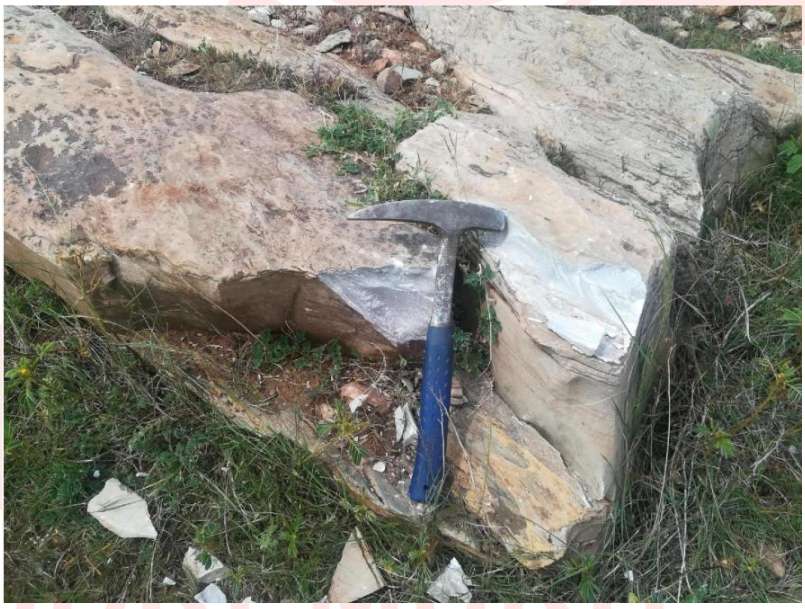
MINERAL EXPLORATION PROJECT PROPOSAL (MEPP)

FOR

G-4 LEVEL WORKS FOR LIMESTONE AND DOLOMITE IN

NEERBUDHIHAL LIMESTONE & DOLOMITE BLOCKS (KAR_NLDB_3363_EAST & KAR_NLDB_3363_WEST),

BADAMI TALUK, BAGALKOTE DISTRICT, KARNATAKA.



Date of Submission: 25th Sept 2019

Submitted by:

KIOCL LIMITED,
(*Notified Exploration Agency*)
BLOCK II, KORAMANGALA,
SARJAPURA ROAD,
BANGALURU 560 034.
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To:

THE CHAIRMAN,
TECHNICAL AND COST COMMITTEE (NMET),
MISSION II A, CENTRAL REGION,
GSI COMPLEX,
SEMINARY HILLS, NEAR TV TOWER,
NAGPUR, MAHARASHTRA- 440006

INDEX

Sl	CONTENTS	PAGE No
A	SUMMARY	03
B	DETAILED DESCRIPTIONS	-
1	BLOCK SUMMARY	10
2	PREVIOUS WORK	15
3	BLOCK DESCRIPTION	17
4	PLANNED METHODOLOGY	17
5	NATURE, QUANTUM AND TARGET	20
6	EXPLORATORY DRILLING	21
7	BREAKUP OF EXPENDITURE	21
8	TERMS OF PAYMENT	21

LIST OF ANNEXURES

Sl	Annexure No	Contents	PAGE No
1	01	TIME SCHEDULE CHART KAR_NLDB_3380_ EAST	22
2	02	TIME SCHEDULE CHART KAR_NLDB_3380_ WEST	23
3	03	COST ESTIMATES OF KAR_NLDB_3380_ EAST	24
4	04	COST ESTIMATES OF KAR_NLDB_3380_ WEST	26

SUMMARY

BLOCK ID	KAR_ NLDB_3363_EAST KAR_ NLDB_3363_WEST
TITLE OF THE PROJECT	G-4 LEVEL MINERAL EXPLORATION WORKS IN NEERBUDHIHAL LIMESTONE & DOLOMITE BLOCKS
CURRENT EXPLORATION AGENCY	KIOCL LIMITED, BANGALORE; ***Notified Exploration Agency***
STATUS OF VARIOUS CLEARANCES (LOCAL/ FOREST / OTHERS)	UNDER THE PROVISIONS OF MINES AND MINERALS (DEVELOPMENT AND REGULATION) ACT, 1957 AND MINERALS (EVIDENCE OF CONTENTS) RULES 2015 AND MINERAL CONCESSION RULES, 1960, a. NOTIFICATION No: DMG / ADV / 2010-11 BANGALORE DATE 18.07.2010 OF DEPARTMENT OF MINES AND GEOLOGY, GOVERNMENT OF KARNATAKA PUBLISHED VIDE KARNATAKA STATE GAZETTE DATED 12.08.2010 IN PART 03 @ No: 3301 b. DEPRTMENT OF MINES AND GEOLOGY, GOVERNMENT OF KARNATAKA PERMITTED KIOCL LIMITED TO PREPARE AND SUBMIT THE EXPLORATION PROPOSAL FOR SEAMLESS G3- TO - G2 LEVEL OF EXPLORATION IN THE BLOCK (UNDER NMET FUNDING) ON BEHALF OF STATE GOVERNMENT VIDE LETTER NO.DMG-17013/6/2018-19/4010 DATED 06TH SEPT 2018. c. VIDE LETTER NO. KIOCL/MED/638 DATED 24TH OCT 2018; MINERAL EXPLORATION PROJECT PROPOSAL (MEPP'S) OF ABOVE INDICATED BLOCK SUBMITTED TO TCC - NMET FOR TECHNO-ECONOMICAL APPROVAL. d. REVIEWED IN 19TH MEETING OF TCC- NMET AND RECOMMENDED AS UNDER; "DUE TO NON-AVAILABILITY OF SUFFICIENT GEOLOGICAL DATA TO TAKE UP G3 LEVEL WORKS, A BLOCK INCLUSIVE OF ABOVE AREA, A LARGER AREA TO THE EXTENT OF 30sqkm, MAY BE DRAWN IN CONSULTATION WITH DMG, KARNATAKA PROPOSING FOR G4 LEVEL STUDIES ALONG WITH PROPOSALS OF DETAILED GEOLOGICAL & STRUCTURAL MAPPING INITIALLY AND COLLECTION OF SAMPLES AND OTHER GEOLOGICAL ACTIVITIES TO PROVE THE CONSISTENT THICKNESS OF LIMESTONE IN THE AREA".

e. VIDE LETTER NO. KIOCL/MED/701 DATED 05TH FEB 2019, REVISED BLOCKS MARKED ON SOI TOPOSHEET AS PER THE RECOMMENDATIONS OF 19TH TCC- NMET, IS SUBMITTED TO DMG, KARNATAKA.

f. DEPRTMENT OF MINES AND GEOLOGY, GOVERNMENT OF KARNATAKA PERMITTED KIOCL LIMITED TO PREPARE AND SUBMIT THE EXPLORATION PROPOSALS OF NEERBUDHIHAL LIMESTONE & DOLOMITE BLOCKS (KAR_NLDB_3363E AND KAR_NLDB_3363W) FOR G4 LEVEL OF EXPLORATION IN THE BLOCKS (UNDER NMET FUNDING) ON BEHALF OF STATE GOVERNMENT VIDE LETTER NO.DMG-17013/6/2018-19/9476 DATED 15TH MAR 2019.

g. VIDE LETTER NO. KIOCL/MED/734 dtd.30th Mar 2019 MINERAL EXPLORATION PROJECT PROPOSAL (MEPP'S) OF ABOVE INDICATED BLOCK SUBMITTED TO TCC - NMET FOR TECHNO-ECONOMICAL APPROVAL

h. REVIEWED IN 20TH MEETING OF TCC- NMET AND RECOMMENDED AS UNDER;

- KIOCL proposed two G3 level exploration projects for limestone and dolomite in Neerbudhihal Block as per the request of DMG Karnataka. The proposals were evaluated in the 19th meeting of TCC held on 18-19th January, 2019 and the Committee recommended that a block inclusive of above area, a larger area to the extent of 30 sq km, may be drawn in consultation with DMG, Karnataka for G4 level exploration initially including Detailed Geological & Structural Mapping and collection of samples and other geological activities to prove the consistent thickness of limestone in the area. Moreover, the geological data is also insufficient to support G3 level of exploration.
- KIOCL modified and resubmitted the proposal for G4 level exploration for limestone and dolomite in these blocks.
- The Committee evaluated the proposals and advised that latest end-use grade classification of IBM shall be followed in resource calculation.
- The Channel/Groove sampling is not required at this stage. The polish section preparation, whole rock analysis, XRD studies and moisture absorption & specific gravity determination are also not required.

