety and lies above the green shale.
7.1.6		Rabanapalli Formation contains three members namely, Muddebihal Conglomerate, Kundarapalle sandstone and Korla shale. Muddebihal conglomerate is impersistent conglomerate unit. Pebbly sandstone, grits, arkosic arenite delineate the basin margin in lieu of conglomerate. Beds of conglomerate gradually grades into medium to coarse grained arkose, which in turn to ferruginous arenite. At higher levels clasts are well sorted, medium sized quartz grains cemented with secondary silica or chert, forming the Kundarapalle sandstone member. Specs of glauconites are seen in the upper beds of sandstone member. Towards the top with further reduction of grain size, the sandstone member grades to siltstone

		and then gradually merges to Korla shale member. Korla shale is the uppermost, thickest and pervasive all along the southern margin. In general, this member is divisible into distinct entity on the basis of the colour, viz. the lower bottle green silt and micaceous shale and upper chocolate brown coloured, finely laminated shale.
7.1.7		Shahabad Formation contains varieties of limestones. Limestone is cream coloured with thin cleavable surface facilitating quarrying of slabs. Variegated limestone covers about 60% of the area and are exposed around Malkhaid, Malkhaid road railway station, Digaon, Udgi, Bankanhalli, Satnur and Kardal. The rock is siliceous, compact, massive, fine grained and the colour variations are grey, buff, pink and blue. Grey limestone is fine grained, highly massive, slabby, thickly bedded and exposed just south of Ravoor. The dark grey limestone is exposed around Totanahalli, 0.5 km west of Malkhaid and 3 km north of Digaon. Upper flaggy limestone overlies the dark grey limestone.
7.1.8		The Hulkal Formation is seen resting over the Shahabad Formation. It contains different varieties of shale. Earthy shale is exposed around Danduti and Gangurti. It is about 10 m thick and is highly calcareous, thinly laminated and highly fissile. Bluish grey shale is the middle member of Hulkal Formation and is exposed just east of Pet Sirur and 1 km west of Gangurti. It is highly argillaceous, thinly laminated and fissile. Buff shale overlies the bluish grey shale with a gradational contact and exposed around Pet Sirur and 1.5 km northwest of Gangurti. The rock is mainly laminated, friable and fissile.
7.1.9		The Katamdevarahalli Formation is the youngest Formation of Bhima Group exposed in this area. The limestone of this formation lies above buff shale and exposed west of Pet Sirur and 2 km northwest of Gangurti. It is dark bluish in colour, highly massive, hard and compact and is extremely fine grained.
7.1.10		HarwalFormationis the uppermost monolithic formation of highly fissile, brown, pink to vermillion-coloured shales. At lower level, 1 to 2 cm thick carbonate layers are frequent, whereas, at the upper level there is more or less no carbonaceous layer.
7.1.11		Two basaltic flows of Deccan trap are exposed above the Bhima Group. The first flow is exposed in an area of 1 sq. km only 2 km west-northwest of Baghwadi. The rock is dark grey and fine to medium grained showing intergranular porphyritic texture. The second flow is exposed at 1.75 km northwest of Gangurti. This flow overlies green shale of Bhima Group and is dark black in colour. The rock is fine to medium grained and sparsely to moderately porphyritic in texture. These two flows are part of Poladpur Formation of Sahyadri Group.
7.1.12		The present exploration block has the presence of three distinct units, namely the purple shale of Rabanpalli Formation, lower flaggy limestone member and limestone (upper) of Shahabad Formation which is host of BF grade limestone. In the eastern block of one sq.km (Block 2), which was proposed initially, the southern boundary is running parallel to the contact between the lower flaggy limestone and limestone (upper) of the Shahabad Formation
7.1.13		Jayaprakash (2007) revised the lithostratigraphic classification in which Bhima Group is represented by Rabanpalli, Shahabad, Hulkal, Katamdevarahalli and Harwal Formations. The stratigraphy proposed is given below.

Stratigraphic successions of the Bhima Basin (after Jayaprakash, 2007)

Eon/Epoch	Group	Formation	Member	Lithology

Cretaceous to Eocene	Deccan Trap			Basaltic flows with inter-trappeansedimentaries
Neo Proterozoic	Bhima Group (297m)	Harwal (45m)		Brown pink to vermilloncoloured fissile shale
		Katamdevarahalli (40m)		Deep grey, occasionally stylolitic flaggy limestone
		Hulkal (30m)		Grey, blackish buff, dull and pale pink coloured shale; occasionally with fine grained thin silty beds at the base
		Shahabad (115m)	Mulkod Limestone (10m)	Deep grey to black coloured flaggy limestone
			Gudur Limestone (20m)	Akin to Wadi, yet slightly inferior in chemical composition
			Sedam Limestone (60m)	Variegated, medium to thickly bedded siliceous limestone
			Wadi Limestone (15m)	Thickly bedded stylolitic relatively superior cement grade
			Ravoor Limestone (10m)	Flaggy limestone with prominent fissility (Shahabad slabs)
		Rabanpalli (67m)	Korla Shale (50m)	Fine silty base, grades into green shale, followed by chocolate brown shale with prominent parting
			Kundarapalle Sandstone (15m)	Fine grained quartz arenite, sub-feldspathic arenite, ferruginous cemented medium grained quartz arenite
			Muddebihal Conglomerate (2m)	Pebbly orthoconglomerate; locally or at the top matrix supported and also granular
Archaean	----------Angular Unconformity----------			
	Basement Rocks		Younger granitoids Eastern Block Greenstone Belts	

