

**GEOLOGICAL REPORT ON PRELIMINARY EXPLORATION (G3) FOR
LIMESTONE IN PEDAVEEDU WEST BLOCK**

SURYAPET DISTRICT, TELANGANA
TEXT, ANNEXURES, AND PLATES



MINERAL EXPLORATION AND CONSULTANCY LIMITED

(Formerly known as Mineral Exploration Corporation Limited)

A Government of India Enterprise
CORPORATE OFFICE, NAGPUR

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**GEOLOGICAL REPORT ON PRELIMINARY EXPLORATION (G3) FOR
LIMESTONE IN PEDAVEEDU WESTBLOCK, SURYAPET DISTRICT,
TELANGANA**

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**GEOLOGICAL REPORT ON PRELIMINARY EXPLORATION (G3) FOR
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CHAPTER-1

1.1.0 EXECUTIVE SUMMARY

1.1.1 INTRODUCTION

- 1.1.2 Limestone, a sedimentary rock, originated mainly by chemical/biochemical precipitation of carbonate minerals in a variety of depositional environments, ranging from marine to terrestrial.
- 1.1.3 Calcium carbonate (CaCO_3) in the form of calcite is the predominant mineral constituent of limestone. It also contains some amount of magnesium carbonate (Mg CO_3) and/or dolomite ($\text{Ca Mg (CO}_3)_2$). Variable amount of ferruginous quartz, clay, pyrite, haematite, chert etc., present as non-carbonate minerals, control the quality/grade of limestone.
- 1.1.4 Limestone is a crucial and versatile mineral commodity. In the modern time, limestone is primarily used to manufacture cement. In Iron & Steel Industry, limestone is used both in blast furnace and steel melting shop as a flux. In chemical industry, limestone is consumed to produce bleaching powder, toothpaste, calcium carbide etc. It is used as a purifier in the sugar industry. Limestone is also consumed by industries like paper, fertilizer and foundry etc.
- 1.1.5 The total reserves/resources of limestone of all categories and grades as per NMI (National Mineral Inventory) data based on UNFC (United Nations Framework Classification) system as on 1.4.2015 (Mineral Year Book 2020) have been estimated at 203,224 million tonnes, of which 16,336 million tonnes (8%) are placed under reserves category and 1,86,889 million tonnes (92%) are under resources category. Karnataka is the leading state having 27% of the total resources followed by Andhra Pradesh and Rajasthan (12% each), Gujarat (10%), Meghalaya (9%), Telangana (8%), Chhattisgarh and Madhya Pradesh (5% each) and remaining 12% by other states. Grade wise, Cement Grade has leading share of about 70% followed by Unclassified Grades (12%) and BF Grade (7%). Remaining (11%) are different Grades.
- 1.1.6 Rajasthan was the leading producing state accounting for (20%) of the total production of limestone, followed by Madhya Pradesh (13%), Andhra Pradesh & Chhattisgarh (12% each), & Karnataka (10%), Tamil Nadu & Telangana (7%

each), Gujarat (6%) and the remaining 13% was contributed by Assam, Bihar, Himachal Pradesh, UT of Jammu and Kashmir, Jharkhand, Kerala, Maharashtra, Meghalaya, Odisha and Uttar Pradesh.

1.2.0 BASIS FOR TAKING UP INVESTIGATION

- 1.2.1 Sagar Cements Limited having mining license (ML), had earlier (2013–14) carried out systematic limestone prospecting in the present exploration area at Matampally over an extent of 794.820 ha during 2013–14 through geological mapping, surface sampling, and 12 core boreholes aggregating 353.5 m of drilling. The investigation established that the limestone belongs to the Narji Limestone Formation of Kurnool Group, occurring as stratiform, gently dipping, and laterally persistent sedimentary beds comprising Light Grey, Dark Grey, Green, and Purple Flaggy Limestone units.
- 1.2.2 The report concluded the presence of substantial cement-grade limestone resources in the area, with Pre-Feasibility Mineral Resources (UNFC 221) of 8.028 million tonnes and Inferred Mineral Resources (UNFC 333/334) of 464.786 million tonnes, totaling 472.814 million tonnes of limestone resources. The chemically superior limestone is represented mainly by Dark Grey Limestone, recording CaO values in the range of 43.07% to 50.10%, thereby confirming the favorable potential of the present exploration block for cement-grade limestone mineralization and corroborating the findings of current exploration.
- 1.2.3 Prospecting Licenses (PLs) granted before the MMDR Amendment Act, 2015 included exploration stage reports (G4, G3, etc.). However, the 2021 amendments to the Act rendered these PL reports ineligible, requiring mineral blocks to go through auction. As a result, 19 such PL reports need re-evaluation under the **Minerals (Evidence of Mineral Contents) Rules, 2015**. To scrutinize them, the State Government formed a Scrutiny Committee (G.O.Ms.No.8, dated 12.03.2025). A meeting with GSI, MECL, and IBM on 04.06.2025 concluded that further field exploration was necessary to validate the with further exploration.
- i. Explored area is part of Mining license areas of applicant M/s Sagar cement Ltd.
 - ii. The area hosts existing mining leases for limestone, in the vicinity of the Prospecting License (PL) blocks, the respective agencies have undertaken G-4 level exploration, confirming the presence of limestone.

- iii. Following the Scrutiny Committee meeting on 04.06.2025 and subsequent discussions with the Director of Geology and Mining, Telangana, it was resolved to upgrade the block over substantial areas to facilitate auction.
- iv. In view of the above, MECL has prepared the exploration proposal involving G-3 level exploration in Pedaveedu West block and the said proposal was discussed in the 77th meeting of TCC, NMEDT held on 20th June 2025, subsequently it was technically evaluated and approved vide F. No.23/638/2025-NMEDT/200 dated 04th July, 2025 with an estimated cost of Rs.88,95,875/- with the time schedule of 7 months for Pedaveedu West block in Suryapet District of Telangana State.

1.3.0 DETAILS OF PROJECT AND INVESTIGATING AGENCY

- 1.3.1 One of the prime objectives of the preliminary exploration (G-3) is to demarcate the various grades of limestone and estimation of resources under (333 & 334) in the Pedaveedu West Block, Suryapet District, Telangana State
- 1.3.2. The investigating agency for the block is Mineral Exploration and Consultancy Limited (MECL), Nagpur

1.4.0 OBJECTIVES OF INVESTIGATION

The exploration was proposed with following objectives:

- i) To demarcate the limestone occurrences within the block area by drilling of 7 boreholes to estimate the grade wise limestone inferred resources in Pedaveedu West Block as per UNFC norms of G-3 level of exploration.
- ii) To carry out preliminary exploration (G-3) as per the Minerals (Evidence and Mineral Contents) Amendment Rules 2021, Mineral Auction Rule 2015 Amended up to 2021, MMDR Amendment Act 2015 in turn to facilitate the Telangana State Government for auctioning of the block.

1.5.0 DETAILS OF THE WORK

- 1.5.1 Following the receipt of approval vide approved vide F. No.23/638/2025-NMEDT/200 dated 04th July, 2025 with an estimated cost of Rs.88,95,875/- from the National Mineral Exploration Trust (NMEDT), Mineral Exploration & Consultancy Ltd. (MECL) has undertaken exploration activities in the designated areas. The details regarding the nature, scope, and quantum of work as approved versus the actual achievements are presented in **Table No. 1.1** below for Pedaveedu West block.

Table No: 1.1
Quantum of Work - Approved Vs Achieved Pedaveedu West Block
District: Suryapet, Telangana State

Sl. No.	Description and Nature of Work	Unit	Approved	Achieved
1	Survey Work			
	i) Topographical Survey (1: 4000)	Sq. Km.	7.79	7.79
	ii) Bore Hole Fixation, determination of coordinates & Reduced Levels of the boreholes	Nos.	7	7
	iii) Cardinal points	Nos.	25	25
B	EXPLORATORY DRILLING*			
1	Drilling up to 50m depth each borehole	M	350	350
2	Drill Core Preservation	M	280	280
C	LABORATORY STUDIES			
1	Chemical Analysis			
	i) Primary CaO, MgO, Al ₂ O ₃ , SiO ₂ , Fe ₂ O ₃ , Na ₂ O, SO ₃ , P ₂ O ₅ , K ₂ O, LOI by XRF	Nos.	280	280
	ii) External Check 10% (CaO, MgO, Al ₂ O ₃ , SiO ₂ , Fe ₂ O ₃ , Na ₂ O, SO ₃ , P ₂ O ₅ K ₂ O and LOI.) by XRF	Nos.	28	28
2	Bulk Density	Nos.	2	2
3	Preparation of Thin Sections	Nos.	2	2
4	Petrographic Study	Nos.	2	2
5	Photomicrograph Study	Nos.	2	2

1.6.0 LOCATION OF THE BLOCK

1.6.1 The explored Pedaveedu West falls in the jurisdiction of Mattem Palle Mandal (Taluk), Suryapet District. The block can be approached from the nearest Mandal (Taluk), Taluk head-quarters towards north-east at a distance of around 18 kms by single lane asphalted village roads. All the villages in the area are well connected to each other and to the highway located at a distance of about 40 km away from National Highway No. 9 connecting Vijayawada- Hyderabad, nearest Railway Station is Miryalaguda about 60 km NNW. The nearest airport is Vijayawada Airport at 135km from the block.

1.6.2 The explored Pedaveedu West block having an area of 7.79 sq. kms it was approved to do DGPS Survey for 25 cardinal points and 7 borehole coordinates.

1.7.0 REGIONAL GEOLOGICAL SETUP OF THE AREA

The study and the surrounding area form a part of the 'Palnad sub basin within the 'Cuddapah Basin. The basin comprises of thick pile of sedimentary rocks of Proterozoic era. The subject area from a part of the 70 km long Palnad limestone of Nalgonda District, which has been the home for several captive limestone mines sustaining a host of cement factories in the region.

In general, the Palnad rocks overlie rocks belonging to the Cuddapah. The Cuddapahs are in turn deposited over the Archaean basement. These rocks are believed to be of Proterozoic in age; equivalent to early Vindhyan rocks. The Palnad rocks comprise limestones, shales and sandstones. Unlike the rocks of Cuddapah Group, which are associated with intrusive and are slightly disturbed, the younger Kurnool Group are free from intrusive and are structurally undisturbed Regional Geological Map of Palnad Basin (Part) of the explored.

Table No: 1.2 Regional Stratigraphy of Palnad sub-basin (After GSI)

Equivalents	Age	Group/System	Series & Stage	Rock Type & Lithology
Lower Vindhyans (Semri Series)	Proterozoic	Kurnool Group	Kundair	Nandyal Shales
				Koilkuntla Limestones
			Paniam	Pinnacled & Plateau Quartzites
			Jammalamadugu	Owk Shales
				Narji Limestones
			Banganpalli	Banganpalli Sandstones
		-----Thrust Contact/Un-conformity-----		
		Cuddapah		Quartzites & Phyllites
Archeans			Granites and granitic gneisses traversed by dolerite dykes and quartz veins	

1.7.1 Limestone in the area forms a part of Proterozoic Palnad Basin equivalents to Narji limestone formation of Kurnool Group. These carbonate rocks of Narji Limestone are sub divided in to several distinct Lithological units.

The general stratigraphic succession of the Pedaveedu West Block based on field observations and available data/literature from nearby mine/areas is given below in Table.

1.7.2 Stratigraphy of the block is given below:

Table No: 1.3 Stratigraphy of the Suryapet cluster of blocks (After GSI)

Group / Super Group	Lithology
	Soil
Narji Limestone	Grey Limestone Green Limestone Purple/Flaggy limestone Shale
	Banaganapalle Quartzite
Unconformity	
Kistna Series	

1.8.0 EXPLORATION BY SYSTEMATIC DRILLING

1.8.1 MECL commenced preliminary exploration (G-3 level) in Pedaveedu West Block on 04.12.2025 (MPWB-01) and completed on 17.02.2026 (MPWB-07). Totally 7 boreholes drilled with cumulative meterage of 350 meters.

1.8.2 The entire core drilling has been carried out by wire line method with NQ borehole size using diamond bits. Lithology wise, the limestone is hard and massive with occasional thin intercalation of clays encountered in few places, hence resulted 60-80% average overall core recovery. These factors are considered in resource estimation.

1.9.0 SAMPLING AND ANALYSIS

1.9.1 PRIMARY AND CHECK SAMPLES

Considering the uniform nature of the limestone over considerable thickness in all the boreholes and after study of lithological data generated during G-3 exploration optimum sample length of 1m is justifiable in evaluating grade of limestone. In Pedaveedu West block totally 280 nos. of primary samples were prepared and analyzed for 10 radicals by MECL Laboratory, Nagpur, in addition to this 28 nos. of check samples also prepared and analyzed by JNARDDC, Nagpur.

1.10.0 EVALUATION OF LIMESTONE HORIZONS

1.10.1 Exploration data, gathered through drilling, geological studies, and lab work, was used to determine the shape, size, and structure of limestone deposits. Limestone zones were identified by analyzing samples of at least 1.0 meter in length, using cut-off values and comparing them with data from nearby boreholes and

previously explored areas. The classification of evaluated limestone is tabulated here under.

Category	Range		
	CaO%	MgO%	SiO ₂
Cement Grade	≥ 44.00	3.50% (Max)	16.00% Max
Blendable Grade	≥ 38 to ≤ 44.00	5.00 % (Max)	16.00 to 18.00%
Threshold Grade	34.00% (Min)	6.00 % (Max)	18.00% Max

1.10.2 In the Pedaveedu West block, entire block is estimated of cement grade limestone.

1.11.0 METHODOLOGY ADOPTED FOR RESOURCE ESTIMATION

1.11.1 The resources of limestone have been estimated by Geological Cross Section method as principal method and Polygon method as check method. The methodology adopted, keeping the above assumptions in view, for resource estimation is as follows:

1.12.0 CATEGORISATION OF RESOURCES

1.12.1 Resources have been categorized under inferred and reconnaissance category of limestone resources (333 and 334) as per UNFC. Limestone zones are computed and categorized based on **End Use Grade** specifications prescribed by Indian Bureau of Mines, Government of India.

1.13.0 RESOURCE

1.13.1 The total geological gross and net in-situ resource of Cement grade limestone are broadly categorized under inferred and reconnaissance (333 & 334) resources, the details of the same are furnished block wise individually in the following table.

Table No: 1.4 Summary of Cement Grade Limestone Resource of Pedaveedu West Block – Cross sectional method (Inferred and Reconnaissance)

Unit: million tonnes					
Resource Category	Gross Geol.Res. (Mil. Tons)	Net.Geol.Res. (Mil.tons)	CaO %	MgO %	SiO ₂ %
Inferred (333)	578.31	462.64	49.03	1.16	10.07
Reconnaissance (334)	230.38	184.31	48.93	1.24	9.13
Total (333+334)	808.69	646.95	49.00	1.18	9.84

1.14.0 RECOMMENDATIONS

1.14.1 **PEDAVEEDU WEST Block:** Total Geological Net In-situ Resources of Cement Grade resource estimate is 646.95 million tonnes with an average grade of CaO

49.00%, MgO 1.18% and SiO₂ 9.84%.

- 1.14.2 The exploration is carried out as per Mineral (Evidence of Mineral Contents) Rule-2015, Mineral Auction Rule-2015, MMDR Amendment Act - 2015 and in accordance with the Minerals (Evidence of Mineral Contents) Amendments Rules 2021.
- 1.14.3 This level of exploration will facilitate the State government of Telangana State for auctioning of block under Mining Lease.
- 1.14.4 The study area suggests that any future mining project may generate employment for the local people and will increase socio-economic status of the people residing in the nearby areas.

CHAPTER – 2

2.0.0 DETAILS OF THE QUALIFIED PERSON(S) / EXPLORATION AGENCY

2.1.0 INVESTIGATING AGENCY

MINERAL EXPLORATION& CONSULTANCY LIMITED

(A Govt. of India Enterprise Miniratna PSE)

Dr. Babasaheb Ambedkar Bhavan, High Land Drive Road,

Seminary Hills, Nagpur-440006

2.2.0 PERSONAL INVOLVED WITH PRELIMINARY EXPLORATION (G3) FOR LIMESTONE IN PEDAVEEDU WESTBLOCK, DISTRICT- SURYAPET, TELANGANA.

- A : OVERALL GUIDANCE
: Shri Shrikant Sharma HoD (Exploration)
- B : OVERALL PLANNING and CO-ORDINATION
: Shri Shrikant Sharma HoD (Exploration)
: Dr. Kuppusamy E, Dy. General Manager (Exploration)(Retd.)
: Shri Naveen Kumar Pala, Senior Manager (Geology)
- C : OVERALL SUPERVISION
: Dr. Kuppusamy E, Dy. General Manager (Expl)(Retd.)
: Shri. Ashish Singh, Senior Manager (Geology)
- D : PROJECT MANAGEMENT
: Shri. Dipankar Manna, Project Manager
: Shri. M. Rampramod K, Manager (Geology)
: Shri, Deepak Choudary Sr. Supervisor (Drilling),
Soiltech India Pvt. Ltd*. *(Drilling is out sourced under clause 2.2.1.1b vide approval from NMEDT order vide approved vide F. No.23/636/2025-NMEDT/196 dated 20th July 2025) and entire drilling operation was supervised by field geologist from MECL.*
- E : PHYSICAL EXECUTION OF WORK
: Shri. M. Rampramod K, Manager (Geology)
: Shri. Sathish Kumar Inaparathi Sr. Tech. (Sampling)
- F : SAMPLE PROCESSING, MECL, NAGPUR
: Mr. Nagraju Vaddi Sr. Tech. (Sampling)
: Mrs. Shika Sharma Sr. Tech. (Sampling)

- G : CHEMICAL LABORATORY, MECL, NAGPUR
: Shri. Rohit Sharma, Manager (Chemical)
: Dr. Dipti Rahangdale, Manager (Chemical)
- H : PETROLOGICAL LABORATORY, MECL, NAGPUR
: Shri. Sayantan Pal, Manager (Geology)
- I : INFORMATION TECHNOLOGY CENTRE
: Shri. N.C.S. Reddy, Superintendent (Information Technology)
: Shri Shivananda S., Sr. Assistant (Information Technology)
- J : DATA PROCESSING and DOCUMENTATION
: Shri. Ashish Singh, Sr. Manager (Geology)
: Ms. Pooja Singh, Young Professional (Geology)
: Shri. Pratap Singh Negi, Sr. ASMO
: Shri. Durgesh Devarshi ASMO

CHAPTER - 3

3.0.0 TITLE OF THE REPORT & OWNERSHIP

Title: Geological Report on Preliminary Exploration (G3) for Limestone in Pedaveedu West Block in Suryapet district, Telangana State.

Ownership: Department of Geology and Mining, Government of Telangana State.

3.1.0 DETAILS ABOUT PERIOD OF PROSPECTING

The exploratory drilling in the block commenced on 04.12.2025 and completed on 17.02.2026 in Pedaveedu West block. Total 07 boreholes were drilled with the cumulative meterage of 350 m and borehole core sampling etc. were completed simultaneously. The analytical / laboratory studies were also carried out simultaneously in laboratories of MECL and other NABL accredited laboratories.

3.2.0 DETAILS OF EXPLORATION AGENCY, QUALIFICATION, AND EXPERIENCE OF ASSOCIATED TECHNICAL PERSONS ENGAGED IN EXPLORATION

3.2.1 Exploration Agency: Mineral Exploration and Consultancy Limited

(Formerly Mineral Exploration Corporation Limited)

A Govt. of India Enterprise - A Miniratna-I CPSE

3.3.2 Qualification : M.Sc. / M. Sc. Tech. (Geology)

3.3.3 Experience : Experience: Since 1972 Exploration agency
: Mineral Exploration and Consultancy Limited

3.3.4 Address of the Prospector: Dr. Babasaheb Ambedkar Bhavan,
High Land Drive Road, Seminary Hills,
Nagpur, Pin- 440006

3.3.5 Email: cmd@gov.in; gm-exploration@mecl.gov.in

3.3.6 Phone No: 0712-2510289; 0712-2511829

CHAPTER - 4

4.0.0 DETAILS OF THE AREA

4.1.0 LOCATION OF THE BLOCK

4.1.1 The explored Pedaveedu West Block falls in the jurisdiction of Mattampally (Taluk), Suryapet District. The block can be approached from the nearest Mattampally Mandal (Taluk), Taluk head-quarters towards south-east at a distance of around 7 kms by single lane asphalted village roads.

4.1.2 All the villages in the area are well connected to each other and to the highway located at a distance of about 40 km away from National Highway No. 9 connecting Vijayawada- Hyderabad, nearest Railway Station is Miryalaguda about 60 km NNW. The nearest airport is Vijayawada Airport at 135km from the block and the location of the Block is shown in Text Figure 01 and Plate No. I. The Blocks fall in the Survey of India Toposheet No 56P/14 and the co-ordinates of the 25 cardinal points of the Pedaveedu West are given in the following Table No: 4.1.

