

## KMML BLOCK III(PART-B)

<b>SI NO:</b>	<b>INDEX(CONTINUED...)</b>	<b>PAGE NO:</b>
4 (Con...td)	MINING PLAN - ANNEXURES (CONTINUED...)	2-121
5	MINING PLAN - LIST OF PLATES	122-136
6	CRZ STATUS REPORT	137-154
7	CRZ-7KM MAP	155-155



VI. Details of Shares/Debtures/transfers since date of last AGM (or, in the case of the first return at any time since the incorporation of the company).

Date of Previous AGM     
Date Month Year

Date of Registration of Transfer of Shares     
Date Month Year

Type of Transfer   
1- Equity 2- Preference Shares, 3- Debentures 4- Stock

Number of Shares/Debture Transferred  Amount per Share (in Rs.)

Ledger Folio of Transferor

Transferor's Name     
Surname Middle Name First Name

Ledger Folio of Transferee

Transferee's Name     
Surname Middle Name First Name

VII. Indebtedness of the Company (Amount in Rs. Thousands) [Secured Loans i.e. using interest outstanding/accrued but not due for payment].

Amount.

VIII. Equity Share Capital Breakup (Percentage of Total Equity)

- (i) Govt. Central & State(s)  (ii) Govt. Companies
- (iii) Public Financial Institutions  (iv) Nationalised/Other Banks
- (v) Mutual Funds  (vi) Venture Capital
- (vii) Foreign Holdings (FII/FCI/NRI/CCBs)  (viii) Bodies Corporate (Not mentioned above)
- (ix) Directors/Relatives of Directors  (x) Other top 50 Shareholders (other than those listed above)

ANNEXURE XII

Annexure XII

NO. MSB 01700  
Date 12.05.2010

3 of 155

157

Speed Post

GOVERNMENT OF INDIA  
MINISTRY OF MINES



No. 4/20/2009-MIV

To

The Secretary to the State Govt. of Kerala,  
Department of Industries (A),  
Thiruvananthapuram

Subject: First renewal of mining lease for mineral Ilmenite, Rutile, Leucosene, Zircon and Sillimanite over an area of 203.802 hectares in villages Neendakara, Chavara, Vadakkumthala, Panmana, Karunagappally, Kulasekharapuram, district Kollam in favour of M/s Kerala Minerals and Metals Ltd. (KMML) for a period of twenty (20) years.

Sir,

I am directed to refer to the State Government letter number 16050/A3/2008:ID dated 20.2.2009 and to convey the Central Govt.'s prior approval under Sec 8(4) of the Mines and Minerals (Development and Regulation) Act, 1957 to the grant of mining lease for Ilmenite, Rutile, Leucosene, Zircon and Sillimanite over an area of 203.802 hectares in villages Neendakara, Chavara, Vadakkumthala, Panmana, Karunagappally, Kulasekharapuram, district Kollam, in favour of M/s Kerala Minerals and Metals Ltd. (KMML) subject to imposition of the following conditions under Rule 27(3) of M.C. Rules, 1960:

- (i) Mining lease for beach sand minerals shall not be granted until a licence is obtained from the Atomic Energy Regulatory Board (AERB), Mumbai under Rule 3 of Atomic Energy (Radiation Protection) Rules, 2004.
- (ii) If radioactive substances like monazite are recovered in the process of exploitation of beach sand minerals, the same shall be disposed of by the entity concerned, at its cost, in accordance with the instructions/directives of the Atomic Energy Regulatory Board or of any person/body authorized by the Competent Authority in accordance with the provisions of the Atomic Energy Act, 1962 and the relevant Rules and Orders thereunder.
- (iii) The company should have no objection to Atomic Minerals Directorate for Exploration and Research's (AMD) exploration activities and inspection by officials of AMD/Government of India.
- (iv) The applicant should obtain all necessary clearances from Revenue Department, Ministry of Environment and Forests, Coastal Regulatory Zone (CRZ) authority and other relevant authorities.
- (v) The Mine Plan indicating the disposal of radioactive wastes shall be submitted to and got approved from Director, Atomic Minerals Directorate for Exploration and Research, Hyderabad or Regional Office of the Indian Bureau of Mines, Nagpur.

JACOB PUNNEN  
ROP/BNG/028/88/A



2. Before allowing grant of mining lease, the State Govt. may kindly ensure compliance of amended provisions of the Act and Rules and other applicable Acts and Rules including Forest (Conservation) Act, 1980. The provisions of Environmental Notification dated 27/1/94 as issued and amended by MOPF may kindly be complied with before grant of ML in this case.

3. A copy of the order passed by the State Govt. in the matter may kindly be furnished to this Ministry for record.

Yours faithfully

(C.K. Rawat)

Under Secretary to the Govt. of India

C. K. RAWAT  
Under Secretary  
Ministry of Mines  
Govt. of India, New Delhi

**Regd./Copy to :**

1. The Controller General, Indian Bureau of Mines, Indira Bhawan, NAGPUR-440001.
2. The Chairman-cum-Managing Director, Mineral Exploration Corporation Ltd., High Land Drive Road, Seminary Hills, NAGPUR-440006.
3. Department of Atomic Energy, Anushakti Bhawan, C.S. Marg, Mumbai-40001 w.r.t. O.M. No. 7/5(5)/2009-PSU/108 dated 17.9.2009.
4. M/s Kerala Minerals and Metals Ltd., Kovithottam, Chavara, Kollem-691583
5. PS to Minister of Mines.
6. Copy for Guard file.

(C.K. Rawat)

Under Secretary to the Govt. of India

C. K. RAWAT  
Under Secretary  
Ministry of Mines  
Govt. of India, New Delhi



The Kerala Minerals and Metals Ltd.  
(A Govt. of Kerala Undertaking)  
Mineral Separation Plant,  
Kovilthottam, Chavara,  
Kollam-691583, Kerala, S. India.  
Phone : 0476-2680147, 2680148, 2682737  
Fax : 0476-2686444  
E-mail : kmmml@rediffmail.com



MS/Mines/Mining Lease/71A/2009  
06-06-2009

**AUTHORIZATION**

"This is to Certify that Shri.Georgekutty Thomas, Assistant General Manager (MS) of the Company be and is hereby authorized to sign the Mining Plan for our Beach Sand Mining Lease held in Karunagappally Taluk, Kollam District".

*(Signature)*  
MANAGING DIRECTOR



*(Signature)*  
JACOB PUNNEN  
ROP/BNG/028/88/A

**ELECTION COMMISSION OF INDIA**  
 ഇന്ത്യയിലെ തിരഞ്ഞെടുപ്പ് കമ്മീഷൻ  
**IDENTITY CARD**  
 തിരഞ്ഞെടുപ്പ് കമ്മീഷൻ

KL/18/122/431603




Electors Name : Georgekutty  
 തിരഞ്ഞെടുപ്പ് കമ്മീഷൻ നമ്പർ : 431603

Father's/Mother's/  
 Husband's Name : Thomas  
 തിരഞ്ഞെടുപ്പ് കമ്മീഷൻ നമ്പർ : 431603

Sex: തിരഞ്ഞെടുപ്പ് കമ്മീഷൻ : M / തിരഞ്ഞെടുപ്പ് കമ്മീഷൻ

Age as on 1-1-97 : 41

Address : 14, Thittanam Nagar  
 43, Kanneel-  
 Sakkikulam  
 തിരഞ്ഞെടുപ്പ് കമ്മീഷൻ നമ്പർ : 431603  
 തിരഞ്ഞെടുപ്പ് കമ്മീഷൻ നമ്പർ : 431603  
 Govt. of India

Place : Kollam  
 തിരഞ്ഞെടുപ്പ് കമ്മീഷൻ നമ്പർ : 431603  
 Date / തിരഞ്ഞെടുപ്പ് കമ്മീഷൻ : 08-10-1997

Electoral Registration Officer  
 തിരഞ്ഞെടുപ്പ് കമ്മീഷൻ നമ്പർ : 431603  
 For Chavara Constituency  
 തിരഞ്ഞെടുപ്പ് കമ്മീഷൻ നമ്പർ : 431603

This card may be used as an Identity Card  
 under different Government Schemes  
 തിരഞ്ഞെടുപ്പ് കമ്മീഷൻ നമ്പർ : 431603  
 തിരഞ്ഞെടുപ്പ് കമ്മീഷൻ നമ്പർ : 431603

*Jacob Punnen*  
**JACOB PUNNEN**  
 RQP/BNG/028/88/A

GOVERNMENT OF KERALA

Abstract

Mines & Minerals - Mining lease for mineral sands (Ilmenite, Monazite, Rutile, Zircon, Garnet & Sillimanite found in beach sands) from Neendakara bar to Kayankulam bar in Quilon and Alleppey Districts to the Indian Rare Earths Ltd. and the Kerala State Industries Development Corporation Ltd. - Granted - Orders issued

INDUSTRIES (C) DEPARTMENT

G.O. (S) 193/70/ID. Dated, Trivandrum, 30th May, 1970.

- Read: 1. Application dated 31-5-1969 from the Indian Rare Earths Ltd., Quilon.  
 2. Application dated 20-4-1970 from the Kerala State Industrial Development Corporation Ltd., Trivandrum.  
 3. Correspondence resting with letter No.480/GI/69 dated 25-4-1970 from the Director of Mining, & Geology.  
 4. Letter No. 6(27)/70-MVI dated 7-8-1970 from the Government of India, Ministry of Petroleum & Chemicals and Mines and Metals (Department of Mines and Metals), New Delhi.

ORDER

The Indian Rare Earths Ltd., Quilon and the Kerala State Industrial Development Corporation Ltd., Vellayambalam, Trivandrum have submitted to Government on 31-5-1969 and 20-4-1970 respectively, applications for grant of mining lease for mineral sands (Ilmenite, Monazite, Rutile, Zircon, Garnet and Sillimanite found in beach sands) over an area of 307,3947 and 323,447 hectares respectively in the mineral sand bearing area of the coastal strip between Neendakara and Kayankulam bar in Thekkumbhagam, Chavara, Panmana, Kuzunagappally, Kula- sekharapuram and Puthuppally villages for a period of 20 years. There was overlapping of the areas in the two applications. Hence discussions were held with the representatives of the companies to arrive at an amicable settlement in the matter and it was agreed that the mineral sand bearing area be allotted between M/s. Indian Rare Earths Ltd. and the Kerala State Industrial Development Corporation Ltd. each getting about half the area and the allocation of the area and the allocation of the blocks have also been agreed upon by both parties. Accordingly the Indian Rare Earths Ltd. and the Kerala State Industrial Development Corporation Ltd. are to get an area of 157,2122 hectares and 157,8496 hectares respectively each comprising 4 separate contiguous blocks. The Government of India have accorded their approval for the project under Section 3 (2) of the Mines and Minerals (Development and Regulation) Act, 1957 and they have also granted exemption from operation of Rule 15 of the Mineral Concession Rules, 1960.

JACOB PUNNEN  
 RQP/BNG/028/88/A

2. Government are therefore pleased to sanction mining leases for mineral sands (Ilmenite, Monazite, Rutile, Zircon, Garnet and Sillimanite) to M/s. Indian Rare Earths Ltd., Quilon and the Kerala State Industrial Development Corporation Ltd., Vellayambalam, Trivandrum, over an area of 157.2192 hectares and 157.6496 hectares respectively, comprised in the survey numbers mentioned in the list appended to this order, under the Mineral Concession Rules, 1960, for a period of 20 years.

3. The rate of royalty for the minerals under the Mines and Minerals (Regulation and Development) Act, 1957 will be fixed at the rates prescribed in the Second Schedule to the Act, subject to alterations from time to time on the basis of amendments made to the second Schedule.

4. The dead rent realisable under rule 27 (1) (c) of the Mineral Concession Rules, 1960 shall be fixed at the rates specified in Schedule IV to the Mineral Concession Rules, 1960.

5. The surface rent is fixed at Rs.4.94 per hectare per annum subject to the periodical revisions on the basis of the prevailing rates of land revenue.

6. The terms and conditions stated in this order are subject to such further modifications and alterations as may be made by Government from time to time.

7. The Secretary, Board of Revenue (Survey Branch) will arrange to conduct a detailed survey of the area, demarcate the land and arrange to supply to the Director of Mining and Geology, a map of the area drawn on a suitable scale showing therein the survey numbers, boundary numbers, the area of each survey number included in the leases and the total area of the plots.

8. The relevant chalan receipts No.1564 and 1565 dated 13-11-1965 and 7240 and 7241 dated 22-1-1969 are herewith returned to the Director of Mining & Geology.

By order of the Governor,

H. Raghunathan,  
Deputy Secretary.

To

- The Managing Director, Indian Rare Earths Ltd.,  
P.B.No.38, Beach Road, Quilon.
- The Managing Director, The Kerala State Industrial  
Development Corporation Ltd., Vellayambalam, Trivandrum.
- The Director of Mining & Geology, Trivandrum.
- The Secretary, Board of Revenue (Survey Branch)
- The District Collector, Quilon.
- The District Collector, Alleppey.
- The Director, Indian Bureau of Mines, Nagpur (with C.L.)
- The Secretary to the Government of India, Department  
of Atomic Energy, Chhatrapathi Shivaji Maharaj Marg,  
Bombay-1 (with C.L.)

Forwarded / By order

Sd/-  
Superintendent

True Copy

APPENDIX TO G.O. (MS). 195/70/ED. DATED 30-1-1970

DIVISION OF MINING AREAS BETWEEN NEENDAKARA AND KAYAKULAM BARS IN FAVOR OF M/S. KERALA STATE INDUSTRIAL ENVIRONMENT CORPORATION LTD. & INDIAN LARGE FERTIS LTD.

Block No.	Name of Village	Survey Nos.	Area (In acres)	Area of each Block (In acres)	To whom allotted
I.	Thekkumbhagom Chevaram	112 A to 20	84.72	81.72 (34.30)	M/s. K.S.I.D.C. Ltd.
		22 to 9 251 to 132	55.53 58.18	155.71 (82.20)	M/s. I.N.E. Ltd.
III.	Chevaram Pottanam	121 to 1 632 to 31	47.93 55.77	103.70 (41.63)	M/s. K.S.I.D.C. Ltd.
		30 to 1 366 to 222 & 218	5.45 84.79	100.24 (40.66)	M/s. I.R.E. Ltd.
		220 to 91 90 to 1	71.41 27.00	71.41 (29.92)	M/s. K.S.I.D.C. Ltd.
		212 to 200 159 to 1 1 to 131	17.40 73.87 55.86	44.40 (17.96)	M/s. I.R.E. Ltd.
152 to 325	90.15	90.15 (36.47)	M/s. I.R.E. Ltd.		



K.S.I.D.C. Ltd.

I.R.E. Ltd.

84.72  
103.70  
71.41  
129.72  
389.56

153.71  
100.66  
44.12  
90.15  
389.56

80/-  
Superintendent

Copy of this order is forwarded to the concerned authorities for their necessary action. This order is issued in pursuance of the order of the Government of Kerala dated 15.1.1970. /True Copy/

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*[Handwritten signature]*

# ANNEXURE XVI



GOVERNMENT OF KERALA  
INDUSTRIAL DEPARTMENT

Mines and Minerals - mining lease for mineral sands (Ilmenite, Monazite, Rutile, Zircon, Garnet, Biliimanite, Leucosoma etc. found in beach sands) from Neendakara bar to Kayankulam bar in Quilon and Alleppey Districts to The Kerala Minerals and Metals Ltd., (A Government of Kerala undertaking) - granted - Orders Issued.

### INDUSTRIAL DEPARTMENT

G.O. (MS) 355/72ID.

Dated, Trivandrum, 11th December, 1972.

- Read again
- (1) G.O. (MS) 195/70/ID. dated 30-5-1970
  - (2) G.O. (MS) 713/72ID. dated 18-7-1972.
  - (3) Application dated 14-6-1972 from the Kerala Minerals and Metals Ltd.
  - (4) Letter No. 2867/G+72 dated 14-6-1972 from the Director of Mining and Geology.
  - (5) Letter No. 1/26/72-MSI dated 12th October, 1972  
18th  
from the Government of India, Ministry of Steel and Mines (Department of Mines) New Delhi.

### O R D E R

Government in their order second read above have cancelled the mining lease granted to the Kerala State Industrial Development Corporation Ltd. as per G.O. (MS) 195/70/ID. dated 30-5-1970. The Managing Director, The Kerala Minerals and Metals Ltd. has applied for a mining lease for mineral sands found in the beach sand over an area of 339.56 acres (157.6400 hectares) from Neendakara bar to Kayankulam bar in Quilon and Alleppey Districts for a period of 20 years under the Mineral Concession Rules, 1960. The Government of India have accorded their approval for the proposal under Section 5(2) of the Mines and Minerals (Regulation & Development) Act, 1957 and they have also granted exemption from the operation of Rule 35 of the Mineral Concession Rules, 1960.

2. Government are therefore pleased to sanction a mining lease for mineral sands (viz. Ilmenite, Monazite, Biliimanite, Rutile, Zircon etc.) to "M/s. The Kerala Minerals and Metals Ltd." Quilon (A Government of Kerala undertaking) over an

*[Signature]*  
**JACOB PUNNEN**  
SNG/028/88/A

.....2/-

: 2 :



area of 389.56 acres (157.6490 hectares) comprised in the survey numbers mentioned in the list appended to this order for a period of 20 years under the Mineral Concession Rules, 1960, as recommended by the Director of Mining & Geology.

The rate of royalty for the minerals payable to Government under the Mines and Minerals (Regulation and Development) Act, 1957 will be fixed at the rates prescribed in the Second Schedule to the Act, subject to the alterations from time to time on the basis of amendments made to the second schedule.

The dead rent realisable under Rule 27(4) (c) of the Mineral Concession Rules, 1960 shall be fixed at the rates specified in the Schedule IV to the Mineral Concession Rules, 1960 subject to the amendments made to the 4th Schedule to Mineral Concession Rules, 1960 from time to time.

The surface rent is fixed at Rs.4.94 per hectare per annum subject to the periodical revisions on the basis of the prevailing rates of land revenue.

The terms and conditions stated in this order are subject to such further modifications and alterations as may be made by Government from time to time.

The Secretary, Board of Revenue (Survey Branch) will arrange to conduct a detailed survey of the area and supply to the Director of Mining and Geology a copy of the map of the area drawn on a suitable scale, showing therein the Survey numbers, the boundary numbers, the area of the survey numbers included in the lease and the total area of the plots.

The related chalan receipts for Rs.500/- and Rs.20/- respectively are herewith returned to the Director of Mining & Geology.

(By Order of the Governor)

C.K. JOHN,  
Deputy Secretary to Govt.