			Peninsular Gneisses-I

7.2 Regional Structure

7.2.1 The sedimentary rocks are undeformed and are horizontally bedded. Both primary and secondary structures have been observed in the outcrop of various litho units. The outcrops of sediments of Bhima Group are scanty. The sediments show horizontal to gentle beds. The general trend of all formations is N-S. The rectilinear E-W to N-W to S-E trending boundaries are faulted while the N-S and NNE-SSW linear trends show unconformable relation with the underlying gneisses. The imprints of two phases of folding deformation are registered in the Bhima sediments. Faults of both 'post Bhima' and ‘post-trappeans' are noticed. The adjoining limestone blocks show centroclinal dip with significant variation in regional strike. The limestone beds of Nalwar Block are having NE-SW trend with a minimum dip < 2^{o}. However, the limestone beds of North Kadaboor Block strikes NNW-SSE with similar dipping amount as Nalwar Block (< 2^{o}).

7.2.2 The primary sedimentary structures, such as bedding laminations are common and prominent in Ravoor Member and chocolate brown shaly rocks of the Rabanpalli Formation. In limestone of Wadi and Sedam Members also occasional clay laminations are present which are parallel to the bedding plane. Pressure solution structures such as stylolites are well developed in Wadi Member and the disposition of limestone bands are near horizontal, dipping NNE to NE, with a dip amount up to 5^{o}.

7.2.3 Brittle diastrophic structures such as joints and fractures were observed on outcrop scale and other than these, the area is devoid of any structural deformations.

8.0 GEOLOGY OF THE BLOCK

The exploration block contains sedimentary rocks that were deposited during the late Proterozoic period, mostly consisting of limestone, shale, and sandstone. The block is mostly covered by black cotton soil with few scanty and sporadic exposures of grey limestone of Sedam Member. The black cotton soil cover is having an average thickness of two meter and at place to place the thickness varies. Grey limestone & Grey Glauconitic limestone of Sedam Member, Dark Grey limestone &Stylolitic limestone of Wadi Member and Flaggy limestone of Ravoor limestone Member in increasing order of depth of intersection in the adjoining blocks.

Generalized stratigraphy of Nalwar Block

Lithology	Member	Formation	Group
Grey Glauconitic limestone	Sedam Member	Shahabad Formation	Bhima Group
Dark Grey limestone	Wadi Member		
Stylolitic limestone			
Flaggy limestone	Ravoor Member		

8.1 **Description of Rock Types**

Almost entire area of the blocks is concealed under quaternary sediments i.e. soil cover.

		Scanty scattered limestone outcrops are seen at places. The beds are horizontally disposed as noticed in nearby areas. Since most of the area is concealed under soil cover the strike and dip of the limestone beds is not observed in the blocks. Mining activities are currently ongoing in surrounding areas and limestone being excavated for manufacturing of cement. The lithological description of litho units from top to bottom as obtained from available data from nearby mines is given below.
8.1.1		**Sedum Member:** The limestone of Sedum Member is light grey in colour and fine grained and massive in habit. There is no proper outcrop of the Sedum Member exposed in the block except for some bouldery patch of rocks in the block. The formation is massive and at places clay laminations and fully developed sulphide crystals also observed along the lamination plane. The lithology shows multiple fracture zones which are characterised by flesh to pale brownish colouration which is grading to grey colour away from the fracture zone. The glauconite is seen as discrete grains as well as aggregates with greenish colour. The presence of glauconite indicates shallow water condition during sedimentation and diagenesis.At places the formation is traversed with few silica veinlets (1-1.5mm sized).
8.1.2		**Wadi Member:** The Wadi limestone is a key stratigraphic unit of the Bhima Basin in southern India. The Wadi limestone, lying beneath the Sedam limestone Member, is not exposed in the area except for a northern rubbly/bouldery limestone exposure. In general, the Wadi limestone is massive to bedded and with light grey to bluish-grey in color. The Wadi Member consists of two variants of limestone: massive grey limestone and grey stylolitic limestone. This limestone is of good quality, with CaO content ranging from 44% to 51%, and low MgO and SiO2. The formation is stylolitic, uniformly grey to dark grey in color, massive, fine-grained, and homogeneous. Towards the lower contact with the Flaggy Limestone of the Ravoor Member, fine shale laminations are observed in the core of the Wadi limestone. Additionally, a few pyrite nodules and concretions are found mostly along the stylolite planes of the litho-unit.
8.1.3		**Ravoor Member:** The Ravoor limestone, situated below the Wadi Member rock formation, exhibits a flaggy habit, often forming slabs. This limestone is characterized by its purple to purplish-grey color, high fissility, and hardness, falling intermediate between limestone and shale in quality. It is extensively used for slab preparation in building materials. The CaO percentage in the flaggy limestone of the Ravoor Member ranges from 24.50% to 37.00%. Additionally, green to greyish-green shale partings are frequently observed within the flaggy limestone core.
8.1.4		The limestone in the area predominantly consists of the mineral calcite ($CaCO_3$), which is the primary component of most limestones. However, the mineralogy can vary depending on the specific conditions during deposition and diagenesis. Other accessory minerals associated with the limestone in the Bhima Basin includes dolomite, quartz as minor either as detrital grains or as microcrystalline chert nodules, clay minerals especially in argillaceous limestone, iron oxides as hematite and goethite which giving the limestone a reddish or yellowish tint, and pyrite which formed in reducing environments, although they are usually minor constituents. This is the most common texture found in limestone is crystalline texture. The crystal size can vary from fine to coarse, depending on the degree of recrystallization.