	➢ The Committee advised that G4 level exploration will be initiated with large scale mapping, trenching one each in the block with collection of BRS. ➢ In each block 5 boreholes will be drilled out of which 01 borehole in each block shall be drilled up to the depth of 100m and other 08 boreholes shall be drilled up to the depth of 60m. Hence, total drilling of 680m may be carried out in these two blocks. i. NO FOREST LAND IN THE BLOCK
PREVIOUS EXPLORATION AGENCY	GSI - GENERAL GEOLOGICAL MAPPING
G4 STAGE GEOLOGICAL REPORT	NIL
MINERALS TO BE EXPLORED	LIMESTONE AND DOLOMITE
MINERAL BELT	KALADGI – GROUP –CHIKKASHELLIKERE LIMESTONE
TIME SCHEDULE	12 (TWELVE) MONTHS
OBJECTIVE	CARRY OUT MINERAL EXPLORATION (ME) WORKS AS PER MINERALS (EVIDENCE OF MINERAL CONTENTS) RULE-2015, MINERAL (AUCTION) RULES-2015 AND MMDR AMENDMENT ACT-2015 IN TURN TO FACILITATE THE GOVERNMENT OF KARNATAKA IN AUCTIONING OF THE BLOCK a. BY LARGE SCALE GEOLOGICAL MAPPING IN 1:12500 SCALE WITH • BED ROCK SAMPLING, • CHEMICAL AND PHYSICAL ANALYSIS OF SAMPLES • ESTABLISH POSSIBLE EXTENTS OF ENRICHED ORE ZONES BY SCOUT DRILLING (@ suiting to multiples of 800m X 800m grid) b. DEMARCATE ZONE OF VARIOUS GRADES OF LIMESTONE AND DOLOMITE AND ESTIMATE GRADE WISE RESERVES IN THE STUDY AREA AS PER UNFC NORMS FROM G-4 LEVEL OF EXPLORATION. c. ON LOCATING POTENTIAL AREAS BASED ON G-4 LEVEL ME WORKS, FURTHER DRILLING AT GRID INTERVAL OF 800 m X 800 m TO BRING THE AREA AT G-3 LEVEL SHALL BE PROPOSED.
NAME/NUMBER OF GEOSCIENTISTS	THREE (03) Nos and more
EXPECTED FIELD DAYS (GEOLOGY/GEOPHYSICS/ SURVEY / OTHERS)	a. KAR_NLDB_3363_EAST ▪ LARGE SCALE GEOLOGICAL MAPPING (04 months) AND SCOUT DRILLING (05 months – DRY MONTHS ONLY)

<table>
<tr><td></td><td>

Geologist party days - 128 days
Survey party days - 10 days
Core sampling party days – 68 days
Bulk sampling party days - 10 days

b. KAR_NLDB_3363_WEST

LARGE SCALE GEOLOGICAL MAPPING (04 months) AND SCOUT DRILLING (05 months - DRY MONTHS ONLY)

Geologist party days - 128 days
Survey party days - 10 days
Core sampling party days – 68 days
Bulk sampling party days - 10 days

</td></tr>
<tr><td colspan="2">LOCATION(KEY MAP @ PLATE No. 01)</td></tr>
<tr><td>CO-ORDINATES OF THE BLOCK BOUNDARY POINTS</td><td>
<table>
<tr><th colspan="3">KAR_NLDB_3363E</th></tr>
<tr><td>Point No.</td><td>LATITUDE</td><td>LONGITUDE</td></tr>
<tr><td>NE01</td><td>16° 06' 56.4"</td><td>75° 35' 54.1"</td></tr>
<tr><td>NE02</td><td>16° 06' 05.4"</td><td>75° 37' 45.3"</td></tr>
<tr><td>NE03</td><td>16° 06' 32.3"</td><td>75° 39' 39.9"</td></tr>
<tr><td>NE04</td><td>16° 06' 14.4"</td><td>75° 41' 41.3"</td></tr>
<tr><td>NE05</td><td>16° 05' 28.6"</td><td>75° 41' 43.1"</td></tr>
<tr><td>NE06</td><td>16° 04' 59.4"</td><td>75° 39' 02.0"</td></tr>
<tr><td>NE07</td><td>16° 04' 31.8"</td><td>75° 38' 34.9"</td></tr>
<tr><td>NE08</td><td>16° 04' 23.3"</td><td>75° 37' 42.3"</td></tr>
<tr><td>NE09</td><td>16° 05' 19.7"</td><td>75° 37' 27.3"</td></tr>
<tr><td>NE10</td><td>16° 05' 29.8"</td><td>75° 36' 03.1"</td></tr>
<tr><td>NE11</td><td>16° 05' 54.6"</td><td>75° 35' 48.9"</td></tr>
<tr><td>NE12</td><td>16° 06' 04.0"</td><td>75° 35' 33.7"</td></tr>
<tr><th colspan="3">KAR_NLDB_3363W</th></tr>
<tr><td>Point No.</td><td>LATITUDE</td><td>LONGITUDE</td></tr>
<tr><td>NW01</td><td>16° 7'17.27"</td><td>75°30'13.40"</td></tr>
<tr><td>NW02</td><td>16° 7'20.82"</td><td>75°30'28.80"</td></tr>
<tr><td>NW03</td><td>16° 7'32.44"</td><td>75°30'26.64"</td></tr>
<tr><td>NW04</td><td>16° 7'32.25"</td><td>75°33'13.66"</td></tr>
<tr><td>NW05</td><td>16° 7'14.50"</td><td>75°33'7.72"</td></tr>
<tr><td>NW06</td><td>16° 7'7.62"</td><td>75°33'14.64"</td></tr>
<tr><td>NW07</td><td>16° 6'51.90"</td><td>75°33'50.99"</td></tr>
<tr><td>NW08</td><td>16° 7'32.25"</td><td>75°34'3.56"</td></tr>
<tr><td>NW09</td><td>16° 7'32.21"</td><td>75°34'42.64"</td></tr>
<tr><td>NW10</td><td>16° 7'1.97"</td><td>75°35'20.36"</td></tr>
<tr><td>NW11</td><td>16° 5'44.18"</td><td>75°34'49.06"</td></tr>
<tr><td>NW12</td><td>16° 6'3.89"</td><td>75°32'52.07"</td></tr>
<tr><td>NW13</td><td>16° 6'29.92"</td><td>75°32'54.84"</td></tr>
<tr><td>NW14</td><td>16° 6'32.65"</td><td>75°32'30.34"</td></tr>
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	NW15	16° 6'8.64"	75°32'26.57"
	NW16	16° 6'34.50"	75°29'50.54"
VILLAGES	➢ KAR_NLDB_3363E : PARTS OF HULAGERI, KATAGERI, SULIKERI (KAGALGOMBE CROSS), KAGALGOMBE, HANGARAGI, KELWADI, JAMMANKATTI, HULASAGERI, ETC. ➢ KAR_NLDB_3363W: PARTS OF NEERABUDHIHAL, HIRESELLIKERE, KARADIGUDDA, BANDAKERI, GANGANABUDHIHAL, JALAGERI, KRISHNAPUR, KERAKALAMATTI, YANDIGERI, HOOLAGERI, ETC.		
TALUKA	BADAMI.		
DISTRICT	BAGALKOTE		
STATE	KARNATAKA		
AREA			
BLOCK AREA	KAR_NLDB_3363E -25.17 sq km KAR_NLDB_3363W - 21.11 sq km		
FOREST AREA	NIL		
GOVERNMENT LAND	NA		
PRIVATE LAND	NA		
ACCESSIBILTY			
NEAREST RAIL HEAD	BAGALKOTE IS THE NEAREST BROAD GAUGE (BG) RAILWAY STATION (OPERATING). NEW BG RAILWAY LINE FROM BAGALKOTE TO KAJJIDONI PASSES ALONG NORTH BOUNDARY OF KAR_NLDB_3363W		
ROAD	NEERBUDHIHAL LIMESTONE DOLOMITE BLOCKS ARE LOCATED ON EAST AND WEST PLANKS OF NH52 STRECH BETWEEN BAGALKOTE AND HUBLI. KAR_NLDB_3363E ➢ BY ROAD, SULIKERI ON EAST FLANK OF BLOCK IS AROUND 11km SOUTH OF BAGALKOTE, DISTRICT HQ. ➢ ALL WEATHER ROAD RUNNING FROM NH52 TO SULIGERI VIA KAGALGOMBE PASSES THROUGH THE BLOCK KAR_NLDB_3363W ➢ BY ROAD, NEERBUDHIHAL IS AROUND 20km SOUTH WEST OF BAGALKOTE, DISTRICT HQ AND ABOUT 40km NORTH OF BADAMI, TALUK HQ. ➢ ALL WEATHER ROAD (SH44) RUNNING TOWARDS KALADGI VIA KEREKALAMATTI FROM NH52. ➢ KEREKALAMATTI – LOKAPUR ROAD PASSES THROUGH THE BLOCK.		
AIRPORT	NEAREST AIRPORT TO THE BLOCK BEING HUBLI, AROUND		