Table No: 4.1
Co-ordinates of corner points of explored Pedaveedu West Block in
Mattampally Mandal, Suryapet District, Telangana State

Boundary Points	Latitude (DMS)	Longitude (DMS)	UTM (m)		RL (MSL)
			X (m E)	Y (m N)	
A	16° 44' 05.23596" N	79° 51' 31.45705" E	378344.065	1850565.224	70.611
B	16° 42' 59.68787" N	79° 51' 20.95843" E	378021.582	1848552.488	56.606
C	16° 43' 00.96786" N	79° 51' 13.75596" E	377808.495	1848593.053	53.559
D	16° 43' 09.15160" N	79° 51' 00.43657" E	377415.473	1848846.842	54.796
E	16° 43' 09.84558" N	79° 50' 56.14279" E	377288.43	1848868.905	56.615
F	16° 43' 15.45422" N	79° 50' 58.14885" E	377348.838	1849040.935	59.642
G	16° 43' 15.16339" N	79° 50' 49.80109" E	377101.559	1849033.427	60.339
H	16° 43' 06.63206" N	79° 50' 40.56757" E	376826.578	1848772.814	58.747
I	16° 42' 57.39783" N	79° 50' 30.05141" E	376513.476	1848490.822	62.831
J	16° 42' 53.33493" N	79° 50' 24.79928" E	376357.197	1848366.86	64.925
K	16° 42' 47.44284" N	79° 50' 19.15496" E	376188.974	1848186.748	67.049
L	16° 42' 59.24447" N	79° 49' 28.69872" E	374696.734	1848558.221	67.253
M	16° 43' 34.81750" N	79° 49' 47.90722" E	375272.054	1849648.163	70.171
N	16° 44' 40.47886" N	79° 50' 22.60339" E	376311.361	1851660.162	78.946
O	16° 44' 40.38320" N	79° 50' 32.87276" E	376615.445	1851655.45	77.393
P	16° 44' 38.97391" N	79° 50' 40.03009" E	376827.139	1851610.905	76.652

Boundary Points	Latitude (DMS)	Longitude (DMS)	UTM (m)		RL (MSL)
			X (m E)	Y (m N)	
Q	16° 44' 37.82304" N	79° 50' 43.95962" E	376943.297	1851574.858	76.191
R	16° 44' 37.13420" N	79° 50' 49.54672" E	377108.622	1851552.728	74.229
S	16° 44' 37.15963" N	79° 51' 00.90558" E	377444.991	1851551.562	69.256
T	16° 44' 39.35623" N	79° 51' 05.77803" E	377589.666	1851618.237	65.417
U	16° 44' 34.44960" N	79° 51' 08.79979" E	377678.277	1851466.923	65.303
V	16° 44' 30.27215" N	79° 51' 11.21420" E	377749.033	1851338.122	64.882
W	16° 44' 21.03822" N	79° 51' 10.55866" E	377727.984	1851054.443	64.318
X	16° 44' 15.53780" N	79° 51' 10.74872" E	377732.638	1850885.363	63.795
Y	16° 44' 11.27889" N	79° 51' 11.38870" E	377750.835	1850754.362	62.386

All the co-ordinates of corner points Pedaveedu West Block are given in Annexure IA.

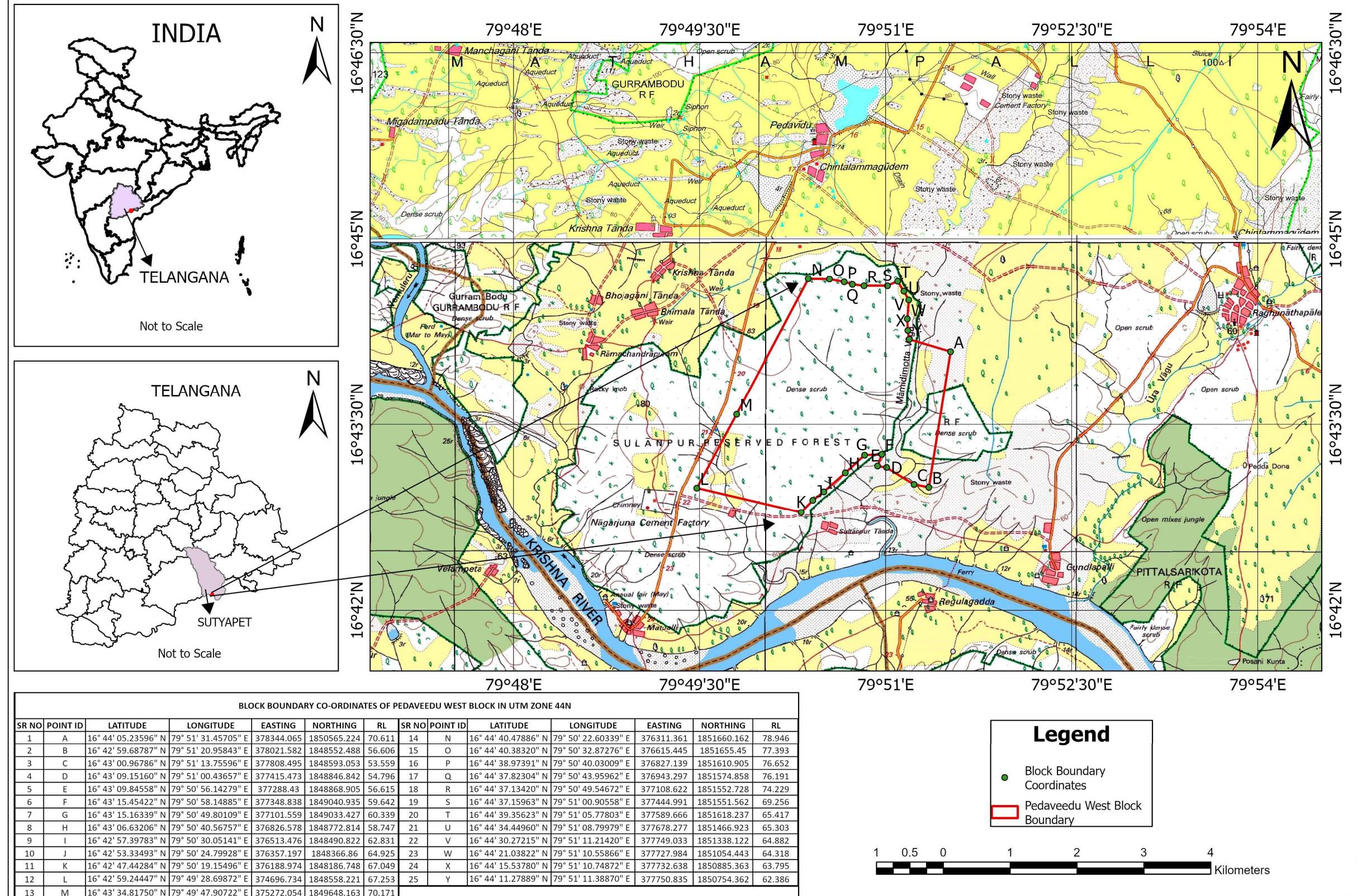
4.2.0 DETAILS OF THE AREA WITH LAND USE

4.2.1 Total explored area lies under Sultanpur Reserve Forest.

4.3.0 MINERAL(S) UNDER INVESTIGATION

4.3.1 Limestone

Location Map Showing Pedaveedu West Block (7.79 Sq Km),Suryapet District, Telangana(Part of Toposheet No 56P14)



Text Figure No: 1 Location Map of Pedaveedu West Block

CHAPTER – 5

5.0.0 PHYSIOGRAPHY AND ENVIRONMENT

5.1.0 RELIEF OF THE AREA WITH MINIMUM AND MAXIMUM ELEVATION, DRAINAGE PATTERN, NATURAL WATER COURSES, RSERVOIRS ETC.

- 5.1.1 The area is flat with gentle slope towards east. The elevation of the area ranges from 80m MSL in the north-west to 60m MSL above mean sea level in the south-east of Pedaveedu West block. The general slope of the topography in the blocks is from NW to SE.



Photo-1: A Panoramic view of Pedaveedu West block.

5.2.0 ROADS, RAILWAY TRACK, ELECTRIC TRANSMISSION LINE, TELEPHONE LINE ETC

- 5.2.1 The explored Pedaveedu West Block falls in the jurisdiction of Mattampally Mandal (Taluk), Suryapet District. The block can be approached from the nearest Mattampally Mandal (Taluk), Taluk head-quarters towards south-east a distance of around 7 kms by single lane asphalted village roads. There is a state boundary with Andhra Pradesh State in the northern part of the block.
- 5.2.2 The block area is well connected to the highway located at a distance of about 40 km away from National Highway No. 9 connecting Vijayawada- Hyderabad, nearest railway station is Miryalaguda about 60 km NNW. The nearest airport is Vijayawada Airport at 135km from the block.

5.2.3 There is two almost parallel H.T electrical transmission line running from north-west to south-south eastern direction in the north eastern portion of the block. The surrounding villages having electric transmission for domestic purposes.

5.3.0 HOST POPULATION (LOCAL TRIBES), HUMAN SETTLEMENTS WITHIN AND NEARBY THE AREA

5.3.1 The initial provisional data released by Census India 2011, shows the density of Suryapet District for 2011 had population of 155,422 of which male and female were 77,072 and 75,350 respectively.

5.3.2 Pedaveedu West block falls in Mattampally Mandal (Taluka) of Suryapet District of Telangana State. Total population of Mattampally Mandal (Taluka) is 6597 out of which Males are 3276 (49.70%) and Females are 3321 (50.30%). The total literacy rate is 50.30% out of this Males are 50.20% and females are 20.50%.

5.4.0 SOCIO DEMOGRAPHIC PROFILE OF THE AREA AND NEARBY

5.4.1 Mattampally Mandal of Suryapet District has a population of 44,939 out of which 22,579 are male and 22,360 females. literacy rate combined is 55.98% (Male 58.80% & Female 40.64%), out of total population 6,446 (14.34%) belong to SC community and 14,160 (31.51%) belong to ST community. The sex ratio of Mattampally is 990 females for 1000 men.

5.4.2 Professionally there are workers, agricultural farmers and laborers in Mattampally Mandal (Taluka). Out of total population of 44,939, a number of 24,173 were engaged in work activities. Out of total 24,173 of workers 1,676 (6.93%) describe their work as Main work (Employment or Earning more than 6 months) while 22,497 (93.07%) were involved in marginal activity providing livelihood for less than 6 months.

5.5.0 HISTORICAL SITES AND ARCHAEOLOGICAL MONUMENTS, PLACES OF WORSHIP, PUBLIC UTILITIES ETC. WITHIN OR NEARBY

5.5.1 No historical sites, monuments and archaeological monuments, places of worships within 10 km radius of Pedaveedu West. However, few Hindu temples of Historical importance are there in Pillamarri and Durijpally near Suryapet town.

5.6.0 FOREST, SANCTUARIES, NATIONAL PARK AND WILD LIFE SANCTUARY

5.6.1 No Forest, Sanctuaries, National Park and Wild Life Sanctuaries within the 10 kms from the explored block.

However, the exploration block lies in Sultanpur Reserve Forest area, necessary clearances were received by exploration agency before commencement of drilling.



5.7.0 FLORA AND FAUNA

- 5.7.1 The area is characterized by scanty vegetation and dry crop cultivation. Chilli, maize, groundnut, gingili and pulses are the common dry crops cultivated by rotation. Study area is fertile. Mostly cashew, black gram is cultivated in the study area.
- 5.7.2 The area has no rare endangered species of flora. The species of fauna found in the area are rat, squirrel, lizard and house crow and reptiles.
- 5.7.3 The block area is partly cultivated by agricultural activities.

5.8.0 WATER BODIES SUCH AS RIVER, NALA, STREAM, RESERVOIR ETC

- 5.8.1 Several seasonal nallas are flowing through the block originating from the catchment area of the river Krishna.

5.9.0 CLIMATE CONDITIONS

- 5.9.1 The exploration block falls in the southern part of the Telangana in between Hyderabad and Vijayawada. Climate of this area is semi-arid, it receives moderate rainfalls and experiences wide temperature variations causing severe summer and moderate winter. The tropical climate of the region is manifested in hot and humid summer, moderately monsoon and mild winter seasons. May is the hottest month in the year. The maximum temperature during the day was recorded as 48 degrees and December the coldest with the temperature during the day time falling down to about 30 degrees the night temperature in winter can be as low as 10 - 13 degree Celsius. The months of December, January, February are considered to have pleasant climate.
- 5.9.2 The average rainfall of this area for the year 2013-14 is 675 mm and the last 10 years average rainfall is 470.5 mm as per the precipitation reports of MRO office, Mattampally. It is observed that the area experiencing rainfall between the months of June to November. South West monsoon accounts for the majority of the precipitation in the region.

5.10.0 OTHER PHYSIOGRAPHIC, SOCIAL AND ENVIRONMENT FACTOR

- 5.10.1 The area is about 80 m above the M.S.L and is an undulating plain dissected by a southerly flowing stream in the eastern part. The general slope is towards North at gradient of about 1 in 70 and towards SE at a gradient of 1 in 60. The maximum relief is 20 m seasonal streams dissect the lease in to two parts viz east and west. The system

comprises of two streams which join together in the S.E part of the area in between the water course the 'Y' shaped nalla area is soil covered. The overall drainage pattern of the block area is dendritic. Rock is exposed amidst the soil cover.

The main source of the income is agriculture. The block area is surrounded by cement manufacturing industries and some of them are as follows in the Suryapet District:

- * Rain Industries Ltd: Based in Nalgonda, with operations in Suryapet. Sri Sai Cement Work, Kodada Cements Pvt. Ltd, Penna Cement Industries Limited, NCL Industries Ltd: Headquartered in Hyderabad, with operations in Suryapet, My Home Cement Industries.
- * Deccan Cements Limited: Located in Bhavanipuram, Janpahad P.O., Suryapet, NCL Industries Limited: Based in Simhapuri, Mattampally Mandal, Suryapet, Sagar Cements Ltd: Has a presence in Mattampally, Suryapet, Parasakti Cement Industries Ltd: Another cement manufacturing unit in Suryapet, Parasakti Cement Industries Ltd. in Suryapet District.

5.10.2 No major environment factors such as Sanctuaries, Forest areas are within the buffer zone of 10 kms.

CHAPTER - 6

6.0.0 INFRASTRUCTURE AND ENVIRONMENT

6.1.0 LOCAL INFRASTRUCTURE DETAILS

- 6.1.1 The Pedaveedu West block area is well connected to the highway located at a distance of about 40 km away from National Highway No. 9 connecting Vijayawada-Hyderabad, nearest railway station is Miryalaguda about 60 km NNW. The nearest airport is Vijayawada Airport at 135km from the block.
- 6.1.2 Banking, Government medical facility, Postal, Police facilities are available at Mattem Palle Mandal (Taluka) which is 26 km from the explored block and educational and other major facilities are available at Sedam Taluk.

6.2.0 HISTORICAL SITES

- 6.2.1 No major historical sites are within the buffer zone of 10 Kms.

6.3.0 FORESTS, SANCTUARIES, NATIONAL PARK AND ENVIRONMENT SETTING OF THE AREA

- 6.3.1 No major environment wild Life Sanctuaries, Forest areas are within the buffer zone of 10 Kms.

CHAPTER – 7

7.0.0 GEOLOGY OF THE AREA

7.1.0 REGIONAL GEOLOGY

- 7.1.1 The study and the surrounding area form a part of the 'Palnad sub basin within the 'Cuddapah Basin. The basin comprises of thick pile of sedimentary rocks of Proterozoic era. The subject area from a part of the 70 km long palnad limestone of Nalgonda District, which has been the home for several captive limestone mines sustaining a host of cement factories in the region.
- 7.1.2 In general, the Palnad rocks overlies rocks belonging to the Cuddapah. The Cuddapah are in turn deposited over the Achaean basement. These rocks are believed to be of Proterozoic in age; equivalent to early Vindhyan rocks. The Palnad rocks comprise limestones, shales and sandstones. Unlike the rocks of Cuddapah Group, which are associated with intrusives and are slightly disturbed, the younger Kurnool Group are free from intrusive and are structurally undisturbed.

Table-7.1

Regional Stratigraphic sequence of lithounits exposed in and around the Block.

Equivalents	Age	Group/System	Series & Stage	Rock Type & Lithology
Lower Vindyans (Semri Series)	Proterozoic	Kurnool System	Kundair	Nandyal Shales
				Koilkuntla Limestones
			Paniam	Pinnacled & Plateau Quartzites
			Jammalamadugu	Auk Shales
				Narji Limestones
Banganpalli	Banganpalli Sandstones			
		-----Thrust Contact/Un conformity-----		
		Cuddapah		Quartzites & Phyllites
Archeans			Granites and granitic gneisses traversed by dolerite dykes and quartz veins	

7.2.0 REGIONAL STRUCTURE

- 7.2.1 The limestone is either horizontal or are gently dipping with the bedding strike in general NNE-SSW direction and dips at an angle of 2-3° towards ESE. Two sets of prominent joints parallel to the bedding and across traverse the rock profusely. The deposit belongs to stratiform deposits of regular habit as per field guideline of MEMC Rules.

7.3.0 GEOLOGY OF THE BLOCK

- 7.3.1 Lithounits and Succession- The rock type exposed in the area belong to the Narji

Formation of the 'Kurnool' Group of Proterozoic rock. The lithological succession is as follows:



Table-7.2 Stratigraphy of the Suryapet cluster of blocks (After GSI)

1. Soil	Recent
2. Light Grey Limestone (LGL) - Youngest	Belongs to Narji Fm of Kurnool Group of Cuddapah Super Group of Proterozoic age.
3. Grey Limestone (GL)	
4. Green Limestone (GNL)	
5. Purple Flaggy Limestone/Shale – Oldest	

Lithology:

(i) Soil:

Soil occurs as an expansive mantle of 1 to 2 m thickness in between the two seasonal streams in eastern part masking the Grey Limestone (Av. Thickness 1.5m) the soil clad part accounts for about 40 Ha. In addition, soil occurs as creep into the joints in the outcrop area. The joints vary in width from 0.5 to 2m and run for 2 to 10m length.

(ii) Light Grey Limestone (LGL):

This is the youngest of the different types of limestone encountered in the area and thus stratigraphically rests over all the other rock types. It is hard, massive, fine grained and light grey to variegated in color, with streaks of impurities which often align along the bedding panes. In view of the low TC (about 77%) and high silica content (about 18 - 20%) it is of sub grade in the context of using for cement manufacture. The litho unit is mainly confined to the SE corner of the area and is at places masked by soil patches.

(iii) Grey Limestone (GL):

This unit lies immediately below LGL and the considered as pay zone for the manufacture of cement in view of its high grade with an average Total Carbonate (TC-Calcium carbonate and magnesium carbonate) of 88%, low silica (6 - 9 %) and larger reserves. The rock is exposed well in the area and it is grey to dark grey in color, fine grained and massive. Thin veins of calcite and quartz traverse the rock.