To

The Managing Director, The Kerala Minerals & Metals Ltd.,  
Quilon.  
The Director of Mining and Geology.  
The Secretary, Board of Revenue (Survey Branch)  
The District Collectors of Quilon and Alleppey Districts.  
The Director, Indian Bureau of Mines, Bangalore (with C.C.)  
The Secretary to the Government of India, Ministry of Steel  
and Mines, (Department of Mines) New Delhi.  
Stock File

Forwarded By order,

13/-

Section Officer.

1/11/60 10/11/60

165  
Annexure - XVII

ANNEXURE XVII



THIS INDENTURE made this 16th day of July One thousand nine hundred eighty five between the Governor of Kerala (Hereinafter referred to as the State Government, which expression shall where the context so admits be deemed to include the successors and assigns) of the one part and M/s The Kerala Minerals and Metals Ltd., P.B.No.30 Quilon-1, a company registered under the Companies Act, 1956 (No. 1 of 1956) and having its registered office at Quilon (hereinafter referred to as the lessee which expression shall where the context so admits be deemed to include its successors and permitted assigns) of the other part.

WHEREAS the lessees have applied to the State Government in accordance with the Mineral Concession Rules, 1960 (hereinafter referred to as the said Rules) for a mining lease for beach sand containing ilmenite, Rutile, Zircon, Leucoxene, Monazite, Sillimanite and other minerals found in beach sand in respect of the lands described in Part I



M. JOSEPH L.A.R.  
The Kerala Minerals and Metals Ltd.  
Quilon-1  
JACOB PUNNEN  
RQP/BNG/028/88/A

Sl. No. & Date - 3322/276 6-85  
 Name & Residence of the Party Kerala  
 Kerala and Malabar S.D. P.O. No. 30, Quilon  
 General Court Fee Stamp to the value of Rs  
 5/- (Five only)  
 Ex-Officio Vendor,  
 Accountant, Central Stamp Dept.  
 Trivandrum-14



344 duplicate

of Bangalore on 10-11-85 of No. 2666/85  
 and a copy of the 2666/85  
 B Reg. No. 11-30

Kerala manuscript of metal 'L' etc.  
 11- No. 2666/85

I am satisfied that the lot has been received by me.  
 I was also of mining and geology who had  
 been exempted from payment of stamp duty as per  
 11- 88 (1) of Registered Act.

Marginal purchase for and  
 on behalf of Kerala manuscript  
 to metal, District  
 Sri. M. Joseph is personally liable to me.  
 11- No. 2666/85

880  
 111-137 880  
 1985  
 I am satisfied that the lot has been received by me.  
 I was also of mining and geology who had  
 been exempted from payment of stamp duty as per  
 11- 88 (1) of Registered Act.



of the schedule hereunder written and have deposited with the State Government the sum of Rs. 1,000/- (Rupees one thousand only) as security and the sum of Rs. 500/- (Rupees five hundred only) for meeting the preliminary expenses for a mining lease as per Government Order No. G.O. (MG) 385/72/ID dated 11-12-1972 of the Industries (G) Department, Government of Kerala as per the approval of the Government of India.

WITNESSETH that in consideration of the rents and royalties covenant and agreements by and in these presents and the schedule hereunder written reserved and contained and on the part of the lessees to be paid observed and performed the State Government (with the approval of the Central Government) hereby grants and demises unto lessees.

All those the mines beds/veins seams of beach sand containing ilmenite, Rutile, Zircon, Leucocoxene, Monazite, Sillimanite and other minerals found in beach sand (hereinafter and in the schedule referred to as the said minerals) situated lying and being in or under the lands which are referred to in Part I of the said schedule, together with the liberties, powers and privileges to be exercised or enjoyed in connection herewith which are mentioned in Part II of the said Schedule subject to the restrictions and conditions as to the exercise and enjoyment of such liberties, powers and privileges which are mentioned in Part III of the said schedule except and reserving out of this demise unto the State Government the liberties, powers and privileges mentioned in Part IV of the said schedule to hold the premises hereby granted and demise unto the lessees from the .... Ninth ..... day the term of 20 (twenty) years thence next ensuing YIELDING AND PAYING ..... 19 85 ..... for the term of ..... years thence next ensuing YIELDING AND PAYING therefore unto the State Government the several rents and royalties mentioned in

*[Handwritten signature]*

*[Handwritten signature]*  
The Kerala Minerals and Metals Ltd.  
18, Govt. Secretariat Building  
K-11, K-12



Boundaries

On the north by : Vattakayal and Karunagappally Village  
 On the east by : Canal  
 On the west by : Arabian Sea  
 On the south by : Sy.Nos.132 of Chavara Village

B L O C K No.V

Name of District and sub District	Name of Taluk	Name of Village	Survey Nos.	Total area in acres and hectares
Quilon	Karunaga-ppally	Karuna-gappally	91-220	71.41 acres (28.899 hectares)
Karunagappally			Less Sy. No.218	

Boundaries

On the north by : Sy.No. 88, 89 & 90 of Karunagappally Village  
 On the south by : Sy. No.218 & 227  
 On the east by : Sy.No. 106, 116 and Kayamkulam lake  
 On the west by : Arabian Sea

B L O C K NO.VII

Name of District and sub District	Name of Taluk	Name of Village	Survey Nos.	Total area in acres and hectares.
(a) Quilon Karunaga-ppally. Additional.	Karunaga-ppally.	Kulasekharapuram	1 to 199	73.87 acres (29.895 hectares)

Boundaries

On the north by : Sy.Nos. 1, 2, 3 & 4 of Puthuppally Village  
 On the south by : Sy.Nos.200 and 201 of Kulasekharapuram Village  
 On the east by : Kayamkulam lake falling in Kulasekharapuram Village.  
 On the west by : Arabian Sea

(b) Quilon Ochira	Karunaga-ppally	Perinad.P	1 to 151	55.86 acres (22.604 hectares)
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Boundaries

On the north by : Sy. Nos. 152, 153, 154, 155, & 156 of Puthuppally Village.  
 On the south by : Sy.Nos. 1, 3, 4 & 5 of Kulasekharapuram Village.

S. KRISHNAMOORTHY  
 DIRECTOR OF MINERALOGY & GEOLOGY  
 TRIVANDRUM

M. G. S. S. S.  
 Managing Director  
 The Kerala Tin and Minerals Ltd.  
 TRIVANDRUM



-5-

On the east by : Kayamkulam lake falling in Puthuppally Villages.  
On the west by : Arabian Sea.

Hereinafter referred to as 'the said Lands'

P A R T - II

Liberties, powers and privileges to be exercised and enjoyed by the lessees subject to the restrictions and conditions in Part III.

1. To enter upon land and search for, win work etc.

Liberty and power at all times during the term hereby demised to enter upon the said lands and to search for mine bore dig, drill or win work dress process convert carry away and dispose of the said minerals.

2. To sink, drive and make pits, shafts and inclines etc.


Liberty and power for or in connection with any of the purpose mentioned in this part to sink drive make maintain and use in the said lands and pits, shafts, inclines, drifts, levels waterways, airways and other works (and to use maintain deepen or extend any existing works of the like nature in the said lands)


3. To bring to use machinery, equipment etc.

Liberty and power for or in connection with any of the purpose mentioned in this part to erect, construct maintain and use on or under the said lands any engines machinery, plant, dressing floors, furnaces, coke ovens brick-kilns workshops store houses bungalows godowns sheds and other buildings and other works and conveniences of the like nature on or under the said lands.

4. To make roads and ways etc. and use existing roads and ways etc.

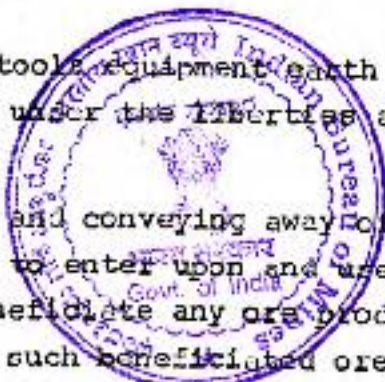
Liberty and power for or in connection with any of the purposes mentioned in this part to make any tramways, railways,

  
S. KRISHNA CHARIT  
DIRECTOR OF MINES AND GEOLGY  
TRIVANDRUM

  
M. JOSEPH  
Managing Director  
The Kerala Minerals and Metals Ltd.  
(a part of the Government of India)



or works carried on and any tools, equipment, earth and materials and substances dug or raised under the liberties and powers mentioned in this part.



8. Beneficiation and conveying away of production Liberty and power to enter upon and use a sufficient part of the said lands to beneficiate any ore produced from the said lands and to carry away such beneficiated ore.

9. To clear brushwood and to fell and utilise trees etc.

Liberty and power for or in connection with any of the purposes mentioned in this part and subject to the existing rights of others and have as provided in clause 3 of Part-III of this Schedule to clear undergrowth and brushwood and to fell and utilise any trees or timber standing or found on the said lands provided that the State Government may ask the lessees to pay for any trees or timber felled and utilized, by them at the rates specified by the Director of Mining & Geology or the State Government.

P A R T - III

RESTRICTIONS AND CONDITIONS AS TO THE EXERCISE OF THE LIBERTIES POWERS AND PRIVILEGES IN PART II

1. No building etc. upon certain places

No building or thing shall be erected set up or placed and no surface operations shall be carried on in or upon any public pleasure ground burning or burial ground or place held sacred by any class of persons or any house or village site public road or other place which the State Government may determine as public ground nor in such a manner as to injure or prejudicially effect any buildings works property or rights of other persons and no land shall be used for surface operations which is already occupied by persons other than the State Government for works or purposes not included in this lease. The lessees shall not also interfere with any right of way, well or tank.

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M. JOSHI P. L. A. &  
Managing Director  
The K... .. Ltd.  
A... ..



2. Permission for surface operations in a land not already in use

Before using for surface operations any land which has not already been used for such operations, the lessees shall give to the Director of Mining & Geology two calendar months previous notice in writing specifying the name or other description of the situation and the extent of the land proposed to be so used and the purpose for which the same is required and the said land shall not be so used if objection is issued by the Director of Mining and Geology within two months after the receipt by him of such notice unless the objections so stated shall on reference to the State Government be annulled or waived.

3. To cut trees in unreserved lands.

The lessees shall not without the express sanction of the Director of Mining & Geology cut down or injure any timber or trees on the said lands but may without such sanction clear away any brushwood or undergrowth which interferes with any operations authorised by these presents. The Director of Mining and Geology or the State Government may require the lessees to pay for any trees or timber felled and utilised by them at the rates specified by the Director of Mining & Geology.

4. To enter upon reserved forests

Notwithstanding anything in this Scheduled contained the lessees shall not enter upon any reserved forest included in the said lands without previous sanction in writing of the District Forest Officer nor fell cut and use any timber or trees without obtaining the sanction in writing of that officer nor otherwise than in accordance with such conditions as the State Government may prescribe.

5. No mining operations within 50 meters of public works etc.

The lessees shall not work or carry on or allow to be worked or carried on any mining operations at or to any point within a distance of 50 metres from any railway line except with the previous written permission of the Railway Administration concerned on under or beneath any rope way or any rope way

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*[Handwritten signature]*  
Mr. JOSEPH...  
Director of Mining & Geology  
The Director of Mining & Geology  
15, New Market, Calcutta



-10-

PROVIDED THAT no substantial hinderance or interference shall be caused by such holders of licences or leases to the operations of the lessees under these presents and fair compensations (as may be mutually agreed upon or in the event of disagreement as may be decided by the State Government) shall be made to the lessees for loss or damage sustained by the lessees by reason of the exercise of this liberty.

#### P A R T - I V

#### LIBERTIES, POWERS AND PRIVILEGES RESERVED TO THE STATE GOVERNMENT

##### 1. To work other minerals

Liberty and power for the State Government or to any lessee or persons authorised by it in that behalf to enter into and upon the said lands and to search for win work dig get raise dress process convert and carry away minerals other than the said minerals and any other substances and for those purposes to sink, drive, make erect, construct, maintain and use such pits shafts inclines drifts levels and other lines, waterways, airways, water courses, drains, reservoirs, engines, machinery, plant, building, canals, tramways, railways, roadways and other works and conveniences as may be deemed necessary or convenient.

PROVIDED THAT IN THE EXERCISE of such liberty and power no substantial hinderance or interference shall be caused to or with the liberties powers and privileges of the lessees under these presents and that fair compensation (as may mutually agreed upon or in the event of disagreement as may be decided by the State Government) shall be made to the lessees for all loss or damage sustained by the lessees by reason or in consequence of the exercise of such liberty and power.

##### 2. To make railways and roads

Liberty and power for the State Government or any lessee or person authorised by it in that behalf to enter into and upon the said lands and to make upon over or through the same any railways, tramways, roadways or pipelines for any purpose other than those mentioned in Part II of these presents and to get

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 Director  
 Mines & Geology  
 Government of India

-11-



from the said lands stones gravel earth and other materials for making maintaining and repairing such railways, tramways and road or any existing railways and roads and to go and repossess at all times with or without horses cattle or other animals carts, wagons carriages locomotives or other vehicles over or along any such railways, tramways roads lines and other ways for all purposes and as occasions may require provided that in the exercise of such liberty and power by such other lessee or person no substantial hinderance or interference shall be caused to or with the liberties powers and privileges of the lessees under these presents and that fair compensation as may be mutually agreed upon or in the event of disagreement as may be decided by the State Government shall be made to the lessees for all loss or damage substantial hinderance or interference shall be caused to or with the exercise by wuch lessee or person of such liberty and power.

P A R T - V

RENTS AND ROYALTIES RESERVED BY THIS LEASE

1. To pay dead rent or royalty whichever is greater.

The lessees shall pay, for every year except the first year of the lease yearly dead rent as specified in clause 2 of this part.

Provided that where the holder of such mining lease becomes liable under section 9 of the Act to pay royalty for any mineral removed or consumed by them or by his agent, manager, employee, contractor or sub-lessee from the leased areas they shall be liable to pay either such royalty or the dead rent in respect of the area whichever is higher.

2. Rate and mode of payment of dead rent

Subject to the provisions of clause I of this part during the subsistence of the lease, the lessees shall pay to the State Government annual deadrent for the lands demised and described in Part I of this schedule at the rate for the time being specified in the 3rd schedule to the Act in such manner as may be specified in this behalf by the State Government.

The lessees shall pay the dead rent for the time being at the following rates subject to revision on the basis of amendment to the 3rd schedule to the Act, Mines and Minerals (Regulation and Development) Act, 1957.




Period of Mining Leave	Name of Mineral	Dead Rent fixed per hectare	Area of demised land	Dead rent payable	Total dead rent payable in a year
1st Year	Mineral Sands	Nil	158.057 hectares	Nil	Nil
2nd Year to 5th year	-do-	Rs. 12.50	-do-	Rs. 1970.61	Rs. 1970.61
6th year to 10th year	-do-	Rs. 25.00	-do-	Rs. 3941.22	Rs. 3941.22
11th year onwards.	-do-	Rs. 37.50	-do-	Rs. 5911.83	Rs. 5911.83


### 3. Rate and mode of payment of royalty

Subject to the provision of clause 1 of this part, the lessees shall during the subsistence of this lease pay to the State Government at such times and in such manner as the State Government may prescribe royalty in respect of any minerals removed by them from the leased area at the rate for the time being specified in the second schedule to the Mines and Minerals (Regulation and Development) Act, 1957.

For the purpose of this clause royalty for the following minerals shall be charged as follows:

- |                |                                     |
|----------------|-------------------------------------|
| 1. Ilmenite    | - Rs. Six only                      |
| 2. Rutile      | - Rs. Seventy only                  |
| 3. Zircon      | - Rs. Thirty only                   |
| 4. Sillimanite | - Rs. Forty only                    |
| 5. Monasite    | - Rs. Thirty two paise seventy only |
| 6. Leucoxene   | - Rs. Thirty only                   |

  
S. KRISHNANORTHI  
DIRECTOR OF MINES AND GEOLOGY  
TIRUVANANTHURAI

  
B. JOSE  
Manager  
Kerala State Minerals Development Corporation Ltd  
K. S. M. D. C.  
K. S. M. D. C.

177

or at such revised rates as the State Government may prescribe in this regard from time to time on the basis of amendments to the 2nd Schedule to the Mines and Minerals (Regulation and Development) Act, 1957.



"The lessees shall not remove any ore or minerals from the leased area except under and in accordance with the conditions of a permit issued by the Director of Mining & Geology, Kerala on payment by the lessees of the royalty due to Government on the ores or minerals."

4. Payment of surface rent and water rates.

The lessees shall pay rent and water rate to the State Government in respect of all parts of the surface of the s-id lands which shall from time to time be occupied or used by the lessees under the authority of these presents at the rate of Rs.4.94 per hectare and Rs. Nil respectively per annum per hectare of the area so occupied or used and so in proportion for any area less than an hectare during the period from the commencement of such occupation or use until the area shall cease to be so occupied or used and shall as far as possible restore the surface land so used to ~~is~~ original conditions. Surface rent and water rate shall be paid as herein before detailed in clause 2 PROVIDED THAT NO such rent/water rate shall be payable in respect of the occupation and use of the area comprised in any roads or ways to which the public have full right of access.

P A R T - V I

PROVISIONS RELATING TO THE RENTS AND ROYALTIES

1. Rent and Royalties to be free from deductions etc.

The rent water rate and royalties mentioned in Part V of this Schedule shall be paid free from any deductions to the State Government at any Government Treasury in Kerala and in such manner as the State Govt. may prescribe from time to time. For the purpose of this clause rates and royalties shall be paid to the credit of the Dept. of Mining and Geology using cheques countersigned by the Director of Mining and Geology or any officer authorised by him under the seal of the Department.

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Director of Mining and Geology  
Govt. of Kerala

2. Mode of computation of royalty

For the purposes of computing the said royalties the lessees shall keep a correct account of the minerals produced and despatched. The accounts as well as the weight of the minerals in stock or in the process of export may be checked by an officer authorised by the Central or State Government. For the purpose of this clause the sale value at pits mouth shall be arrived at by deducting from the sale price of the mineral beneficiation transport and other allied charges incurred if any between the mine head and the place of sale. This clause will become applicable only in those cases where royalty is to be calculated on the basis of pits mouth value.



3. Course of action if rents and royalties are not paid in time.

Should any rent, royalty or other sums due to the State Government under the terms and conditions of these presents be not paid by the lessees within the prescribed time, the same may be recovered together with simple interest thereon at the rate of 15% per annum on a certificate of such officer as may be specified by the State Government by general or special order, in the same manner as an arrear of land revenue.