	110km FROM NEERBUDHIHAL.
HYDROGRAPHY	
LOCAL SURFACE DRIANAGE PATTERN (CHANNELS)	BLOCK AREA IS OCCUPIED BY A FEW SEASONAL NALLAS AND STREAMS FLOWING TOWARDS NORTH AND NORTHEASTERN DIRECTIONS, DRAINING THE AREA TO JOIN THE GHATAPRABHA RIVER. IMPORTANT NALAS INCLUDE HIREHALLA,GONDIMADA HALLA.
RIVERS AND STREAMS	DRAINAGE PATTERN IS SLOPING NORTHWARDS TO FEED GHATAPRABHA RIVER FLOWING EAST WARDS (AROUND 11 km TOWARDS NORTH)
CLIMATE	
MEAN ANNUAL RAINFALL	VARIES FROM 50cm TO 62cm.
TEMPERATURE	CLIMATE OF THE AREA IS TEMPORATE TO WARM DURING WINTER AND WARM TO VERY HOT AND DRY DURING SUMMER. Winter – 18^0c to 28^0c, Summer – 23^0 c to 38^0 c
TOPOGRAPHY	
TOPOSHEET NO	47P12 BLOCK MARKED ON TOPOSHEET – **PLATE NO. 02**
MORPHOLOGY OF THE AREA	MORE OR LESS A GENTLE SLOPE AND IS UNDULATING IN SOME AREAS. THE PLAINS AND DEPRESSIONS ARE COVERED BY BLACK COTTON SOIL CONCEALING THE UNDERLYING KALADGI ROCKS AND DECCANTRAPS
AVAILABILITY OF THE BASELINE GEOSCIENCE DATA	
GEOLOGICAL MAP (1:50 k)	AVAILABLE
GEOCHEMICAL MAP	NOT AVAILABLE
GEOPHYSICAL MAP (Aero/ Ground, Regional/ Local scale)	AEROMAGNETIC (NRSA PROJECT) MAP AVAILABLE
JUSTIFICATION FOR TAKING UP G4 LEVEL OF MINERAL EXPLORATION	
PREVIOUS WORK:	➢ EARLIER STUDIES OF THE KALADGI BASIN WERE MADE BY CHRISTIE (1836), AYTON (1852-54) AND CARTER (1854). ➢ BRUCE FOOTE (1876) CARRIED OUT DETAIL STUDIES OF THE BASIN, COMPILED INTO A GSI MEMOIRE (NO.12). ➢ IN 1950-54, THE KALADGI BASIN WAS RE-MAPPED ON 1:63,360 SCALE BY VENKOBA RAO ET AL. AND A GEOLOGICAL MAP OF THE BASIN WAS COMPILED AND PUBLISHED BY GSI IN 1961. ➢ VENKOBA RAO ET AL. (1967) HAD DEMARCATED FIVE FLUX GRADE DOLOMITE BANDS AND OPINED THAT GENERALLY FLUX GRADE DOLOMITE BANDS OVERLIES THE FLUX GRADE LIME STONE. DETAIL AND EXTENSIVE

WORK INCLUDING DRILLING WAS CARRIED OUT BY GSI IN KALADGI BASIN FOR FLUX GRADE LIMESTONE AND DOLOMITE (VENKOBA RAO ET AL, 1965).

- AV JAYAPRAKASH ET AL (1987) CARRIED OUT EXTENSIVE MAPPING OF THE ENTIRE KALADGI BASIN AND WORKED OUT STRATIGRAPHY, STRUCTURE AND EVOLUTION LATER COMPILED INTO A MEMOIRE PUBLISHED BY GSI (NO.129).
- DURING 1993 -94, MOHAMMED AHMED ET AL CARRIED OUT PRELIMINARY APPRAISAL FOR FLUX AND SMS GRADE DOLOMITE IN PARTS OF KALADGI BASIN, BIJAPUR(THEN) AND BELGAUM DISTRICTS BY SYSTEMATIC CHIP SAMPLING OF THE PROSPECTS.(study in nearby area)
- NIBIN TOM ET AL(2012) RECOMMENDED THAT LIMESTONE RESOURCES COULD BE ASSESSED FOR LOW-ALKALI SMS AND BF (GRADE 1/2) IN THE ADJOINING AREAS COVERED IN PARTS OF SOI T. S. NO.: 47P/12, BAGALKOT DISTRICT AND 47P/4 INPARTS OF BELGAUM DISTRICT, KARNATAKA. IN THE INVESTIGATED AREAS, BF GRADE RESOURCES OF LOW ALKALI ZONES WITH < 0.2 % TOTAL ALKALI CONTENT (GRADE 1) WERE RECORDED AS NARROW ZONES (<10M).

THE AUTHORS BELIEVE SUCH ZONES ON A WIDER SCALE EXIST IN OTHER PARTS OF THE BASIN AND COULD BE DELINEATE BY SYSTEMATIC SAMPLING.(study in nearby area)

PRELIMINARY FIELD INSPECTION BY KIOCL:

Technical Team of KIOCL visited the various parts around Kerakalmatti, Ganganabhudhihal & Jalageri villages on 17th, 18th& 19th Aug 2018 to identify Limestone & Dolomite mineralization.