(iv) Green Limestone (GNL):

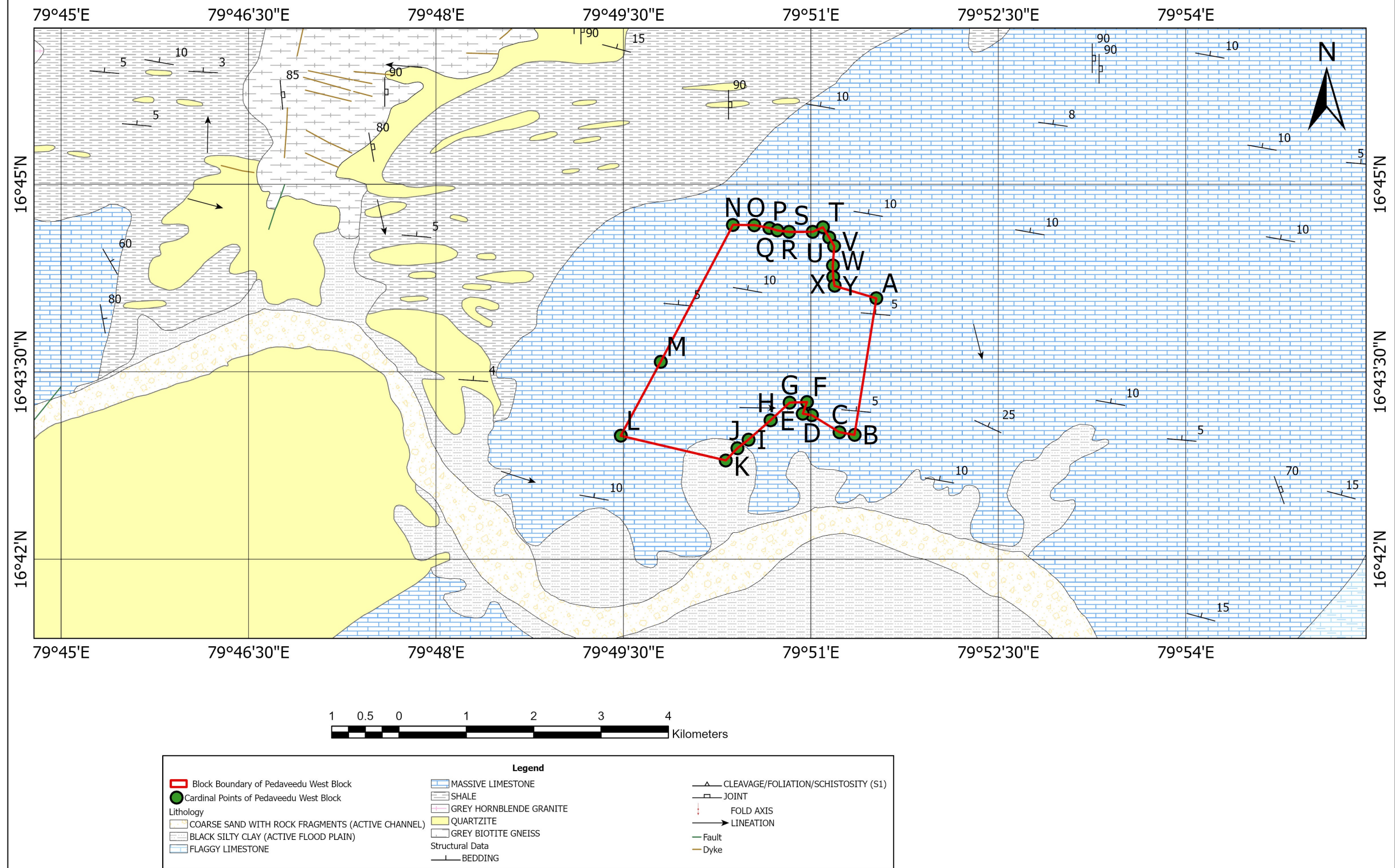
Green limestone lies below grey limestone. It is light green in color and exposed in the NW part of the area. GNL with a TC of 79 - 82% and SiO₂ of 10 - 15% is of marginal grade for cement manufacture. A little part may be used after sweetening it with grey limestone it is softer rock of among all 3 litho units available in the area.

(v) Purple Flaggy Limestone / Shale:

This is the oldest sedimentary bed encountered in the region. It is exposed in the NW edge of the area. It is purple in color, flaggy with bands of argillaceous matter. It grades into shale with an average TC of 67 % and SiO₂ of 18-24%.

Regional Geological Map of Pedaveedu West Block, Part of Palnad Sub-Basin (GSI), Dist. Suryapet, Telangana

Data Source: NGDR & GSI



Text Figure No: 2 Regional Geological Map of Pedaveedu West Block

7.4.0 REGIONAL STRUCTURE

7.4.1 PRIMARY SEDIMENTARY STRUCTURES

The preservation of primary sedimentary structure is relatively poor. In terms of primary sedimentary structure, bedding planes and laminations are common within limestone-shale unit. Bedding planes are usually marked by variation in colour, composition and grain size.

- 7.4.2 The general strike of the formation is NNE-SSW dipping gently (2° to 4°) towards ESE and dipping from west to east. The variation in dip direction and amount may be attributed to warps and minor folds. Open asymmetrical synform and antiform folds are preserved in the western part of the study area which are having trend $N70^{\circ}W-S70^{\circ}E$ (axial plane) and plunging towards SE. Minor folds are formed in calcite and quartz vein within the massive grey limestone, the axial plane is trending in E-W direction.

7.4.3 SECONDARY/ DIAGENETIC STRUCTURE

Joints: Open, systematic joint sets are common, often with NNE-SSW trend.

Stylolites: Pressure-solution features (stylolite) can form parallel to bedding sometimes creating “pseudo-bedding”. Within the massive limestone, intercalations of thin quartzite veins are seen at place of core. Sedimentary deformation structures are present at places in siliceous limestone.

- 7.4.4 The general trend of all formations is NE–SW, and limestone beds dip 2° to 4° due ESE.

7.5.0 REGIONAL MINERALISATION

- 7.5.1 The Palnad Basin in Suryapet District, Telangana, is primarily known for its significant **limestone** resources, with extensive exploration confirming large reserves for cement and other industries. While limestone is the dominant commodity, the basin also shows potential for **uranium mineralization**, especially unconformity-related, with deposits established in the marginal parts of Srisailem and Palnad Sub-basins, Nalgonda and Guntur districts, Andhra Pradesh.

The uranium mineralisation is mainly localised along fracture zones proximal to basement–cover sediment unconformity and occur as elongated pods, fine veins and cavity and grain boundary fillings. Mineralised zones are invariably associated with significant alteration features like illitisation, chloritisation and kaolinization. Primary uranium ore minerals viz. pitchblende, uraninite and coffinite are found generally associated with sulphides and organic matter. However, there is marginal difference in

mineralisation pattern in these sub-basins as uranium is mainly hosted by granitoids just below the unconformity in Srisailam Sub-basin while it is dominantly associated with cover sediments in Palnad Sub-basin. Recent integrated surface and sub-surface studies have also indicated uranium potential in deeper parts of these sub-basins. (Ref: P.V. Ramesh Bapu, Rahul Banerjee and K.K. Achar AMD, Hyderabad).

Other minor minerals occurrences might exist, but limestone and uranium are the key mineral focus in the surrounding areas. However, no uranium outcrops were exposed or encountered in the drilled core samples in the explored block area. Regional Geological map provided as Text Figure No.2 & Plate No. II.



Photo 2: The grey colour Limestone showing vertical as well as horizontal joints in Pedaveedu West Block



Photo 3: Strike and Dip recording in Jointed limestone of Pedaveedu West Block



Photo 4: Photograph of a nearby limestone mine

7.6.0 STRUCTURAL FEATURES OBSERVED IN THE BLOCK

7.6.1 STRUCTURE OF THE BLOCK

The limestone is either horizontal or are gently dipping with the bedding strike in general NNE-SSW direction and dips at an angle of 2-4° towards ESE. Two sets of prominent joints parallel to the bedding and across traverse the rock profusely. The deposit belongs to stratiform deposits of regular habit as per field guideline of MEMC.

7.7.0 PETROGRAPHIC STUDIES

7.7.1 A total of 02 core samples, each one from borehole MPWB-01 and MPWB-02 and the detailed study report is given in Annexure No. VI. The summary is tabulated in the following table.

SL No	Sample No	BH/Ref	Depth (m)		Thick (m)	Lithology
			From	To		
1	MPWB-PG-01	MPWB/01	48.15	48.25	0.10	Micritic limestone
2	MPWB-PG-02	MPWB/02	21.00	21.10	0.10	Micritic limestone

7.8.0 MINERALISATION IN THE BLOCK

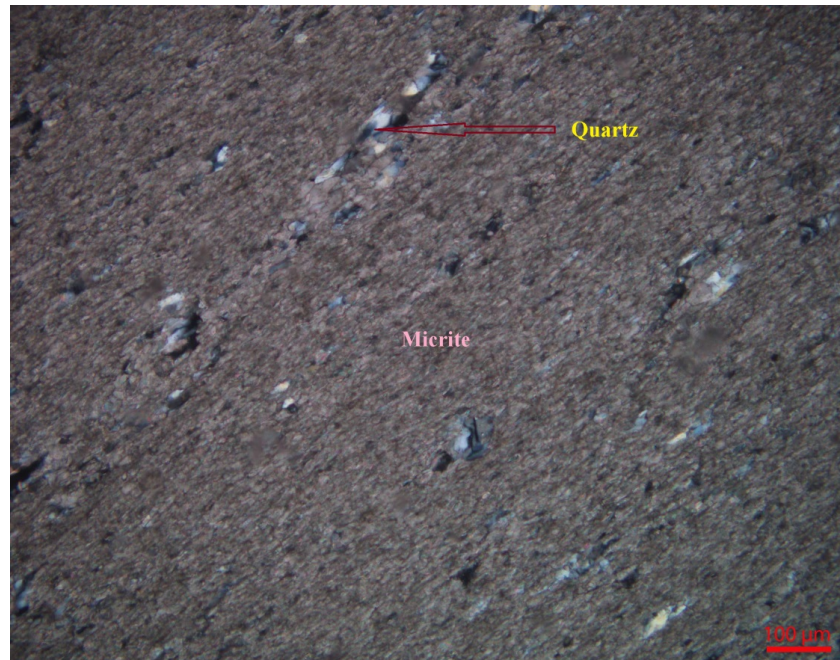
7.8.1 Massive limestone is dark grey to light grey in colour, micritic, fine grained and compact. Stylolitic structures are often noticed. The intersection of soil cover and limestone are given in Annexure. No. IIA.

The massive grey limestone is of Cement Grade. The limestone is dark grey to light grey in colour, micritic, fine grained and compact.

7.8.2 PHOTOMICROGRAPHIC STUDIES



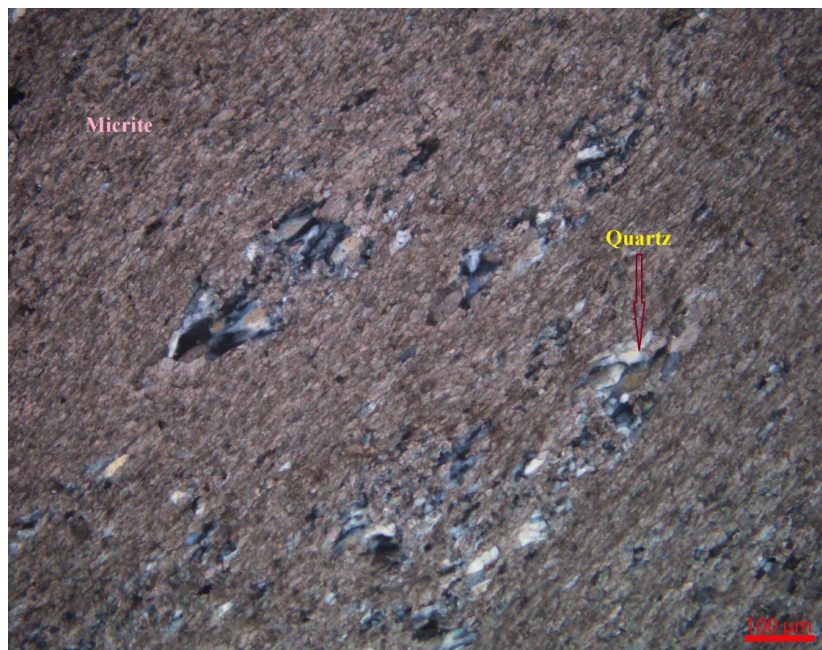
Photomicrographic studies are conducted for 02 samples and the study is reported here under.



Pmg – 1: Photomicrograph showing parallel alignment of micrite and quartz within foliated impure micritic limestone as seen under crossed nicols.

Specimen No.: MPWB-PG-01

Magnification: 40X



Pmg – 2: Photomicrograph showing parallel alignment of micrite and lensoidal quartz clasts within foliated impure micritic limestone as seen under crossed nicols.

Specimen No.: MPWB-PG-02

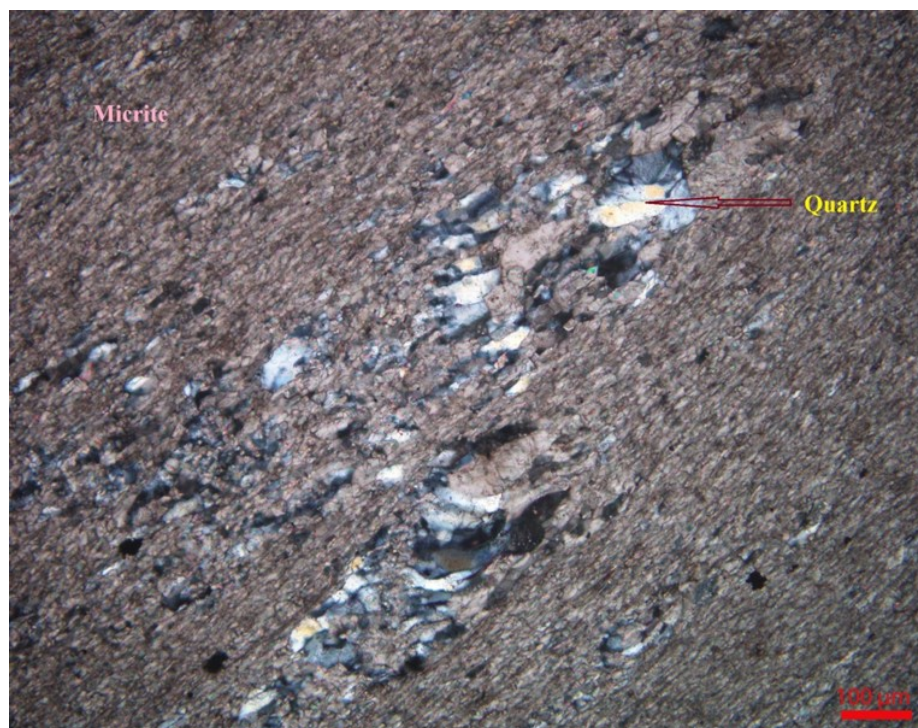
Magnification: 100X



Pmg – 3: Photomicrograph showing parallel alignment of micrite and quartz within foliated impure micritic limestone as seen under crossed nicols.

Specimen No.: MPWB-PG-01

Magnification: 100X



Pmg – 4: Photomicrograph showing parallel alignment of micrite and lensoidal quartz clasts within foliated impure micritic limestone as seen under crossed nicols.

Specimen No.: MPWB-PG-02

Magnification: 100X

8.0.0 PREVIOUS WORK

8.1.0 DETAILS OF PREVIOUS EXPLORATION CARRIED OUT BY OTHER AGENCIES/PARTIES

- 8.1.1 The block forms part of Palnad Sub-basin and is located in the north-eastern portion of the Cuddappah Basin. The earliest geological account of Palnad Sub-basin was documented by William King (1872).
- 8.1.2 Mukherji and Syed Kazim (1947) of erstwhile Hyderabad Geological Survey carried out geological mapping of Palnad Basin covering parts of Nalgonda district.
- 8.1.3 Systematic geological mapping and mineral investigation in this part of Palnad Sub- basin was carried out by Ziauddin and Sharma (1959-61) Ramalingaswamy, G. (1976-77) has mapped area in parts of Toposheet No. 56P/10. Krupanidhi (1966-67), Nagaeswara Rao and Varaprasada Rao (1967-68), Chakradhar et. al, (1980-83), Ravindra Babu et. al, (1989), Ramakrishnaiah et al, (2012-13), Jagadishwar Babu. K and. Tirumurugan. M. (2013) and Sugathan & RimpalKar (2013) have carried out investigation for limestone in parts of Palnad sub-basin.
- 8.1.4 Two cluster of Blocks namely Ramapuram Cluster 5 and Dondapadu Cluster 6 were explored by TSMDC through NMEDT funding and these blocks are located North and South of the explored block respectively. Resource of 675 million tonnes with average grade of 46.05% CaO (334) were estimated in Ramapuram Cluster 5. Resource of 452 million tonnes with average grade of 44.82% CaO (334) were estimated in Dondapadu Cluster 6.
- 8.1.5 Mining activities are currently ongoing in surrounding areas and limestone being excavated for manufacturing cement.
- 8.1.6 Sagar Cements Limited, the company had earlier (2013–14) carried out systematic limestone prospecting in the present exploration area at Matampally over an extent of 794.820 ha during 2013–14 through geological mapping, surface sampling, and 12 core boreholes aggregating 353.5 m of drilling. The investigation established that the limestone belongs to the Narji Limestone Formation of Kurnool Group, occurring as

stratiform, gently dipping, and laterally persistent sedimentary beds comprising Light Grey, Dark Grey, Green, and Purple Flaggy Limestone units.

- 8.1.7 The report concluded the presence of substantial cement-grade limestone resources in the area, with Pre-Feasibility Mineral Resources (UNFC 221) of 8.028 million tonnes and Inferred Mineral Resources (UNFC 333/334) of 464.786 million tonnes, totaling 472.814 million tonnes of limestone resources. The chemically superior limestone is represented mainly by Dark Grey Limestone, recording CaO values in the range of 43.07% to 50.10%, thereby confirming the favorable potential of the present exploration block for cement-grade limestone mineralization and corroborating the findings of current exploration.
- 8.1.8 Data pertaining to Sagar cements (Drilling) is considered in the resource estimation of the present block.

8.2.0 PREVIOUS WORK DONE BY MECL

- 8.2.1 MECL FY 2017-2018, has carried out G-3 level exploration in the vicinity of this area for exploration blocks namely Sultanpur, Saidulnama and Pasupalabodu where it was established the continuity of limestone and resources were established, out of these three blocks Saidulnama and Sultanpur block are auctioned in the year 2024. Thickness of limestone intercepted are 10.5 to 36.0m

CHAPTER – 9

9.0.0 GEOPHYSICAL EXPLORATION

Geophysical/Geochemical survey was not carried out by MECL and it was also not proposed to the NMEDT for the approval.

CHAPTER - 10

10.0.0 EXPLORATION UNDERTAKEN DURING CURRENT INVESTIGATION

10.1.0 OBJECTIVES OF INVESTIGATION

The exploration was proposed with following objectives:

- i) To confirm the continuity of limestone occurrences within the block area by drilling of 7 boreholes in Pedaveedu West block at G-3 level of exploration to estimate the grade wise limestone inferred resources in the block area as per UNFC norms of G-3 level of exploration.
- ii) To carry out preliminary exploration (G-3) as per the Minerals (Evidence and Mineral Contents) Amendment Rules 2021, Mineral Auction Rule 2015 Amended up to 2021, MMDR Amendment Act 2015 in turn to facilitate the State Government (Telangana) for auctioning of the block.

10.2.0 EXPLORATION ACTIVITIES TAKEN UP

After the receipt of approval vide approved vide F. No.23/638/2025-NMEDT/200 dated 04th July, 2025 with an estimated cost of Rs.88,95,875/- from the National Mineral Exploration Trust (NMEDT), Mineral Exploration & Consultancy Ltd. (MECL) has undertaken exploration activities in the designated areas. The details regarding the nature, scope, and quantum of works completed are presented in Table No. 10.1 below for Pedaveedu West block.

Table No: 10.1
Quantum of Work - Approved Vs Achieved Pedaveedu West Block District:
Suryapet, Telangana State

Sl. No.	Description and Nature of Work	Unit	Approved	Achieved
1	Survey Work			
	i) Topographical Survey (1: 4000)	Sq. Km.	7.79	7.79
	ii) Bore Hole Fixation, determination of coordinates & Reduced Levels of the boreholes	Nos.	7	7
	iii) Cardinal points	Nos.	25	25
B	EXPLORATORY DRILLING*			
1	Drilling up to 50m depth each borehole (Hard Rock)	M	350	350
2	Drill Core Preservation	M	280	280
C	LABORATORY STUDIES			

* Core drilling was outsourced to Soiltech (India) Pvt. Ltd by MECL as per SoC Item Sl. No. 2.2.1.1b in OM order no. F. No.23/637/2025-NMEDT/197 dated 02nd July, 2025 issued by NMEDT.

Exploratory drilling commenced with borehole no. MPWB-01 on 04.12.2025 in Pedaveedu West Block and was completed with the closure of borehole no. MPWB-07 on 17.02.2026. The allied field-works including surveying, drilling and borehole core sampling etc. were completed simultaneously. The analytical / laboratory studies were also carried out simultaneously in laboratories of MECL (Primary) and other NABL accredited laboratories, JNARDDC (External check), Nagpur.

10.2.1 Topographical Survey:

The block boundaries of Pedaveedu West block are surveyed with the help of DGPS (TRIMBLE make) and topographical survey by total station in WGS-84 datum by the input data provided by DMG, Telangana State. Triangulation network has been laid in the explored area of 7.79 sq.km for Pedaveedu West Block. Surface Contouring done at 2m contour intervals along with survey of surface features for Pedaveedu West block (on scale 1:4,000). During current exploration boreholes are fixed on the ground. RL's and co-ordinates of survey and exploration points are determined by DGPS survey. The RL and co-ordinates of block boundary corner points and boreholes have been determined and furnished as **Annexure IA and IC** respectively.

10.2.2 Geological Mapping

The Geological mapping on 1:4,000 scale was carried out area of 7.79 sq. km. for Pedaveedu West block. The surface features and topography of the for Pedaveedu West block. The block area is covered with limestone exposures and soil/alluvium, and the same is marked in the Topographical and Geological Map enclosed as **Plate No. III** on 1: 4000 Scale for Pedaveedu West block.

10.2.3 Exploratory Drilling

Geological logging of borehole cores was properly done along-with all the structural, lithological and mineralogical observations (Annexure-II-A and II-B) limestone have been encountered in all of the 07 boreholes in Pedaveedu West block.