9.0		**OBJECTIVE**
		Based on the available geological information the proposed exploration programme has been formulated with the following objectives: 1. To carry out a detailed topographical survey and geological mapping on a 1:4,000 scale over an area of 6.60 sq. km in the proposed Honnal Block. 2. To delineate the strike and depth continuity and quality parameters of limestone bands by drilling 10 vertical boreholes in the Honnal Block, with an average borehole depth of 100.00 m. 3. To carry out exploration in accordance with the Minerals (Evidence of Mineral Contents) Rules, 2015 and the Mineral (Auction) Rules, 2015 (amended up to 2021). The proposed exploration programme will help in demarcating zones of various limestone grades within the block as per UNFC norms and in estimating limestone Inferred (333) resources, which will, in turn, facilitate the State Government in auctioning the block.
10.0		**METHODOLOGY OF EXPLORATION**
		In present exploration scheme for proposed Honnal Block, geological mapping, topographical survey and exploratory drilling (G-3) is planned. The proposed activities are described below.
10.1		**DGPS Boundary Corner Pillars Survey & Geological Mapping.**
10.1.1		The Blocks boundary shall be surveyed by DGPS in WGS-84 datum for demarcation of block boundary/corner points. Triangulation network will be laid down in the proposed study area of 6.60 Sq. Km (660Ha). 10 Boreholes will be fixed on the ground whose RL's and co-ordinates of survey and exploration points will be determined. Detailed Geological Mapping will be done in the proposed block and all the geological features will be recorded and litho-contacts will be plotted for finalization of Geological map. This map will be used as base map for future work.
10.2		**Drilling**
10.2.1		The present exploration scheme is prepared by proposing total core drilling of 1000.00 m in 10 boreholes of NQ size with a vertical depth of 50.00 m each.The borehole location map is enclosed as **Fig.4** and the details of proposed boreholes at G-3 level are listed as in the table below:

Proposed Borehole	Latitude	Longitude
BH-1	16°54'9.96"N	76°55'11.58"E
BH-2	16°54'9.24"N	76°55'45.82"E
BH-3	16°54'41.44"N	76°55'11.66"E
BH-4	16°54'41.70"N	76°55'46.08"E
BH-5	16°55'13.58"N	76°55'11.38"E
BH-6	16°55'13.32"N	76°55'46.28"E
BH-7	16°55'45.06"N	76°55'11.46"E
BH-8	16°55'45.76"N	76°55'46.53"E
BH-9	16°56'11.94"N	76°55'11.37"E
BH-10	16°56'12.38"N	76°55'46.61"E

10.3		**Drill Core Logging and Sampling**
10.3.1		Detailed drill core logging will be done with consideration of weathering, grain size, fossil contents, and color of various formations, intercalation / parting of shale, stylolite, and structure. On the basis of these parameters, grade of limestone can be broadly presented and it will also be helpful in sampling. Primary samples will be drawn at 1m interval subject to change in lithology and core recovery. The following parameters shall be considered while sampling the drill cores. 1) Colour, grain size. 2) Fossil variation. 3) Thin intercalations of shale/siltstone. 4) Partially weathered zone. For preparation of samples the borehole core will be longitudinally split into two equal halves by using core splitter. One half will be powdered to -100 mesh size and the other half will be kept for future studies. The powdered material will be mixed thoroughly and about 100 gm of samples will be taken for chemical analysis by successive coning and quartering as primary samples and rest of the material (-100 mesh size) will be kept as duplicate half for future reference. Total number of primary samples shall likely to generate about 900 for Limestone, internal check samples (5% of primary samples) of 45 Nos and 10% of primary samples i.e. 90 Nos. will be prepared as external check samples and will be sent to NABL accredited Labs for analysis of 9 radicals. Total 1035 nos. of samples would be generated including primary samples, internal check sample and external check samples.
10.4		**Laboratory Studies**
		Chemical Analysis: Primary samples (900 Nos.) will be analyzed for 9 radicals, CaO, MgO, Al2O3, SiO2, Fe2O3, SO3, P2O5, K2O and LOI by XRF method. 5% of primary samples around 45 nos. will be analyzed as internal check for 9 radicals CaO, MgO, Al2O3, SiO2, Fe2O3, SO3, P2O5, K2O and LOI. 10% of primary samples i.e. 90 Nos. will be sent to NABL external labs as external check samples for analysis of 9 radicals CaO, MgO, Al2O3, SiO2, Fe2O3, SO3, P2O5, K2Oand LOI.
		Petrological Studies: Petrological studies will be done on 10 nos. of drill core and surface specimen.
		Bulk Density Determination: Bulk Density will be determined on 05 nos. drill core samples.
11.0		**THE QUANTUM OF WORK PROPOSED**
		The Quantum of work proposed is given in Table No.