Observations:

- Lesser outcrop exposure is observed due to highly irrigated and agricultural lands.
- 05 nos of samples were collected and the Analysis results are provided below.
-

Sample No	Latitudes	Longitude	CaO%	MgO%	SiO2%	LOI%	Remarks
NBH - 01	N16° 08' 07.7"	E75° 31' 52.7"	48.20	3.06	3.52	42.24	Sample collected from out side the Block (Around 1.7 km North West direction of the block)

NBH - 05	N16° 07' 02.0"	E75° 33' 25.5"	21.00	1.5	52.00	18.34	-
KBS-02	N16° 6'37.54"	E75°32'53.29"	42.05	2.90	12.89	-	-
KBS-03	16° 6'59.85"N	75°33'28.19"E	46.05	1.74	8.68	-	-
KBS-04	16° 7'31.01"N	75°34'20.08"E	44.64	1.35	11.9	-	-

DETAILED DESCRIPTIONS:

1. BLOCK SUMMARY:

1.1 Physiography : Blocks form an undulating topography with a gentle slope towards north. The area exhibits sub-dendritic to dendritic drainage pattern of smaller streams. The average elevation in this area reaches approximately 610 m.

The quartzite ridges in the area strike in a WNW-ESE direction. Dolomite is resistant to weathering comparatively and occupies irregular and craggy outcrops on the plains. The valleys and plains in the area are about 600m above MSL and the ridges are 65m to100m above the plains. The plains and depressions are covered by black cotton soil concealing the underlying Kaladgi rocks and Deccan traps. The shale, argillites and limestones which form the major rock types in the area, are easily susceptible for weathering and hence occupy the low lying tracte.
Blocks under investigation has flat topography with scanty outcrops and thick soil cover (02 to 10 m) at places.

1.2 Back Ground Geology & Regional Geology of the Block:

Regional Geology

Kaladgi basin is an E-W trending irregular basin underlain by the basement granitoids (Peninsular Gneiss and Dharwar batholith) of the Dharwar Craton in the south and east and overlain by the Deccan Trap in the north. The basin covering an area of 8300 sq. km is made of an older Kaladgi sequence and younger Badami sequence occurring as separate sub-basinal areas, like the older Cuddapah and younger Kurnool sequences in Cuddapah Basin. Unlike the other Purana basins, Kaladgi Basin is not marginally deformed, as it is not spatially associated either with mobile belt or with terrain boundaries. Instead, the deformation is concentrated in the centre of the basin with the periphery remaining unaffected. The basin consists of three quartzite-shale-limestone cycles with an aggregate thickness of 4500 m. Kaladgi basin hosts vast resources of limestone and dolomite, as well as building and ornamental stones, besides minor iron ore.

Bruce Foote (1876) systematically mapped the basin and divided the sediments in to Lower and Upper Kaladgi 'series'. Vishwanathiah (1979) found that the 'sandstone and shale' unit of the Lower Kaladgi series was a flat-lying unit laid with a marked angular unconformity on the underlying, folded Kaladgi series He therefore proposed that the lower sequence be called the Kaladgi and upper the Badami. Symposium volumes (Krishnan, 1964; Viswanathiah 1979) describe various aspects of the

Kaladgi basin. Jayaprakash et al. (1987) provide a geological overview of the Kaladgi-Badami basin.

Brief regional geology outlining the broad geological and structural frame work

The Kaladgi Group is characterized by a thick pile of argillaceous carbonate sediments deposited in a rifted basin whose configuration is delineated by a series of faults. The basin is enclosed within the metasediments of Dharwar Supergroup, Hungund Schist Belt, Peninsular gneiss (PGC) suite and granite (Closepet equivalent) covering an area of 8000 sq. km. The total sedimentary fill is 4500 m; out of which 4234 m thick sediments are named as Bagalkot Group and 286 m thick sediments as Badami Group. They constitute a repeated or cyclic sequence of clastic sediments and chemical precipitates, rich in high grade carbonates.

The Kaladgi Basin is considered as an intracratonic type, surrounded by supracrustal rocks of Karnataka craton on all sides with the longer axis of the basin being sub parallel with the northern segment of the Closepet batholith and at right angles to the supracrustals. The central part of the basin is intensely folded and deformed than the marginal areas.

The sediments of the Lokapur Group display a series of anticlines and synclines, wherein the Simikere rocks are seen as doubly plunging synclinal basins due to intensive and tight folding. Two deformational episodes viz. D1 and D2 are recorded in the lithounits of Kaladgi basin resulting in F1 and F2 folds, respectively. During D1 episode, the rocks were folded to WNW-ESE trending doubly plunging antiforms and synforms; plunge amount varies from 10 to 35 degrees. The second deformation (D2) episode has resulted in cross folding of almost ENE-WSW trending sub-vertical to moderate planes of F1 folds to NNW-SSE horizontal compression of moderate intensity producing asymmetric dome and basin outcrop patterns formed by their interference. The resultant type of superposed folds could be modulated by certain degree due to uneven basement floor and shapes of early folds. The F2 folds have produced bedding parallel slips at places indicating a flexural slip mechanism.

The lithounits exposed in the area belongs to Yargatti, Yendigere, Muddapur, Yadhalli, Kundargi, Arlikatti and Hoskatti Formations of Lokapur sub group. The argillite/limestone/dolomite successions in the area are interpreted as part of a megacycle (Jayaprakash, 1987 & 2007). The descriptions of units are given below according to the chronological order starting from the older Formations

Table 01: Regional Stratigraphy of the Kaladgi Basin, (after AV JAYAPRAKASH ET AL (1987))

MEMBER	THICKNESS	FORMATION	SUB-GROUP	GROUP
LIMESTONE	85m	KARATEGI		**KALADGI**
SHALE	67m			
ARENITE	39m			
SHARP CONTACT				
SHALE	03m	KERUR		

ARENITE	89m			
CONLOMERATE	003m			
ANGULAR UNCONFORMITY				
PHYLLITE		HOSKATTI	SIMIKERE	
TRANSITIONAL CONTACT				
DOLOMITE	87m	ARLIKATTI		
CHERT	*42m*			
META-IRON STONE	*39m*			
ARGILLITE	*80m*			
TRANSITIONAL CONTACT				
QUARTZITE	182m	KUNDARGI		
CONGLOMERATE	*15m*			
DISCONFORMITIES				
ARGILLITE – DOLOMITE		YADHALLI	**LOKAPUR**	
TRANSITIONAL CONTACT				
DOLOMITE	402m	MUDDAPUR		
LIMESTONE	*121m*			
ARGILLITE	*43m*			
SHARP CONTACT				
NAGNAPUR DOLOMITE	***93m***	***YENDIGERE***		
CHIKKASELLIKERE LIMESTONE	***883m***			
ARGILLITE	*166m*			
TRANSITIONAL CONTACT				
DOLOMITE	218m	YARGATTI		
ARGILLITE	502m			
SHARP CONTACT				
CHERT	133m	MALAPRABHA		
ARGILLITE	61m			
TRANSITIONAL CONTACT				
QUARTZITE	383m	RAMDURG		
CONGLOMERATE	31m			
NON-CONFORMITY				
BASEMENT ROCK	PGC, GRANITOIDS AND METASEDIMENTS			

1.3 Mineral Potentiality based on Geology, Geophysics and Ground Geo Chemistry etc:

Recommendations of earlier investigation works

1.3.1 VenkobaRao et al (1950-54) ,re-mapped the Kaladgi basin on 1:63,360 scale and a geological mapof the basin was compiled and published by GSI in 1961.

VenkobaRao et al, (1965) carried out detail and extensive work including drilling in Kaladgi basin for flux grade limestone and dolomite

VenkobaRao et al. (1967) demarcated five flux grade dolomite bands and opined that generally the flux grade overlies the flux grade lime stone.