Borehole co-ordinates along with RL have been determined for all the boreholes with the help of WGS-84 Datum. The drilling commenced on 04.12.2025 with MPWB/01 and concluded with MPWB/07 on 17.02.2026. The details of section wise boreholes drilled are tabulated below Table No 10.2.

Table No: 10.2
Details of section-wise boreholes drilled in Pedaveedu West Block Suryapet
District, Telangana State.

Sl. No.	Borehole No.	Section Line	Vertical (°)	Total Depth (m)	RL (m)	Remarks (Drilling agency)
1	MPWB-02	S1 – S1'	90°	50.00	62.684	MECL
2	MPWB-05	S2 – S2'	90°	50.00	67.629	MECL
3	Pbh-09	S3 – S3'	90°	39.00	64.500	Sagar Cements Ltd.
4	MPWB-04	S4 – S4'	90°	50.00	74.958	MECL
5	MPWB-03(P)	S4 – S4'	90°	50.00	71.747	MECL
6	MPWB-06	S5 – S5'	90°	50.00	54.071	MECL
7	MPWB-07(P)	S5 – S5'	90°	50.00	78.049	MECL
8	MPWB-01(P)	S5 – S5'	90°	50.00	58.078	MECL
9	Pbh-06	S6 – S6'	90°	29.00	74.500	Sagar Cements Ltd.
10	Pbh-08	S6 – S6'	90°	30.00	76.000	Sagar Cements Ltd.
11	Pbh-03	S6 – S6'	90°	33.00	72.000	Sagar Cements Ltd.
12	Pbh-05	S7 – S7'	90°	27.00	75.000	Sagar Cements Ltd.
13	Pbh-07	S7 – S7'	90°	25.00	75.500	Sagar Cements Ltd.
14	Pbh-02	S7 – S7'	90°	32.00	72.500	Sagar Cements Ltd.
15	Pbh-04	S8 – S8'	90°	27.00	72.500	Sagar Cements Ltd.
16	Pbh-01	S8 – S8'	90°	24.00	70.500	Sagar Cements Ltd.

10.2.3.1 The limestone is nearly horizontal with the bedding strike in general NNE-SSW direction and dips at an angle of 2-3° towards ESE. Hence the parallel cross section lines are prepared along N57°W-S57°E direction in Pedaveedu West block.

In total there are 08 geological cross sections are prepared along N57°W-S57°E direction in Pedaveedu West block. Totally 16 boreholes were considered for the preparation of geological cross section and all these boreholes intersected limestone zones. Out of 16 boreholes, 09 boreholes drilled by Sagar Cement Ltd were only considered and all the 07 boreholes drilled by MECL were taken in the cross section. The intersected limestone is of Cement Grade limestone zones. Zone-wise, borehole wise intersection of various grades limestone zones, are tabulated here under in Table No: 10.3.

Table No: 10.3

Details of section wise borehole wise intersections of Cement grade limestone zones in Pedaveedu West Block District- Suryapet, Telangana State.

BH.NO.	From(m)	To(m)	Thick(m)	Grade	Remarks
MPWB-01	3.00	50.00	47.00	Cement Grade	MECL
MPWB-02	1.50	50.00	48.50	Cement Grade	
MPWB-03	1.91	50.00	48.09	Cement Grade	
MPWB-04	1.50	50.00	48.50	Cement Grade	
MPWB-05	0.68	50.00	49.32	Cement Grade	
MPWB-06	0.79	39.00	38.21	Cement Grade	
MPWB-07	1.20	50.00	48.80	Cement Grade	
PBH-1	0.50	24.00	23.50	Cement Grade	Sagar Cements Ltd.
PBH-2	0.50	32.00	31.50	Cement Grade	
PBH-3	0.60	33.00	32.40	Cement Grade	
PBH-4	0.70	27.00	26.30	Cement Grade	
PBH-5	1.00	27.00	26.00	Cement Grade	
PBH-6	0.50	29.00	28.50	Cement Grade	
PBH-7	0.00	25.00	25.00	Cement Grade	
PBH-8	0.00	30.00	30.00	Cement Grade	
PBH-9	0.00	39.00	39.00	Cement Grade	

Cement grade limestone:

- i. The thickness of grade varies from a minimum 23.50 m (PBH-01) to maximum 49.32 m (MPWB- 05).

10.2.3.2 The associated sampling and chemical analysis of 280 primary samples were completed simultaneously and geological report has been submitted.

CHAPTER – 11

11.0.0 LOCATION DATA POINTS

11.1.0 ACCURACY AND QUALITY OF SURVEY USED TO LOCATE BLOCK BOUNDARY AND DRILL HOLES

11.1.1 The Pedaveedu West Block area (7.79 sq.km.) is located north of Krishna River in Suryapet District, Telangana and covered under Survey of India Toposheet No 56P/14. Survey site is located about 01 km west from Pedaveedu village. The Pedaveedu block is moderately well connected by road and rail networks to the nearest towns and cities.

11.1.2 The Topographical survey, Borehole connection and Block Boundary demarcation in this block has been carried out by the GNSS DA2 Catalyst Instrument.

11.1.3 The **Survey of India (SOI)** base station was utilized for Topographical survey, Borehole connection and Block Boundary demarcation. The base stations used from the Survey of India CORS network named '**NIDA**' through online GNSS Post processing method.

The coordinates of the SOI base station are provided in **Table No: 11.1**.

Table-11.1
The R.L & Coordinates of the SOI CORS Base Point

Base Station	Latitude	Longitude	Easting (m)	Northing (m)	RL (m)
SURVEY OF INDIA BASE STATION – <i>NIDA</i>	N16°49'19.50971"	E79°22'04.96052"	326106.609	1860590.317	141.644

11.1.4 TECHNICAL SPECIFICATIONS OF DGPS

- **Make:** Trimble GNSS
- **Model:** DA-2 Catalyst
- **Year:** 2025

Measurement Accuracy:

- Static Mode
 - Horizontal: 10 mm + 0.1 ppm or better
 - Vertical: 20 mm + 0.4 ppm or better

11.1.5 Baseline Processing Results:

Total twenty-five block boundary and seven boreholes have been fixed by MECL as part of present G3 stage exploration. Co-ordinates & Reduced level (RL) of the block boundary and boreholes are given in **Annexure-IA/IC** and also shown in **Plate-III**.

11.2.0 QUALITY AND ADEQUACY OF TOPOGRAPHIC CONTROL

11.2.1 The survey work has been carried out with the help of DGPS(GNSS) for higher level measurement accuracy. A point list was then generated as .csv file for topographical points and summary was attached along with report. The baseline processing results are also enclosed with this report. Survey work carried out by the experienced qualified surveyor as per the prevailing standard procedures

CHAPTER – 12

12.0.0 SAMPLING TECHNIQUES

12.1.0 NATURE AND QUALITY OF SAMPLING AND MEASURES TAKEN TO ENSURE SAMPLE REPRESENTATIVITY

- 12.1.1 The sampling and analyses have been carried out for the entire mineralized zones/length encountered in bed rocks and boreholes drilled on visual identification basis. The primary samples have been marked in the mineralized zones based on type and concentration of mineralization/lithology and in general the sample length has been kept as 1.0 m which varies in some instances because of variation in lithology and type and concentration of mineralization. The mineralized core has been split into two equal halves in such a way that the concentrations of ore minerals are uniform in both the equal halves. One half of the core sample has been crushed to (-) 200 mesh size. By progressive coning and quartering and repeatedly mixing the sample has been reduced to 600 g. A representative sample of 200 g has been collected and analyzed for CaO, MgO, Al₂O₃, SiO₂, Fe₂O₃, Na₂O, SO₃, P₂O₅, K₂O and LOI at Chemical Laboratory of MECL, Nagpur.
- 12.1.2 A total of 280 nos. of borehole primary samples and 28 nos. of external check samples were generated from 7 borehole core samples of Pedaveedu West block. All the primary samples are analyzed in MECL laboratory and external check samples are analyzed from external lab (JNARDDC).

12.2.0 NATURE, QUALITY AND APPROPRIATENESS OF THE SAMPLE PREPARATION TECHNIQUE

- 12.2.1 The details of sampling procedure for primary samples are described in Para 12.1.1. Quality of the sample preparation is maintained by proper cleaning, maintenance of the equipment and proper crushing, sieving and coning and quartering of samples. For sample preparation proper technique and expertise has been used.

12.3.0 QUALITY CONTROL PROCEDURES ADOPTED

- 12.3.1 The primary core samples have been collected from entire mineralized zones/length intersected in the boreholes drilled and the samples have been prepared at centralized mechanized sampling unit. The standard sampling procedure in

supervision of qualified sampling technician has been adopted to control the quality of samples. Similarly, internal check and external check samples have also been prepared under the supervision of qualified sampling technician following the standard sampling procedure.

- 12.3.2 Quality control (QC) ensures accuracy, precision, and reliability of analytical results in XRF Analysis. It involves systematic procedures to monitor and maintain data integrity. Running blanks, duplicates, and CRMs after every 20 samples ensures data quality, detects contamination, checks precision, and validates accuracy, which are critical for reliable XRF results.

12.4.0 MEASURES TAKEN TO ENSURE THE SAMPLING IS REPRESENTATIVE OF THE IN-SITU MATERIAL COLLECTED

- 12.4.1 All the primary samples have been marked and prepared from mineralized cores. During the preparation of primary samples, the mineralized cores have been studied meticulously and samples have been marked properly. These mineralized cores are subjected for preparation of primary samples as per the sampling procedure for primary samples are described in Para 12.1.1. The proper marking of primary samples from drilled cores and following standard procedure for sample preparation shows the representative samples have been collected from the in-situ materials.

12.5.0 WHETHER SAMPLE SIZES ARE APPROPRIATE TO THE GRAINSIZE OF THE MATERIAL BEING SAMPLED

- 12.5.1 The primary samples have been prepared (-) 200 mesh size and all the other samples have been prepared from primary samples. As per the previous studies in the area, (-) 200 mesh size is appropriate for the analysis of limestone mineralization in the block area.

CHAPTER – 13

13.0.0 DRILLING TECHNIQUES AND DRILL SAMPLING EMPLOYED

13.1.1 DRILLING TYPES AND DETAILS: The core drilling was out sourced to Soil tech (India) Pvt Ltd. Totally 7 nos. of boreholes were drilled with a cumulative meterage of 350 m and other associated geological analytical works in the Pedaveedu West block. The header details of boreholes are given in Annexure-I-C.

13.1.2 The Drilling operation in the block was performed by skid mounted Voltas 90 Drilling Rig. All the boreholes in the block were drilled in NQ size with double tube barrel wire line, wet core drilling method. Initially 0.00 m to 6.00m HX casing was set in each borehole by using HX casing short piece. After setting HX casing, drilling advanced in NQ size till to the total depth of each borehole.

Drilling was done by NQ Diamond bit (Hyden, Sandvik) till closure of the borehole.

13.1.3 The quality of drilling was ensured during the operation. After closure, all the boreholes have been properly plugged and sealed with cement pillars.

13.2.0 DEVIATION SURVEY IN DRILLING

13.2.1 All the exploratory boreholes drilled in the block are vertical and drilled up to 50m depth in each of boreholes MPWB-01, 02, 03, 04, 05, 06 and 07. Since the depth is shallow and no deviation occurred hence deviation survey was not performed for the boreholes.

13.3.0 WHETHER CORE AND CHIP SAMPLE RECOVERIES HAVE BEEN PROPERLY RECORDED AND RESULTS ASSAYED

13.3.1 The core samples have been recorded properly and the detailed run wise litholog and summarized concise litholog for boreholes are given in Annexure-II-A and Annexure-II-B respectively. The logging of run wise core as well as the cuttings from boreholes has helped in discerning the physical characters like colour, shape, size and nature of the mineralization as well as texture, structural features and identification of different litho units.

13.3.2 Core recovery with reference to the lithologies are properly recorded and represented in Annexure-II-A.

13.3.3 The mineralized zones /length recorded during the geological core logging have been sampled for limestone analysis consisting 10 radicals i.e., CaO, MgO, Al₂O₃, SiO₂, Fe₂O₃, Na₂O, SO₃, P₂O₅, K₂O and LOI at Chemical Laboratory of MECL, Nagpur.

The primary sample had been marked in the mineralized zones intersected in the borehole based on visual inspection/lithology and in general the sample length has been kept as 1.00m which varied in some instances because of variation in lithology and type and concentration of mineralization. The details of analysis of primary core samples are given in Annexure-III A.

13.4.0 MEASURES TAKEN TO MAXIMIZE SAMPLE RECOVERY AND ENSURE REPRESENTATIVE NATURE OF THE SAMPLES

13.4.1 The drilling has been done by NQ size diamond drill bit with single barrel wire line, wet core drilling method. Initially 0.00m to 6.00m HX casing was set in each borehole by using HX casing short piece. After setting HX casing, drilling advanced in NQ size till. NX casing was set in the drilled ranging from 10m to 25m depending on the formation of the boreholes. The polymer was used as drilling fluid to flush out the cuttings and stabilize the borehole wall. The drilling fluid also works as a coolant to avoid burning of drill bits. Proper core recovery of more than 90% was maintained in limestone by using double tube core barrel, however in case of weathered, loose and fractured zone and in solution cavities, the core recovery was low. Whenever core recovery is less, the grade of the recovered portion has been extrapolated over the non-recovered section. However, all the precautions like modulated water pressure, proper liner, optimum head pressure and the hands of an expert drilling technician had been taken to maintain the quality of drilling.

13.5.0 WHETHER THE RELATIONSHIP EXISTS BETWEEN SAMPLE RECOVERY AND GRADE

13.5.1 A relationship may exist between sample recovery and limestone grade depending on the nature of the intersected lithology and drilling conditions. Higher core recovery generally reflects compact and competent limestone horizons, which often correspond to better quality zones with higher CaO and lower SiO₂/MgO values. Reduced recovery may indicate fractured, weathered, clayey, or dolomitic/interbedded zones that commonly show lower CaO and comparatively elevated SiO₂ and MgO. In the present exploration, core recovery is consistently >90%, indicating good recovery conditions and suggesting that the obtained CaO, MgO, and SiO₂ assay results are representative and reliable for grade estimation.

13.6.0 CORE LOGGING

13.6.1 The core recovered by drilling was logged systematically in detail describing lithological units with mineralization details that can be observed by visual inspection. The details of lithology, grain size, colour, texture, structural features, presence of intercalations and cavities have been recorded. Wherever the recovery is less than 100%, extrapolations of drilled depth were done on proportionate basis considering the physical characteristics of individual units recovered. All the cores were kept and preserved properly in the GI core boxes of specifications given by NMEDT following “Book pattern”. The detailed run wise litholog and summarized litholog for boreholes are given in Annexure- II-A and Annexure-II-B respectively.

Core Photographs:



Photo 5: MPWB-01 – 39.40m to 45.00m

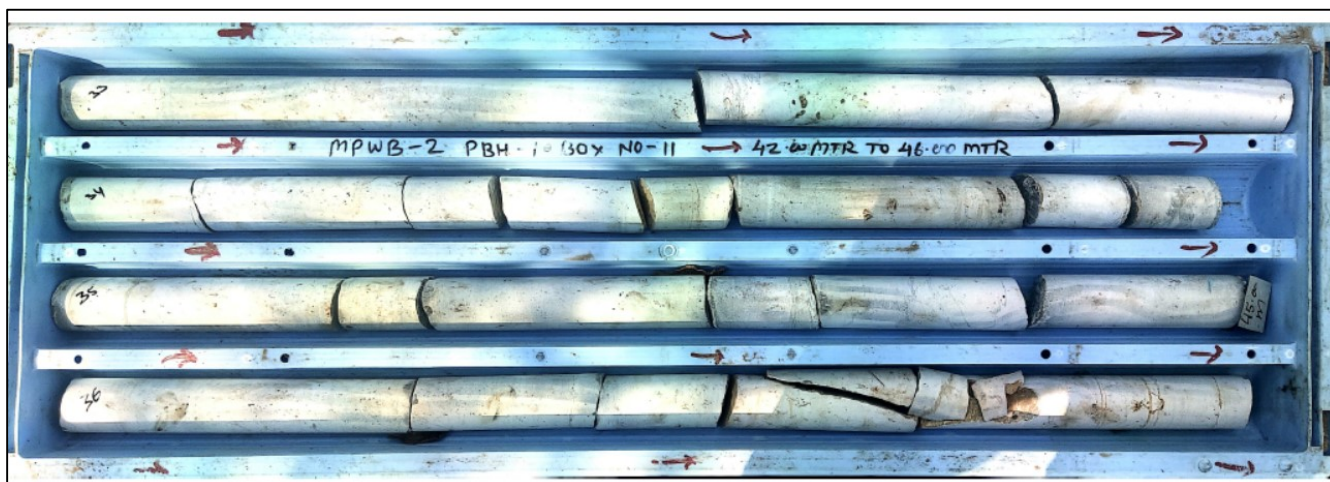


Photo 6: MPWB-02 – 42.00m to 46.00m



Photo 7: MPWB-03 – 17.60m to 21.50m

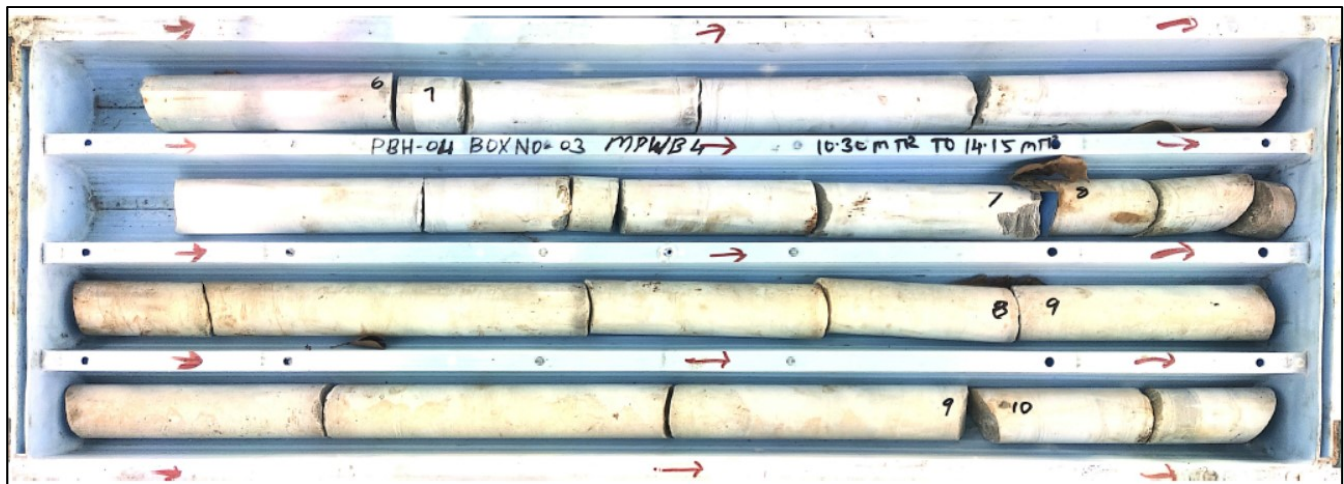


Photo 8: MPWB-04 – 10.30m to 14.15m



Photo 9: MPWB-05 – 13.40m to 17.60m



Photo 10: MPWB-06 – 45.10m to 50.00m

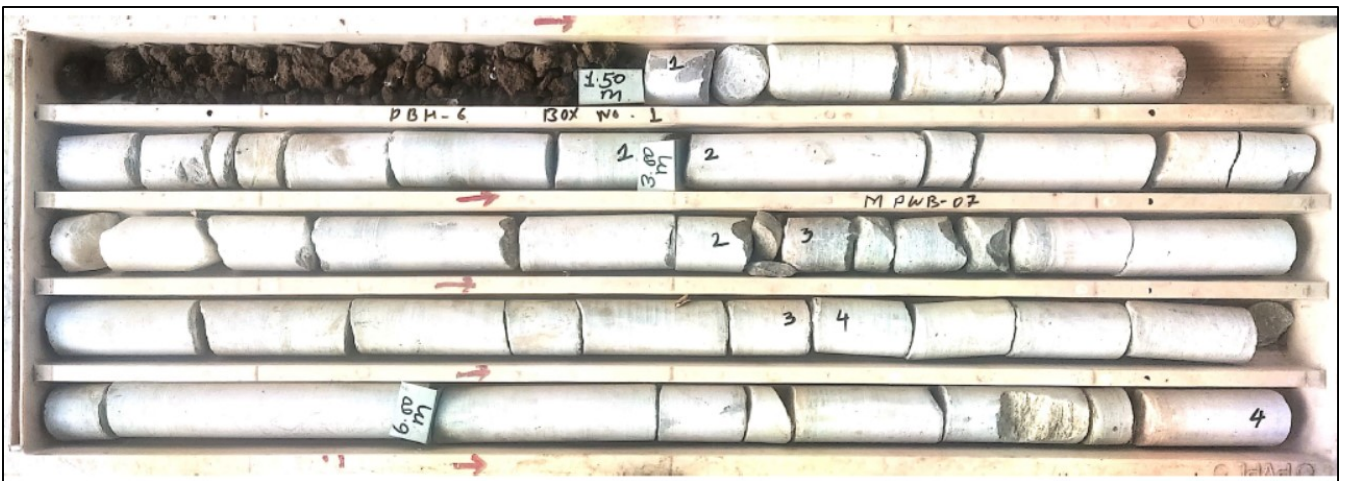


Photo 11: MPWB-07 – 0.00m to 6.70m

CHAPTER - 14

14.0.0 SUB SAMPLING TECHNIQUES AND SAMPLE PREPARATIONS

14.1.0 WHETHER CUT OR DRAWN AND WHETHER QUARTER, HALF OR ALL CORE TAKEN

14.1.1 The core sampling and chemical analysis of core samples have been carried out for entire mineralized zones/length intersected in the boreholes drilled. Samples were marked in limestone zones marked on the basis of visual inspection. The mineralized core has been split into two equal halves by core splitter in such a way that the concentrations of ore minerals are uniform in both the equal halves. The whole quantity of half portion of the sample was crushed to (-) 200 mesh and about 600g representative sample of was drawn by coning and quartering method of gradual size reduction with the help of crusher and pulveriser. Two sample pouches weighing samples 200g each were drawn, one of which was analysed for limestone analysis of 10 radicals CaO, MgO, Al₂O₃, SiO₂, Fe₂O₃, Na₂O, SO₃, P₂O₅, K₂O and LOI were analysed at Chemical Laboratory of MECL, Nagpur and external check samples were analysed in Jawaharlal Nehru Aluminium Research Development and Design Centre, (JNARDDC) Nagpur (NABL accredited Laboratory). The remaining 200g fraction was kept for future purpose including composite sample analysis etc.