P A R T - V I I

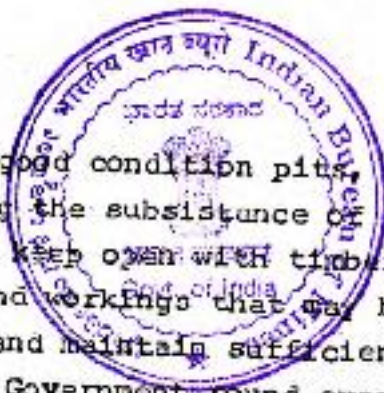
THE COVENANTS OF THE LESSEES/LESSEES TO PAY RENTS AND ROYALTIES, TAXES ETC.

1. The lessees shall pay the rent, water rate and royalties reserved by this lease at such times and in the manner provided in PARTS V and VI of these presents and shall also pay and discharge all taxes, rates, assessment and impositions whatsoever being in the nature of public demands which shall from time to time be charged, assessed or imposed by the authority of the Central and State Governments upon or in respect of the premises and works of the lessees in common with other premises and works of a like nature except demands for land revenues.

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5. To secure and keep good condition pits, shafts, etc. The lessees shall during the subsistence of this lease well and sufficiently secure and keep open with timber or other durable means all pits, shafts and workings that may be made or used in the said lands and made and maintain sufficient fences to the satisfaction of the State Government round every such pit, shaft or working whether the same is abandoned or not and shall during the same period keep all workings in the said lands except such as may be abandoned accessible free from water and foul air as far as possible.

6. To strengthen and support the mine to necessary extent.

The lessees shall strengthen and support to the satisfaction of the Railway Administration concerned or the State Government, as the case may be, any part of the mine which in its opinion requires such strengthening or support for the safety of any railway reservoir, canal, road and any other public works or structures.

7. To allow inspection of workings

The lessees shall allow any officer authorised by the Central Government or the State Government in that behalf to enter upon the premises, including any Building excavation or land comprised in the lease for the purpose of inspecting, examining, surveying, prospecting and making plans, thereof sampling and collecting a data and the lessees shall with proper person employed by the lessees and acquainted with the mines and work effectually assist the officer, agents, servants and workmen in conducting every such section and shall afford them all facilities information connected with them the working of the mines which they may reasonably require and also shall and will conform to and observe all orders and regulations which the Central and State Governments as the result of such inspection or otherwise may from time to time see fit to impose.

-17-

## 8. To report accident

The lessees shall without delay send to the Director of Mining & Geology a report of any accident causing death or serious bodily injury or serious injury to property or seriously affecting or endangering life or property which may occur in the course of the operations under this lease.

## 9. To report discovery of other minerals

The lessees shall report to the State Government the discovery in the leased area of any mineral not specified in the lease within sixty days of such discovery along with full particulars of the nature and position of each such find. If any mineral not specified in the lease is discovered in the leased area, the lessees shall not win and dispose of such mineral unless such mineral is included in the lease or a separate lease is obtained therefor.

## 10. To keep records and accounts regarding production and employees etc.

The lessees shall at all time during the said term keep or cause to be kept at an office to be situated upon or near the said lands correct and intelligible books of accounts which shall contain accurate entries showing from time to time,

1. Quantity and quality of the said minerals realised from the said lands.
2. Quantity of the various qualities of ores beneficiated or converted (for example coal converted into coke)
3. Quantities of the various qualities of the said minerals sold and exported separately.
4. Quantities of the various qualities of the said minerals otherwise disposed of and the manner and purpose of such disposal.
5. The prices and all other particulars of all sales of said minerals.
6. The number of persons employed in the mines or works or upon the said lands specifying nationality, qualifications and pay of the technical personnel.





7. Such other facts, particulars and circumstances as the Central or the State Governments may from time to time require and shall also furnish free of charge to such officers and at such times as the Central and State Governments may appoint true and correct abstract of all or any such books of accounts and such information and returns to all or any of the matters aforesaid as the State Government may prescribe and shall at all reasonable times allow such officers as the Central Government or State Government shall in that behalf appoint to enter into and have free-access to the said officers for the purpose of examining and inspecting the said books of accounts plans and records and to make copies thereof and make extracts therefrom.

11. To maintain plans etc.

The lessees shall at all times during the said term maintain at the mine office correct intelligible up-to-date and complete plans and sections of the mines in the said lands. They shall show all the operations, and workings and all the trenches, pits and drillings made by them in the course of operations carried on by them under the lease faults and other disturbances encountered and geological data and all such plans and sections shall be amended and filled up by and from actual surveys to be made for that purpose at the end of twelve months or any period specified from time to time and the lessees shall furnish free of charge to the Central and State Governments true and correct copies of such plans and sections whenever required; accurate records of all trenches, pits and drilling shall show:

- (a) The sub soil and strata through which they pass
- (b) Any mineral encountered
- (c) Any other matter of interest and all data required by the Central and State Government from time to time.

The lessees shall allow any officer of the Central or the State Government, authorised in this behalf by the Central Government to inspect the same at all reasonable time. They shall also supply when asked for by the State Government/the Coal Controller/The Director, Geological Survey of India/The Director General, Indian Bureau of Mines, a composite plan of the area showing thickness, dip, inclination, etc. or all the seams as also the quantity of reserves quality-wise.

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 J. JOSEPH  
 Manager  
 The ... Ltd

12. Act 67 of 1957

The lessees shall be bound by such rules as may be issued from time to time by the Government of India under section 18 of the Mines and Minerals (Regulations and Development) Act, 1957 (Act 67 of 1957) and shall not carry on mining or other operations under the said lease in any way other than as prescribed under these rules.



13. To provide weighing machine

Unless specifically exempted by the State Government the lessees shall provide and at all times keep at or near the pit head or each of the pit heads at which the said minerals shall be brought to bank a properly constructed and efficient weighing machine and shall weigh or cause to be weighed thereon all the said minerals from time to time brought to bank sold, exported and converted and all the converted products and shall at the close of each day cause to be the total weight, ascertained by such means of the said mineral, ores products raised, sold, exported and converted during the previous twenty four hours to be entered in the aforesaid books of accounts. The lessees shall permit the State Government at all times during the said term to employ any person or persons to be present at the weighing of the said minerals as aforesaid and to keep accounts thereof and to check the accounts kept by the lessees. The lessees shall give 10 (Ten) days previous notice in writing to the Director of Mining & Geology every such measuring or weighing in order that some officer on his behalf may be present thereat.

14. To allow test of weighing machine

The lessees shall allow any person or persons appointed in that behalf by the State Government at any time or time during the said term to examine and test every weighing machine to be provided and kept as aforesaid and the weights used therewith in order to ascertain whether the same respectively are correct and in good repair and order and if upon any such examination or testing any such weighing machine or weights shall be found in correct or out of repair or order the State Government may require that the same be adjusted, repaired and put in order by at the expense of the lessees and if such requisition be not

*[Handwritten signature]*  
 M. JOSEPH  
 Director  
 The Bureau of Mines

complied with within fourteen days after the same shall have been made, the State Government may cause such weighing machine or weight to be adjusted, repaired, and put in order and expense of so doing shall be paid by the lessees to the State Government on demand and if upon any such examination or testing as aforesaid any error shall be discovered in any weighing machine or weights to the prejudice of the State Government such error shall be regarded as having existed for three calendar months previous to the discovery thereof or from the last occasion of so examining and testing the same weighing machine and weights in case such occasion shall be within such period of three months and the said rent and royalty shall be paid and accounted for accordingly.

15. To pay compensation for injury of third parties.

The lessees shall make and pay reasonable satisfaction and compensation for all damage, injury or disturbance of person or property which may be done by or on the part of lessees in exercise of the liberties and powers granted by these presents and shall at all times save harmless and keep indemnified the State Government from and against all suits claims and demands which may be brought or made by any person or persons in respect of any such damage, injury or disturbance.

16. Not to obstruct working of other minerals.

The lessees will exercise the liberties and powers hereby granted in such a manner as to offer no unnecessary or reasonably avoidable obstruction or interruption to the development and working within the said lands of any minerals not included in this lease and shall at all times afford to the Central and State Governments and to the holders of prospecting licences or mining leases in respect of any such minerals or any minerals within any land adjacent to the said lands as the case may be reasonable means of access and safe and convenient passage upon and across the said lands to such minerals for the purpose of getting working, developing and carrying away the same provided that the lessees shall receive reasonable compensation for any damage or injury which they may sustain by reason or in consequence of the use of such passage by such lessees or holders of prospecting licences.

*[Handwritten Signature]*  
 M. JOSEPH  
 Manager, Deptt.  
 The Kerala Mines Deptt.  
 14, Govt. Buildings, Thiruvananthapuram

85

17. Transfer of lease

1. The lessees shall not, without the previous consent in writing of the State Government

- a. Assign, sublet, mortgage or in any other manner, transfer the mining lease, or any right title or interest therein, or
- b. Enter into or make any arrangement, contract or understanding whereby the lessee will or may be directly or indirectly financed to a substantial extent by, or under which the lessee's operations or undertakings will or may be substantially controlled hereby, and person or body of persons other than the lessees provided that the State Government shall not give its written consent unless (a) the lessees have furnished an affidavit along with this application for transfer of the mining lease specifying therein the amount that he has already taken or proposes to take as consideration from the transferee (b) the transfer of mining lease is to be made to a person or body directly undertaking mining operation.

2. Without prejudice to the above provisions, the lessees may, subject to the conditions specified in the proviso to rule 35, of said Rules transfer this lease or any right, title or interest therein to a person holding a certificate of approval and an income-tax clearance certificate from the Income-tax Officer concerned, on payment of a fee of rupees one hundred to the State Government;

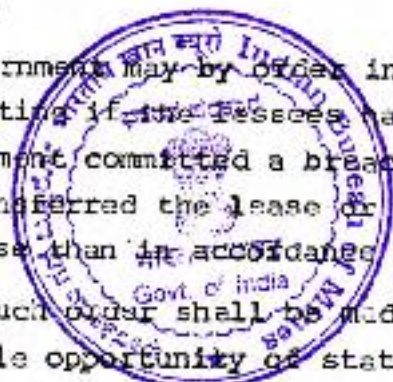
Provided that the lessees shall make available to the transferee the original or certified copies of all plans of abandoned workings in the area and in a belt 65 metres wide surrounding it. Provided further that where the mortgage is an Institution or a Bank or a Corporation specified in Schedule V it shall not be necessary for any such Institution or Bank or Corporation to hold the said certificate of approval and the said income-tax clearance certificate.



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 M. JOSEPH, I.A.S.  
 Managing Director  
 The State Mineral Development Corporation  
 12/11/68

3. The State Government may by order in writing, determine the lease at any time if the lessees have in the opinion of the State Government committed a breach of any of the above provision or have transferred the lease or any right, title or interest therein otherwise than in accordance with clause (2).



Provided that no such order shall be made without giving the lessees reasonable opportunity of stating their case.

18. Not to be financed or controlled by a Trust, Corporation, Firm or person.

The lessees shall not be controlled and the lessees shall not allow themselves to be controlled by any Trust, Syndicate, Corporation, Firm or person except with the written consent of the Central Government. The lessees shall not enter into or make any arrangement compact for understanding whereby the lessee will or may be directly or indirectly financed by or under which the lessee's operations or undertaking will or may be carried on directly or indirectly by or for the benefit of or subject to the control of any Trust, Syndicate, Corporation, Firm or person unless with the written sanction given prior to such arrangement compact or understanding being entered into or made of the Central Government and any or every such arrangement compact or understanding as aforesaid (entered into or made with such sanction as aforesaid) shall only be entered into or made and shall always be subject to an express condition binding upon the other party or parties thereto that on the occasion of a State of emergency of which the President of India in his discretion shall be the sole judge it shall be terminable if so required in writing by the State Government and shall in the event of any such requisition being made be forthwith thereafter determined by the lessees accordingly.

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 M. JOSEPH, I.A.S.  
 Managing Director  
 The State of Karnataka and State's Ltd  
 Bangalore



19. Lessee shall deposit any additional amount necessary

Whenever the security deposit of Rs. 1,000 or any part thereof or any further sum hereafter deposited with the State Government in replenishment thereof shall be forfeited or applied by the Central or State Government pursuant to the power hereinafter declared in that behalf the lessees shall deposit with the State Government such further sum as may be sufficient with the unappropriated part thereof to bring the amount in deposit with the State Government upto the sum of Rs. 1,000/-.

20. Delivery of workings in good order to State Governments after determination of lease

The lessees shall at the expiration or sooner determination of the said term or any renewal thereof deliver upto the State Government all mines, pits, shafts, inclines, drifts, levels, waterways, airways and other works now existing, or hereafter to be sunk or made on or under the said lands except such as have been abandoned with the sanction of the State Government and in any ordinary and fair course of working all engines, machinery, plant, buildings, structures, other works and conveniences which at the commencement of the said term were upon or under the said lands and all such machinery set up by the lessee below ground which cannot be removed without causing injury to the mines or works under the said lands (except such of the same as may with the sanction of the State Government have become disused) and all buildings and structures of bricks or stone erected by the lessees above ground level in good repair order and condition and fit in all respects for further working of the said mines and the said mineral.

21. Right of pre-emption.

a. State Government shall from time to time and all times during the said term have the right (to be exercised by notice in writing to the lessees) of pre-emption of the said minerals (and all products thereof), lying in or upon the said lands hereby demised or elsewhere under the control of the lessees and the lessees shall with all possible expedition deliver all

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M. JOSEPH  
Manager, Dept. for  
The Kerala Mines  
Govt. of India

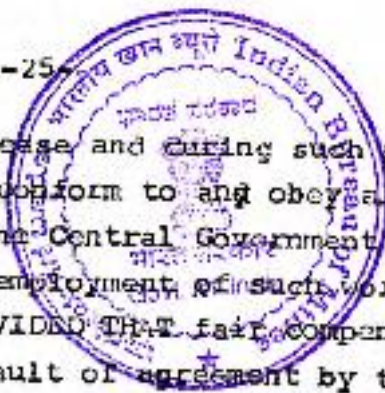
minerals or products or minerals purchased by the State Government under the power conferred by this provision in the quantities at the times in the manner and at the place specified in the notice exercising the said rights.

b. Should the right of pre-emption conferred by this present provision be exercised and a vessel chartered to carry the minerals or products thereof procured on behalf of the State Government or the Central Government be detained on demurrage at the port of loading the lessees shall pay the amount due for demurrage according to the terms of the charter party of such vessel unless the State Government shall be satisfied that the delay is due to causes beyond the control of the lessees.

c. The price to be paid for all minerals or products of mineral taken in pre-emption by the State Government in exercise of the right hereby conferred shall be the fair market price prevailing at the time of pre-emption PROVIDED THAT in order to assist in arriving at the said fair market price the lessees shall if so require furnish to the State Government for the confidential information of the Government particulars of the quantities, descriptions and prices of the said minerals or products thereof sold to other customers and of charters entered into for freight for carriage of the same and shall produce to such officer or officers as may be directed by the State Government original or authenticated copies of contracts and charter parties entered into for the sale or freightage of such minerals or products.

d. In the event of the existence of a state of war or emergency (of which existence the President of India shall be the sole judge and a notification to this effect in the Gazette of India shall be conclusive proof) the State Government with the consent of the Central Government shall from time to time and all times during the said term have the right (to be exercised by a notice in writing to the lessees) forthwith take possession and control of the works, plant, machinery and premises of the lessees or in connection with the said lands

W. W. M. JOSEPH, I. A. S.  
 Managing Director  
 The Kerala Minerals & Metals Ltd  
 (A Govt. of Kerala Undertaking)  
 GOVT. OF KERALA



or operations under this lease and during such possession or control the lessees shall conform to and obey all directions given by or on behalf of the Central Government or State Government regarding the use or employment of such works, plants, premises, and minerals PROVIDED THAT fair compensation which shall be determined in default of agreement by the State Government shall be paid to the lessees for all loss or damage sustained by him by reason or in consequence of the exercise of the powers conferred by this clause and PROVIDED ALSO that the exercise of such powers shall not determine the said term hereby granted or affect the terms and provisions of these presents further than may be necessary to give effect to the provisions of this clause.

22. Employment of foreign national.

The lessees shall not employ, in connection with the mining operations any person who is not an Indian national except with the previous approval of the Central Government.

23. Recovery of expenses incurred by the State Government.

If any of the works or matters which in accordance with the covenants in that behalf herein before contained are to be carried or performed by the lessees be not so carried out or performed with the time specified in that behalf the State Government may cause the same to be carried out or performed and the lessees shall pay the State Government on demand all expenses which shall be incurred in such carrying out or performance of the same and the decision of the State Government as to such expenses shall be final.

24. Furnishing of geophysical data.

(2). The lessees shall furnish

(a) all geophysical data relating to mining fields or engineering and ground water surveys\* such as anomaly, maps sections, plans, structures, contour maps, logging, collected by them during the course of mining operations to the Director, Geological Survey of India, Calcutta.

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*[Handwritten signature]*  
Director  
Geological Survey of India  
Calcutta

(b) all information pertaining to investigations of radioactive minerals collected by them during course of mining operations to the Secretary, Department of Atomic Energy, New Delhi.



Data or information referred to above shall be furnished every year reckoned from the date of commencement of the period of the mining lease.

P A R T - V I I I

THE COVENANTS OF THE STATE GOVERNMENT.

1. Lessees may hold and enjoy rights quitely.

The lessees paying the rents, water rate and royalties hereby reserved and observing and performing all the covenants and agreements herein contained and on the part of the lessee to be observed and performed shall and may quitely hold and enjoy the rights and premises hereby demised for and during the term hereby granted without any unlawful interruption from or by the State Government, or any person rightfully claiming under it.

2. Acquisition of land of third parties and compensation thereof.

If in accordance with the provision of clause 4 of part VII of this Schedule the lessees shall offer to pay to an occupier of the surface of any part of the said lands compensation for any damage or injury which may arise from the proposed operations of the lessees and the said occupier shall refuse his consent to the exercise of the right and powers reserved to the State Government and demised to the lessees by these presents and the lessees shall report the matter to the State Government and shall deposit with it the amount offered as compensation and if the Central/State Governments are satisfied that the amount of compensation offered is fair and reasonable or if it is not so satisfied and the lessees shall have deposited with it such further amount as the State and Central Governments shall consider fair and reasonable the State Government shall order the occupier to allow the lessees to enter the land and to carry out such operations as may be necessary for the purpose of this lease. In assessing the amount of such compensation the State Government shall be guided by the principles of the Land

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*[Handwritten signature]*

RECEIVED  
FOR THE  
SECRETARY  
DEPARTMENT OF ATOMIC ENERGY  
NEW DELHI



Acquisition Act.