1.3.2 AV Jayaprakash et al (1987) carried out extensive mapping of the entire Kaladgi basin and worked out stratigraphy, structure and evolution later compiled into a memoir published by GSI (No. 129, 2007) and recorded as under

Overall compositional range & Reserves of major limestone deposits:

Locality	Ca O%	Mg O%	I R%	SMS Grade (in tonnes)	BF Grade (in tonnes)
KALASKOPPA	41 - 48	02 -04	05 -13	99,42,000	711,73,000
NIRBUDIHAL	51	02	04	442,56,000	237,33,000
KALADGI	45 - 52	1 - 4	2 - 6	70,92,000	84,60,000

Grades have been assigned with reference to the specifications shown below:

Grade	CaO	Acid insoluble	MgO
SMS(Open hearth)	> 50%	< 06 %	<04%
BF	50%	< 10%	<04%

Sulphur and phosphorus should be less than 0.05% and 0.1 % respectively for SMS and BF grade

Summarising the studies,the grand total of the measured reserves of all these three grades to a depth of 60m is 452 million tonnes. Besides the above mentioned deposits. vast areas remain unexplored due to lack of good outcrops, doubtful Inventories of the Indian Bureau of Mines (2004) show the reserves are still on the higher side, if results of the work carried out by other agencies are taken into account.

Subsurface studies either by direct or by indirect methods to delineate the boundary of the Kaladgi basin in the northern segment which is concealed under the cover of Deccan basalts will be of immense value , to appreciate both the evolutionary history and mineral potential of the basin in full .

1.3.3 IBM GUIDELINES

In view of the changing market dynamics and availability of new technologies for upgrading the low grade resources, IBM has revised the THRESHOLD VALUE for the LIMESTONE minerals under provision of Rule 12(7) of "Mineral Conservation and Development Rules, 2017" (MCDR, 2017), vide Notification No: C -284 / 03 / CMG / 2017 dated 25.April 2018, as under:

(6) THRESHOLD VALUE OF MINERALS

Sl No (8) Limestone: CaO- 34% (Min.) and MgO-5% (Max.)

(All resources shall be assessed up to the threshold value and the resources between the threshold value and the cut-off grade shall be reported separately. There will however be no restrictions in estimating resources below the threshold value if there is a ready market of such mineral/ore either directly or after beneficiation)

1.3.4 BIS STANDARDS: Bureau of Indian Standards (BIS) 10345 – 2004, 2nd Revision, reaffirmed 2009, the following end use grade classification as below:

Flux Grade	CaO (%)	Mg(%)	SiO2 (%)	Acid Insoluble (%)	Preferred size (mm)
Grade I-Steel Making	53(min)	1.5(max)	1.5(max)	2 (max)	30-80
Grade II-Iron Making	44(min)	4 (max)	6 (max)	10 (max)	15-75

1.3.5 NCCBM: Norm of limestone deposits as per National Council for Cement and Building Materials (NCCBM) for cement manufacture is as below

Grade	Portland Cement (%)	Consideration of other types of cements, scope of beneficiation and Blending (%)
CaO	44-52	40 (min)
MgO	3.5 (max)	5 (max)
SiO2	To satisfy LSF, silica	---
Al2O3	Modules and alumina	---
Fe2O3	Modules	---
TiO2	< 0.5	< 1.0
Mn2O3	< 0.5	< 1.0
R2O (Na2O + K2O)	< 0.6	< 1.0
Total S as SO3	< 0.6	< 0.8
P2O5	< 0.6	< 1.0
Cl	< 0.015	< 0.05
Free silica	< 8.0	< 10.0

1.4 Scope for proposed Exploration:

1.4.1 The Purana Basin – Kaladgi Group has well developed exposures and the Block is surrounded by operating lime stone / dolomite mines.

Extensive ME works in the west of KAR_NLDB_3363W block i.e., around Hanumaneri, Manami / Yadwad, Jallikatti Salapur are reported by GSI

1.4.2 As per the recommendations of 19th TCC of NMET, the block is divided into TWO parts (NLDB-EAST and NLDB- WEST) for carrying out *Large Scale*

Geological & Structural Mapping initially and *other ME activities* to prove the consistency of limestone and dolomite in the area.

1.4.3 Hence the proposal for G4 level work is re submitted for Large Scale Geological Mapping, sampling and Scout Drilling. Blocks marked on 1:50k GSI Geological Map is @ **Plate No. 03.**

1.5 Recommendations of G4 level Mineral Exploration reports :

No G4 works are carried out.

1.6 Objectives:

a. To carryout Large Scale Geological mapping in 1:12500 scale.
b. To delineate strike continuity and structural behaviour of limestone and dolomite bands by bed rock sampling
c. Carry out scout drilling to establish possible extents of enriched / potential ore zones.
d. On locating potential areas, to bring the area at G3 level ME Works shall be proposed.

ME Works shall be confirming to Minerals (Evidence of Mineral Contents) Rule-2015, and Mineral (Auction) Rules-2015 and MMDR Amendment Act-2015

2. PREVIOUS WORK:

2.1 EARLIER STUDIES OF THE KALADGI BASIN WERE MADE BY CHRISTIE (1836), AYTON (1852-54) AND CARTER (1854).

2.2 BRUCE FOOTE (1876) CARRIED OUT DETAIL STUDIES OF THE BASIN, COMPILED INTO A GSI MEMOIRE (NO.12) detailed the more important exposures of limestones near Kaladgi, Sillikeri and Bagalkot. About the exposures of limestones near Kaladgi he writes from no point can the limestones be better studied than from the town of Kaladgi itself, which stands upon them, very nearly in the centre of the basin. The beds of limestone are much contorted and the dips end strikes, therefore, are very variable within small limits. The average dip is about north east, from 35° 40°. The commonest colour is grey in various shades, banded with very wavy bands of grey chert which generally weather of a drab or yellowish tint externally

2.3 IN 1950-54, THE KALADGI BASIN WAS RE-MAPPED ON 1:63,360 SCALE BY VENKOBA RAO ET AL. AND A GEOLOGICAL MAP OF THE BASIN WAS COMPILED AND PUBLISHED BY GSI IN 1961.- He recommended that, the material is suitable for the manufacture of cement and further prospecting aided by sampling, however, is recommended to prove the quantity and quality of the limestone deposit

2.4 VENKOBA RAO ET AL. (1967) HAD DEMARCATED FIVE FLUX GRADE DOLOMITE BANDS AND OPINED THAT GENERALLY FLUX GRADE DOLOMITE BANDS OVERLIES THE FLUX GRADE LIME STONE.

2.5 VENKOBA RAO ET AL, (1965). CARRIED OUT DETAILED AND EXTENSIVE WORK IN KALADGI BASIN FOR FLUX GRADE LIMESTONE AND DOLOMITE

2.6 AV JAYAPRAKASH ET AL (1987) CARRIED OUT EXTENSIVE MAPPING OF THE ENTIRE KALADGI BASIN AND WORKED OUT STRATIGRAPHY, STRUCTURE AND EVOLUTION LATER COMPILED INTO A MEMOIRE PUBLISHED BY GSI (NO.129).

2.7 MOHAMMED AHMED ET AL (1993 -94), CARRIED OUT PRELIMINARY APPRAISAL FOR FLUX AND SMS GRADE DOLOMITE IN PARTS OF KALADGI BASIN, BIJAPUR(THEN) AND BELGAUM DISTRICTS BY SYSTEMATIC CHIP SAMPLING OF THE PROSPECTS.