Sl.No.	Description and Nature of Work	Unit	Target
A	**GEOLOGICAL WORK AND SURVEYING**		
1	Geological Mapping (1:4,000 scale)	Sq. km	6.60
2	Survey Work		
	i) Topographical Survey (1:4,000 scale)	Sq. km	6.60

	ii) Bore Hole Fixation	Nos	10
	iii) RL & Coordinate Determination by DGPS	Nos	14
B	EXPLORATORY DRILLING		
1	Drilling up to 100m (Soft Rock)	m	1000
2	Drill Core Preservation	Per m	900
C	LABORATORY STUDIES		
1	Chemical Analysis		
	i) Primary Sampling (8 radicals CaO, MgO, Al2O3, SiO2, Fe2O3, SO3, P2O5, K2O and LOI.) by XRF	Nos	900
	ii) Check Sampling Internal 5% (8 radicals CaO, MgO, Al2O3, SiO2, Fe2O3, SO3, P2O5 and LOI.) by XRF	Nos	45
	iii) Check Sampling External 10% (8 radicals CaO, MgO, Al2O3, SiO2, Fe2O3, SO3, P2O5 and LOI.)	Nos	90
2	Petrological samples (Surface & BH Core Samples)		
	i) Preparation of thin section	Nos	10
	ii) Study of Thin Section	Nos	10
3	Bulk Density Determination		
	i)Bulk Density	Nos	5
D	Report Preparation (5 Hard copies with a soft copy)	Nos	1
E	Preparation of Exploration Proposal (5 Hard copies with a soft copy)	Nos	1

12.0 COST ESTIMATE

12.1 The cost has been estimated based on actual schedule of rates mandated in the circular OM No. 61/1/2018/NMET dated 31st March 2020 for NMET funded projects which is Rs. 181.36 Lakhs. The detailed cost sheet for G-3 exploration for Limestone in proposed Kolkunda-Turnur Block is given the below Table:

Summary of Cost Estimates of Proposed Kolkunda and Turnur Blocks, Bhima Basin, Gulbarga (Kalaburagi) District, Karnataka

SL. NO.	ITEM	ESTIMATED COST (Rs.)
1	Drilling	85,88,305
2	Geology & Survey	35,27,280
3	Laboratory	20,07,730
	Sub Total (1 to 3)	1,41,23,315
4	Exploration Report	10,21,954
5	Proposal Preparation	2,04,391
6	Peer Review Charges	20,000

		Grand Total	
		GST 18%	27,66,539
		Total:	1,81,36,199
		Say Rs. in Lakhs	181.36
13.0		**TIME SCHEDULE**	
		The proposed exploration programme envisages geological mapping, topographic survey, exploratory drilling, laboratory studies and geological report preparation which will be completed within 10 months. Therefore, all activities have been planned with overlapping and tentative timeline has been worked out for total 10 months for the proposed project completion.	

PROPOSAL FOR PRELIMINARY EXPLORATION (G-3) FOR LIMESTONE IN HONNAL BLOCK,KALABURAGI DISTRICT, KARNATAKAUNDER NMEDT PROGRAM COMMODITY: CRYSTALLINE LIMESTONE							
S.No	Nature of work	unit	Rate as per NMET SoC March 2020		Estimated Cost of the Proposal		Remarks
			SoC- Item- S. No.	Rates as per SoC	Qty	Total Amount (Rs)	
1.1	Headquarters geologist (Map generation, statistical & geological interpretation and report work)	1 no	1.2	9000/-	75 Man days	6,75,000/-	
1.2	Field Geologist (Geological Mapping, drill core logging, core sampling, sample processing)	2 nos	1.2	11,000/-	240 Man days (180+60)	26,40,000/-	
1.3	Surveyor	1no.	1.6.1b	8,300/-	40 days	3,32,000/-	
1.4	Casual labour (field work including geological mapping , surveying, pitting & trenching)	4nos	5.7	534/-	520 man days	2,77,680/-	As per rates prescribed by Central Labour Commission ratesor respective State Govt. whichever is higher.
1.5	Sampler (marking of cores, core splitting, crushing, powdering, cone & quartering, sample packing, labeling)	2nos	1.5.2	5100/- (Per day per sampler)	90 days	9,18,000/-	Processing of 2000 CS @ 4 samples per day per sampler (approx)
Total (1)						**48,42,680 /-**	
2.1	Core Drilling (sedimentary rock)	m	2.2.1.4a	5242/-	1000m	52,42,000/-	
2.3	Land or crop compensation	Per borehole	5.6	20000/-	10nos	2,00,000/-	
2.4	Construction of concrete Pillar (12"x12"x30")	Per borehole	2.2.7a	2,000/-	10nos	20,000/-	
2.5	Rig mobilization charges (Transportation of Drill Rig & Truck associated perDrill)	Km	2.2.8	36/-	1400 km	50,400/-	