3. To renew

Where the mining lease relates to any mineral not specified in the First Schedule to the Act, it may be renewable for one period not exceeding the period specified in sub section (2) of section 7 at the option of the lessee:

Provided that the State Government may for reasons to be recorded in writing reduce the area applied for.

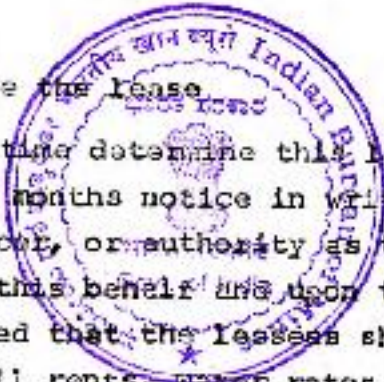
If the lease is in respect of minerals specified in the First Schedule to the Act, renewal will be subject to the prior approval of the Central Government. The lessees be desirous of taking a renewed lease of the premises hereby demised or of any part or parts of them for a further term from the expiration of the term hereby granted and is otherwise eligible, they shall prior to the expiration of the last mentioned term give to the State Government twelve calendar months previous notice in writing and shall pay the rents, rates and royalties hereby reserved and shall observe and perform the several covenants and agreements herein contained and on the part of the lessees to be observed and performed up to the expiration of the term hereby granted. The State Government on receipt of application for renewal, shall consider it in accordance with rule 28 of the said rules and shall pass orders as it deems fit. If renewal is granted, the State Government will at the expense of the lessees and upon his executing and delivering to the State Government if required a counter part thereof execute and deliver to the lessees a renewed lease of the said premises or part thereof for the further term of 20 years at such rents, rates and royalties and on such terms and subject to such covenants and agreements, including this present covenant to renew as shall be in accordance with the Mineral Concession Rules 1960 applicable to Beach Sand on the day next following the expiration of the term hereby granted.

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Handwritten signature or initials on the right side.

Official stamp and text: The Director, Mines, Government of India, New Delhi.



4. Liberty to determine the lease

The lessees may at any time determine this lease by giving not less than 12 calendar months notice in writing to the State Government or to such officer, or authority as the State Government may specify in this behalf and upon the expiration of such notice provided that the lessees shall upon such expiration render and pay all rents, water rates, royalties, compensation for damages and other moneys which may then be due and payable under these presents to the lessor or any other person or persons and shall deliver these presents to the State Government then this lease and the said term and the liberties powers and privileges hereby granted shall absolutely cease and determine but without prejudice to any right or remedy of the lessor in respect of any breach of any of the covenants or agreements contained in these presents.

4A. The State Government may on an application made by the lessee permit him to surrender one or more minerals from his lease which is for a group of minerals on the ground that deposits of that mineral have since exhausted or depleted to such an extent that it is no longer possible to work the mineral economically subject to the condition that the lessee.

- (a) makes an application for such surrender of mineral at least six months before the intended date of surrender and
- (b) gives an undertaking that he will not cause any hinderance in the working of the mineral so surrendered by any other person who is subsequently granted a mining lease for that mineral.

5. Refund of security deposits

On such date as the State Government may elect within 12 calendar months after the determination of this lease or of any renewal thereof, the amount of the security deposits paid in respect of this lease and then remaining in deposit with the State Government and not required to be applied to any of the purpose mentioned in this lease shall be refunded to the lessees. No interest shall run on the security deposit.

*[Handwritten signature]*

M. JOSHI, J. A. S.  
Managing Director  
The Dept. of Mines, Govt. of India  
A. East of ...  
06/10/68

**P A R T - IX**  
**GENERAL PROVISIONS**



**1. Obstruction to inspection**

In the case the lessees or their transferees/assignee do not allow entry or inspection by the officers authorised by the Central or State Government under clauses (1), (j) or (l) of sub rule (1) of rule 27 of the said Rules, the State Government shall give notice in writing to the lessees requiring them to show cause within such time as may be specified in the notice why the lease should not be determined and their security deposit forfeited; and if the lessees fails fail to show cause within the aforesaid time to the satisfaction of the State Government, the State Government may determine the lease and forfeit the whole or part of the security deposit.

**2. Penalty in case of default in payment of royalty and breach of covenants.**

If the lessees or their transferees or assignee make any default in payment of rent or water rate or royalty as required by section 9 of the Act or commits a breach of any of the conditions and covenants other than these referred to in covenant (1) above the State Government shall give notice to the lessees requiring them to pay the rent, water rate, royalty or remedy the breach, as the case may be, within sixty days from the date of receipt of the notice and if the rent, water rate, royalty are not paid or the breach is not remedied within such period, the State Government may without prejudice to any proceedings that may be taken against them, determine the lease and forfeit the whole or part of the security deposit.

**3. Penalty for repeated breaches of covenants**

In cases of repeated breaches of covenants and agreements by the lessees for which notice has been given by the State Government in accordance with clauses (1) and (2) afore mentioned on earlier occasion, the State Government without giving any further notice, may impose such penalty not exceeding twice the amount of the annual dead rent specified in clause 2, Part V.

*[Handwritten scribbles]*

*[Handwritten signature]*  
The Director  
Indian Bureau of Mines  
Lucknow

4. Failure to fulfil the terms of lease due to 'Force Majeure'



Failure on the part of the lessees to fulfill any of the terms and conditions of this lease shall not give the Central or State Government any claim against the lessees or be deemed a breach of this lease, in so far as such failure is considered by the said Government to arise from force majeure, and if through force majeure the fulfilment by the lessees of any of the terms and conditions of this lease be delayed, the period of such delay shall be added to the period fixed by this lease. In this clause the expression 'Force majeure' means Act of God, War, insurrection, riot, civil commotion, strike, earthquake, tide storm tidal wave flood, lightning, explosion, fire, earthquake and any other happening which the lessees could not reasonably prevent or control.

5. Lessees to remove their properties on the expiry of lease.

The lessees having first paid and discharged rent, rates, and royalties payable by virtue of these presents may at the expiration or sooner determination of the said term or within six calendar months thereafter (unless the lease shall be determined under clause 1 and 2 of this part and in this case at any time not less than three calendar months nor more than six calendar months after such determination) take down and remove for their own benefit all or any engines machinery plant, buildings structures tramways railways and other work erections and conveniences which may have been erected set up or placed by the lessees in or upon the said lands and which the lessees are not bound to deliver to the State Government, under clause 20 of Part VII of this Schedule and which the State Government shall not desire to purchase.

*[Handwritten signature]*

*[Handwritten signature]*  
*[Faint official stamp]*

6. Forfeiture of property ~~less than~~ <sup>more than</sup> six months after determination of lease.

If at the end of six calendar months after the expiration of sooner determination of the said term under the provision contained in clause 4 of Part VIII of this schedule become effective there shall remain ~~in or upon~~ <sup>on</sup> the said land any engines machinery plant buildings structures ~~ways~~ <sup>airways</sup> railways and other work erections and conveniences or other property which are not required by the lessees in connection with operations in any other lands held by them under prospecting licence or mining lease the same shall if not removed by the lessees within one calendar month after notice in writing requiring their removal has been given to the lessees by the State Government be deemed to become the property of the State Government and may be sold or disposed of in such manner as the State Government shall deem fit without liability to pay any compensation or to account to the lessees in respect thereof.

7. Notices

Every notice by these presents required to be given to the lessees shall be given in writing to such person resident on the said lands as the lessees may appoint for the purpose of receiving such notices and if there shall have been no such appointment then every such notice shall be sent to the lessees by registered post addressed to the lessees at the address recorded in this lease or at such other address in India as the lessees may from time to time in writing to the State Government designate for the receipt of notices and every such service shall be deemed to be proper and valid service upon the lessees and shall not be questioned or challenged by him.

8. Immunity of State Government from liability to pay compensation.

If in any event the orders of the State Government are revised, reviewed or cancelled by the Central Government in pursuance of proceedings under Chapter VII of the Mineral Concession Rules, 1960, the lessees shall not be entitled to compensation for any loss sustained by the lessees in exercise of the powers and privileges conferred upon them by these presents.

X

M. M. M.

196

9. For the purpose of stamp duty the anticipated royalty from the demised land to Rs. 13,20,350/- per year, (Rupees thirteen lakhs twenty thousand three hundred and fifty only).

In WITNESS WHEREOF these presents have been executed in the manner hereunder appearing the day and year first above written.



Signed by Shri. S. Krishna Moorthy, The Director of Mining & Geology, Trivandrum, Kerala for and on behalf of the Governor of Kerala in the presence of

1. GEORGE P.O. Deputy Director Directorate of Mining & Geology Trivandrum
2. C. Gopuiah Khan Iyer Geologist Secretary of Mining & Geology Trivandrum.

Handwritten signatures and initials, including a large signature that appears to be 'S. Krishna Moorthy'.

Signed by Shri. M. Joseph, Managing Director for and on behalf of The Kerala Minerals and Metals Ltd., Quilon the lessee aforesaid in the presence of




1. U. L. KURIAN PROJECT ENGINEER (MS) THE KERALA MINERALS AND METALS LTD QUILON
2. S. Subramaniam Iyer Geologist The Kerala Minerals & Metals Ltd Quilon

Handwritten signature of M. Joseph, Managing Director, and other notes.

Prepared by M. Kunju Kunju, Licence No. QDA 82, Typewritten. Corrections. Nil.

M. JOSEPH Managing Director for The Kerala Minerals and Metals Ltd

Name and Address of the Board Members

- 
1. Shri M. Mohankumar, IAS - Chief Secretary,  
(Chairman) Govt. of Kerala,  
Thiruvananthapuram
  2. Shri H.S. Majumdar - 103, Vikram Apartments,  
(Director) 19/29 Janki Kutir,  
Juhu, Mumbai-400 049.
  3. Shri S. Subramanyan - 5, Green Acre Co-op.  
(Director) Hsg. Society, Plot No. 19  
Maritvan, Goregaon(E),  
Mumbai-400 063.
  4. Shri K.P. Viswalsalan - Cherasseril,  
(Director) Manayilkulangara,  
Thirumallavaram P.O.,  
Kollam.
  5. Shri V. Vasu Pillai - Vidanad Bunglow,  
(Director) Chavara P.O.,  
Kollam.
  6. Shri K. Mohandas, IAS - Secretary to Govt.,  
(Director) Industries Dept.,  
Govt. of Kerala,  
Thiruvananthapuram.
  7. Shri A. Balakrishna Pillai - Addl. Secretary,  
(Director) Industries Dept.,  
Govt. of Kerala,  
Thiruvananthapuram.
  8. Shri M.K. Ravindranathan IAS - Prabha Cottage,  
(Retd.) Talap,  
(Special Director) Kanmur-670 002.
  9. Dr. K.M. Abraham, IAS - Secretary,  
(Director) Finance (Resources),  
Finance Dept.,  
Govt. of Kerala,  
Thiruvananthapuram.
  10. Shri P.S. Nair - KMML, Chavara,  
(Managing Director) Kollam.

Extract of the Minutes of the 2nd Meeting of the Board of Directors held on 25th April, 1974.

Item No. VII - Mining Lease:-

The Board felt the immediate necessity for getting mining lease in favour of the Company as otherwise the Company will be forced to stop the work in the immediate future due to the acute shortage of good quality raw sand. The following resolution was adopted:-

"RESOLVED that Government be requested for granting the Mining lease in favour of the Company immediately as otherwise the Company will be forced to stop the work in the near future due to the acute shortage of good quality raw sand and the Managing Director is authorised to take appropriate further action for getting the Mining Lease granted at the earliest".

COMPANY SECRETARY.

// True Copy //



ANNEXURE XVIII

**CONFIDENTIAL**

## FEASIBILITY REPORT FOR MINING OF BLOCK 3 IN KMML LEASEHOLD

### Geographical conditions


The Chavara beach sand deposit is located near the town of Quilon which is north of Trivandrum on the western side of the southernmost tip of India (Fig 2). The heavy mineral deposit as a whole extends for about 23 km (14 miles) between Kayamkulam in the north (9° 8' 24"; 76° 27' 36") and Neendakara in the south (9° 56' 03"; 76° 32' 34").

The deposit has been subdivided into eight blocks, 4 of which have been assigned for development to the Kerala Minerals and Metals Ltd (KMML) and 4 to Indian Rare Earth Ltd (IRE). This report deals only with KMML Block III falling in Chavara, Panmana and Vadakumthala villages and having an area of 88.119 Ha.

### Infrastructure

#### Public utilities

The area is well served by a net work of roads. The important Trivandrum Cherthala Canal (T.S. Canal) forms the eastern boundary of plot. This canal used to be an important waterway of south Kerala. It is now being developed as

  
**JACOB PUNNEN**  
 RQ/BNG/028/88/A

## ANNEXURE XVIII 2



National Waterway No 3 by Inland Waterways Authority of India (I W W A I).

↳ road, railways and other

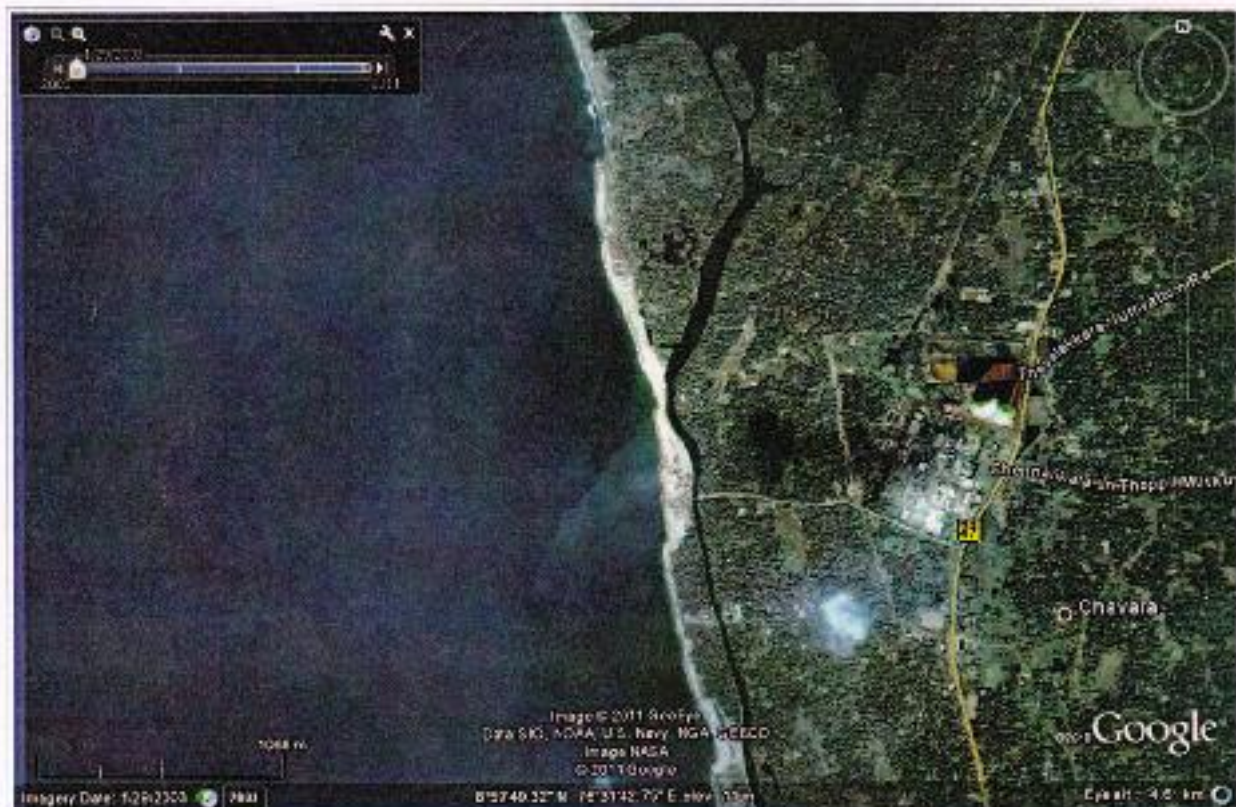
National Highway 47 passes to the east of the plot at a distance of about 2 kilometers. The plot is connected to the NH by an asphalt road starting at Sankaramangalam Jn. This road terminates on the eastern side of the TS canal.

The plot is assessed from there by a foot overbridge and a Jhankar (ferry)

↳ manpower

### Geology

↳ structure, size, shape



A SATELLITE VIEW OF THE AREA

## ANNEXURE XVIII 3

The Chavara beach sand deposit, also known as the Neendakara – Kayamkulam deposit, is a barrier beach extending over a length of 22.54 kms (14 miles) between two tidal channels, the southern at Neendakara of the Ashtamudi estuary and the northern at Kayamkulam of the Kayamkulam lagoon. It covers an area of about 400 hectares (about one thousand acres) with an average width of 200 metres (about one furlong) Fig.1. It has been the only deposit so far on the Indian Coast having heavy mineral contents ranging as high as 60 to 70%. Consequently this deposit has been under intensive mining for nearly fifty years and is reputed as one of the most important production and export centres of ilmenite in the world.

Geomorphologically, the system appears to be a drowned bay feature where streams entered the ocean in the east – further east than the extremity of the deposit. The Bay was closed off by the barrier-beach, in time due to the south to north transportation of sea borne sands. Rivers entering the ocean broke through progressive barrier beaches at different places from time to time and sand bars in the bay where likewise developed, cut and at times assisted in the concentration of heavy minerals.

***Mineral content, grade, density***

Percentages of heavies is about 39. The average composition of the heavies for

## ANNEXURE XVII 4

the whole of the block is approximately as follows:



Ilmenite	68
Rutile	7
Leucoxene	2
Zircon	6
Monazite	1
Sillimanite and Kyanite	14
Balance silica sand	

The economic heavy minerals fall mainly in the size range – 60 + 120 mesh with the dominant fraction being – 60 + 80 mesh. The proportion of heavy mineral decreases with depth but the size range is similar. Quartz, however, becomes more abundant and larger in grain size with depth and there is also some tendency for the proportion of slimes to increase with depth.