14.2.0 NATURE, QUALITY AND APPROPRIATENESS OF THE SAMPLE PREPARATION TECHNIQUE

14.2.1 Quality of the sample preparation is maintained by proper cleaning, maintenance of the equipment and proper crushing, sieving and coning and quartering of samples. For sample preparation, proper technique and expertise has been used.

14.3.0 QUALITY CONTROL PROCEDURES ADOPTED

14.3.1 The primary core samples have been collected from entire mineralized zones/length intersected in the boreholes drilled and the samples have been prepared at centralized mechanized sampling unit. The standard sampling procedure in supervision of qualified sampling technician has been adopted to control the quality of samples. Similarly external check samples have also been prepared under the supervision of qualified sampling technician following the standard sampling procedure and analysed at NABL accredited external lab.

14.3.2 Quality control (QC) ensures accuracy, precision, and reliability of analytical results in XRF Analysis. It involves systematic procedures to monitor and maintain data integrity. Running blanks, duplicates, and CRMs after every 20 samples ensures data quality, detects contamination, checks precision, and validates accuracy, which are critical for reliable XRF results.

14.4.0 MEASURES TAKEN TO ENSURE THE SAMPLING IS REPRESENTATIVE OF THE INSITU MATERIAL COLLECTED

14.4.1 All the primary samples have been marked and prepared from mineralized cores. During the preparation of primary samples, the mineralized cores have been studied meticulously and samples have been marked properly. These mineralized cores are subjected for preparation of primary samples as per the sampling procedure for primary samples are described in Para 14.1.0. The proper marking of primary samples from drilled cores and following standard procedure for sample preparation shows the representative samples have been collected from the in-situ materials.

14.5.0 WHETHER SAMPLE SIZES ARE APPROPRIATE TO THE GRAIN SIZE OF THE MATERIAL BEING SAMPLED

14.5.1 The primary samples have been prepared (-) 200 mesh size and all the other samples have been prepared from primary samples. As per the previous studies in the area (-) 200 mesh size is appropriate for the analysis of limestone etc. mineralization in the block area.

CHAPTER - 15

15.0.0 QUALITY OF ASSAY DATA AND LABORATORY TESTS

15.1.0 THE NATURE, QUALITY AND APPROPRIATENESS OF THE ASSAYING AND LABORATORY PROCEDURES

15.1.1 The primary samples from limestone mineralization have been analyzed for 10 radicals i.e., CaO, MgO, Al₂O₃, SiO₂, Fe₂O₃, Na₂O, SO₃, P₂O₅, K₂O and LOI by in Jawaharlal Nehru Aluminium Research Development and Design Centre, (JNARDDC) Nagpur a NABL accredited Laboratory and external check samples for same 10 radicals have been analysed by Chemical Laboratory of MECL, Nagpur.

15.2.0 STANDARD OPERATING PROCEDURE (SoP) FOR THE ANALYSIS BY JNARDDC, NAGPUR

CHEMICAL ANALYSIS

- 1. Pellet Method (using XRF)**
- 2. XRF (model Axiosm Ax, (Panalytical make))**
- 3. CRM used- NCSDC-16006**

Procedure for Preparation of Pellets by Hydraulic Press:

For XRF measurement a sample must be homogenized, pulverized to -100 mesh and pressed into pellet.

- (i) Weigh accurately 5 gms of sample and used 10 gms of boric acid as a binder
- (ii) Press the sample at a pressure of around 20-22 tons on a hydraulic press (Pellet Making Machine) with a diameter of 40 mm
- (iii) Calibrate the XRF equipment using known standards for elements present in limestone (Calcium, Magnesium etc)
- (iv) Ensure the instrument is set up correctly according to standard guidelines
- (v) Place the prepared pellet into the sample holder
- (vi) Ensure the sample cup is positioned correctly in the instrument for carrying out analysis
- (vii) Start the XRF analysis using software and initiate the analysis process automatically
- (viii) Allow the XRF instrument to scan the sample. It will emit X-rays onto the sample, causing the atoms to emit fluorescence

- (ix) Record the results in a report, including elemental concentrations and any relevant information about the analysis conditions
- (x) Intermediate check also performed using bead with inbuilt software

LOSS ON IGNITION

WCL procedure for determination of LOI:

Weighed quantity of sample (duly dried at 110°C) is placed in platinum crucible and heated to 1000°C for about an hour. Sample is again weighed after it is cooled. Difference in weight expressed in percentage as LOI.

15.3.0 STANDARD OPERATING PROCEDURE (SoP) FOR THE ANALYSIS BY MECL LAB, NAGPUR.

15.3.1 SOP OF ANALYSIS BY XRF

Sample Particle Size:

The Sample is ground to a particle size <75µm, but <50µm is ideal.

Sample preparation: Pellets preparation

The process of making pressed pellets for XRF analysis includes grinding the sample

to fine particle size and pressing the sample at pressure of between 15 to 35 ton.

Instrumentation:

1. X-ray irradiates the sample.
2. Sample emits secondary X-ray characteristic of a particular element.
3. Analyzing sample rotates to accurately diffract each wavelength and satisfy Bragg's Law.
4. Detector measures position and intensity of XRF peaks

Photograph of WD-XRF instrument (Rigaku, Japan) at Chemical Lab, MECL, Nagpur have been represented in photo 15.



Photo - 12: Photographs showing WD-XRF instrument (Rigaku, Japan) at Chemical Lab, MECL, Nagpur

15.3.2 STANDARD OPERATING PROCEDURE (SoP) FOR THE DETERMINATION OF LOSS ON IGNITION (L.O.I.) AT MECL LAB

Procedure

1. Weigh 1 g of dry sample in silica or platinum crucible.
2. Place this crucible in muffle furnace at a temperature below 300°C. Raise the temperature of the furnace to 1000°C. Keep this at this temperature for about 30 minutes.
3. Cool the crucible in desiccators and weigh the crucible.
4. Find the loss in weight.

$$5. \text{ \% Loss on Ignition (LOI)} = \left(\frac{\text{Loss in weight}}{\text{Sample Weight}} \right) \times 100$$

15.4.0 NATURE OF QUALITY CONTROL PROCEDURES ADOPTED

- 15.4.1 In order to ensure the accuracy of the analyzed samples, **NCSDC-16006** has been used as certified reference material. The Certified Reference Material (CRM) was processed under similar conditions as samples and run after every 20 samples.
- 15.4.2 Quality control (QC) ensures accuracy, precision, and reliability of analytical results in XRF Analysis. It involves systematic procedures to monitor and maintain data integrity. Running blanks, duplicates, and CRMs after every 20 samples ensures data quality, detects contamination, checks precision, and validates accuracy, which are critical for reliable XRF results.
- 15.4.3 A total 28 nos. of external check samples have been sent for analysis by JNARDC, Nagpur for 10 radicals. The analysis report is received. The statistical comparison is done as the analysis report is received.

15.5.0 SECURITY AND CHAIN OF CONTROL OF SAMPLES SHOULD BE CLEARLY MENTIONED

- 15.5.1 The samples have been prepared at centralized mechanized sampling unit with proper labelling and tag and sent to chemical laboratory in supervision of qualified sampling technician. At the sampling unit, standard procedure has been followed and all the precautionary measures have been taken to avoid the contamination. The sampling unit is separate from the chemical laboratory, so there is no chance of contamination.
- 15.5.2 Sample collection – under supervision of qualified geologist

Type of sample collection	Supervision
Bedrock/Soil/Stream	Qualified Geologist
Pitting Sample	N/A
Drill Core Sample Marking	Qualified Geologist
Sample processing. Packing, labelling	Sample Technician
Analysis	Assistant Manager Chemical
Sampling unit/Chemical Lab	Manager Chemical

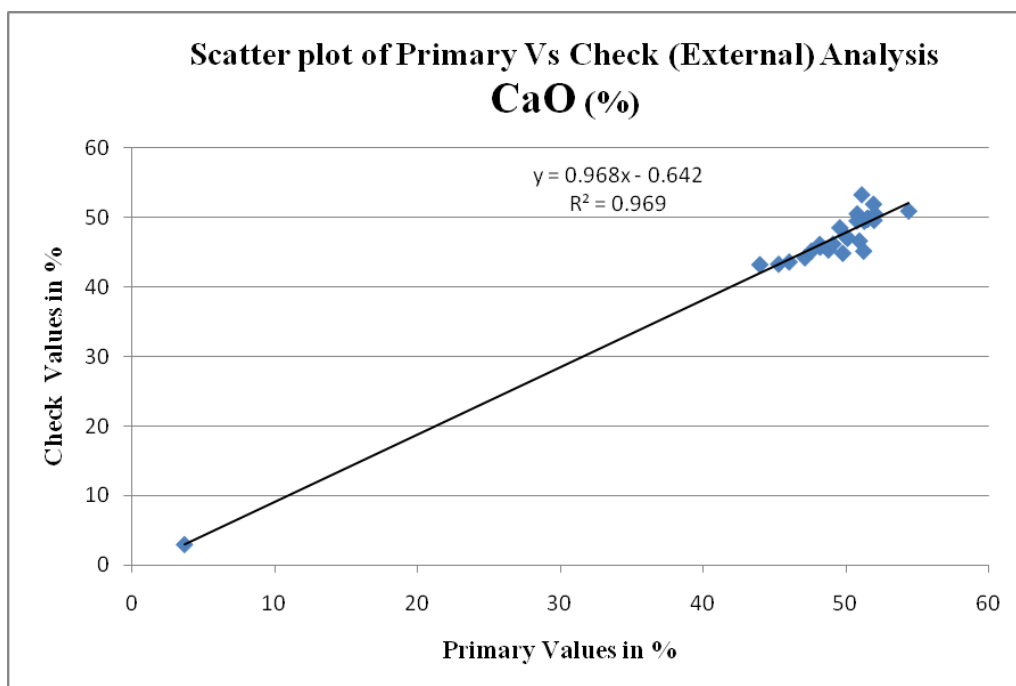
15.6.0 CHECK ANALYSIS FROM THIRD PARTY NABL ACCREDITED LABORATORY



- 15.6.1 A total 28 nos. of External Check samples have been sent to JNARDDC, Nagpur for 10 radicals i.e. CaO, MgO, Al₂O₃, SiO₂, Fe₂O₃, SO₃, P₂O₅, K₂O, Na₂O and LOI analysis. Comparison of chemical analysis of external check samples with primary samples are provided in the Annexure -IIIC.
- 15.6.2 In order to assess the bias and inaccuracies in analytical determination as well as to check the repeatability of analysis, 28 borehole samples were analyzed for external check analysis out of 280 primary samples. External check sample results of M/s JNARDDC Laboratory have been compared with primary sample results for 10 radicals i.e. CaO, MgO, Al₂O₃, SiO₂, Fe₂O₃, SO₃, P₂O₅, K₂O, Na₂O & LOI and found no major or significant difference between the results. The comparative studies for limestone primary Vs external check samples are tabulated in Annexure -IIIC.
- 15.6.3 The comparative studies of Primary Vs External check analysis of borehole core samples for CaO is given in Table-15.1 and scatter plots is represented.

TABLE-15.1 COMPARISON OF PRIMARY Vs. EXTERNAL CHECK ANALYSIS OF CaO

COMPARISON INDEX	CaO %	
	Primary	Check
No. of Sample Pairs	28	
Arithmetic Mean	48.146	45.994
Standard Deviation	8.838	8.697
Std. Error of Mean	1.67	1.644
Variance	78.119	75.635
Mean of Deviation	2.152	
Standard Deviation (Error)	1.554	
Correlation Coefficient	0.984	
Mean Absolute Error	2.306	
Mean Relative Random Error	4.79%	
Paired T value	7.326	
F - test value	1.033	



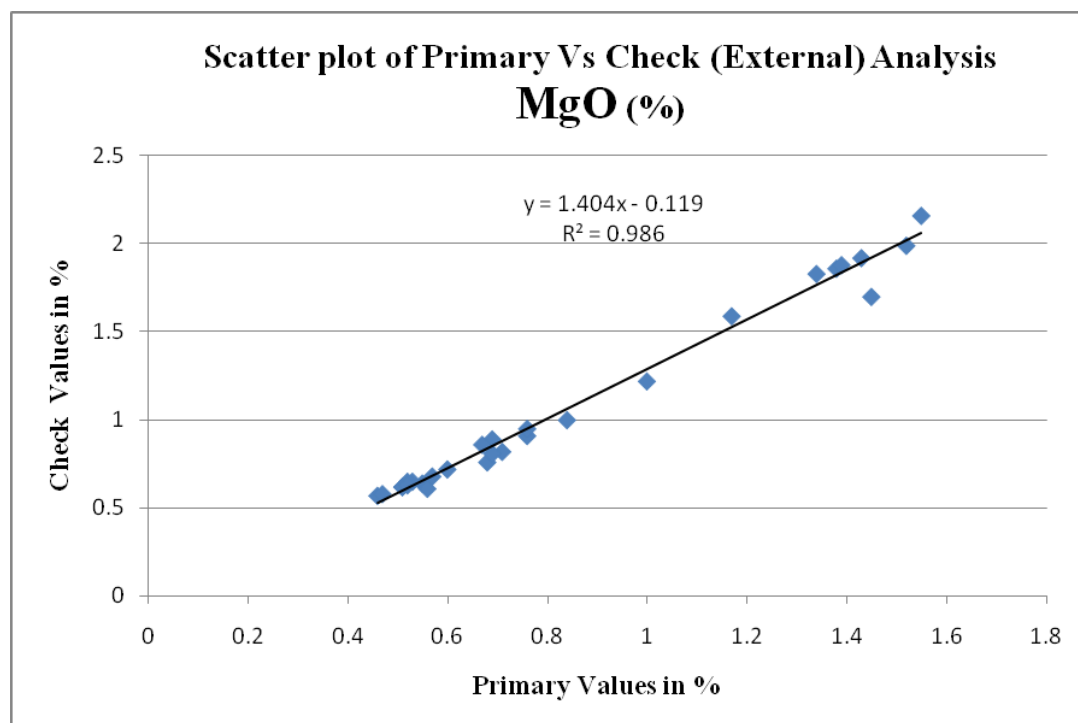
15.6.3.1 The data set for primary Vs External check analysis comprises 28 pairs of borehole

core samples. Table-15.1 shows that the difference in arithmetic mean, standard deviation, of primary and external check samples for CaO are not high. The value of R^2 given in scatter plot is 0.969, which is close to 1.00 and indicates a good correlation in primary and external check analysis.

15.6.4 The comparative studies of Primary Vs External check analysis of borehole core samples for MgO is given in Table-15.2 and scatter plots is represented.

TABLE-15.2 COMPARISON OF PRIMARY Vs. EXTERNAL CHECK ANALYSIS OF MgO

COMPARISON INDEX	MgO %	
	Primary	Check
No. of Sample Pairs	28	
Arithmetic Mean	0.851	1.076
Standard Deviation	0.372	0.527
Std. Error of Mean	0.07	0.1
Variance	0.139	0.277
Mean of Deviation	-0.225	
Standard Deviation (Error)	0.163	
Correlation Coefficient	0.993	
Mean Absolute Error	0.225	
Mean Relative Random Error	26.395%	
Paired T value	-7.312	
F - test value	0.5	

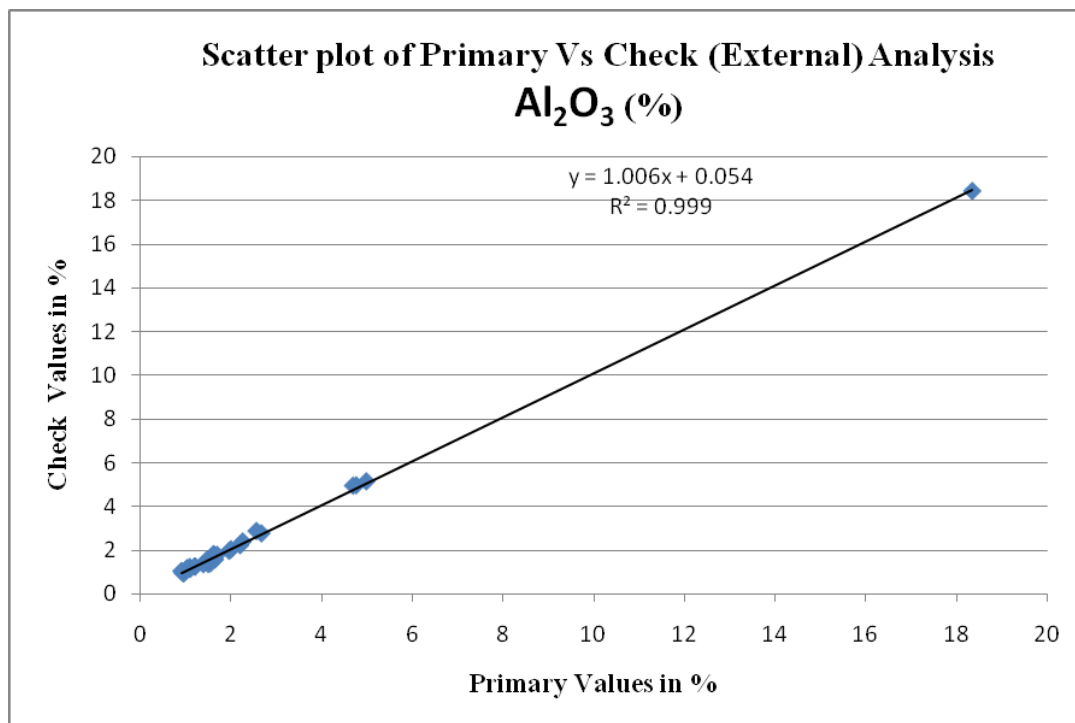


15.6.4.1 The data set for Primary Vs External check analysis comprises 28 pairs of borehole core samples. Table-15.2 shows that the difference in arithmetic mean, standard deviation, of primary and external check samples for MgO are not high. The value of R^2 given in scatter plot is 0.986, which is close to 1.00 and indicates a good correlation in primary and external check analysis.

15.6.5 The comparative studies of Primary Vs External check analysis of borehole core samples for Al_2O_3 is given in Table-15.3 and scatter plots is represented.