2.6	Monthly Accommodation Charges for drilling Camp	Rig/month	2.2.9	50,000/-	5	2,50,000/-	Period required for drilling 2200m @ 22 boreholes
2.7	Drilling Camp Setting Cost	nos	2.2.9a	2,50,000/-	1	2,50,000/-	
2.8	Drilling Camp Winding up Cost	nos	2.2.9b	2,50,000/-	1	2,50,000/-	
2.9	Approach Road Making	Km	2.2.10.a	22,020/-	10	2,20,200/-	
2.10	Bore Hole Fixation and determination of coordinates& Reduced Level of the boreholes andby DGPS	Nos	1.6.2	19,200/-	10nos	1,92,000/-	16 boreholes + 1 base station
2.11	Drill Core Preservation (complete borehole plus mineralised cores ofall the remaining Bhs)	m	5.3	1,590/-	900	14,31,000/-	Entire drill core excluding topsoil will be analysed.
Total (2)						**81,05,600/-**	
3	Laboratory studies						
3.1	Primary BH Samples (CaO, MgO, Al2O3, SiO2, Fe2O3, SO3, P2O5 and LOI) by XRF	Nos	4.1.15a	4,200/-	900	37,80,000/-	Major oxide
3.2	BH Check Samples Internal 5% (CaO, MgO, Al2O3, SiO2, Fe2O3, SO3, P2O5 and LOI) by XRF	Nos	4.1.15a	4200/-	45	1,89,000/-	Major oxide 5% internal sample
3.3	BH Check Samples Internal 10% (CaO, MgO, Al2O3, SiO2, Fe2O3, SO3, P2O5 and LOI) by XRF	nos	4.1.15a	4200/-	90	3,78,000/-	Major oxide 10% internal sample
Total (3)						**43,47,000/-**	

4.	Petrological studies						
4.1	**Preparation of thin section**	**Nos.**	**4.3.1**	**2,353/-**	**10**	**23,530/-**	
4.2	**Petrological Study of thin section for optical properties**	**Nos.**	**4.3.4**	**4,232/-**	**10**	**42,320/-**	
4.3	**Specific gravity**	**Nos.**	**4.8.1**	**1605/-**	**5**	**8,025/-**	

Total (4)						**73,875/-**	
Total (1+2+3+4)						**1,73,69,155/-**	
Miscellaneous							
5	Preparation of Exploration Proposal	Nos	5.1	2% of project cost	1	3,47,383/-	5 hard copies with 1 soft copy
6	Geological report preparation	Nos	5.2	A Minimum of Rs. 7.5 lakhs or 3% of the work whichever is more	1	7,50,000/-	5 hard copies with 1 soft copy Additional copy @Rs.3000/- per copy
7	Report Peer Review Charges			lumpsum		30,000/-	
Total (1+2+3+4+5+6+7)						1,84,96,538**/-**	
8	GST (18%)					33,29,376/-	
GRAND TOTAL (1+2+3+4+5+6+7+8)						**2,18,25,914/-**	

Time Schedule / Action plan for G-3 exploration for Limestone in the proposed Honnal Block, Bhima Basin, Gulbarga (Kalaburagi) District, Karnataka.

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

Note:
1. Commencement of project may be reckoned from the day the exploration acreage is available along with all statutory clearances.
2. Time loss on account of monsoon/agricultural activity/forest clearance/local law & order problem may be additional to above time line