2.8 NIBIN TOM AT ALL (2012) RECOMMENDED AS THE LIMESTONE RESOURCES COULD BE ASSESSED FOR LOW-ALKALI SMS AND BF (GRADE 1/2) IN THE ADJOINING AREAS COVERED IN PARTS OF SOI T. S. NO.: 47P/12, BAGALKOT DISTRICT AND 47P/4 IN PARTS OF BELGAUM DISTRICT, KARNATAKA. IN THE INVESTIGATED AREAS, BF GRADE RESOURCES OF LOW ALKALI ZONES WITH < 0.2 % TOTAL ALKALI CONTENT (GRADE 1) WERE RECORDED AS NARROW ZONES (<10M). THE AUTHORS BELIEVE SUCH ZONES ON A WIDER SCALE EXIST IN OTHER PARTS OF THE BASIN AND COULD BE DELINEATE BY SYSTEMATIC SAMPLING (WHILE ON A STUDY IN NEARBY AREA).

2.9 PARSURAM BEHERA AT ALL (2017) CARRIED OUT G3 LEVEL ME WORKS FOR SMS GRADE LIMESTONE AROUND HOSKOTI AND SALAPUR AREAS OF BELGAUM AND BAGALKOT DISTRICTS, KARNATAKA. RECOMMENDED INVESTIGATION FOR LARGER BODIES OF MASSIVE AND BEDDED GRAY AND PINK LIMESTONE NORTH OF THE MAPPED AREA SHOULD BE CARRIED OUT AS THESE UNITS GIVE PROMISING CAO CONTENT WHICH MIGHT PROVE ECONOMICALLY VIABLE. IT IS SUGGESTED TO TAKE UP AN RP TO CARRY OUT DETAILED CHARACTERIZATION OF STROMATOLITE AND PRESENCE OF PHOSPHORITE WITHIN THE INTERCALATING DARK CHERT BANDS.

2.10 KARTHIKEYAN A. AT ALL (2019) CARRIED OUT G2 LEVEL ME WORKS FOR LIMESTONE IN NW OF HANAMANERI BLOCK, BAGALKOT DISTRICT, KARNATAKA. THE AREA WITH PROVEN POTENTIAL FOR ALL GRADES OF LIMESTONE HAS BEEN RECOMMENDED FOR AUCTIONING FOR MINING IN FUTURE.

3. BLOCK DESCRIPTION:

NEERBUDHIHAL LIMESTONE DOLOMITE BLOCKS (KAR_NLDB_3363_East & KAR_NLDB_3363_West) are located in between Neerabudhihal and Sulikeri villages,

- to the south and south east of BG railway line from Bagalkote to Kajjidoni.
- NH52 runs North South devides the Blocks

The population falls under rural status and the main occupation is agriculture, mining/quarrying and animal livestock.

Ownership of the land belongs to the villagers.

4. PLANNED METHODOLOGY

4.1. LARGE SCALE (1: 12500) GEOLOGICAL MAPPING (LSM):

a. Study and interpretation of available Aero Geo – physical, NGPM, NGCM data and maps of the areas including previous Study Reports (if any, to be obtained from GSI or other agencies) for creating a geological Base Map of the Blocks.

b. LSM by traversing (total 46.28sqkm), to identify and mark the anomalies of Limestone and Dolomite Zones and significant geo / litho structures in the Blocks.

c. Total 120 nos of Bed Rock Samples are proposed for collection and analysis which may vary depending on the site conditions for proving mineralization/otherwise and geological structures.

d. Sampling on Bed Rock on the outcrops / ore body out crops shall be done by collecting atleast five representative fresh rock samples from a radius of 5.0m area and aggregating.

e. Insitu Bluk Density Test will be carried out @ site as per IS : 5842 - 1986 BIS adopted for limestone/ dolomite and overburden(black cotton soil) @ size 15-80 mm.

f. All the geological features / details ample analysis data recorded will be plotted.

g. Interpretation of observed details and other inputs shall be used in drawing Geological Map and locating mineralised /potential target areas.

h. Generate a detailed Geological Map along with recommendations for taking up Scout Drilling in the enriched / potential zones.

4.2. **SURVEY WORKS:**

a. RL's and co-ordinates of exploration / observation points will be determined using handheld GPS units.

b. DGPS survey will be carried out for fixing up (Scout Drill) Boreholes points on the ground. Tentatively, 30 nos DGPS survey points shall be required and may vary based on the site conditions.

Sl	Block	Borehole points	*Additional points	Total
1	KAR_NLDB_3363_E	05	05	10
2	KAR_NLDB_3363_W	05	05	10
3	Total	10	10	20

*Additional points for establishing SOI control points, Block Base Station and Triangulation Ref Points etc.

4.3. **SURFACE (SCOUT) DRILLING :**

a. Present Exploration scheme proposes 680 m of Scout Drilling (Approx 10 nos , inclined OR Vertical)

Sl	Block	No of Boreholes	Proposed meterage of Drilling	Total meterage	Cumulative meterage
(a)		(b)	(c)	(d)=(b)*(c)	(e)
1	KAR_NLDB_3363_E	04	60	240	340
2		01	100	100	
3	KAR_NLDB_3363_W	04	60	240	340
4		01	100	100	
5	**Total**	**10**	**-**	**680**	**680**

b. Scout Drilling will be carried out with reference to LSM (1:12,500 scale@ suiting to multiples of 800m X 800m grid) with a view to firm up the grade and resources of limestone at G-4 level of exploration across the length & breadth of Blocks.

PS: The position extent and number of boreholes shall be based on the recommendations of LSM works.

4.4. LABORATORY STUDIES

a. Chemical Analysis:

- All the Primary samples will be analyzed at Mineral Exploration laboratory, KIOCL Limited(BFU), Panambur, Mangaluru, AN ISO 9001:2008 Certified laboratory. Details of samples to be analysed are provided below.

Sl	Samples	KAR_NLDB_3363_E	KAR_NLDB_3363_W	Total
1	Primary samples *08 radicals- 100%	400 (BRS – 60+ Drill core – 340)	400 (BRS – 60+ Drill core – 340)	800
2	Radicals for Phosporates and others (# 04 radicals) 10%	40	40	80
3	Internal Check sample analysis - *08 radicals - 5%	20	20	40
4	Composite sample analysis (13 radicals - (CaO,MgO,SiO_2, Al_2O_3, Fe_2O_3, LOI, Na_2O, K_2O SO_3, P_2O_5, Cr_2O_3, $MnO2$, Acid Insoluables) -10%	40	40	80
5	Total	500	500	1000

- Sample Analysis will be as per laid down standards.
- Primary samples shall be analysed for
  - * 08 radicals- CaO,MgO,SiO_2, Al_2O_3,Fe_2O_3, LOI, Na_2O and K_2O.
    - Na_2O and K_2O (R_2O) shall be to establish alkaline contents
  - Analysis of Phospherites and Acid Insoluble (# 04 radicals- SO_3, P_2O_5, Cr_2O_3, Acid Insoluble) – 10%,
  - Internal check for 08 radicals -5%
- Composite sample analysis (13 radicals - (CaO, MgO, SiO_2, Al_2O_3, Fe_2O_3, LOI, Na_2O, K_2O SO_3, P_2O_5, Cr_2O_3, MnO_2, Acid Insoluables) - 10%
- 10% of primary samples will be subjected to analysis at a NABL certified external laboratory as check samples for analysis of * 08 radicals.

b. Physical Analysis

- Petrological studies like Preparation and study of Polished Thin Section will be done on BRS/Core samples.
- Moisture absorption & Specific Gravity will be determined on BRS/ Drill core samples (lab scale).