TABLE-15.3 COMPARISON OF PRIMARY Vs. EXTERNAL CHECK ANALYSIS OF Al_2O_3

COMPARISON INDEX	Al_2O_3 %	
	Primary	Check
No. of Sample Pairs	28	
Arithmetic Mean	2.493	2.563
Standard Deviation	3.244	3.265
Std. Error of Mean	0.613	0.617
Variance	10.522	10.659
Mean of Deviation	-0.07	
Standard Deviation (Error)	0.106	
Correlation Coefficient	0.999	
Mean Absolute Error	0.102	
Mean Relative Random Error	4.083%	
Paired T value	-3.466	
F - test value	0.987	

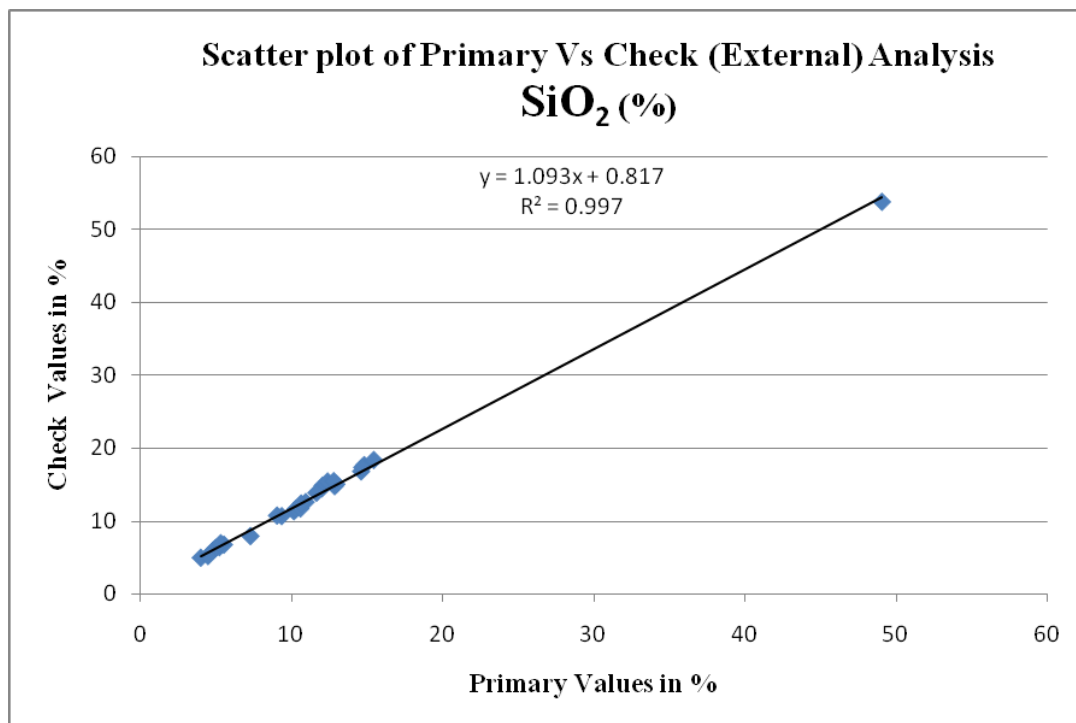


15.6.5.1 The data set for Primary Vs External check analysis comprises 28 pairs of borehole core samples. Table-15.3 shows that the difference in arithmetic mean, standard deviation, of primary and external check samples for Al₂O₃ are not high. The value of R² given in scatter plot is 0.999, which is close to 1.00 and indicates a good correlation in primary and external check analysis.

15.6.6 The comparative studies of Primary Vs External check analysis of borehole core samples for SiO₂ is given in Table-15.4 and scatter plots is represented.

TABLE- 15.4 COMPARISON OF PRIMARY Vs. EXTERNAL CHECK ANALYSIS OF SiO₂

COMPARISON INDEX	SiO ₂ %	
	Primary	Check
No. of Sample Pairs	28	
Arithmetic Mean	11.216	13.082
Standard Deviation	8.099	8.869
Std. Error of Mean	1.531	1.676
Variance	65.593	78.663
Mean of Deviation	-1.865	
Standard Deviation (Error)	0.899	
Correlation Coefficient	0.999	
Mean Absolute Error	1.865	
Mean Relative Random Error	16.631%	
Paired T value	-10.977	
F - test value	0.834	

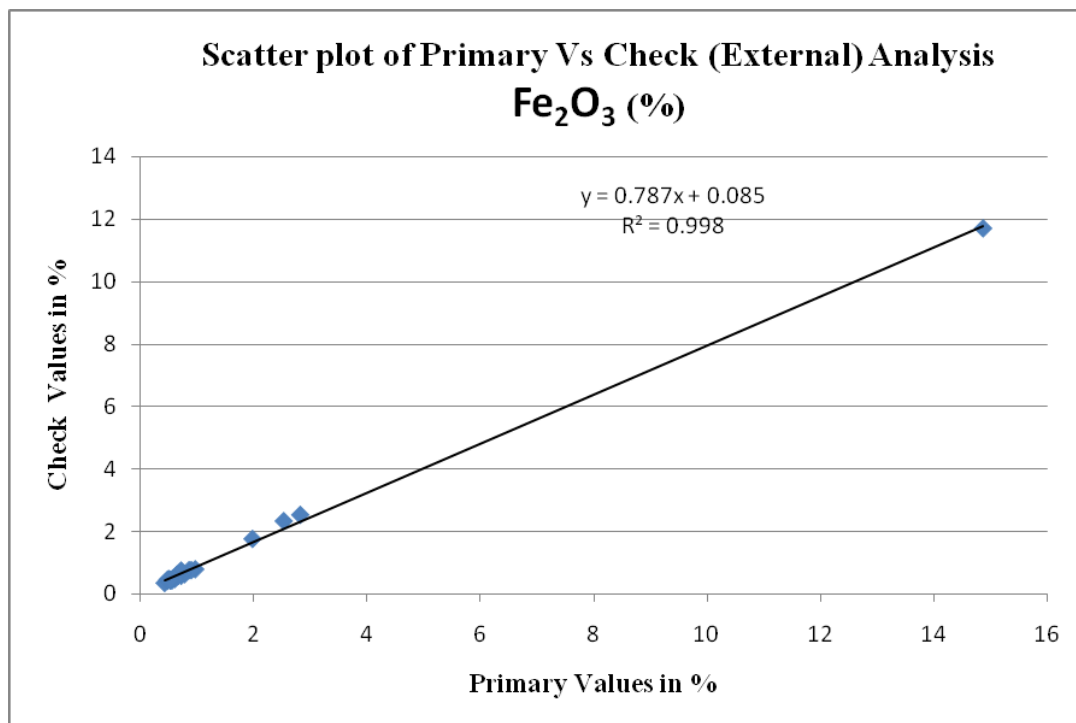


15.6.6.1 The data set for Primary Vs External check analysis comprises 28 pairs of borehole core samples. Table-15.4 shows that the difference in arithmetic mean, standard deviation, of primary and external check samples for SiO₂ are not high. The value of R^2 given in scatter plot is 0.997, which is close to 1.00 and indicates a good correlation in primary and external check analysis.

15.6.7 The comparative studies of Primary Vs External check analysis of borehole core samples for Fe₂O₃ is given in Table-15.5 and scatter plots is represented.

TABLE 15.5 COMPARISON OF PRIMARY Vs. EXTERNAL CHECK ANALYSIS OF Fe₂O₃

COMPARISON INDEX	Fe ₂ O ₃ %	
	Primary	Check
No. of Sample Pairs	28	
Arithmetic Mean	1.347	1.146
Standard Deviation	2.664	2.099
Std. Error of Mean	0.504	0.397
Variance	7.099	4.407
Mean of Deviation	0.201	
Standard Deviation (Error)	0.573	
Correlation Coefficient	0.999	
Mean Absolute Error	0.204	
Mean Relative Random Error	15.111%	
Paired T value	1.853	
F - test value	1.611	

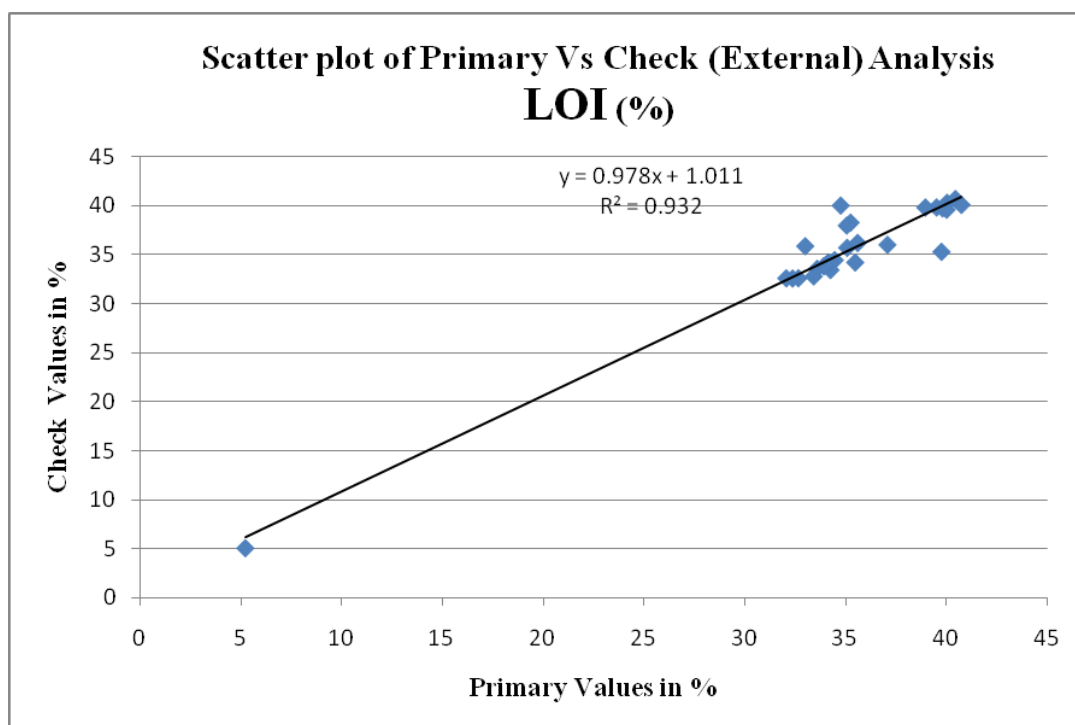


15.6.7.1 The data set for Primary Vs External check analysis comprises 10 pairs of borehole core samples. Table-15.5 shows that the difference in arithmetic mean, standard deviation, of primary and external check samples for Fe₂O₃ are not high. The value of R^2 given in scatter plot is 0.998, which is close to 1.00 and indicates a good correlation in primary and external check analysis.

15.6.8 The comparative studies of Primary Vs External check analysis of borehole core samples for LOI is given in Table-15.6 and scatter plots is represented.

TABLE-15.6 COMPARISON OF PRIMARY Vs. EXTERNAL CHECK ANALYSIS OF LOI

COMPARISON INDEX	LOI %	
	Primary	Check
No. of Sample Pairs	28	
Arithmetic Mean	34.827	35.106
Standard Deviation	6.325	6.411
Std. Error of Mean	1.195	1.212
Variance	40.007	41.097
Mean of Deviation	-0.279	
Standard Deviation (Error)	1.666	
Correlation Coefficient	0.966	
Mean Absolute Error	0.984	
Mean Relative Random Error	2.826%	
Paired T value	-0.885	
F - test value	0.973	



15.6.8.1 The data set for Primary Vs External check analysis comprises 28 pairs of borehole core samples. Table-15.6 shows that the difference in arithmetic mean, standard deviation, of primary and external check samples for LOI are not high. The value of R^2 given in scatter plot is 0.932, which is close to 1.00 and indicates a good correlation in primary and external check analysis.

CHAPTER – 16

16.0.0 MOISTURE

16.1.0 All the analysis of borehole core samples has been carried out with natural moisture.

CHAPTER – 17

17.0.0 BULK DENSITY/SPECIFIC GRAVITY

17.1.0 BULK DENSITY

A total of 2 of samples are conducted for bulk density studies and the results are tabulated hereunder.

Sr. No.	Sample No.	BH. No.	From (m)	To (m)	Bulk Density
1	MPW-BD-01	MPWB-06	26.55	26.75	2.69
2	MPW-BD-02	MPWB-07	19.00	19.20	2.68

The average bulk density of the limestone zones in the block is determined as 2.685, which has been utilized for the resource estimation. Bulk density study report is analyzed as Annexure-V.

CHAPTER – 18

18.0.0 BENEFICIATION STUDIES

18.1.0 The present exploration has no provision for beneficiation studies.

CHAPTER – 19

19.0.0 RESOURCE ESTIMATION TECHNIQUE

19.1.0 GENERAL

19.1.1 The limestone resource of the block has been estimated by “**Geological cross-section Method**” and **Polygonal** methods. Certain axiomatic assumptions are inherently involved in estimation of overall grade and resource of the deposit, which are given below:

1. The rule of gradual change or law of linear function has been applied (Constantine C. Popoff, 1966) along with the rule of nearest points for application of influence of half way between successive boreholes.
2. The boreholes which did not intersect any mineralization have been considered as negative boreholes and completely eliminated from resource estimation.
3. The thickness and grade of each mineralized zone intersected in the borehole have been considered as it is for the entire influence area of the borehole.

19.1.2 Grades and Resource have been assessed on the basis of end-use grade classification given by IBM's National Mineral Inventory (NMI) in following three categories

- i) Cement grade ($\geq 44\%$ CaO, $< 3.5\%$ MgO and $< 16\%$ SiO₂),
- ii) Blendable grade (≥ 38 to $< 44\%$ CaO, $< 5\%$ MgO and > 16 and $< 18\%$ SiO₂), and
- iii) Threshold Grade ($> 34\%$ CaO, $< 6\%$ MgO).

19.1.3 Further Resource have been estimated and categorized as per UNFC and placed as Inferred Resource (333) and Reconnaissance Resource (334) categories by cross sectional method also has been calculated by polygonal method also.

19.2.0 ASSUMPTIONS FOR RESOURCE ESTIMATION

19.2.1 Resource was computed by “Cross-sectional method” as well as by “Polygonal method”. Certain axiomatic assumptions are inherently involved in estimating overall grade and resource of a deposit, are given below.

19.2.2 For limestone grade categorization into cement grade, CaO has been considered strictly. For other radicals like in case of MgO and SiO₂, slight variation on higher side is also considered.

19.2.3 Resource estimated for Cement grade limestone CaO $\geq 44\%$, 3.5% MgO (Max) and 16% SiO₂ (Max) are considered for the assessment of limestone resource.

- 19.2.4** The zones of different grades have been demarcated from the values of primary sample analysis as per cut-off limits by End Use Grade specifications by IBM for CaO, MgO and SiO₂. The minimum cumulative thickness of 1.00m of all grades has been considered for resource calculation in both methods.
- 19.2.5** The exploration scheme was formulated for G-3 level exploration. After completing the exploration program, which involved drilling 7 boreholes (MPWB-01,02,03, 04,05,06 and 07) fall along eight parallel cross-section lines (S1-S1', S2-S2', S4-S4', S5-S5', S6-S6', S7-S7' and S8-S8') oriented in the N 57° W / S 57° E direction and PBH-01,02,03,04,05,06,07,08,09 oriented also in the N 57° W / S 57° E direction within the Pedaveedu West block.
- 19.2.6** The Limestone body is bedded and continuous within the block. For resource estimation by cross-section method, resources are categorized under Inferred Resource (333) and Reconnaissance Resource (334) of UNFC (as per MEMC 2015 and 2021) Rules.
- 19.2.7** The grade classification and categorization marked in the cross sections are suitable indexed and enclosed as Plate No IV for Pedaveedu West block. Along strike and dip the influence of maximum 400 m from control point towards the lease boundary has been categorized in Inferred Category (333). Beyond this limit the resource are categorized under Reconnaissance category (334) up to block boundary
- 19.2.8** The average bulk density of limestone has been taken as 2.685 as determined by Calliper's method from 2 limestone samples in MECL Laboratory, Nagpur. This value is taken for computation of resource for cement grade of limestone.
- A deduction of 20% from Gross in-situ resource has been made to arrive at Net-in-situ resource by geological cross-section and, polygon method for unseen geological factors i.e. nature of core, recovery factor, cavities/caverns and other structural features.
- 19.2.9** Cross sectional resource of inferred category and reconnaissance categories are calculated for Cement grades for thickness of limestone zone of respective grades encountered in each borehole is enclosed as Annexures VII-A1 & VII-A2 and suitably annexed accordingly.
- 19.2.10** Polygonal resource is calculated for Cement grades for thickness of limestone zone of respective grades encountered in each borehole is enclosed as Annexure-VIII for Polygonal resources.

19.3.0 PARAMETERS FOR RESOURCE ESTIMATION

19.3.0 SAMPLING PROCEDURE

The primary samples have been collected as per the litho-contact and sample length of one meter has been taken, however due to lithological variations in very few places the sample length was also taken less than 1.00m, but resource has not been calculated for the zones which are less than 1.00m. Samples from bore hole cores were crushed to (-) 200 mesh size, cone and quartered, thoroughly mixed and representative samples of 200g were prepared and sent to laboratory for analysis of 10 radicals i.e. CaO, MgO, Al₂O₃, SiO₂, Fe₂O₃, Na₂O, SO₃, P₂O₅, K₂O and LOI at Chemical Laboratory of MECL, Nagpur and results were obtained to delineate the ore zones.

19.3.1 CHEMICAL ANALYSIS

A total of 280 nos. of samples generated from the 7 boreholes drilled (MPWB-01,02,03,04,05, 06 and 07) in Pedaveedu West block were analyzed by MECL Lab Nagpur and the results are enclosed as Annexure-IIIA and 28 nos. of external check samples have been analysed by JNARDDC, Nagpur and the results are received (Annexure-IIIC).

Considering the open cast potentiality of the block, the minimum workable thickness / minimum stopping width of 1.00 m and minimum non ore parting of 1.00 m is considered for resource estimation.

19.4.0 OVERBURDEN

19.4.1 Overburden of limestone includes top layer of soil and subsequent sticky clay which lies immediately above Limestone in Pedaveedu West block. The minimum overburden of soil cover is 0.68 m in MPWB-05 and maximum is 3.00m in MPWB-01.

19.5.0 METHODOLOGY

19.5.1 The resource of limestone has been estimated by geological cross section method. The methodology is adopted, keeping the above assumptions in view resource estimation are described further.

19.6.0 METHODOLOGY ADOPTED IN CROSS-SECTION METHOD OF RESOURCE ESTIMATION (PRINCIPAL METHOD)

19.6.1 A total of 07 boreholes is located along eight parallel cross-section lines, S1-S1', S2-

S2', S3-S3', S4-S4', S5-S5', S6-S6', S7-S7' and S8-S8' drawn in the N 57° W / S 57° E direction from east to west throughout the Pedaveedu West block which is marked on Plate No IV.



19.6.2 The limestone intersected in all the drilled boreholes and continuous within the block. Efforts were made to pass these sections through drilled borehole locations wherever possible. The boreholes which have not fallen on section lines are projected on to the nearest section line. Since the beds are generally horizontal with very low dip of 2° to 4° due ESE direction and boreholes drilled are all vertical hence true thickness will be the same as thickness intersected in the exploratory boreholes. Geological cross sections are generated by GDM software. Cross sectional area on each section has been measured with the help of Auto CAD map 2018 software and recorded systematically. Strike influence between two section lines and boreholes has been taken up-to half way distance. However, the influence is up to block boundary has been taken in section S1-S1' and S8-S8' up to 400m in inferred (333) category beyond 400m is reconnaissance (334) category. Each of these areas has been multiplied with sectional influence / strike influence of the section lines to give volume. The volume is then multiplied with average specific gravity, to estimate geological in-situ gross resources.

$$R = Sv (X) T (X) \text{ Avg Specific Gravity}$$

Where in,

R = Resource / Tonnage

Sv = Sectional area of limestone

T = Influence between successive section lines

Sp. Gr. = Specific Gravity of limestone

Methodology adopted for determining area of influence is tabulated in the following Table No 19.2.

Table No. 19.1
Section-wise area influence for estimation of resource by cross sectional method

Block	Cross Section Lines	Influence (m)
Pedaveedu West Block	S8-S8' and beyond	287.97
	S7-S7' to S8-S8'	202.95
	S6-S6' to S7-S7'	547.16
	S5-S5' to S6-S6'	920.615
	S4-S4' to S5-S5'	762.87
	S3-S3' to S4-S4'	395.92
	S2-S2' to S3-S3'	435.28
	S1-S1' to S2-S2'	359.915

19.7.0 POLYGON METHOD (CHECK METHOD):

19.7.1 The main objective of this method is to demarcate the area of influence of the limestone intersected by a particular borehole. The influence area has been obtained by constructing polygons by drawing perpendicular bisector of triangles, rectangles that connect the adjoining boreholes. The area of the influence of zones has been ascertained by Auto-Cad software. The area of non-development of respective zones is shown on the resource plan. The height of polygons is the cumulative thickness of limestone horizon/bands encountered by the corresponding borehole. The entire limestone body in block is divided into number of polygons.

The zone wise borehole wise resource estimation by Polygon method for Cement Grade of this block are calculated.

The grade assigned to the polygon blocks is same as the weighted average grade of the corresponding boreholes. The area of non-development of particular grade in borehole has been deducted.