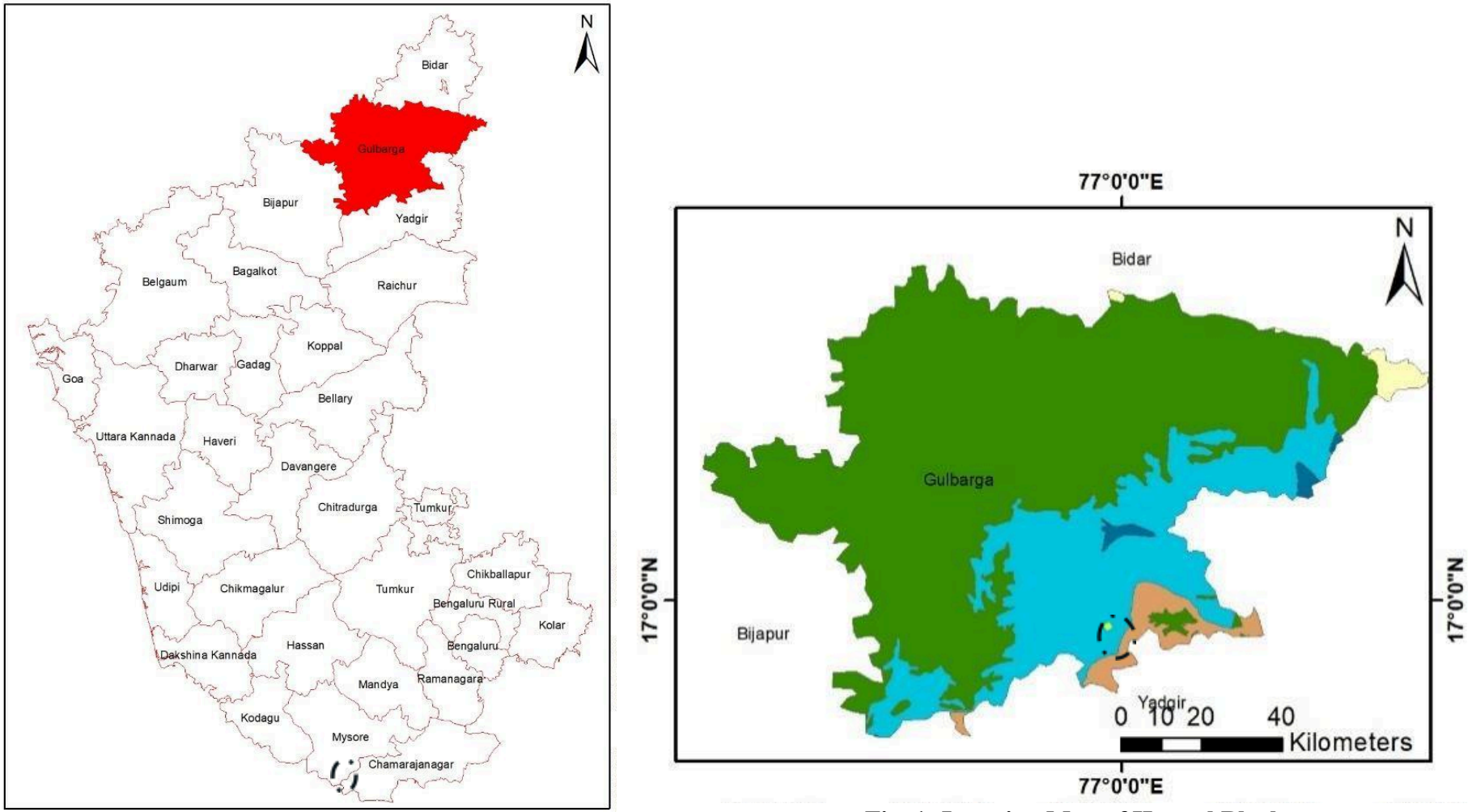

Fig. 1: Location Map of Honnal Block

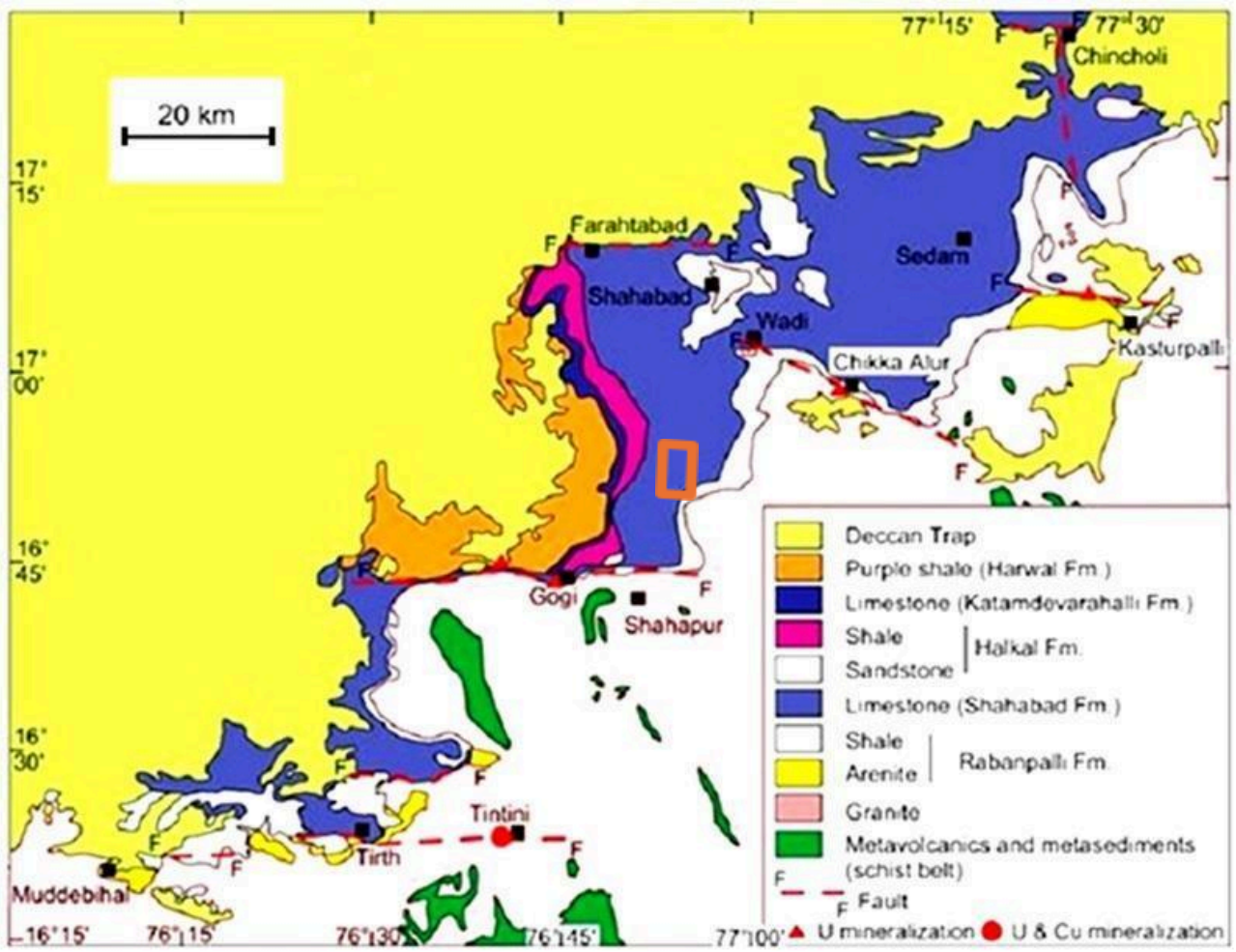

Fig.2: Geological Map of the Bhima Basin modified after Mishra et al. 1987 (Dey, 2015) showing the Exploration Block (Block not to scale, only representation)