***P reserve/resource quantity and quality***

For assessing the minable reserves, the lease area is divided into fields of 137m X 275 meters size. The reserve in each field was assessed using the data from detailed drilling and analysis by Atomic Minerals Dept. In case of fields at the boundary of the lease, percentage minable was estimated and the minable tonnage worked out. Detailed assessment is given below

## ANNEXURE XVIII



MINABLE RESERVES IN BLOCK 3					
(1)	(2)	(3)	(4)	(5)	(6)
FIELD NO	AREA MINABLE %	RESERVE IN THE FIELD	HM %	MINABLE RESERVES IN THE FIELD	Minable HM content
		metric tons		metric tons	metric tons
1F	25	640,000	9	160,000	13,824
1E	49	670,000	15	328,300	48,096
1D	22	670,000	15	147,400	21,933
2G	17	640,000	7	108,800	8,127
2F	97	640,000	6	620,800	39,172
2E	96	640,000	8	627,200	52,873
3G	44	640,000	9	281,600	24,527
3F	100	640,000	6	640,000	41,536
3E	100	640,000	7	640,000	43,520
4F	44	650,000	9	286,200	26,140
4E	99	650,000	11	643,500	68,726
4D	86	660,000	13	567,600	71,688
5E	54	710,000	26	383,400	101,141
5D	96	720,000	31	691,200	210,816
	<b>TOTAL</b>	<b>9,210,000</b>		<b>6,125,800</b>	<b>772,120</b>

**Legal Matters*****P* Rights and ownership**

The land is entirely patta land and is being purchased by the company. The company follows a rehabilitation policy that is agreed to by all the stakeholders in the presence of the State Minister for Industries. A considerable portion of the land has already been purchased by the company.

204

## ANNEXURE XVIII 5



***• Socioeconomic impact studies***

KMML is the largest employer of the area. Mining has been going on in the area for the last 70 years. Dredge mining will help KMML to increase production of beach sand minerals. In this case, KMML will be self sufficient for raw material for its pigment plant.

***• Public acceptance***

There are two companies -M/s IRE Ltd and M/s KMML – which are engaged in beach sand mining in the area. IRE is a Govt of India undertaking under Ministry of Atomic Energy and KMML is a State Govt undertaking. These units are the major employers of the area and it is the ambition of the villagers to gain employment in either of the units. Additionally, the companies are mining a placer deposit containing a radio-active mineral Monazite. Removal of Monazite from the area reduces radiation risk to the population.

***• Land requirements***

The block No 3 has a total area of 88,119 Ha. The method of mining is surface mining, Hence all the lease area will be required for the operation.

***• Government factors***

KMML is owned by the Govt of Kerala. The State Govt is fully supportive of the company.

265

## ANNEXURE XVIII

**Operating**

The operations will be by opencast mining. There will be two types of mining: by collection of beach washings and by dredging of deposit.

***b rock mechanics***

There is no underground mining and no hard rocks are encountered in the mining operations.

***b mining equipment***

The equipments that will be used are the following

For Beach washing collection

1. Front end loader 1No
2. Bulldozer 1 No
3. Tipping trucks 10 ton capacity 4 nos

For dredge mining

The dredging scheme allows for pumping of concentrate to the shore and then by relay pumping to the stockpile at the dry plant. Tailing disposal is by pumping to- a disposal area using a long flexible line and a floating tailing stacker.

The design of the power supply for the dredge has been assumed as electric.

**Ancillary Mining Equipment**

A list of the major items of ancillary equipment is as follows:

Mobile Crane, 8 tonnes capacity

## ANNEXURE XVIII



- Mobile Pipe Carriage, 5 tonnes capacity
- Vehicle fleet, car, 4-wheel drive
- Tractor and Mobile winch to transfer ground anchors
- Swamp dozer, 90 hp
- Shore based Mobile electrical sub-station with an earth leakage system
- Mobile shore based offices, stores and workshops: 120m<sup>2</sup> floor area
- Two-way radio
- Surveying equipment
- Water supply from the canal.

4.4.6 Dredge – General

Essentially the dredge consists of seven basic sections:

1. Side pontoons with ballast tanks
2. Centre pontoon with machinery beds
3. Deck house with service gantry
4. Ladder with cutter and drive unit
5. Bow gantry
6. Control cabin module
7. Machinery – pumps, engines, winches etc.

Outline Specification for Suction Cutter Dredge

Dredge length – side Pontoons	25.3 m
Pontoon depth	1.52 m
Digging depth	15.3 m

Operation

Cable control – 6 drum dredging winch with P/S Bow and Stern Lines – 2 off each.

Ladder Hoist and Hand Line - 1 of each.

267

## ANNEXURE XVIII



A TYPICAL DREDGE

Each drum to be manually operated by 'Signal Box' type control lever from the control cabin. One lever will control such clutch and one lever will operate each brake which will be of a self energizing band type. For the operation outlined, a line pull of 5.230 kg would be sufficient. Power required will be approximately 15 kw.

#### Pumping Equipment

The main pump would be a Dredge Pump with an output of 800 t/h which would be transmitted by a totally enclosed, pressure lubricated chain drive, designed to operate at a continuous 500 kw through a fluid coupling.



## ANNEXURE XVIII

The above configuration would enable the center of gravity to be kept low and add stability to the dredge.

The motor would be a 500 kw T.E.F.C. machine. A 6.6 KV 50 Hertz 3 ph supply would enable power at reasonable voltage level to be taken from the floating treatment plant via trailing cable supported along the dredge delivery line.

#### Gland Seal Pump

High pressure pump to supply Gland seal water for the main pump. Approximately 11 KW.

#### Priming Pump4

High volume – medium pressure pump for priming main pump. The output from this unit is transferred to supply flushing water to the Cutterhead Rearing after the main pump has become operationa. 'Bleed off' supply Heat Exchanger for main pump for chain case cooling. (Approx. 11 KW).

#### Bilge Pump

Diaphragm type to handle accumulated spillage in the centre pontoon. Approximately 1.4 kw.

#### Chain Case Pump

High pressure gear pump to supply oil to chain drive through spray bars in chain case. Oil cooled by heat exchanger from 'bleed off' to cutter bearing. Approximately 1 KW.

#### Lubrication Pump

Supply cutter line shaft bearings, ladder pivot bearings from electrically driven 7 point automatic lubricator. Approximately 5 Kw.

#### Electric Motors

540 KW approximately. + Cutter 125 KW.

#### Light – Power

## ANNEXURE XVIII



6KW

Estimated Total Power Consumption

670 KW.

Ladder – Cutter Drive

The cutter would be driven by means of a line shaft supported in bearings and connected to an electric motor mounted at the top end of the ladder. Speed reduction by means of a heavy duty gear box enables maximum torque to be transmitted to the cutter.

Cutter Head Bearings & Stubshaft

Heavy duty unit equipped with roller bearings sealed from water and materials by special glands and water flushing rings.

Lubrication from automotive feed source

It is envisaged that a cutter of 60" diameter would be adequate.

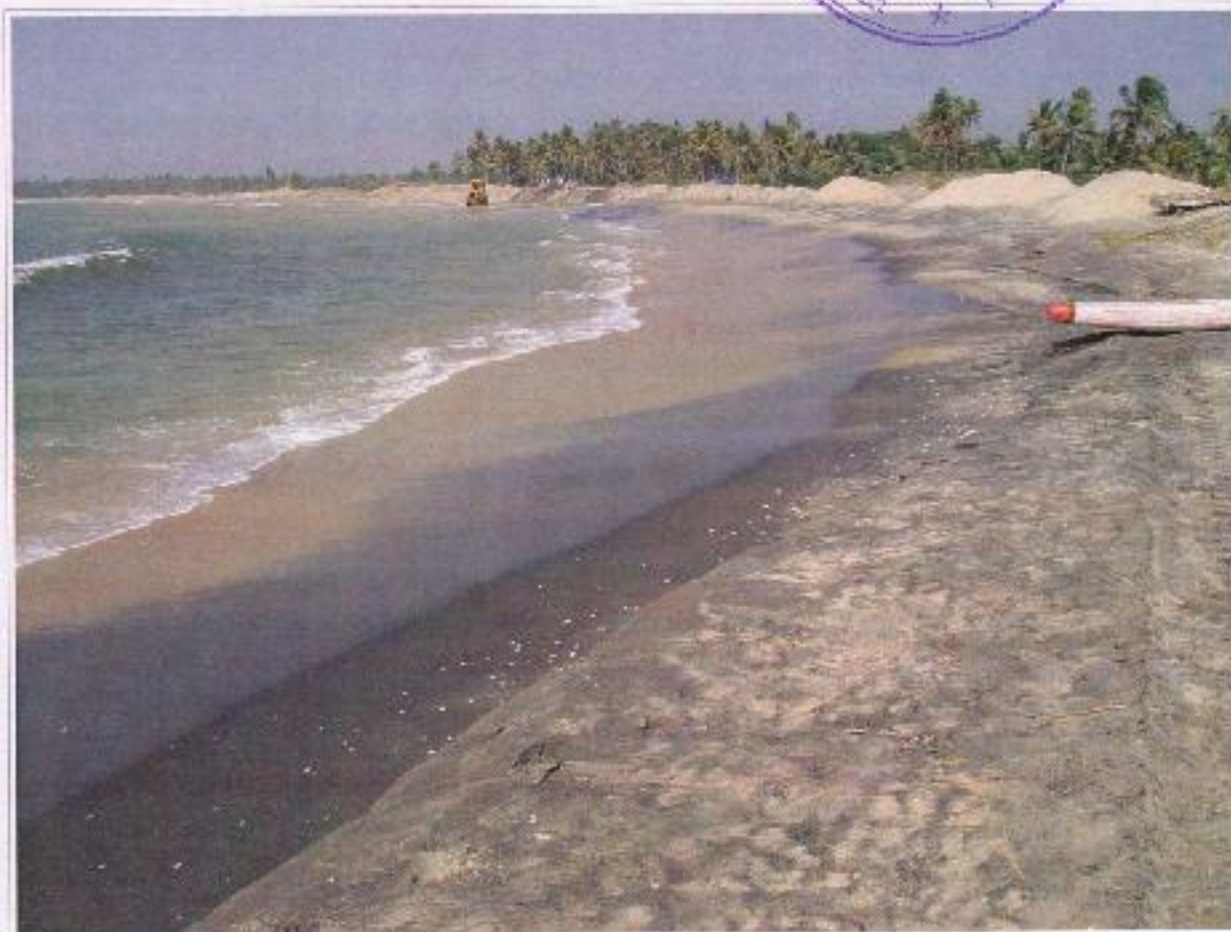
Approximate power requirement would be 125 KW.

***Mining method***

The existing method of beach washing collection will be continued.



ANNEXURE XVIII 12

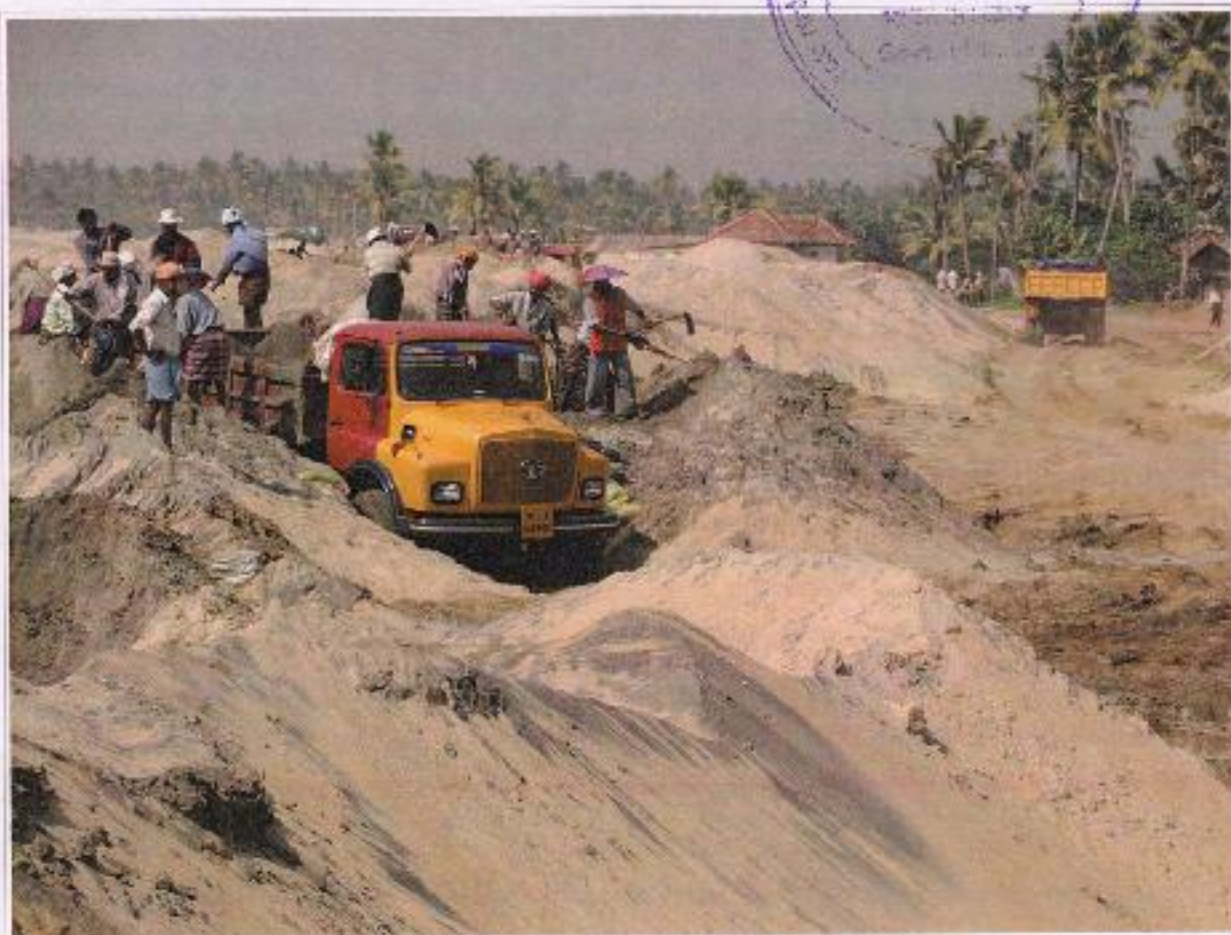


**AREA USED FOR BEACH WASHING COLLECTION**

The proposed mining new scheme for the deposit is by means of a floating suction cutter dredge with an associated floating wet treatment plant with a dredge capacity of 600 tonnes per hour. The mining scheme is designed to leave the beach front in as safe a condition as currently exists.



ANNEXURE XVIII 13



**BEACH WASHING COLLECTION WORK IN PROGRESS**

## ANNEXURE XVIII



AREA SUITABLE FOR DREDGE MINING

***► construction plan and schedule***

The company is dependent on government approvals for major projects. Hence the dredge purchase will be only after Govt approval.

***► appropriate technological pilot tests***

Dredge mining has been practiced by M/s IRE Ltd in the adjacent block which is a continuation of Block No 3. Regarding processing, Mineral Separation plant of KMML has been in operation for the last 50 years. Hence pilot plant tests are not

## ANNEXURE XVIII



required.

***Mill and processing plant***

Mineral Separation plant of KMML has been in operation for the last 50 years. Hence pilot plant tests are not required. The ore will be treated in the existing MS plant for separation based on various physical properties of the minerals.

**PHYSICAL PROPERTIES**

The minerals are separated by various physical means depending on their properties viz.

- Magnetic Susceptibility
- Electrical Conductivity and
- Specific Gravity.

Ilmenite, Leucoxene and Monazite are magnetic materials. The magnetic susceptibility of these materials is different. Ilmenite is more magnetic and Leucoxene and Monazite are feebly magnetic.

Regarding Electrical conductivity, all the Titanium containing minerals (i.e. Ilmenite, Leucoxene and Rutile) are conducting and all others are non-conducting.

The specific gravity the various Minerals are: -

1. Monazite - 5.20
2. Zircon - 4.70
3. Rutile -4.25

## ANNEXURE XVIII



4. Ilmenite -4.2
5. Leucoxene - 3.50
6. Sillimanite - 3.30
7. Quartz – 2.60

### SEPARATION OF MINERALS

A flow sheet of the process followed here will be included in the Mining Plan.

#### ***▸ tailings disposal***

Major part of the tailings will be generated in the Dredge-wet concentrator system. This tailing will be used for refilling the dredge pond as the dredge advances. Tailing from the dry processing plant will also be used for refilling the land to the original profile.

#### ***▸ water management***

The deposit occurs between the sea and TS Canal. Both these water bodies are saline. The dredge pond will have saline water from the canal and the sea. No water is removed from the pond because all the water is returned to the pond from the dredge. The canal has unlimited supply of saline water. Hence specific water management plan is not required.

#### ***▸ transportation***

Beach washing material will be transported to the MS plant in 10 ton capacity tipping trucks. The concentrate from Dredge -wet concentrator will also be transported to the MS plant in 10 ton capacity tipping trucks. The tailings from

215

## ANNEXURE XVIII 17



Dredge -wet concentrator will be pushed by bulldozer to refill the rear part of the dredge pond.

***Power supply***

Power supply will be by 11 KV line from KSEB

***Manpower/labour relations***

*The unit is under State govt and enjoys good labour relations.*

***Auxiliary facilities and services***

Auxiliary facilities and services as required will be provided. The processing plant incorporates most of the systems required as auxiliary facilities.

***Closure design***

The Dredge -wet concentrator tailings and MS plant tailings are used for reclaiming the dredged area. Hence closure of the mined area is part of the mining operations. The reclaimed area can be used for various purposes as directed by the State Govt. Detailed Closure Plan will be provided along with Mining Plan.

***Environment (if not dealt with in a separate study)***

Environmental Impact Assessment and environment impact management are dealt with in the mining Mining Plan in detail.

***Market analysis***

Ilmenite produced here is used in the pigment plant of KMML. Other products

## ANNEXURE XVIII 18

can be sold in open market. The current market prices are as below



## SALE/TRANSFER PRICE

<u>MINERAL</u>	<u>Rs per ton</u>
Ilmenite	5,118
Rutile	36,000
Zircon	54,500

**Financial Analysis**

## KMML MS UNIT PROFITABILITY

<u>ITEM</u>	<u>2010-11</u>
	<u>Rs Lakhs</u>
<b>Total income</b>	<b>4414.75</b>
Variable cost	1390.08
Fixed cost	2796.58
<b>Total cost</b>	<b>4186.66</b>
Profit	228.09

## ANNEXURE XVIII 19

**Capital cost**

Capital cost required for dredge will be about Rs 10 crores. However a dredge with wet concentration plant mounted on it will cost about Rs 100 crores.

**► Cashflow forecast**

KMML is a profitable unit and has sufficient cash flow to meet any requirement for capital expenses.

**► Operating cost**

Summary of operating cost for mining and mineral separation unit is as below

ITEM	2010-11
	Rs Lakhs
Employee cost	1,823.06
Repairs	139.37
Depreciation	252.00
Stores & Spares	215.10
Other administrative exp	367.11
<b>Total</b>	<b>2,796.58</b>

## ANNEXURE XVII 20

***p Closure and Rehabilitation cost***

Mining method is such that no specific closure procedure is warranted. The dredge mining will also ensure simultaneous reclamation of the back side of the dredge pit. Hence special closure and rehabilitation cost will be very minimal.