The formula of resource estimation is as follows:

$$R = P_A \times Th \times \text{Bulk Density}$$

Where, P_A = Area of Polygon

R = Resource/ Tonnage

Th = Thickness of Limestone

19.7.2 The resources are estimated grade wise, zone wise, borehole wise, polygon wise and presented as Annexure No. VIII for Cement grade limestones. Polygon maps for Cement grade limestones are provided as Plate No VI for Pedaveedu West block.

19.8.0 COMPUTATION OF AVERAGE GRADE

19.8.1 All calculations for grade estimation are made by weighted average method. The sample interval was uniformly maintained at 1.00m interval with the exception of minor variations or structural implications and the weighted average method of calculation is made by the following formula:

$$\text{Weighted Average Grade} = \frac{V_1 \times G_1 + V_2 \times G_2 + V_3 \times G_3}{V_1 + V_2 + V_3}$$

$$\begin{aligned} \text{Weighted Average Grade} &= \frac{1.00 \times 44.48 + 1.00 \times 46.28 + 1.00 \times 48.12}{1.00 + 1.00 + 1.00} \\ &= 46.46\% \end{aligned}$$

Where 'V' = Volume of CaO% in individual borehole

'G' = Grade of the respective CaO% in the corresponding borehole

Table No. 19.2
Details of section wise borehole wise intersections of Cement grade
limestone zones in Pedaveedu West Block District- Suryapet, Telangana
State.

BH.NO.	From	To	Thick	CaO%	MgO%	SiO ₂ %	Grade	Remarks
MPWB-01	3.00	50.00	47.00	49.15	0.62	13.61	Cement Grade	MECL
MPWB-02	1.50	50.00	48.50	50.40	0.80	9.47	Cement Grade	
MPWB-03	1.91	50.00	48.09	51.36	0.90	6.91	Cement Grade	
MPWB-04	1.50	50.00	48.50	49.15	0.72	10.75	Cement Grade	
MPWB-05	0.68	50.00	49.32	51.08	0.94	5.80	Cement Grade	
MPWB-06	0.79	39.00	38.21	48.11	0.90	9.46	Cement Grade	
MPWB-07	1.20	50.00	48.80	49.67	0.68	11.58	Cement Grade	
PBH-01	0.50	24.00	23.50	48.79	1.43	7.31	Cement Grade	Sagar Cements Ltd.
PBH-02	0.50	32.00	31.50	47.46	1.01	9.41	Cement Grade	
PBH-03	0.60	33.00	32.40	46.73	1.15	11.52	Cement Grade	
PBH-04	0.70	27.00	26.30	47.31	1.17	9.24	Cement Grade	
PBH-05	1.00	27.00	26.00	45.52	0.82	13.20	Cement Grade	
PBH-06	0.50	29.00	28.50	45.20	0.84	14.02	Cement Grade	
PBH-07	0.00	25.00	25.00	45.90	1.19	11.36	Cement Grade	
PBH-08	0.00	30.00	30.00	46.03	1.33	11.09	Cement Grade	
PBH-09	0.00	39.00	39.00	45.23	0.96	13.01	Cement Grade	

As mentioned earlier, Limestone is classified into different grades on the basis of three major constituents viz. CaO, MgO and SiO₂. The other major chemical constituents of limestone are Al₂O₃, Fe₂O₃ and LOI.

Deleterious Constituents

The most deleterious constituent of cement is MgO. It affects the soundness of setting time of cement. It mostly adds through limestone. The Indian cement manufacturers consider 4% as the safe limit. The average MgO % estimated for Cement grade zone is 1.08.

Another harmful impurity in limestone for cement making is sulphur. The SO₃% content in limestone should not exceed 1.75%, because it forms sulpho-aluminate which has marked swelling property. The average SO₃ content in Primary samples analyzed is 0.04% which is well-within the limit.

Minor Constituents

Besides above broad chemical specifications, Cement grade limestone bound to have some limitations in the content of minor elements and constituents. Although these minor constituents do not have direct significance in assessing the suitability of a limestone, however, their presence beyond certain limits is undesirable as these may affect the manufacturing process or the quality of cement adversely.

Phosphorus: Content of P_2O_5 should not exceed 1% as excess phosphorus which inhibits clinker minerals formation and reduces the strength of cement appreciably. Average P_2O_5 content is 0.30% which is within the permissible limit.

19.9.0 CATEGORISATION OF RESOURCE

19.9.1 Resource have been categorized under Inferred (333) and Reconnaissance (334) category of resource as per UNFC. The assumptions and parameters are already discussed earlier in this chapter under 19.2.0 and 19.6.

19.9.2 Limestone zones are computed are categorized based on **end use grade** specifications prescribed by Indian Bureau of Mines.

19.9.3 The average grades for 3 radicals CaO , MgO and SiO_2 have been calculated. Thus, average grade of the block is calculated for all grades of limestone.

CHAPTER - 20

20.0.0 REPORTING OF RESOURCE

20.1.0 RESOURCE ESTIMATION

The Resource of limestone have been estimated grade wise, borehole wise and section wise in cross section method for different intersected zones/grade wise as per specifications and basic assumptions enumerated earlier. The resources of limestone grades have been estimated borehole wise for limestone intersected in the boreholes as per specifications by cross section method. The category wise, zone-wise and grade wise estimated resources are tabulated in corresponding Annexure-VII for cross sectional resources and Annexure-VIII for Polygonal resources.

20.1.1 The total gross in-situ resource of limestone is broadly categorized under inferred and reconnaissance resource categories. The details of the same are furnished in the following tables for Pedaveedu West block.

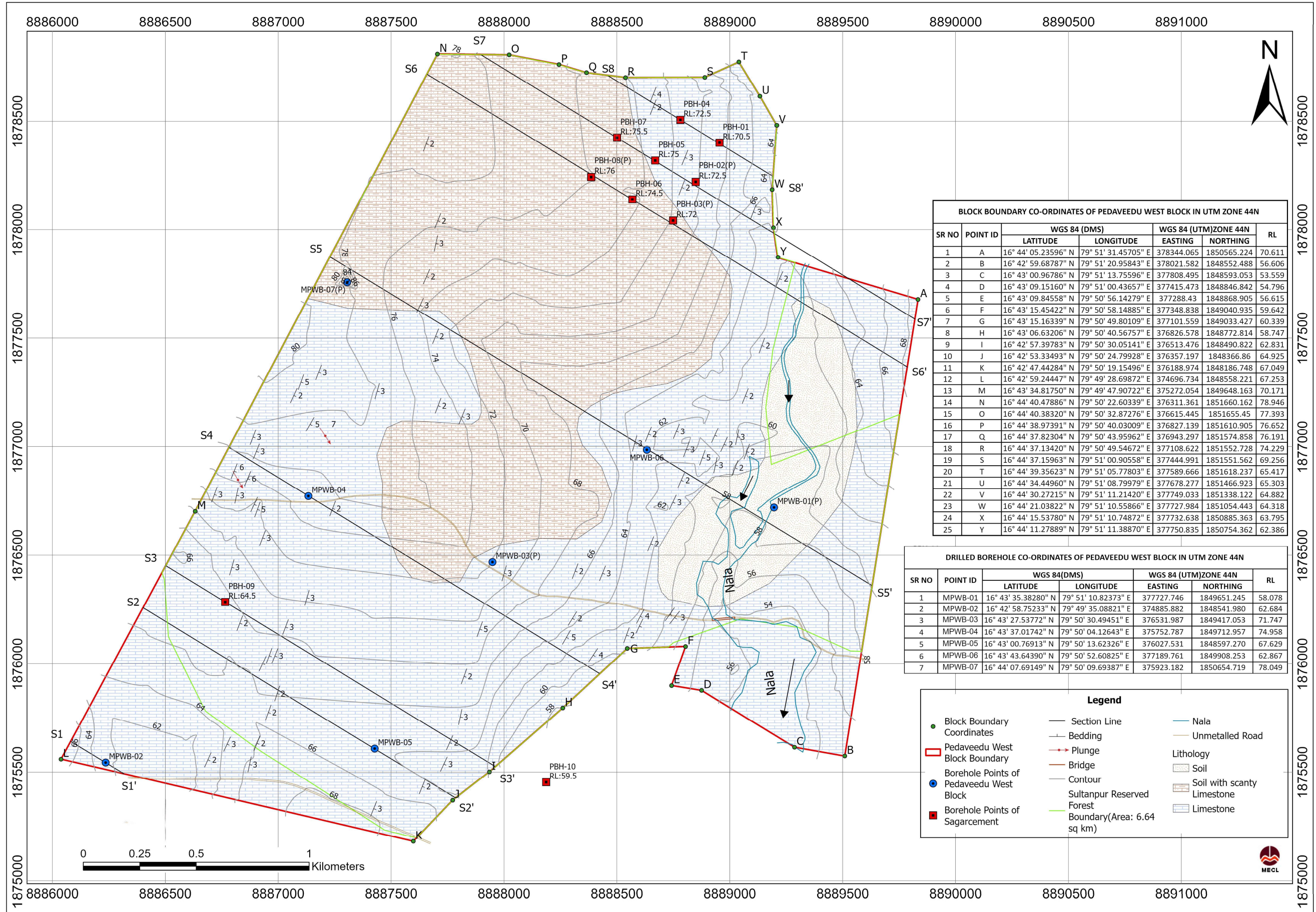
Table No: 20.1

Summary of category-wise Cement Grade Limestone Resource of Pedaveedu West Block – Cross sectional method (Inferred and Reconnaissance)

Unit: million tonnes

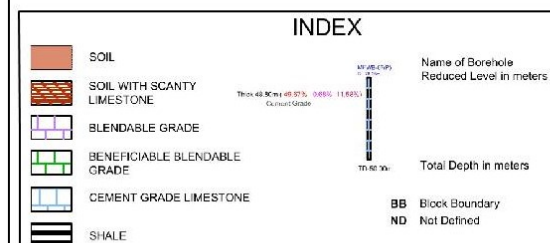
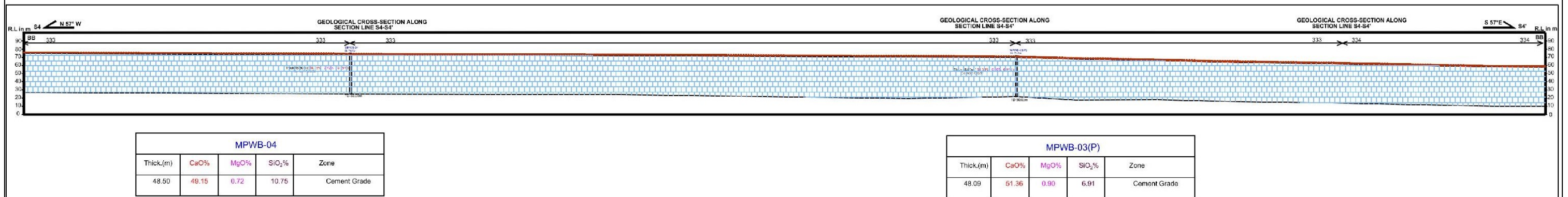
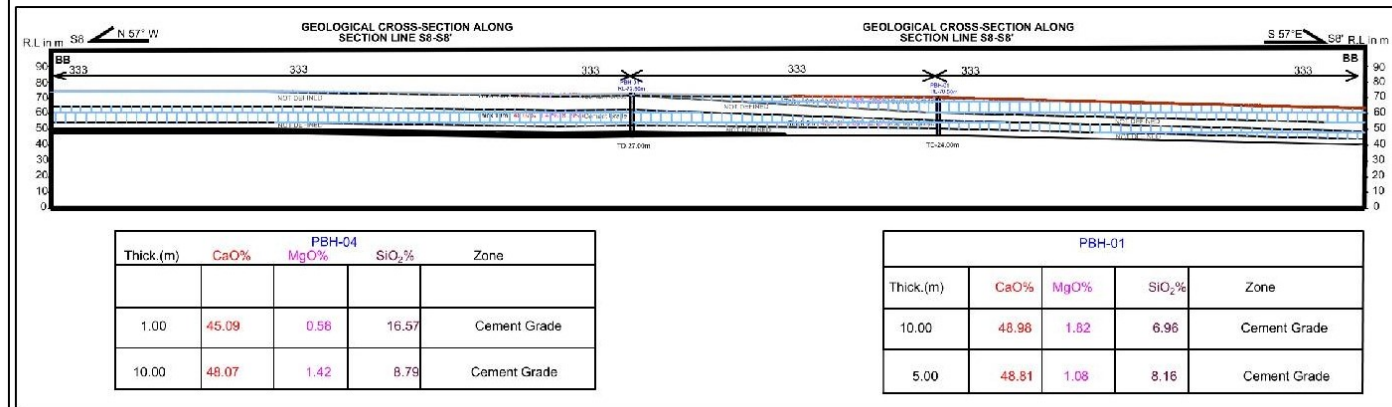
Resource Category	Gross Geol.Res. (Mil. Tons)	Net.Geol.Res. (Mil.tons)	CaO %	MgO %	SiO₂ %
Inferred (333)	578.31	462.64	49.03	1.16	10.07
Reconnaissance (334)	230.38	184.31	48.93	1.24	9.13
Total (333+334)	808.69	646.95	49.00	1.18	9.84

Section-wise, borehole-wise, Inferred and Reconnaissance resources of Cement Grade limestone for Pedaveedu West block is furnished as Annexure No VII-A1 & VII-A2.



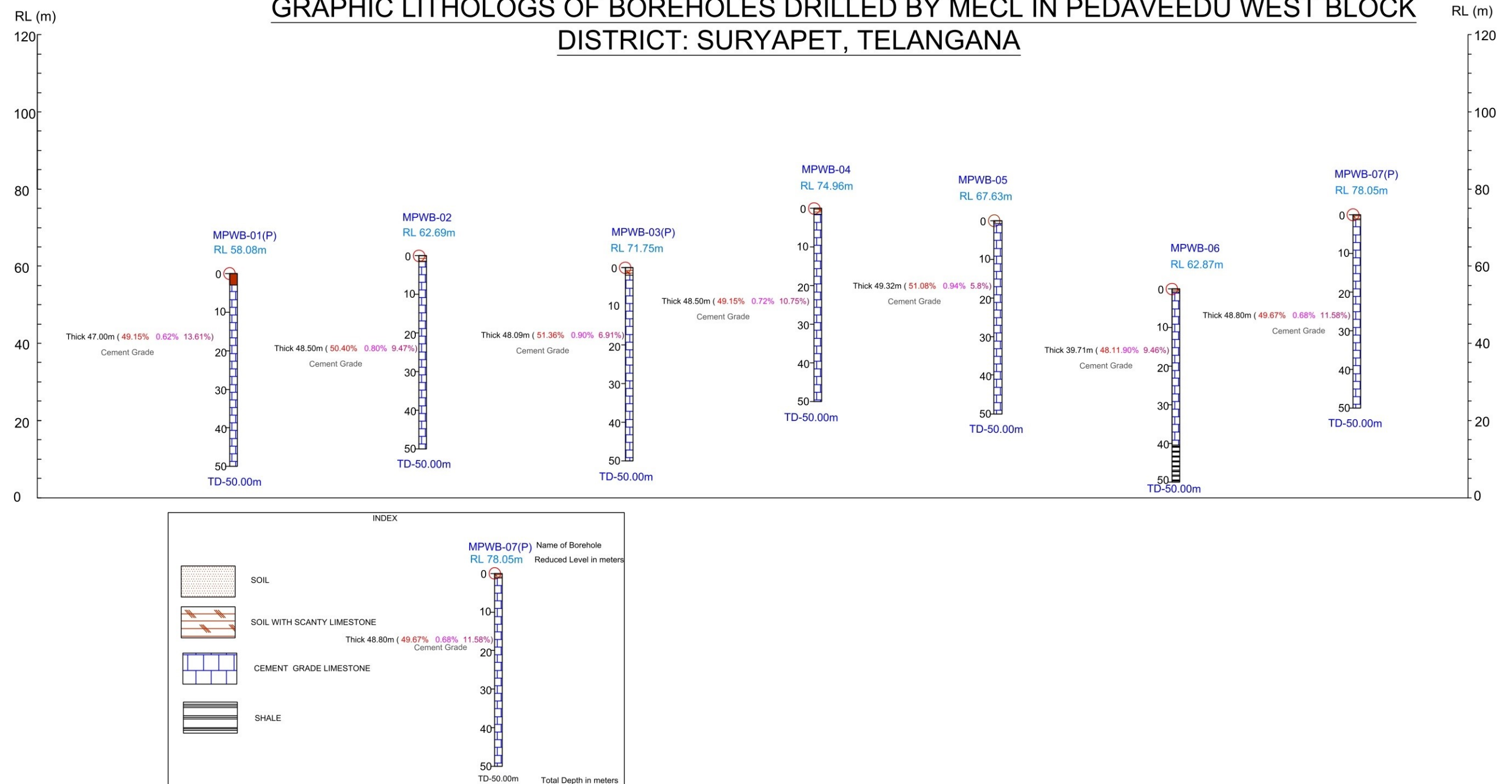
Text Figure No: 3 Topographical Geological Map of Pedaveedu West Block

GEOLOGICAL CROSS SECTIONS OF BOREHOLES DRILLED IN PEDAVEEDU WEST BLOCK DISTRICT:SURYAPET , TELANGANA

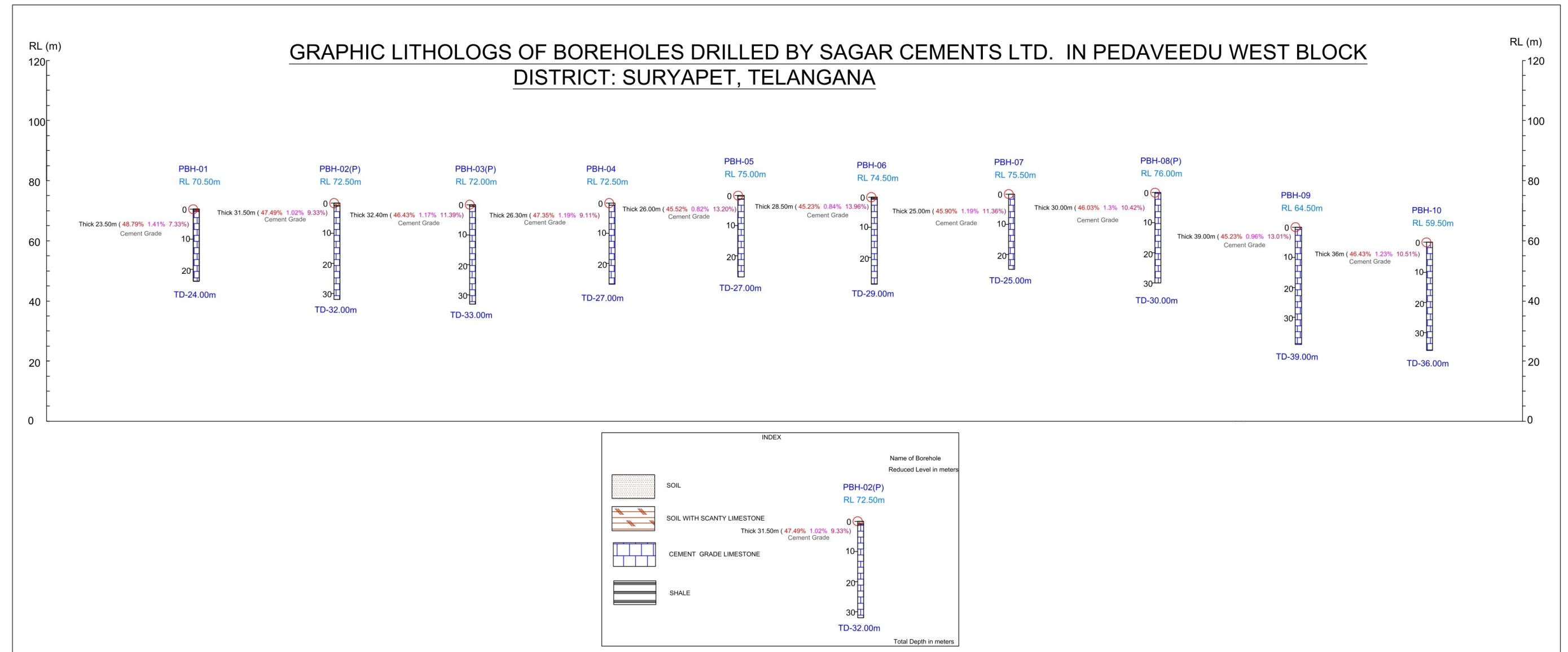


Text Figure No: 4 Geological Cross sections of Pedaveedu West Block along S4-S4' and S8-S8'

GRAPHIC LITHOLOGS OF BOREHOLES DRILLED BY MECL IN PEDAVEEDU WEST BLOCK DISTRICT: SURYAPET, TELANGANA



Text Figure No: 5A Graphic Lithologs of Boreholes Drilled in Pedaveedu West Block by MECL



Text Figure No: 5B Graphic Lithologs of Boreholes Drilled in Pedaveedu West Block by Sagar Cements Limited

20.2.0 POLYGON METHOD

20.2.1 The main objective of this method is to demarcate the area of influence of the limestone intersected by a particular borehole and the same is discussed earlier under chapter 19.7.0 of this report.