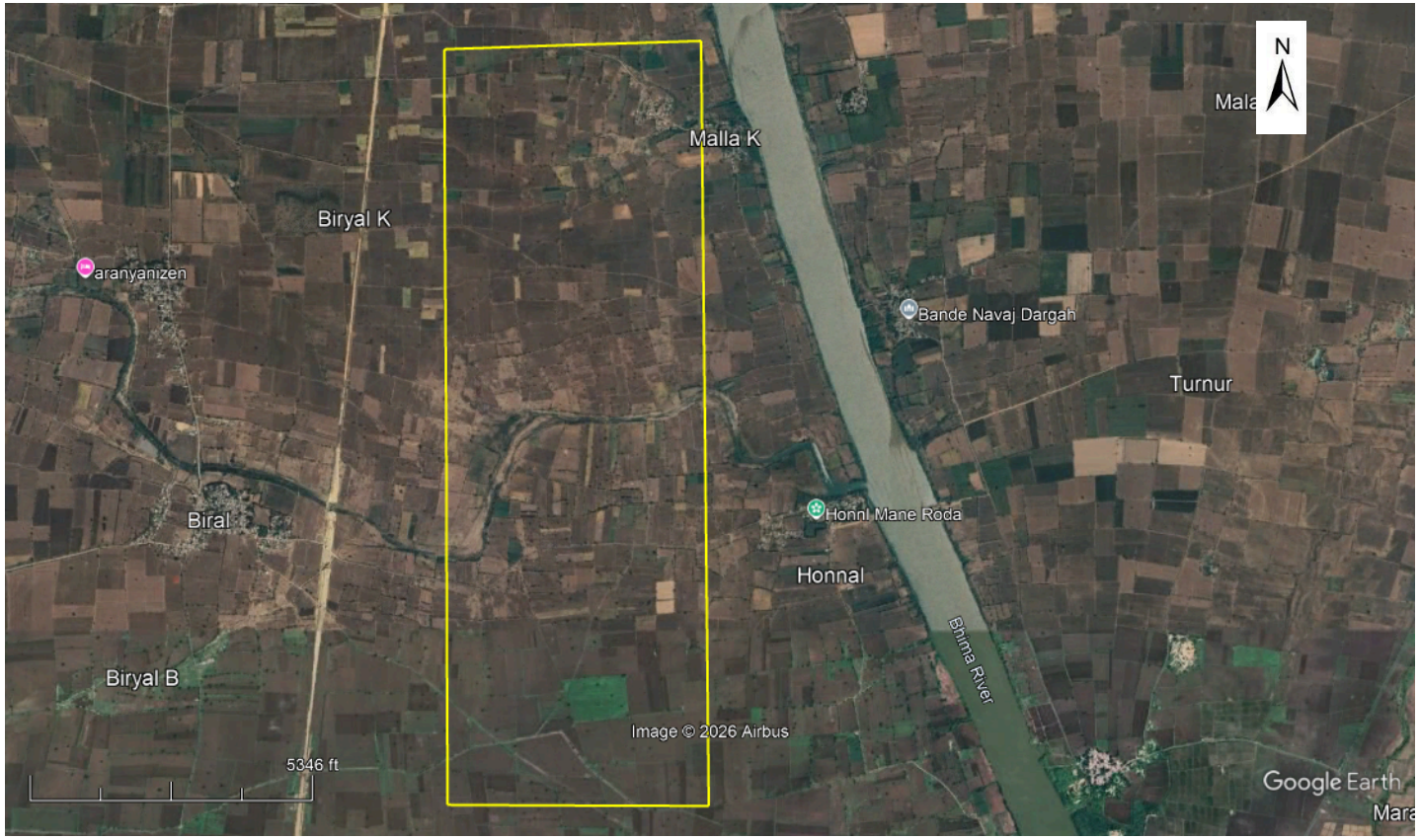

Fig.3: Google Imagery showing the Exploration Block

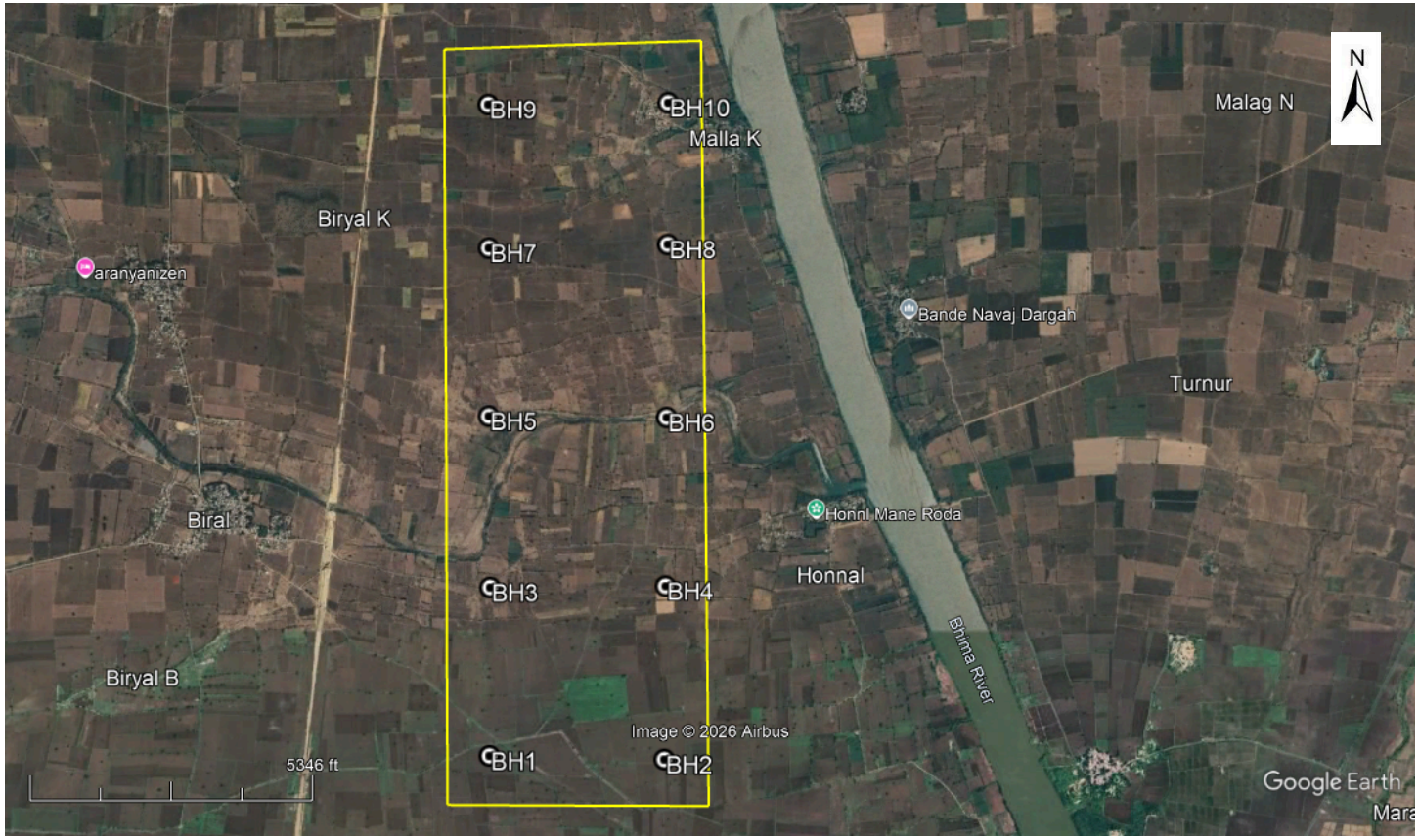

Fig.4: Google Imagery showing the tentative location of boreholes in the Honnal Block