4.5. EXPLORATION REPORT:

- Generate a detailed Report (Final G4 Report) along with a Geological Map identifying and establishing OBIVIOUS GEOLOGICAL POTENTIAL (OGP) Areas with quantity and quality of resources worthy of further exploration to realize an AUCTIONABLE BLOCK.
- Data generated from G-4 level works, and earlier data if any shall be presented in the Report as per the guidelines laid down in provisions of MINERAL (EVIDENCE OF CONTENTS) RULES 2015in the NMET prescribed format for Peer Review.

5. NATURE, QUANTUM AND TARGET

Quantum of work proposed for G4 level of work is as below.

TABLE No. 03 : QUANTITIES OF WORK

Sl	Details of the Work			Units	Quantities		
					NLDB (E)	NLDB (W)	Total
1	**Large Scale Geological Mapping Works**		Geological Mapping	sq km	25.17	21.11	46.28
2			Collection of Surface / Bedrock samples	nos	60	60	120
3			Insitu Bulk Density tests	cum	10	10	20
4	**Survey Works**		DGPS Survey - Fixing up of borehole points(including SOI Control point + Block Base Station + Triangulation Reference Point)	points	10	10	20
5	**Drilling Works**		Core Drilling (N/B series or equivalent size)	m	340	340	680
6			Detailed core/ sample logging including supply of core/ sample boxes	m	340	340	680
7	**Sample Analysis Works**	**Sample preparation works**	BRS	nos	60	60	120
8			Drill Core (Splitting + Preparation)	nos	340	340	680
9			Composite	nos	34	34	68
10		**Primary Analysis - In house**	Primary radicals (*08 radicals)	nos	400	400	800
11			Radicals for Phosporates and others (# 04 radicals-) - 10%	nos	40	40	80
12			Internal Check sample analysis - *08 radicals - 5%	nos	20	20	40
13			Composite sample analysis(13 radicals - (CaO,MgO,SiO_2, Al_2O_3, Fe_2O_3, LOI, Na_2O, K_2O SO_3, P_2O_5, Cr_2O_3, MnO_2, Acid Insoluables) - 10%	nos	40	40	80
14		**Check sample analysis (08 radicals) - External lab -10%**		nos	40	40	80

15		**Analytical Studies @ GSI**	Preparation of Polished Section.	nos	10	10	20
16			Complete Petrological Report of rock sample	nos	10	10	20
17			Photomicrographs of Thin Polished Section	nos	10	10	20
18			Moisture absorption & Specific Gravity determination	nos	3	3	6
19	**G4 Level Report preparation**			nos	1	1	2

6. EXPLORATORY DRILLING

Based on LSM works, Scout Drilling (@ suiting to multiples of 8oom x 800m grid) Plan to establish possible extents of enriched ore zones shall be proposed in G4 Level of ME Works.

Exploratory Drilling in OGP areas shall be planned and executed for G3 and G2 level works subsequently.

7. TIME LINES

Time Schedule Chart is provided @ Annexure No – 01

8. BREAKUP OF EXPENDITURE : Total estimated cost is Rs. 185.63 lakhs (including GST @ 18%).

Sl	PROJECT	Amount in Rs (Excluding GST)	Amount in Rs (Including GST)	Annexure Ref
1	KAR_NLDB_3363_EAST	79,37,298/-	93,66,012/-	03
2	KAR_NLDB_3363_WEST	77,94,826/-	91,97,894/-	04
3	Total amount	**1,57,32,124/-**	**1,85,63,906/-**	

9. TERMS OF PAYMENT

9.1. KIOCL shall raise invoice for the quantum work executed and completed in accordance with the approved MEPP, as per NMET guidelines, for payment.

9.2. Projected cost estimates are as arrived for FY 2018-19 from the respective approved base prices. However, cost of execution will be claimed with appropriate escalation as per procedure.

****

WORK PLAN – G4 LEVEL MINERAL EXPLORATION IN NEERBUDHIHAL LIMESTONE & DOLOMITE BLOCK (KAR_NLDB_3363_EAST)

TIME SCHEDULE CHART

Sl	Details of Works	Duration	12 MONTHS											
		Months	1	2	3	4	5	6	7	8	9	10	11	12
1	CAMP SETTING	01	↔											
2	LARGE SCALE GEOLOGICAL MAPPING (Includes 25.17 sq km of LSM + 60 nos of BRS)	05		↔	↔	↔	↔	↔						
	2.1 Geologist Party days (1 Party)	04		↔	↔	↔	↔	↔						
	2.2 Survey Party days (1 Party	04		↔	↔	↔	↔	↔						
	2.3 Bulk Sampling Party days	01					↔							
	2.4 Laboratory Works	04		↔	↔	↔	↔							
3	Surface Drilling (01 rig)	06						↔	↔	↔	↔	↔	↔	
	3.1 Geologist Party days (1 Party)	06						↔	↔	↔	↔	↔	↔	
	3.2 Core sampling Party days (1 Party)	06						↔	↔	↔	↔	↔	↔	
	3.3 Survey Party days (1 Party)	01					↔							
	3.4 Laboratory Works	07						Parallel execution ↔						
4	Camp Winding	01											↔	
	Preparation of Reports and Maps	02											↔	

WORK PLAN – G4 LEVEL MINERAL EXPLORATION IN NEERBUDHIHAL LIMESTONE & DOLOMITE BLOCK (KAR_NLDB_3363_WEST)

TIME SCHEDULE CHART

Sl	Details of Works	Duration	12 MONTHS											
		Months	1	2	3	4	5	6	7	8	9	10	11	12
1	CAMP SETTING	01	← →											
2	LARGE SCALE GEOLOGICAL MAPPING (Includes 21.11 sq km of LSM + 60 nos of BRS)	05		←	—	—	—	→						
	2.1 Geologist Party days (1 Party)	04		←	—	—	—	→						
	2.2 Survey Party days (1 Party	04		←	—	—	—	→						
	2.3 Bulk Sampling Party days	01					← →							
	2.4 Laboratory Works	04		←	—	—	—	→						
3	Surface Drilling (01 rig)	06						←	—	—	—	—	→	
	3.1 Geologist Party days (1 Party)	06						←	—	—	—	—	→	
	3.2 Core sampling Party days (1 Party)	06						←	—	—	—	—	→	
	3.3 Survey Party days (1 Party)	01					← →							
	3.4 Laboratory Works	07						Parallel execution						
								←	—	—	—	—	—	→
4	Camp Winding	01												← →
	Preparation of Reports and Maps	02											←	→