20.2.2 The grade assigned to the polygon blocks is same as the weighted average grade of the corresponding boreholes. The area of non-development of particular grade in borehole has been deducted. Block-wise, polygon-wise, borehole-wise polygonal area is tabulated hereunder. Out of 12 boreholes, 09 boreholes drilled by the Sagar Cements Ltd. have been considered in the resource calculation.

Table No. 20.2

Table showing borehole wise polygonal area of Pedaveedu West block.

Polygon No.	Bh. No.	Polygonal Area (m ²)	Exploration Agency
P1	MPWB-01	1343442.54	MECL
P5	MPWB-02	281385.52	
P3	MPWB-03	955131.28	
P6	MPWB-04	642036.88	
P4	MPWB-05	761820.46	
P2	MPWB-06	830448.22	
P7	MPWB-07	747928.34	
P16	PBH-01	118162.06	Sagar Cements Ltd.
P15	PBH-02	93747.23	
P14	PBH-03	460196.50	
P13	PBH-04	89933.90	
P12	PBH-05	39165.95	
P11	PBH-06	152735.21	
P10	PBH-07	202228.45	
P8	PBH-08	517168.36	
P9	PBH-09	535621.18	

20.2.3 Polygon Maps of Pedaveedu West block for Cement Grade limestone zones is furnished in Annexures and Plates.

20.2.4 The Polygon-wise zone-wise borehole-wise resource estimation by Polygon method for Cement Grade of this block are calculated and tabulated here under.

Table No: 20.3
Summary of Cement
Grade Limestone Resource of Pedaveedu West Block - Polygonal Method
Unit: million tonnes

Grade	Gross Geol.Resources (Mil. tons)	Net Geol.Res. (Mil. tons)	CaO%	MgO%	SiO ₂ %
Cement Grade	888.05	710.44	49.03	0.85	10.31

Polygon-wise, borehole-wise resources of Cement Grade limestone for Pedaveedu West Block estimated by Polygonal method is furnished as Annexure No. VIII.

20.3.0 RELIABILITY OF RESOURCE

20.3.1 The Limestone resource estimated at different end use cut off by the cross-section method and polygonal method were compared to ascertain the confidence level of estimation. The resources are estimated grade wise, borehole wise, section wise by both cross sectional and polygonal methods and presented as Annexure Nos. VII & VIII respectively.

20.3.2 In Pedaveedu West block, the difference in Resource by two methods comes to 8.93%. The resource calculated by polygonal method are bit on higher side due to irregular shape of the block. Hence the cross-sectional method is more reliable than polygon method. The comparison of resource is given in the Table 20.4.

Table No: 20.4
Comparison of Net in-situ Resource estimated by
Cross sectional and Polygonal method for Pedaveedu West Block

Method of estimation	Net in-situ Resource (mT)
Cross sectional method	646.95
Polygonal method	710.44
Difference	63.49 (8.93%)

CHAPTER – 21

21.0.0 SUMMARY AND RECOMMENDATIONS

21.1.0 SUMMARY

21.1.1 The Pedaveedu West block for Preliminary Exploration (G-3 stage) for limestone which lies in the Palnad Basin of Suryapet District, Telangana State. It falls in parts of the Survey of India Toposheet No. 56P/14 in Mattem Palle Mandal (Taluka) of Suryapet District, Telangana State.

21.1.2 Major portion of the explored block are of limestone. The general stratigraphic succession of the Pedaveedu West block in 1: 4000 scale geological mapping done by MECL along-with current exploration and available data and literature.

21.1.3 The total absence of fossils rules out the sediments of Bhima Group transgresses into the Cambrian. Thus envisaged the upper age limit is not less than 600 million years.

21.1.4 The rock types exposed in the block belong to the Narji Limestone Formation of Kurnool Group of Palnad Basin, the limestone exposed about 2/3 of the block area in the center to east of the block and quaternary sediments i.e. soil cover is seen in the west and south of the block.

21.1.5 The limestone formation of the block is horizontally disposed with strike of N to NE dips 2° to 4° due SE. A total of 7 boreholes drilled, are located along four parallel cross-section lines, S1-S1', S2- S2', S3-S3', S4-S4', S5-S5', S6-S6', S7-S7' and S8-S8' are drawn in the N 57° W / S 57° E direction from west to east throughout the Pedaveedu West block, which is marked on Plate No. IV. All the 07 boreholes intersected limestone zones drilled by MECL and 09 boreholes drilled by Sagar Cement Ltd.

The intersected limestone is of Cement grade. Zone-wise borehole wise intersection of various grades limestone zones, are discussed under Chapter 10.

21.1.6 A total of 280 nos. of borehole primary samples and 28 nos. of external check samples were generated in Pedaveedu West block. All the primary samples are analysed in Laboratory MECL, Nagpur (Annexure-IIIA) and external check samples are analysed from JNARDDC, Nagpur and the results are received (Annexure-IIIC). Considering the open cast potentiality of the block, the minimum workable thickness / minimum stopping width of 1.00 m and minimum non ore parting of 1.00 m is considered for resource estimation.

The limestone is grey and greyish white with massive hard-core nature. The maximum CaO% is 51.36 which is intersected in MPWB-03, between 1.91 to 50.00m.

The block-wise resources are estimated are broadly categorized under inferred (333) and reconnaissance resource (334) the details of the same are furnished in the following tables.

Table No: 21.1
Summary of Cement Grade Limestone Resource of Pedaveedu West Block –
Cross sectional method (Inferred and Reconnaissance)

Unit: million tonnes

Resource Category	Gross Geol.Res. (Mil. Tons)	Net.Geol.Res. (Mil.tons)	CaO %	MgO %	SiO₂ %
Inferred (333)	578.31	462.64	49.03	1.16	10.07
Reconnaissance (334)	230.38	184.31	48.93	1.24	9.13
Total (333+334)	808.69	646.95	49.00	1.18	9.84

Section-wise, borehole-wise, zone-wise Inferred and Reconnaissance resources of Cement Grade limestone for Pedaveedu West Block are furnished as Annexure No. VII-A1 & VII-A2.

21.2.0 RECOMMENDATIONS

21.2.1 Pedaveedu West Block: Total Geological Net In-situ Resources of Cement Grade resource estimate is 646.95 million tonnes with an average grade of CaO 49.00%, MgO 1.18% and SiO₂ 9.84%.

21.2.2 The exploration is carried out as per Mineral (Evidence of Mineral Contents) Rule-2015, Mineral Auction Rule-2015, MMDR Amendment Act - 2015 and in accordance with the Minerals (Evidence of Mineral Contents) Amendments Rules 2021.

21.2.3 This level of exploration will facilitate the State Government of Telangana State for auctioning of these four blocks under Mining Lease.

21.2.4 The study area suggests that any future mining project may generate employment for the local people and will increase socio-economic status of the people residing in the nearby areas.

CHAPTER - 22

22.0.0 PLATES AND MAPS

- 22.1.0 Location Map Pedaveedu West block, Matampally Mandal (Taluk), Suryapet District, Telangana State on 1: 50,000 Scale is given as Plate No. I.
- 22.2.0 Regional Geological Map Palnad Basin Part (GSI) - Pedaveedu West block, Mattampally Mandal (Taluk), Suryapet District, Telangana State on 1:50,000 scale is given as Plate No. II.
- 22.3.0 Topographical and Geological map of Pedaveedu West block, Mattampally Mandal (Taluk), Suryapet District, Telangana State on 1:4,000 scale is given as Plate No. III.
- 22.4.0 Geological Cross Sections of Pedaveedu West block (S_1-S_1' , S_2-S_2' , S_3-S_3' , S_4-S_4' , S_5-S_5' , S_6-S_6' , S_7-S_7' and S_8-S_8') on 1:2000 scale is given as Plate No. IV.
- 22.6.0 Graphic Lithologs of boreholes drilled by MECL in Pedaveedu West block on 1:800 scale is given as Plate No. VA.
- 22.7.0 Graphic Lithologs of boreholes drilled by SAGAR CEMENTS LTD. in Pedaveedu West block on 1:800 scale is given as Plate No. VB.
- 22.8.0 Polygon Map of Cement Grade Limestone Grade in Pedaveedu West block on 1 : 4,000 scale is given as Plate No.VI.

CHAPTER - 23

23.0.0 ANNEXURE / ENCLOSURES TO THE REPORT

23.1.0 The report includes all the relevant annexure and maps/, plans, sections and photographs etc. List of annexures, tables, maps/plans/sections, photographs, text figures etc are provided before the start of the text and part of the Geological Report.

CHAPTER - 24

24.0.0 ANY OTHER INFORMATION

24.1.0 UTILISATION ASPECTS AND MINEABILITY (AS PER NATIONAL COUNCIL FOR CEMENT AND BUILDING MATERIALS)

24.1.1 The specifications of limestone for various industrial used are as follows

1. CEMENT INDUSTRY SPECIFICATION

Table No. 24.1

Cement Industry Specification for Limestone

CaO	: 44% (min.) to 46%
MgO	: 3.50% (max.)
Silica	: 16% (max.)
Al ₂ O ₃	: 2 (max.)
Fe ₂ O ₃	: 2% (max.)
SO ₃	: 1.75% (max.)

PEDAVEEDU WEST Block

a) Lime Saturation Factor:

$$\text{Lime Saturation Factor (LSF)} = \frac{\text{CaO} + \text{MgO}}{2.8 (\text{SiO}_2) + 1.2 (\text{Al}_2\text{O}_3) + 0.65 (\text{Fe}_2\text{O}_3)} = 0.66 \text{ to } 1.02$$

$$\text{Lime Saturation Factor (LSF)} = \frac{49.03 + 1.14}{(2.8 \times 10.15) + (1.2 \times 1.51) + (0.65 \times 0.69)} = 1.64$$

The LSF in PEDAVEEDU WEST Block is 1.64 hence it is suitable for Cement Industry

b) Silica Modulus:

$$\text{Silica Modulus} = \frac{\text{SiO}_2}{\text{Al}_2\text{O}_3 + \text{Fe}_2\text{O}_3} = 1.2 \text{ to } 4.0$$

$$\text{Silica Modulus (Cement Grade)} = \frac{10.15}{1.51 + 0.69} = 4.61$$

The Silica modulus value in PEDAVEEDU WEST Block is 4.61

c) Alumina Modulus:

$$\text{Alumina Modulus (Alumina/Iron Ratio (AM))} = \frac{\text{Al}_2\text{O}_3}{\text{Fe}_2\text{O}_3} = 0.65 (\text{min.})$$

$$\text{Alumina Modulus (Cement Grade)} = \frac{1.51}{0.69} = 2.19$$

The Alumina modulus value in PEDAVEEDU WEST Block is 2.19

2. B. I. S. (BUREAU OF INDIAN STANDARDS) SPECIFICATION



Table 24.2

B. I. S. (Bureau of Indian Standards) Specification for Limestone

CaO (Min)	:	42%
MgO (Max.)	:	2.5%
SiO ₂ (Max.)	:	15%
P ₂ O ₅ (Max.)	:	1.5 %
FeS ₂ (Max.)	:	2%

3. IRON AND STEEL INDUSTRY :

Table No. 24.3

Iron and Steel Industry for Specification for Limestone

Elements	BF Grade	SMS Grade	LD Grade
CaO	42% (Min.)	48% (Min.)	52% (Min.)
MgO	4% (Max.)	3% (Max.)	2% (Max.)
SiO ₂	9% (Max.)	4% (Max.)	1% (Max.)
SiO ₂ + Al ₂ O ₃	11.5% (Max.)	-	-
Total Insoluble	12%	-	-
Acid Insoluble	-	6.5% (Max.)	-

4. CHEMICAL INDUSTRY SPECIFICATION

BIS Specifications (1S:3204-1978, Reaffirmed-2003)

Table No. 24.4

Chemical Industry Specification for Limestone

Characteristics	Requirement in percent by mass for			
	Calcium carbide	Bleaching Powder	Caustic soda	Sugar
CaO (Min.)	54.0	54.0	53.0	50.0
MgO (Max.)	0.8	2.0	1.0	1.0
SiO ₂ (Max.)	1.0	0.75	-	2.0
Fe ₂ O ₃ (Max.)	0.25	0.15	-	-
Mn ₂ O ₃ (Min.)	-	0.06	-	-
CO ₂ (Min.)	42.00	42.00	42.00	41.00
Loss on Ignition (LOI)	46.00	46.00	46.00	44.00
S (Max.)	0.10	-	-	-
P (Max.)	0.01	-	-	-
Al ₂ O ₃ + Fe ₂ O ₃ (Max.)	0.50	-	-	1.5
SiO ₂ + Al ₂ O ₃ + Fe ₂ O ₃ (Max.)	-	-	3.0	-

5. FERTILIZER INDUSTRY SPECIFICATION

CaCO₃+ MgCO₃: 85% (Min)
SiO₂ : 5% (Max.)

6. GLASS INDUSTRY SPECIFICATION

CaCO ₃	:	94.5 % CaCO ₃ + MgCO ₃	:	97.5 %
Fe ₂ O ₃	:	0.20 % (Max.)		

BIS Specifications (IS:997-1973, Reaffirmed-1998)

CaO	:	53.0 %
SiO ₂	:	2.5 %
Fe ₂ O ₃	:	0.10 %
CaO + MgO	:	54.50 %

7. FOUNDRY INDUSTRY SPECIFICATION

BIS Specifications (IS:4149-1978, Re-affirmed-2008)

Table N.: 24.5

Foundry Industry Specification for Limestone

Characteristics	Grade-1	Grade-2	Grade-3
CaO (Min.)	52 %	50 %	45 %
SiO ₂ (Max)	1.5 %	3 %	5 %
R ₂ O ₃ (Al ₂ O ₃ + Fe ₂ O ₃) Max.	1 %	1 %	2 %
MgO	2 %	3 %	5 %
Insoluble matter	0.5	1	2
Sulphur and Phosphorus	Traces	Traces	Traces

8. CEMENT, IRON AND STEEL AND CHEMICAL INDUSTRY SPECIFICATION

Table No. 24.6

Cement, Iron and Steel and Chemical Industry Specification for Limestone

Constituents	Cement Industry (Specification)	Iron and Steel Industry (Specification)			Chemical Industry BIS Specifications (IS:3204-1978, Reaffirmed-2003)			
					Requirement in percent by mass for			
		<i>BF Grade</i>	<i>SMS- OH Grade</i>	<i>SMS- LD</i>	<i>Calcium carbide</i>	<i>Bleaching Powder</i>	<i>Caustic soda</i>	<i>Sugar</i>
CaO (Min.)	44% (Min.) to 48%	42% (Min.)	48% (Min.)	52% (Min.)	54.0	54.0	53.0	50.0
MgO (Max.)	3.50% (Max.)	4%	3%	2%	0.8	2.0	1.0	1.0
SiO ₂ (Max.)	16 % (Max.)	9%	4%	1%	1.0	0.75	-	2.0
Fe ₂ O ₃ (Max.)	2% (Max.)				0.25	0.15	-	-
Mn ₂ O ₃ (Min.)	--	--	--	--	-	0.06	-	-
CO ₂ (Min.)	--	--	--	--	42.00	42.00	42.00	41.00

Constituents	Cement Industry (Specification)	Iron and Steel Industry (Specification)			Chemical Industry BIS Specifications (IS:3204-1978, Reaffirmed-2003)			
					Requirement in percent by mass for			
		<i>BF Grade</i>	<i>SMS- OH Grade</i>	<i>SMS- LD</i>	<i>Calcium carbide</i>	<i>Bleaching Powder</i>	<i>Caustic soda</i>	<i>Sugar</i>
Loss on Ignition	--	--	--	--	46.00	46.00	46.00	44.00
S (Max.)	--	--	--	--	0.10	-	-	-
P (Max.)	--				0.01	-	-	-
Al ₂ O ₃ + Fe ₂ O ₃ (Max.)	2%				0.50	-	-	1.5
SiO ₂ + Al ₂ O ₃ + Fe ₂ O ₃ (Max.)	--	11.5% (Max.)			-	-	3.0	-
Acid Insoluble			6.5% (Max.)					

CHAPTER – 25

25.0.0 CERTIFICATE FROM THE QUALIFIED PERSON WITH NAME, DATE AND SIGNATURE

This is to certify that geological report has been prepared in respect of Preliminary Exploration Report (G-3 stage) for Limestone in Pedaveedu West Block District-Suryapet, Telangana State. The report was prepared by Mineral Exploration and Consultancy Limited (MECL) on behalf of the National Mineral exploration Trust (NMEDT). The report adheres to the Minerals (Evidence of Mineral Contents) Rules, 2015, as specified under the Mineral Auction Rules, 2015 and amended up to 2021.

NAME: SHRI SHRIKANT SHARMA

DESIGNATION: HOD EXPLORATION

DATE: 30-04-2026

**LIST OF PERSONNEL ASSOCIATED WITH PRELIMINARY EXPLORATION (G-3
STAGE) FOR LIMESTONE IN PEDAVEEDU WESTBLOCK, DISTRICT: SURYAPET,
TELANGANA STATE**

1	Overall guidance	: Shri Shrikant Sharma, HoD (Exploration)
2	Overall Planning, Co-ordination & Supervision	: Shri Shrikant Sharma, HoD (Exploration)
		: Dr. Kuppusamy E, Dy. General Manager (Exploration)(Retd.)
		: Shri Naveen Kr. Pala, Sr. Manager (Geology)
		: Shri Ashish Singh, Sr. Manager (Geology)
3	Project Management	: Shri Dippankar Manna, Project Manager : Mr. Rampramod K Manager (Geology)
4	Physical Execution of work	
	a) Geology	: Mr. Rampramod K Manager (Geology)
	b) Survey	: Mr. Sanilam Guha STA (S&D)
	c) Core Sample Splitting	: Shri Satish Kumar Inaparthi, Sr. Tech. Sampling
	d) Drilling	: Shri Deepak (Dilling Supervisor)
5	Sample Processing	: Mr. Nagraju Vaddi Sr. Tech. (Sampling) : Mrs. Shika Sharma, Sr. Tech. Sampling
6	Chemical Laboratory	: Shri Shrikant Sharma HoD (Exploration)
		: Shri Rohit Sharma, Manager (Chemistry) Lab. in-charge
		: Dr Deepti Rahangdale, Manager (Chemistry)
		: Shri Pijush Kanti Mohanti, Astd. Manager (Chemistry)
7	Documentation	: Shri Ashish Singh, Sr. Manager (Geology)
		: Mrs. Pooja Singh, YP (Geology)
		: Shri Uday Patil, Sr. Assistant (IT)
		: Shri Ashok Kumar, Sr. Assistant (IT)
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3. Geological report by TSMDC for limestone blocks in Telangana State with special reference to the Ramapuram Cluster 5 and Dondapadu Cluster 6 explored by TSMDC through NMEDT funding and these blocks are located North and South of the proposed block respectively. The GR were submitted in Jan 2020
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5. MSTC E commerce Website
6. Demographic and population data from Census India.

ABBREVIATIONS USED

SL. No.	Abbreviation	Full form
1	MECL	Mineral Exploration and Consultancy Limited
2	GSI	Geological Survey of India
3	CGWB	Central Ground Water Board
4	CPSE	Central Public Sector Enterprises
5	NMEDT	National Mineral Exploration Trust
6	TCC	Technical cum Cost Committee
7	EC	Executive Committee
8	DMG, TS	Directorate of Mines and Geology, Telangana State
9	UNFC	United Nation Framework Classification
10	NMI	National Mineral Inventory
11	DGCO	Directorate General Camp Office
12	NABL	National Accreditation Board for Testing and Calibration Laboratories
13	JNARDDC	Jawaharlal Nehru Aluminium Research Development and Design Centre
14	F.S.P.	Field Season Programme
15	MEMC	Minerals (Evidence of Mineral Contents)
16	MMDR	Mines & Minerals (Development and Regulation)
17	NH	National Highway
18	WGS-84	World Geodetic System-84
19	UTM	Universal Transverse Mercator
20	RL	Reduced Level
21	Cu.m	Cubic Meter
22	DGPS	Differential Global Positioning System
23	DMS	Degree Minute Second
24	M / m	Meter
25	mt	Million Tonne
26	Sq. km/sq.km	Square Kilometer
27	M. Sc.	Master of Science
28	M. Sc. Tech	Master of Science Technology
29	NDDP	Net District Domestic Product
30	mRL	Reduced Level in metre
31	R.F.	Reserve Forest
32	XRF	X-ray Fluorescence
33	ML	Mining Lease
34	CRM	Certified Reference Material
35	MMT	Million Metric Tonnes
36	GGR	Gross Geological Resource
37	NGR	Net Geological Resource
37	Geol. Res. (Mil. tons)	Geological Resources (Million tons)