**The Kerala Minerals and Metals Ltd.***(A Govt. of Kerala Undertaking)*

Mineral Separation Unit

Kovilhottam, Chavara

Kollam- 691583, Kerala, S. India

Ph : 0476-2680047, 2680048, 2680049

Fax : 0476-2686442

E-mail : agmms@kmmml.com



MS/MINES/IBM/354/2011

14/03/2012

To

The Regional Controller of Mines,  
Indian Bureau of Mines,  
29, Industrial Suburb, II stage, Tumkur Road,  
Goruguntapalya, Yeshwantpur,  
Bangalore- 560 022

Sub:- Employment and nomination of Mining Engineer.

Ref:- MCDR, Rule 42(b) (1)

Dear Sir,

This is to inform you that Shri. T. Karthikeyan, BE(Mining) with 17 years experience in open cast metal mining has been nominated as Mining Engineer under Rule 42 (b)(1) of MCDR for working the Mining lease area granted to us.

Yours truly,

For The Kerala Minerals and Metals Ltd.

Asst. General Manager (MS)

**JACOB PUNNEN**  
RQP/BNG/028/88/A

**The Kerala Minerals and Metals Ltd.**

(A Govt. of Kerala Undertaking)

(An ISO 9001, ISO 14001, OHSAS 18001 Certified Company)

SANKARAMANGALAM, CHAVARA- 691583

KOLLAM, KERALA, INDIA

Ph : 0476-2686722 to 2686733 (12 Lines), 2686000

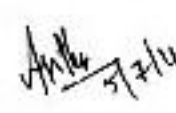
Fax : 91-476-2680101

E-mail : kmml@md3.vsnl.net.in, URL : www.kmml.com

ISO 9001 / 14001  
OHSAS 18001  
BUREAU VERITAS  
Certification**THE KERALA MINERALS AND METALS LTD., CHAVARA****DETAILS OF BOARD OF DIRECTORS**

Sl. No.	Name and Address	Position (Chairman / MD / Director)	Address
1.	Shri. T. Balakrishnan, IAS	Chairman	Addl. Chief Secretary, Industries Department, Govt. of Kerala, Thiruvananthapuram
2.	Shri. N.R. Subramaniam,	Managing Director	KMML, Chavara P.O., Kollam, Pin 691 583.
3.	Alkesh Kumar Sharma, IAS	Director	Secretary to Government, Industries (IP) Department, Govt. of Kerala, Thiruvananthapuram.
4.	Shri. Sanjay Garg, IAS	Director	Secretary, Finance (Expenditure), Finance Department, Govt. of Kerala, Thiruvananthapuram.
5.	Shri. K.N. Sathyaprasad	Director	Joint Secretary, Industries Department, Government of Kerala, Thiruvananthapuram.
6.	Shri. C.J. George	Executive Director	KMML, Chavara P.O., Kollam.
7.	Suresh Kumar. S	Executive Director	KMML, Chavara P.O., Kollam.

  
JACOB PUNNEN  
RQP/BNG/028/88/A

  
AJITH JOHN,  
COMPANY SECRETARY  
THE KERALA MINERALS AND METALS LTD.,  
SANKARAMANGALAM, CHAVARA,  
KOLLAM - 691 583.

# ANNEXURE XXI



## TYPICAL SIEVE ANALYSIS

WET MILL CONCENTRATE  
(DRY MILL FEED)

SIEVE ANALYSIS		
MESH	WT ( gm )	
(+)40	0.1040	0.18
(+)60	10.8740	18.56
(+)80	7.5610	12.90
(+)100	20.9220	35.71
(+)120	6.5210	11.13
(+)140	8.0970	13.82
(+)170	1.1500	1.96
(-)170	3.1720	5.41
SIEVELOSS	0.1940	0.33
T /WT	58.5950	100.00

DRY MILL CONDUCTINGS

SIEVE ANALYSIS		
MESH	WT ( gm )	
(+)40	0.0850	0.13
(+)60	11.4460	17.42
(+)80	7.6550	11.65
(+)100	26.5220	40.37
(+)120	8.8400	13.46
(+)140	8.8060	13.40
(+)170	0.3490	0.53
(-)170	1.9610	2.99
SIEVELOSS	0.0310	0.05
T /WT	65.6950	100.00

DRY MILL NON- CONDUCTINGS

SIEVE ANALYSIS		
MESH	WT ( gm )	
(+)40	0.0230	0.04
(+)60	11.1310	20.22
(+)80	5.0250	9.13
(+)100	14.9590	27.18
(+)120	5.7120	10.38
(+)140	10.9100	19.82
(+)170	0.9950	1.81
(-)170	6.2090	11.28
SIEVELOSS	0.0750	0.14
T /WT	55.0390	100.00

Note :  
It may be noted that we are not making use of size difference in flow sheet except in screening out on a 30# screen. The grain size of different minerals overlap and can not be made use in the process design

JACOB PUNNEN  
RQP/BNG/028/88/A

# ANNEXURE

## ANNEXURE XXII

~~Case No. 2~~

### Typical Analysis of Major Fractions

**1 Wet Mill Feed** wt%

Ilmenite	-	22.5
Leucoxene+Monazite	-	1.1
Rutile	-	3.3
Zircon	-	6.9
Sillimanite	-	8.1
Kyanite	-	1.8
Garnet	-	0.5
Quartz	-	55.8

**2 Dry Mill Feed (Wet Mill Concentrate)** wt%

Ilmenite	-	44.9
Leucoxene+Monazite	-	2.1
Rutile	-	6.7
Zircon	-	13.2
Sillimanite	-	12.3
Kyanite	-	3.8
Garnet	-	1.1
Quartz	-	15.9

**3 Non Conductings of Dry Mill** wt%

Ilmenite	-	5.2
Leucoxene+Monazite	-	3.3
Rutile	-	2.9
Zircon	-	28.1
Sillimanite	-	26.1
Kyanite	-	6.9
Garnet	-	2.1
Quartz	-	24.4



*[Handwritten Signature]*  
**JACOB PUNNEN**  
 RQP/BNG/028/88/A

# ANNEXURE

XXIII

Annexure - 71 of 155  
224

1.

FORM - J

" To be submitted in duplicate"

Received at..... (Place) on.....2008 (Date)

Initial of Receiving Officer

GOVERNMENT OF KERALA

**APPLICATION FOR RENEWAL OF MINING LEASE**

[See rule 24A]

Dated 30th day of October 2008

**To**

The Principal Secretary to Government  
Industries Department  
Government of Kerala  
Trivandrum

**Through**

Director of Mining and Geology,  
Kesavadasapuram,  
Trivandrum

Sir,

I/We request for renewal of my/our mining lease under the Mineral Concession Rules, 1960.

A sum of (Rs.2500) being the application fee payable under sub-rule (3)(i)(a) of rule 22 of the said rules has been deposited.


2. The required particulars are given below:-

(i) Name of the applicant with complete address .

M/s Kerala Minerals and Metals Ltd.,  
Sankaramangalam, Chavara P.O  
Kollam - 691 583.

(ii) Is the applicant a private individual/private company/public company/firm or association?

Kerala State Govt. Public Sector company incorporated as a Private Limited Company under the companies Act, 1956.

  
JACOB PUNNEN  
RQP/BNG/028/88/A



.2.

(iii) In case applicant is :

- (a) an individual, his nationality
- (b) a company, an attested copy of the Certificate of registration shall be enclosed
- (c) Omitted.
- (d) a firm or association, the nationality of all the partners of the firm or members of the association.

(iv) Profession or nature of business of applicant

(v) (Omitted)

(vi) (Omitted)

(via) No. and date of the valid Clearance Certificate of Payment of mining dues (copy to be enclosed)

(vii) an affidavit, that up-to-date Income tax returns, as prescribed under the Income Tax Act, 1961, have been filed, and the tax due, including the tax on account of self-assessment has been paid.

(viii) (a) Particulars of the Mining lease of which renewal is desired

Not applicable

Already submitted



Name and addresses of the Board of Directors already submitted.

Mining, processing etc. for details, please see Memorandum of Association already submitted. Beach sand containing minerals mined and separated and Minerals produced are Ilmenite Rutile and Zircon. Mine is a semi mechanized mine.

"No dues Certificate" No.8968/MI/04 dated 20.01.05 is already submitted

Original already submitted

Particulars of lease area enclosed. Mining lease originally granted for an area of 157.653 hectares vide Govt. order No. G.O.(MS)355/72/ID. Dt 11.12.72 Deed executed on 9th July 1985 already submitted. Details of the land for which lease is desired is as given below

Contd..3

(3)

Sl.No	District	Taluk	Village	Block	Survey Nos	Hectares	Ares	Sq. Mts
1	Kollam	Karunagapally	Neendakara	I	25 to 112 A	34	28	30
2	Kollam	Karunagapally	Panmens	III	6 to 60	70	69	70
3	Kollam	Karunagapally	Vadakkumthala	III	695		97	
4	Kollam	Karunagapally	Chavara	III	1 to 23	15	26	
5	Kollam	Karunagapally	Chavara	III	24	0	17	70
		<b>TOTAL</b>	<b>BLOCK III</b>			<b>88</b>	<b>11</b>	<b>93</b>
6	Kollam	Karunagapally	Karunagapally	V	91 to 220	28	89	90
7	Kollam	Karunagapally	Kulasekharapuram	VII	1 to 199	29	89	30
8	Kollam	Karunagapally	Kulasekharapuram	VII	1 to 151	22	60	40
		<b>TOTAL</b>				<b>203</b>	<b>80</b>	<b>23</b>

- (b) Details of previous renewal granted, if any. Not applicable
- (ix) Period for which renewal of mining lease is required. 20 years
- (x) Whether renewal is applied for the whole or part of the leasehold. Renewal is applied for the whole. Actual Area within the boundary of the plot is now seen to be 203.802 hectares.
- (xA) (a) Does the applicant continue to have surface rights over the area of the land for which he requires renewal of the mining lease. No, only part of the land is owned by the applicant. Details of the land owned by the company as on 4.5.05 has already been submitted
- (b) If not, has he obtained the consent of the owner and occupier for undertaking mining operations. If so, the consent of the owner and occupier of the land obtained in writing be filed. Company proposes to acquire the other entire portions through LA/ negotiated purchase in various blocks. Before entering any plot, surface rights will be obtained through purchase, acquisition or written consent. Land acquisition is in progress.
- (xB) Particulars of the areas mineral wise in each State duly supported by affidavit for which the applicant or any person joint in interest with him.

contd...4.

:4:

(a) already holds under mining lease (as given below)

Sl No.	District	Taluk	Village	Block	Survey Nos.	Area in hectares of mining lease held
1.	Kollam	Karunagappally	Neendakara	I	25 to 112 A	34.285
2.	Kollam	"	Chavara Pannama	III III	1 to 121 31 to 632	41.956
3.	Kollam	"	Karunagappally	V	91 to 220 (less 218)	28.899
4.	Kollam	"	Kulasekharapuram	VII	1 to 199 1 to 151	29.895 22.604
						<b>157.649</b>



(b) has already applied for but not granted; or

Nil

(c) being applied for simultaneously, (x) a mining plan which shall include

Nil

(a) the plan of the area showing the nature and extent of the mineral body, spot or spots where the excavation is to be done in the first year and its extent a detailed cross-section and detailed plan of spot(s) of excavation based on prospecting data gathered by the applicant, a tentative scheme of mining for the first five years of the lease.

The required details are included in Mining Plan approved by Atomic Minerals Directorate for exploration and Research, Department of Atomic Energy Govt. of India vide letter No. AMD/MPA/3M(KMML)/03/829 dated 13.05.2003. Valid for 5 Years, that is, till 2008 already submitted.

If a fresh Mining Plan is required, it will be submitted within 6 months of the lease order or before executing the lease agreement.

(b) the details of geology and lithology of the area, the extent of manual mining and through machines

The required details are included in Mining Plan approved by Atomic Minerals Directorate for Exploration and Research, Department of Atomic Energy, Govt. of India vide letter No. AMD/MPA/3M(KMML)/03/829 dated 13.05.2003. valid for 5 years, that is till 2008, already submitted .

Contd..5

15:

- (c) annual programme and plan for excavation for five years; and



A fresh Mining Plan is required, it will be submitted within 6 months of the lease order or before executing the lease agreement.

The required details are included in Mining Plan approved by Atomic Minerals Directorate for Exploration and Research,

Department of Atomic Energy, Govt. of India vide letter No. AMD/MPA/3M(KMML)/03/829 dated 13.05.2003. Valid for 5 years, that is, till 2008. Already submitted.

If a fresh Mining Plan is required, it will be submitted within 6 months of the lease order or before executing the lease agreement.

- (d) the plan of the area showing natural water courses; limit of reserved and other forest areas and density of trees, assessment of impact of mining activity of forest, land surface and Environment including air and water pollution, and details of the scheme for afforestation, land reclamation, use of pollution control devices.

The required details are included in Mining Plan approved by Atomic Minerals Directorate for Exploration and Research, Department of Atomic Energy, Govt. of India vide letter No. AMD/MPA/3M(KMML)/03/829 dated 13.05.2003, valid for 5 years, that is, till 2008. Already submitted.

If a fresh Mining Plan is required, it will be submitted within 6 months of the lease order or before executing the lease agreement.

- (x) Is the mineral going to be used in his own industry? If so, give full details; for ("own industry" see Explanation under Rule 24B)

Yes, The entire quantity of Ilmenite is consumed in the TiO<sub>2</sub> Pigment unit of Kerala Minerals Metals Limited. Rutile is also partly consumed and rest sold to Domestic markets. Zircon is sold to domestic market.

- (xi) In case the renewal applied for is only for part of the lease hold:

Contd..6

6.

(a) the area applied for renewal,

SI No.	District	Taluk	Village	Block	Survey Nos.	Area in Hectares of mining lease appl	Remarks
1.	Kollam	Karunagappally	Neendakara	I	25 to 112 A	34.285	
2.	Kollam	"	Chavara Panmana	III	1 to 121	88.119	
3.	Kollam	"	Karunagappally	V	91 to 220 (less 218)	28.899	
4.	Kollam	"	Kulasekhara-puram	VII	1 to 199 1 to 151	29.895 22.604	

**203.802**

Actual area within the boundary of the plot is now seen to be the following

Sl.No	District	Taluk	Village	Block	Survey Nos	Hectares	Area	Sq.Mts
1	Kollam	Karunagappally	Neendakara	I	25 to 112 A	34	28	50
2	Kollam	Karunagappally	Panmana	III	6 to 60	70	64	70
3	Kollam	Karunagappally	Vadakkumthala	III	695	1	97	77
4	Kollam	Karunagappally	Chavara	III	14 to 23	15	36	76
5	Kollam	Karunagappally	Chavara	III	24	0	17	70
		TOTAL	BLOCK III			88	11	93
6	Kollam	Karunagappally	Karunagappally	V	91 to 220	28	89	90
7	Kollam	Karunagappally	Kulasekhara-puram	VII	1 to 199	29	89	50
8	Kollam	Karunagappally	Kulasekhara-puram	VII	1 to 151	22	60	40
		TOTAL				203	80	23

contd...7

7:

(b) description of the area applied for renewal (description should be adequate for the purpose of demarcating the plot) (As enclosed below in table)



Sl.No	District	Taluk	Village	Block	Survey Nos	Hectares	Acres	Sq.Mts
1	Kollam	Karunagapally	Neendakam	I	25 to 112 A	34	28	50
2	Kollam	Karunagapally	Pannana	III	6 to 60	70	69	70
3	Kollam	Karunagapally	Vadakkunthala	III	695	1	97	77
4	Kollam	Karunagapally	Chavara	III	1 to 23	15	26	76
5	Kollam	Karunagapally	Chavara	III	24	0	17	70
		<b>TOTAL</b>	<b>BLOCK III</b>			<b>88</b>	<b>11</b>	<b>93</b>
6	Kollam	Karunagapally	Karunagapally	V	91 to 220	28	89	90
7	Kollam	Karunagapally	Kulasekharapuram	VII	1 to 199	29	89	50
8	Kollam	Karunagapally	Kulasekharapuram	VII	1 to 151	22	60	40
		<b>TOTAL</b>				<b>203</b>	<b>80</b>	<b>23</b>

(c) particulars of map of the leasehold with area applied for renewal clearly marked on it (attached),

The areas are indicated on the enclosed plans (4 Nos).

(d) particulars of existing or created dumps of ore, if any.

Nil

(xii) Means by which the mineral is to be raised, i.e., by hand, labour or mechanical or electric power.


Existing Beach Wash Mining is by semi mechanized methods. Beach washing are dozed and heaped by Bulldozers and Front End Loaders. The mineral sand thus collected is manually mechanically loaded into tippers and transported to Mineral separation unit. In the proposed expansion scheme, inland mining by dredging is also proposed.

contd...8

8:

(xiii) Manner in which the mineral raised is to be utilized

(a) for manufacture in India,



The entire quantity of Ilmenite is used for captive consumption for the production of TiO<sub>2</sub> Pigment in our pigment unit. Rutile produced is partly consumed in TiO<sub>2</sub> plant and the rest is sold to domestic markets. The entire quantity of Zircon is sold in domestic markets. Rutile is sold to industries manufacturing welding electrodes. Zircon is sold to Refractory industries.

(b) for exports to foreign countries,

No export of Minerals is proposed now. Manufacture of Titanium dioxide pigments, refractory industries and ceramic industries.

(c) in the former case the industries in connection with which it is required, should be specified. In the latter case, the countries to which the mineral will be exported and whether the mineral is to be exported after processing or in raw form should be stated.

(xiv) Details of out put during the last three years and phased programme for production during the next three years along with a layout plan for development, if any.

Already submitted. No specific development work is required since mining is by collection of beach washings

(xv) In case of coal, details of existing railway transport facility available and additional transport facility, if any, required

Not applicable as the application is not for coal mining.

(xvi) Any other particulars which the applicant wishes to furnish.

Resolution of the Board of Directors authorizing the Managing Director to apply for renewal of mining Lease is already submitted.

contd...9

:9:

I /We hereby declare that the particulars furnished above are correct and true and are ready to furnish any other details, including accurate plans as required by you before the grant of renewal of the lease.

Place: *Chennai*

Date: *11/11/2008*

Yours faithfully,



*[Handwritten Signature]*  
The Chairman & Managing Director  
(Signature, and designation of the applicant)  
**A. K. LUKE**  
Chairman & Managing Director

- If the application is signed by an authorized agent of the applicant, Power of Attorney should be attached.