Annexure – 03

COST ESTIMATES - PROSPECTING EXPLORATION (G-4 LEVEL) FOR KAR_NLDB_3363_EAST

S.N	Item of Work		Unit	Base Rate as on 01-04-1990	Financial Year (2019-20)			Total Amount in Rs
					Escalated Rate (18-19)	Qty	Amount (Rs)	
(a)	(b)		(c)	(d)	(e)	(f)	(g)=(e)*(f)	(h)
1	**DRILLING**							**40,09,281**
1.1	Surface Drilling (01 Rig)		m.	1,714	7,028	340	23,89,520	
1.2	Transportation (01 Rig for 500 km - One way)		Km.	8.8	33	1,000	33,000	
1.3	Accommodation		One time/ Drill	1,85,925	6,90,693	1	6,90,693	
1.4	Camp Setting / Winding		Drill/month	68,606	2,54,864	2	5,09,728	
1.5	Road Making (Flat Terrain)		Km	5,200	19,317	20	3,86,340	
2	**GEOLOGICAL WORK (25.17 sq km)**							**12,92,724**
2.1	Geologist Party days (1 party)	LSM (25.17)+ Collection of BRS (60)	days	1,541	8,083	128	10,34,624	
		Drilling works						
2.1	Survey Party Days (1 party)	LSM + Collection of BRS (60)	days	1,180	6,056	10	60,560	
		DGPS - Drilling points						
2.3	Core Sampling Party days(1 party)		days	525	2,905	68	1,97,540	
3	**TRENCHING /PITTING WORKS**							**1,47,775**
3.1	Trenching/ pitting for Insitu Bulk Density		cum	395	1,739	5	8,695	
3.2	Bulk Sampling Party days		days	2,566	13,908	10	1,39,080	
4	**Preservation of Cores**							**2,36,000**
4.1	GI core boxes		nos	0	2,000	85	1,70,000	
4.2	Transportation (2 trips * 1000 km per trip - 300m of core per trip)		kms	8.8	33	2,000	66,000	
5	**LABORATORY STUDIES**							**19,07,720**
5.1	**Chemical Analysis**							
a)	Primary analysis for * 08 radicals (CaO,MgO,SiO2,Al2O3,Fe2O3, LOI, Na2O & K2O)		Nos	642 '(110+76X7)	3,502	400	14,00,800	
b)	04 radicals (SO3,P2O5, Cr2O3 & Acid Insoluables) - 10%			338 '(110+76X3)	1,838	40	73,520	
d)	Internal Check sample analysis for analysis of for * 08 radicals - 5%		Nos	642 '(110+76X7)	3,502	20	70,040	
e)	External Check (NABL) samples for analysis of for *08 radicals - 10 %		Nos	642 '(110+76X7)	3,502	40	1,40,080	
f)	Composite sample analysis (13 radicals -		Nos	1022	5,582	40	2,23,280	

	(CaO, MgO, R2O3(Al2O3,Cr2O3 & Fe2O3) SiO2, LOI, SO3, P2O5 , MnO2, K2O, Na2O, and Acid insolubales.)) - 10%		'(110 + 76X12)				
5.2	**Petro studies**						
a)	Preparation of thin section	Nos	100	556	10	5,560	
b)	Complete petrological report of Rock samples	Nos	228	1,478	10	14,780	
c)	Photomicrographs of Thin sections	Nos	GSI Rate	363	10	3,630	**28,908**
d)	Moisture absorption & Specific Gravity determination	Nos	64	389	3	1,167	
g)	Sample Handling/Transportation charges (@15% of 5.2)		-	-	-	3,771	
6	**STUDY AND INTERPRETATION OF AERO GEOPHYSICAL DATA**					2,36,303	**2,36,303**
7	**EXPLORATION REPORT - 1% of (Total (1+2+3+4+5+6))**					**78,587**	**78,587**
8	**GRAND TOTAL (1 to 7)**					**79,37,298**	**79,37,298**
9	**GST 18%**					**14,28,714**	**14,28,714**
10	**Grand Total (with GST 18%)**					**93,66,012**	**93,66,012**
							or say Rs. 93.66 Lakhs

Note :

1. Revised Rates of Promotional Work done by MECL on behalf of Govt. of India Vide letter No. 37(I) /2006-M.I. dated- 02-07-2014 and based on actual escalation as per RBI indices as on 31-03-2018.
2. Procurement of Aerogeophysical maps, Data, Fees & Levies on actual t be reimbursed.
3. Petro studies (Sl N0.5.2)- To be carried out at GSI, / other Govt. Lab, the charges will be reimbursed as per actual.

Annexure – 04

COST ESTIMATES -PROSPECTING EXPLORATION(G-4 LEVEL) FOR KAR_NLDB_3363_WEST

S.N	Item of Work		Unit	Base Rate as on 01-04-1990	Financial Year (2019-20)			Total Amount in Rs
					Escalated Rate (18-19)	Qty	Amount (Rs)	
(a)	(b)		(c)	(d)	(e)	(f)	(g)=(e)*(f)	(h)
1	**DRILLING**							
1.1	Surface Drilling (01 Rig)		m.	1,714	7,028	340	23,89,520	
1.2	Transportation (01 Rig for 500 km - One way)		Km.	8.8	33	1,000	33,000	**40,09,281**
1.3	Accomodation		One time/ Drill	1,85,925	6,90,693	1	6,90,693	
1.4	Camp Setting / Winding		Drill/month	68,606	2,54,864	2	5,09,728	
1.5	Road Making (Flat Terrain)		Km	5,200	19,317	20	3,86,340	
2	**GEOLOGICAL WORK (21.11 sq km)**							
2.1	Geologist Party days (1 party)	LSM + Collection of BRS	days	1,541	8,083	128	10,34,624	**12,92,724**
		Drilling works						
2.2	Survey Party Days (1 party)	LSM + Collection of BRS	days	1,180	6,056	10	60,560	
		DGPS - Drilling points						
2.3	Core Sampling Party days(1 party)		days	525	2,905	68	1,97,540	
3	**TRENCHING /PITTING WORKS**							
3.1	Trenching/ pitting for Insitu Bulk Density		cum	395	1,739	10	17,390	**1,56,470**
3.2	Bulk Sampling Party days		days	2,566	13,908	10	1,39,080	
4	**Preservation of Cores**							
4.1	GI core boxes		nos	0	2,000	85	1,70,000	**2,36,000**
4.2	Transportation (2 trips * 1000 km per trip - 300m of core per trip)		kms	8.8	33	2,000	66,000	
5	**LABORATORY STUDIES**							
5.1	**Chemical Analysis**							
a)	Primary analysis for * 08 radicals (CaO,MgO,SiO2,Al2O3,Fe2O3, LOI, Na2O & K2O)		Nos	642 '(110+76X7)	3,502	400	14,00,800	**17,96,080**
b)	04 radicals (SO3,P2O5, Cr2O3 & Acid Insoluables) - 10%			338 '(110+76X3)	1,838	40	73,520	

d)	Internal Check sample analysis for analysis of for * 08 radicals - 5%	Nos	642 '(110+76X7)	3,502	20	70,040	
e)	External Check (NABL) samples for analysis of for *08 radicals - 10 %	Nos	642 '(110+76X7)	3,502	40	1,40,080	
f)	Composite sample analysis (13 radicals - (CaO, MgO, R2O3(Al2O3,Cr2O3 & Fe2O3) SiO2, LOI, SO3, P2O5 , MnO2, K2O, Na2O, and Acid insolubales.)) - 10%	Nos	1022 '(110 + 76X12)	5,582	20	1,11,640	
5.2	**Petro studies**						
a)	Preparation of thin section	Nos		556	10	5,560	
b)	Complete petrological report of Rock samples	Nos		1,478	10	14,780	
c)	Photomicrographs of Thin sections	Nos	GSI Rate	363	10	3,630	**28,908**
d)	Moisture absorption & Specific Gravity determination	Nos	64	389	3	1,167	
g)	Sample Handling/Transportation charges (@15% of 5.2)		-	-	-	3,771	
6	**STUDY AND INTERPRETATION OF AERO GEOPHYSICAL DATA**					1,98,187	**1,98,187**
7	**EXPLORATION REPORT - 1% of (Total (1+2+3+4+5+6))**					**77,176**	**77,176**
8	**GRAND TOTAL (1 to 7)**					**77,94,826**	**77,94,826**
9	**GST 18%**					**14,03,069**	**14,03,069**
10	**Grand Total (with GST 18%)**					**91,97,894**	**91,97,894**
							or Say 91.98 Lakhs

Note :

1. Revised Rates of Promotional Work done by MECL on behalf of Govt. of India Vide letter No. 37(I) /2006-M.I. dated- 02-07-2014 and based on actual escalation as per RBI indices as on 31-03-2018.
2. Procurement of Aerogeophysical maps, Data, Fees & Levies on actual t be reimbursed.
3. Petro studies (Sl N0.5.2)- To be carried out at GSI, / other Govt. Lab, the charges will be reimbursed as per actual.