## GOVERNMENT OF KERALA

Abstract

Industries Department - Mining & Geology - Mines and Minerals - Mining Lease of Mineral sands - Renewal of Mining Lease to M/s.KMML, Chavara  
Modification of Order - granted - Orders issued.

INDUSTRIES (A) DEPARTMENT

G.O. (MS) No 214/2011/AD

Dated Thiruvananthapuram, 24/10/2011

Read: 1) G.O.(Ms) No.175/2010/AD dated 12.8.2010

2) Letter No.MS/Mines/mining lease/71A-2010 dated 13.9.2010 and MS/Mines/Min&Geo/182A-2010/446 dated 10.11.2010 and letter No.MS/Mines/Min&Geo/71A-2011/49 dated 11.5.2011 from M/s.KMML, Chavara.

3) Letter No.4958/M1/2004 dated 20.12.2010 and 16.4.2011 and 03.08.2011 from the Director of Mining & Geology, Thiruvananthapuram.

ORDER

As per Government Order read as 1st paper above, a mining lease for Mineral sand, limonite, Rutile, Leucosae, Zircon and Silimanite to M/s.KMML, Chavara, over an area of 203.802 ha of land in Karunagappally Taluk, Kollam District was granted to M/s.KMML for a period of 20 years subject to 23 specific condition from 'a' to 'w'.

Vide letter read as 2<sup>nd</sup> paper, M/s.KMML had requested to amend condition (J),(I),(M) and (T) of the Government Order read as 1st paper above.

Government had examined the matter in detail, in consultation with Director of Mining & Geology, Thiruvananthapuram and are pleased to make the following modifications to the Government Order read as 1 paper.

The condition (J) in the Government Order read as 1st paper above is modified as 'mining near the T.S canal shall be carried out in accordance with the Inland Water Authority of India Act and Rules and Mines & Minerals (Development & Regulation) Act, 1957 and Rules made there under.'

The condition (t) in the Government Order read as 1st paper above is amended as 'the applicant should obtain necessary clearances from Revenue Department, if required, and clearances from CRZ Authority, as per the EIA Notification as issued and amended from time to time by Ministry of Environment and Forest'

JACOB PUNNEN  
RQP/BNG/028/88



The condition (m) in the Government Order read as 1st paper above is amended as 'the mining activities below the sea level shall be carried out by leaving a buffer zone of 50 m away from the shore line and also 50 m away from the T.S.Canal wherever it is applicable. This condition is stipulated to protect the T.S.Canal and the barrier beach. The reclamation and restoration of the mined out area shall be done simultaneously as the mining progress. Mining shall be done by using MRP (Manual Recovery Plant).'

The word 'prevention' in condition 'f' in the Government Order read as 1st paper is substituted with the word 'preservation'.

The Government Order read as first paper above is modified to this extent only.

(By Order of the Governor)

K.S.SRINIVAS,  
Special Secretary to Government.

To

- ✓ The Managing Director, Kerala Minerals & Metals Limited, Chavara.
- The Director of Mining and Geology, Thiruvananthapuram.
- The Controller, Indian Bureau of Mines, Nagpur (with C/L)
- The Secretary, Ministry of Mines, Government of India, New Delhi.
- The Director, Survey & Land Records, Thiruvananthapuram.
- The Accountant General (Audit), Kerala, Thiruvananthapuram.
- The District Collector, Kollam/Alappuzha.

Stock file/Office copy.  
Copy to: The disposal leading to G.O(Ms)No.175/2010/ID dt:12.8.2010)

Forwarded/By order,

Section Officer.

# ANNEXURE XXV

Annexure - XXV 82 of 155 235



25 Years of  
Safety Regulation  
1983 - 2008

परमाणु  
ऊर्जा  
नियामक  
परिषद

10/09/09  
M.M./c  
9/9/09



भारत सरकार

GOVERNMENT OF INDIA

Atomic  
Energy  
Regulatory  
Board



अध्यक्ष  
CHAIRMAN

No.CH/AERB/IPSD/BSML/65A/2009 /885c



## LICENSE

With reference to Application No. MS/ Mining/ AERB. License/147/2008/234 dated 20<sup>th</sup> December 2008

Shri George kutty Thomas, Assistant General Manager (MS) of M/s The Kerala Minerals and Metals Ltd., Chavara, Kerala having undertaken to comply with the conditions prescribed in the

- Atomic Energy Act, 1962 and the rules framed thereunder
- Applicable Codes and Guides, giving requirement for various operation stages and any orders Issued thereunder

**License to operate** is hereby granted under **Rule 3 of the Atomic Energy (Radiation Protection) Rules, 2004** to M/s-The Kerala Minerals and Metals Ltd., Chavara, Kerala, subject to the conditions annexed to this license.

This license is valid until 31<sup>st</sup> August 2014.

Shri Georgekutty Thomas  
Assistant General Manager (MS)  
M/s The Kerala Minerals & Metals Ltd.  
M.S. Unit, Kovalthottam  
Chavara- 691583  
Kollam, Kerala

(Competent Authority)

ए.के. शर्मा / S.K. SHARMA  
अध्यक्ष / Chairman  
परमाणु ऊर्जा नियामक परिषद  
Atomic Energy Regulatory Board

JACOB PUNNEN  
RQP/BNG/028/88/A



ISO 9001:2000  
Organisation

नियामक परिसर, अनुशक्तिनगर, मुंबई - 400 094  
NIYAMAK BHAVAN, ANUSHAKTI NAGAR, MUMBAI - 400 094

दुरावा / TELEPHONE : 91-22-2556 2343, 2558 0504  
फैक्स / FAX : 91-22-2556 2344, 2558 5717, 2558 3290  
E-mail: chairman@aerb.gov.in  
वेबसाइट / WEBSITE : www.aerb.gov.in

Conditions of License:

1. The employer shall ensure that provisions of the Atomic Energy (Radiation Protection) Rules, 2004 are implemented.
2. Duly qualified Radiological Safety Officer (RSO) approved by Atomic Energy Regulatory Board (AERB) shall be available at the site and shall be provided with requisite facilities to discharge his duties and functions.
3. Records of quantity and monazite content of the raw material, products and monazite enriched tailings shall be maintained.
4. Monazite enriched tailings shall be disposed in trenches and topped with silica rich sand. The employer shall ensure that sufficient trenches are available for the disposal of tailings to be generated during the license period and there is no enhancement in the natural radiation background of the tailings disposal area.
5. Appropriate records of radiological monitoring of personnel, workplace, plant premises including tailings disposal area, mining area and iron oxide pipelines of chemical processing plant shall be maintained.
6. Transport of Monazite enriched tailings shall be in accordance with the guidelines prescribed by the AERB.
7. Annual Health Physics Report shall be sent to AERB in the prescribed format.
8. Full facilities shall be accorded to authorised representative(s) of AERB to inspect the installation at any time.
9. The employer shall comply with all the recommendations made by AERB with respect to radiological safety.
10. Any changes in the information listed in the application shall be intimated forthwith to AERB.
11. The license shall not be transferred without prior approval of AERB.
12. Application for renewal of license in the format prescribed vide No.CH/AERB/PSD/65/2009/7471 dated July 20, 2009 shall reach AERB before 180 days of the date of expiry.
13. Any plan for decommissioning of the facility shall be intimated forthwith to AERB.

This license may be suspended/or cancelled, if any declaration made or information given in the application thereof is found to be false or if any undertaking given in such application is not carried out.



दूरवाणी :  
 Telephone : 2202500  
 तार : परमाणु ऊर्जा  
 Telegrams : 'ATOMERG'  
 फेक्स : 2204 8476  
 Fax : 2202 6728

**ANNEXURE XXVI**

009460



भारत सरकार  
 GOVERNMENT OF INDIA

परमाणु ऊर्जा विभाग  
 DEPARTMENT OF ATOMIC ENERGY



अणुशक्ती भवन  
 Anushakti Bhavan  
 शास्त्री शिवाजी महाराज मार्ग,  
 Charapati Shivali Maharaj Marg,  
 मुंबई - ४००००८  
 MUMBAI - 400 008

No. MS. 3203  
 Date 18.09.06

No. 7/1(C00B19)/2006-PSU/MING/IRZ-00549

**LICENCE FOR HANDLING PRESCRIBED SUBSTANCES**

( Under Rule 3 of the Atomic Energy ( Working of the Mines , Minerals & Handling of Prescribed Substances) Rules,1984 read with Department of Atomic Energy Notification No.A.A/27(1)/2005 - ER - S.O.61 (E) dated 18.01.2006 )

**M/s. The Kerala Minerals and Metals Ltd.**  
**Sankaramangalam,**  
**Chavara - 691 583, Kollam,**  
**Kerala,**

having undertaken to comply with the conditions prescribed in the Atomic Energy (working of the Mines, Minerals and Handling of prescribed Substances ) Rules, 1984 and orders issued thereunder, and having paid the prescribed licence fee, are hereby authorised to undertake beach sand mining at lands in various villages of Kollam District, Kerala as listed in Annexure A for production of prescribed substances (minerals), viz. 70000 MT of Ilmenite, 6000 MT of Rutile and 3000 MT of Zircon per annum and further handling thereon within India (i.e. no export) as described in their application dated 28/07/2005.

2. This licence is issued, with the approval of the Licensing Authority, on 11/09/2006 and shall be valid upto 31/12/2006, subject to the conditions detailed in the enclosed Annexure D.

  
 (A.K.V. Nair)  
 Under Secretary  
 Tel.22027918

  
**JACOB PUNNEN**  
**ROP/BNG/028/88/A**

PS  
 Copies to:  
 1. Am (ms)  
 2. mm (1c) ✓  
 3. DM (PEA)  
 4. m (P/ry)  
 5. m (adP)  
 19/9/06

भारत सरकार  
परमाणु ऊर्जा विभाग

सं. 7/1(C00819)/2006-पीएसयू/एमआईएनजी/आईआरजेड-00549

दिनांक : 11/09/2006

12

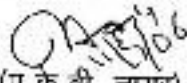
निर्धारित पदार्थों के हस्तन हेतु लाइसेंस

[परमाणु ऊर्जा विभाग की दिनांक 18.01.2006 की अधिसूचना सं. - ए ई ए/27(1)/2005 - ई आर - एसओ.61 (ई) के साथ संशुद्ध परमाणु ऊर्जा (खनिजों से संबंधित कार्यप्रणालियाँ एवं निर्धारित पदार्थों का हस्तन) नियमावली 1984 के नियम 3 के अधीन ]

मेसर्स द केरल मिगरल्स एंड मेटल्स लिमिटेड  
संकरामंगलम,  
चावरा - 691 583,  
कोल्म,  
केरल,

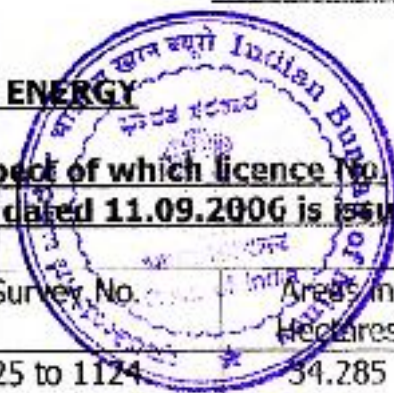
को, परमाणु ऊर्जा (खान, खनिजों से संबंधित कार्य प्रणालियाँ एवं निर्धारित पदार्थों का हस्तन) नियमावली 1984 और इसके अंतर्गत जारी किसी अन्य आदेश में निर्धारित शर्तों का अनुपालन सुनिश्चित करने और निर्धारित लाइसेंस शुल्क का भुगतान करने के फलस्वरूप विहित पदार्थों (खनिजों) अर्थात् प्रतिवर्ष 70000 M.T. इल्मेनाइट, 6000 M.T. रुटाइल और 3000 M.T. जिर्कोन के उत्पादन हेतु लाइसेंस के लिए किए गए दिनांक 28/07/2005 के उनके आवेदन पत्र के अनुलग्नक-क में उल्लिखित विवरण के अनुसार केरल के कोल्म जिले के विभिन्न गांवों में भूमि के पुलिन बालू के खनन तथा इन पदार्थों के भारत में हस्तन (अर्थात् निर्यात नहीं) हेतु प्राधिकृत किया जाता है ।

2. यह लाइसेंस, साथ में संलग्न अनुलग्नक ख में वर्णित शर्तों के तहत दिनांक 11/09/2006 को लाइसेंस प्राधिकारी के अनुमोदन से जारी किया जाता है और यह दिनांक 31/12/2006 तक विधिमान्य होगा ।

  
(ए.के.वी. नायर)  
अवर सचिव  
टेलीफोन 2202 7910

**Annexure-A****DEPARTMENT OF ATOMIC ENERGY**

**Areas covered under Mining lease in respect of which licence No. 7/1(C00819)/2006-PSU/MING/IRZ-00549 dated 11.09.2006 is issued**



Block No.	District	Village	Survey No.	Area in Hectares
I	Kollam	Neendakara	25 to 1124	34.285
III	Kollam	Chavara	1 to 121	41.966
		Ponmana	31 to 632	
V	Kollam	Karunagappally	91 to 220 (Less Sy. No.218)	28.899
VII	Kollam	Kulasekharapuram	1 to 199	29.895
		Perinad	1 to 151	22.604

अनुलग्नक -क



दि. 11.09.2006 के जारी किए गए सर्वे सं. 7/1(200819)/2006-पीएसयू/एमआईएनजी/  
आईआरजेड-00549 के अधीन सूचन लेख के तहत कवर क्षेत्र के संबंध में

ब्लॉक सं.	जिला	सर्वे सं.	हेक्टरों में क्षेत्र
I	कोल्लम	नीनडकरा 25 to 1124	34.205
III	कोल्लम	चावरा 1 to 121	41.966
		पोन्मन 31 to 632	
V	कोल्लम	करुनागणपल्ली 91 to 220 (Less Sy. No.218)	28.899
VII	कोल्लम	कुलसेखरापुरम 1 to 199	29.895
		पेरिनाड 1 to 151	22.604

ANNEXURE

XXVII

Annexure - XXVII

88 of 155

239

~~DESPATCHED~~  
~~Parilakhe~~  
~~Asst. 09.2.2011~~  
~~DATE~~

MS/Mines/Mineral sand budgeting /321-2010 /650.  
27-01-2011.

To Center for Earth Science studies,  
P B No. 7250  
Akkulam,  
Thiruvananthapuram -695 031



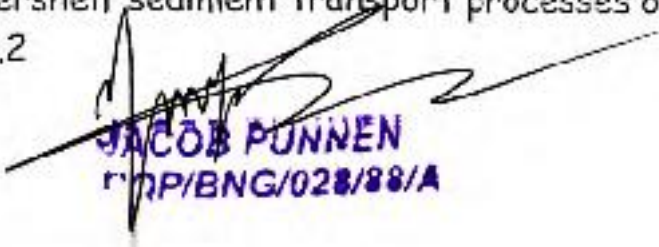
**Sub:-** Mineral sand budgeting and connected studies for our mining area at Ponmana - Work order.

- Ref:-**
1. Our enquiry letter dated 11-03-2010.
  2. Your offer letter dated 19-04-2010.
  3. Our re enquiry dated 11-10-2010.
  4. Your letter dated 16-11-2010
  5. Our Letter of intent dated 26-11-2010.

Kindly recall our enquiry on taking up the study of mineral sand budgeting at our mining area located at Chavara , Kollam and subsequent correspondences , meetings and letter of intent referred above. In this connection we are pleased to award you the work of Mineral sand budgeting and connected studies for our mining area at Ponmana and the tecno commercial aspects of the work order and financial aspects are as detailed below.

1. Study Objectives
  - Study the hydrodynamic and sedimentologic characteristics in the innershelf of Chavara coast.
  - Carry out numerical model studies to understand the innershelf sediment transport processes of the region.

Contd.2

  
JACOB PUNNEN  
P/BNG/028/88/A

-2-



- Estimate the beach sediment budget for the coast.
- Recommend the quantity of the mineral sand accretions that can be removed without affecting the beach stability.

## 2. Work Components

The work components are

- Reconnaissance survey in the project area.
- Collation of environmental data.
- Innershelf of bathymetry survey for preparing the depth grid for numerical modeling and understanding the present morphology of the innershelf.
- Deployment of wave gauges, current meters and other equipments at different locations in the model domain and recording of data during different seasons.
- Monthly beach profile measurements in the Block III area of chavara Coast.
- Collection and analysis of surficial sediment samples from different locations in the beach and offshore of the study area.
- Setting up of numerical models for stimulating the circulation and sediment transport pattern in the study area.
- Calibration and Validation of the model.
- Computation of sediment transport and working out beach sediment budget.
- Preparation of final report.

Contd.3

-3-

### 3.Duration

The duration of the project shall be 18 months.

### 4.Data/Facilities to be provided by KMML

- Details of beach washing collection by KMML for the past one decade.
- Data/reports available with relevant to the study.
- Access for the project to team to KMML premises/mining sites and when required for field operations.

### 5.Deliverables

The deliverables of the project shall be :

- i. An interim report comprising of the results of the hydrodynamic and sedimentological measurements at the end of 9 months.
- ii. A final report at the end of 18 months. The final report shall comprise of :
  - a) Result of hydrodynamic and sedimentological Investigations.
  - b) Result of Numerical Modeling studies.
  - c) Estimate of the beach sediment budget for the coast.
  - d) Recommendation of the quantity of the mineral sand accretions that can be removed without causing erosion of the beach.
  - e) Elucidation of the probable ill effects of the mineral sand accretions on sea erosion
  - f) Recommendation on mitigation measures for controlling sea erosion along the coast.

Contd.4



-4-

- g) Comment on the advisability of the commencing the sea washing collections in the other parts of block III lease area of KMML.



#### 6. Accepted rates and payment terms

The total cost of the project is Rs.39.5 lakh plus Service Tax (ST) as applicable. 50% of the project cost shall be released by KMML at the time of commencement of the project. The balance 50% shall be released at the end of 9 months on submission of an Interim Report. The effective date of commencement of the project will be the date of receipt of the first installment.

#### 7. General terms

1. Selection of any agencies, labs required in connection with the work will be prerogative of CESS.
2. KMML shall provide available data for the work.
3. KMML shall also provide persons for local guidance, power and utilities for measuring instruments as required.
4. In case of any difference /ambiguity in the original offer/conditions and this work order then the conditions of this work order will prevail.
5. All disputes /differences if any arising under or in connection with this work order shall be mutually settled and the decision of The Managing Director KMML shall be final and binding in this regard.

Contd.5

-5-

6. Other general commercial provisions of work order viz Force Majeure is applicable and admissible.
7. This work order is issued in duplicate . Kindly return the duplicate copy duly signed in token of acceptance of the same.



Thanking you

Yours truly,

Asst General Manager (MS)  
For The Kerala Minerals and Metals Ltd.

Copy to Dy Manager (Accnts) ,Cashier, Manager (P&M) ,Manager (P&A), AMM.

CESS



## CENTRE FOR EARTH SCIENCE STUDIES

(An R&D Institution of the Kerala State Council for Science, Technology & Environment  
Government of Kerala)

P.B. No. 7250, Alkulam, Thiruvananthapuram 695 031, India

**Dr. K.V. Thomas**  
**Head, Marine Sciences Division &**  
**Principal Investigator**  
2012

30 May

To

The Assistant General Manager  
Kerala Metals and Minerals Ltd  
Chavara-691 583



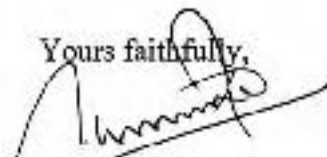
Sir,

Sub: Project "Sediment budgeting studies for Mining sites of Kerala Minerals and Metals Ltd., Chavara" – status

Ref: MS/Mines/Mineral sand budgeting/321-2010/650; dated 27.01.2011

The project "Sediment budgeting studies for Mining sites of Kerala Minerals and Metals Ltd., Chavara" undertaken by CESS is expected to give a total picture of sediment budget with respect to the heavy mineral deposits and mining along the mining blocks of KMML at Chavara. The primary data collection on waves, currents, surf zone morphodynamics, sediment characteristics, sediment transport, etc for different months/seasons is in progress. It is expected that the study will take another 24 months for its completion. The final report with the details of the sediment budget and the mineable quantity of beach sediment will be submitted as scheduled on completion of the project.

Yours faithfully,



(K V Thomas)

ANNEXURE XXVIII Annexure 84 of 155 XXVIII

Regd No. 1074  
916

245  
E-8  
1988

Government of India  
Department of Atomic Energy  
Atomic Minerals Directorate for Exploration and Research

No. MS/11755  
Date 13-06-03

1-10-153-156, Begumpet  
Hyderabad - 500 016

No.AMD/WPA/3M(KMML)/03/829



Sub: Approval of mining Plan, Panama and Chavara, Extent 41.9666 Hectares, Survey Nos. 1 to 121 and 31 to 632, Villages Panama and Chavara, Taluk: Karunagapally, District: Kollam, Kerala in respect of minerals ilmenite, rutile and zircon.  
Ref: Letter No. MS/605-28/2002 dated April 02, 2003

In pursuance of Gazette Notification No.1/(8)/89-M/VI dated 1997 issued by the Ministry of Steel & Mines, Government of India authorizing Director, AMD to approve the Mining Plans in respect of prescribed substances, the mining plan of Panama and Chavara villages, Karunagapally taluk, Kollam District, Kerala extending over 41.96.6 hectares, partly owned by Kerala Minerals and Metals Limited and partly privately owned land of survey Nos. 1 to 121 and 31 to 632 is approved subject to the following conditions:

- 1) The mining plan is approved in respect of minerals, Ilmenite, Rutile and Zircon which are notified as "prescribed substances" under Atomic Energy Act, 1962, subject to the condition that the total quantity handled per annum should not exceed the licensed quantity is 70,000 metric tons of ilmenite, 2,500 metric tons of rutile and 1,200 metric tons of zircon.
- 2) This mining plan is approved without any prejudice to any other laws applicable to the mine/area from time to time whether made by the Government of India, State Government or any other authority.
- 3) State Government shall examine MOEF clearance before granting the mining lease, if required.
- 4) The approval is also subject to the clearance under CRZ notification.
- 5) M/s. K.M.M. Ltd. Will furnish the details of grant of lease to Director, AMD for records
- 6) If anytime, during the operations of mines, if it is found that the existing laws are not being followed, Director shall be empowered to suspend the approval of mining plan giving the relevant reasons in writing.
- 7) If there is any dramatic change in the method of mining/milling, the information in this regard shall be sent to the Director, AMD, Hyderabad

JACOB PUNNEN  
ROB/MS/028/88/A

JACOB PUNNEN  
ADDITIONAL DIRECTOR

- 8) Full facilities shall be accorded to any authorized representative of the Director, AMD to inspect the mine and the processing plant, concerned records and registers at any time.
- 9) A copy of statutory returns and notices, which will be sent by the Management to Indian Bureau of Mines and Director General for safety will also be sent to Director, AMD, Hyderabad.

A copy of approved Mining Plan in respect of Ilmenite, Rutile and Zircon subject to fulfillment of above conditions is herewith enclosed.

→ M/s. Kerala Minerals and Metals Limited  
Kovithottam, Chavara  
KOLLAM - 691 583, KERALA



Copy for information to:

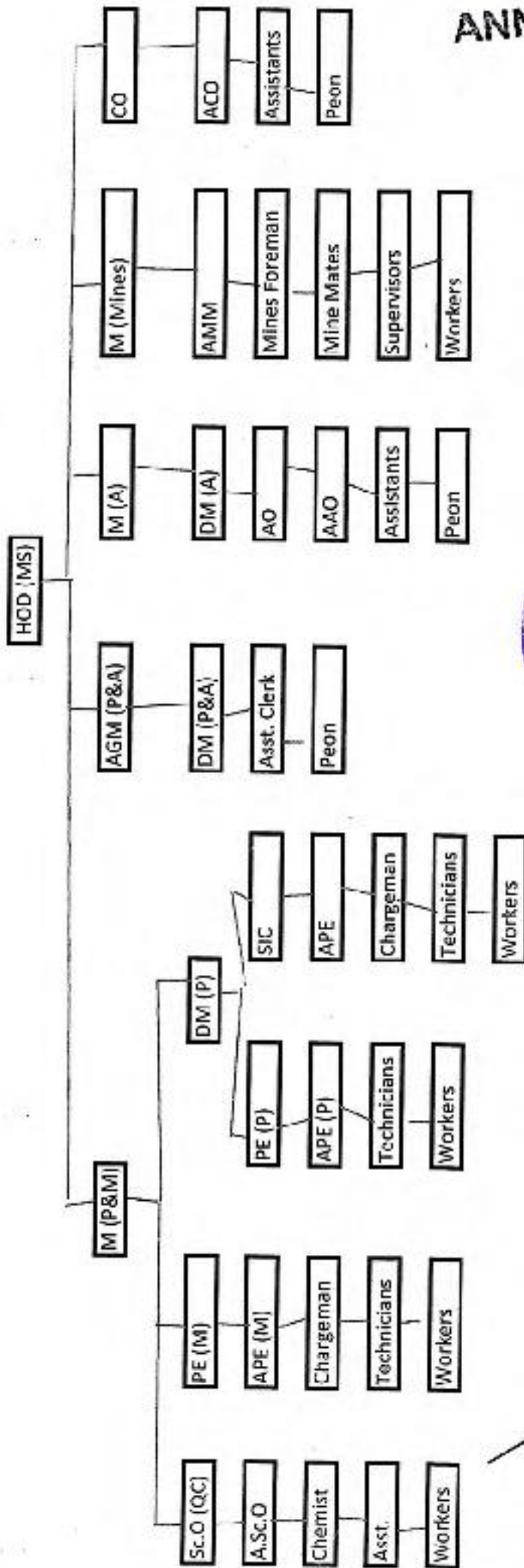
1. The Chief Controller of Mines, Indian Bureau of Mines, Indira Bhavan, Civil Lines, Nagpur - 440 001.
2. The Regional Controller of Mines, Indian Bureau of Mines, C-4A, Rajaji Nagar, Basant Nagar, Chennai - 600 090.
3. The Director, Directorate of Mines and Geology, Government of Tamil Nadu, Chennai - 600 032.
4. OSD(I&M), DAE, C.S.M. Marg, Mumbai - 400 039

Copy to:

- 1) Additional Director (Operations I/II), AMD, Hyderabad.
- 2) Incharge, PMSG, AMD, Hyderabad.

RK-GA  
(R.K. GUPTA)  
DIRECTOR

**ORGANIZATION CHART OF CHAVARA ILMENITE MINES OF M/S. KMMML**



**ANNEXURE**

96 of 155 **247**



Mines Manager  
Chavara Ilmenite Mines  
The Kerala Minerals and Metals Ltd.  
M. S. Unit, Kovilthottam  
Chavara - 691 583.  
Kollam, Kerala.



**JAGOB PUNNEN**  
K/OP/BNG/028/88/A

**SBT****ANNEXURE XXX****STATE BANK OF TRAVANCORE  
KOLLAM MAIN BRANCH**Bishop Jerome Nagar, Kollam – 691001, Kerala  
Ph: 0474 – 2740057 / 2751009 Fax: 0474 - 2750258 Email: kollam@sbt.co.inThe Regional Controller of Mines,  
Indian Bureau of Mines,  
Bangalore.

Dear Sir,

Original Bank Guarantee No	7005412BG0000111
Amount of Bank Guarantee	Rs. 2,00,000/-
Original guarantee period	: 27/07/2012 to 26/07/2013
Extended Bank guarantee period	: 27/07/2012 to 31/03/2016
Last date of lodgment of claim	: 31/03/2016
Applicant	: M/s. Kerala Minerals and Metals Ltd., Sankaramangalam, Chavara – 691583, Kollam.



We hereby inform you that at the request of the above applicant, the captioned Bank Guarantee No: 7005412BG0000111 issued by us on 27/07/2012 for an amount of Rs.2,00,000/- (Rupees Two lakh only) for a period from 27/07/2012 to 26/07/2013 is extended for further period up to 31/03/2016 for an amount of Rs.2,00,000/- (Rupees Two lakh only). The last date for the receipt of claims under this extended Bank Guarantee stands extended upto 31/03/2016.

All other terms and conditions as appearing in the original Guarantee shall apply to this Extension Guarantee and shall be read with the original Bank Guarantee.

For State Bank of Travancore

കുറേ സ്റ്റേറ്റ് ബാങ്ക് ഓഫ് ത്രാവന്കൂർ  
For State Bank of Travancore

മുഖ്യ പ്രബന്ധക (സി & റെ) കോല്ലം  
Manager (C&R) Kollam Main Br.

AUTHORISED SIGNATORY

Dated 22<sup>nd</sup> October 2012

കുറേ സ്റ്റേറ്റ് ബാങ്ക് ഓഫ് ത്രാവന്കൂർ  
For State Bank of Travancore

മുഖ്യ പ്രബന്ധക (സി & റെ) കോല്ലം  
Chief Manager (C&R) Kollam

AUTHORISED SIGNATORY

JACOB PUNNEN  
RQP/BNG/028/88/A

**SBT****STATE BANK OF TRAVANCORE  
KOLLAM MAIN BRANCH**

Bishop Jerome Nagar, Kollam - 691001, Kerala

Ph: 0474 - 2740057 / 2751009 Fax: 0474 - 2750258 Email: [kollam@sbt.co.in](mailto:kollam@sbt.co.in)

Original Bank Guarantee No	: 7005412BG0000111
Amount of Bank Guarantee	: Rs.2,00,000/-
Renewal Period From	: 27/07/2012 to 26/07/2013
Last date for Lodgment of Claim	: 26/07/2013
Applicant	: M/s.Kerala Minerals and Metals Limited, Chavara, Kollam.



This deed of guarantee executed by the State Bank of Travancore, constituted under the State Bank of India (Subsidiary Banks) Act 1959 having its Head Office at Poojappura, Thiruvananthapuram and amongst other places, a branch at Kollam Main branch (hereinafter referred to as "the Bank") in favour of the Regional Controller of Mines, Indian Bureau of Mines for an amount of Rs.2,00,000/- (Rupees two lakh only) at the request of M/s.Kerala Minerals and Metals Limited, Chavara, Kollam (hereinafter referred to as the party)

1. This guarantee is issued subject to the condition that the liability of the Bank is limited to a sum of Rs.2,00,000/- (Rupees two lakh only) and the guarantee shall remain in force up to 26/07/2013 and cannot be invoked otherwise than by a written demand or claim under this guarantee served on the Bank on or before 26/07/2013.
2. We, State Bank of Travancore (Hereinafter referred to as "the Bank") at the request of M/s. Kerala Minerals and Metals Limited, Chavara, Kollam do hereby undertake to pay to the Regional Controller of Mines, Indian Bureau of Mines or any other authority nominated by the State Government, an amount not exceeding Rs.2,00,000/- (Rupees two lakh only) against any loss or damage caused to or suffered or would be caused to or suffered by the Government or towards non compliance of provisions of Rule 23 A and B of MCDR 1988 i.e., Mine Closure Plan/Progressive Mine Closure Plan approved in respect of ML No.G.O.(MS)No.175/2010/ID and 214/2011/ID dated 12/08/2010 and 24/10/2011 of Kerala Minerals and Metals Ltd., Chavara, situated in Karunagapally Taluk, Kollam District, Kerala State, by reason of any breach by the said Lessee of any of the terms or conditions contained in the Mine Closure Plan/Progressive Mine Closure Plan.

സംസ്ഥാന ബാങ്കിംഗ് കമ്മീഷന്റെ  
For State Bank of Travancore

സൂപ്പർ ഗ്രാൻഡ്  
Chief Manager (C&M) Kollam

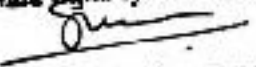
സംസ്ഥാന ബാങ്കിംഗ് കമ്മീഷന്റെ  
For State Bank of Travancore

സൂപ്പർ ഗ്രാൻഡ്  
Manager (C&M) Kollam Main Br.

3. We, State Bank of Travancore, Kollam Main Branch do hereby undertake to pay the amounts due and payable under this guarantee without any demur, merely on a demand from the Regional Controller of Mines, Indian Bureau of Mines, Bangalore, or any other authority nominated by the State Government stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the Government, reason of breach by the said Lessee of any of the terms or conditions contained in the said Mining Plan/Mining Scheme or by reason of the Lessee's failure to perform the said Mine Closure Plan/Progressive Closure Plan. Any such demand made on the bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs.2,00,000/- (Rupees two lakh only).
4. We undertake to pay to the Regional Controller of Mines, Indian Bureau of Mines, Bangalore or any other authority nominated by the State Government any money so demanded not with standing any dispute raised by the Lessee in any suit or proceeding pending before any Court or Tribunal relating there to our liability under this present being absolute and unequivocal. The payment so made by us under this bond shall be valid discharge of our liability for payment there under and the Lessee shall have no claim against us for making such payment.
5. We, State Bank of Travancore, Kollam Main Branch further agree that the guarantee herein contained shall remain in full force till 26/07/2013 that would be taken for the performance of the said Agreement and that it shall continue to be enforceable till all the dues of the Government under or by virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till Regional Controller of Mines, Indian Bureau of Mines, Bangalore or any other authority nominated by the State Government certifies that the terms and conditions of the said Mine Closure Plan/Progressive Mine Closure Plan have been fully and properly carried out by the said Lessee and accordingly discharges this guarantee. Unless a demand or claim under this guarantee is made on us in writing on or before the 26/07/2013 we shall be discharged from all liability under this guarantee thereafter.
6. We, State Bank of Travancore, Kollam Main Branch further agree that the Regional Controller of Mines, Indian Bureau of Mines, Bangalore or any other authority nominated by the State Government, shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Agreement or to extend time of performance by the said Lessee from time to time or to postpone for any time or from time to time any powers exercisable by the Regional Controller of Mines, Indian Bureau of Mines, Bangalore or any other authority nominated by the State Government against the said Lessee and the



സ്റ്റേറ്റ് ബैंക് ഓഫ് ത്രാവന്കൂർ  
of State Bank of Travancore  
  
മുഖ്യ മാനേജർ  
Chief Manager  
Kollam

സ്റ്റേറ്റ് ബैंക് ഓഫ് ത്രാവന്കൂർ  
of State Bank of Travancore  
  
മുഖ്യ (സി. & ടി) മാനേജർ  
Manager (C & T) Kollam Main Br.

forbear or enforce any of the terms and conditions relating to the said agreement and we State Bank of Travancore shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Lessee or for any forbearance, act or omission on the part of the Regional Controller of Mines, Indian Bureau of Mines, Bangalore to the said Lessee or by any such matter or thing whatsoever which under the law relating to sureties would, but this provision have effect of so relieving us.

7. This guarantee will not be discharged due to the change in the constitution of the Bank of the Lessee.
8. We, State Bank of Travancore, Kollam Main Branch, hereby undertake not to revoke this guarantee during its currency except with the previous consent of the Regional Controller of Mines, Indian Bureau of Mines, Bangalore in writing.

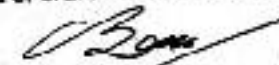
Notwithstanding what is stated here in above, our liability under this guarantee is restricted to Rs.2,00,000/- (Rupees two lakh only) and shall be valid up to 26/07/2013. Unless any claim or demand under this guarantee is made on us in writing on or before 26/07/2013 all rights under this guarantee shall be forfeited and we shall be relieved and discharged from all liability there under.

Dated the Friday 27<sup>th</sup> of July 2012 for State Bank of Travancore, Kollam Main Branch.

Place: Kollam,

Date: 27.07.2012.

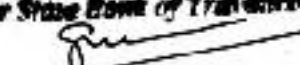
കുല സ്റ്റേറ്റ് ബാങ്ക് ഓഫ് ത്രാവന്കൂർ  
For State Bank of Travancore



മുഖ്യ പ്രവർത്തക (സി & റി) കോല്ലം  
Chief Manager (C&I) Kollam

**AUTHORIZED SIGNATORY**

കുല സ്റ്റേറ്റ് ബാങ്ക് ഓഫ് ത്രാവന്കൂർ  
For State Bank of Travancore



പ്രവർത്തക (സി & റി) കോല്ലം മുഖ്യ ശാഖ  
Manager (C&I) Kollam Main Br.

**AUTHORIZED SIGNATORY**

**The Kerala Minerals and Metals Ltd.***(A Govt. of Kerala Undertaking)*

Mineral Separation Unit

Kovilhottam, Chavara

Kollam- 691583, Kerala, S. India.

Ph : 0476-2680047, 2680048, 2680049

Fax : 0476-2686442

E-mail : agmans@kmml.com

KMML/MS/IBM/169/2012  
17/10/2012**UNDERTAKING**

I undertake that I shall reassess the Replenishable reserves in this Mining Plan as per UNFC immediately after receipt of the Study Report from CESS.

Georgekutty Thomas,

Asst. General Manager (MS).

Authorized by Managing Director, Kerala Minerals and Metals Ltd

Vide letter No. MS/Mines/Mining Lease/71A/2009 of 06/06/2009.

  
**JACOB PUNNEN**  
**RQP/BNG/028/88/A**

## ANNEXURE XVIII 1

**CONFIDENTIAL**

## FEASIBILITY REPORT FOR MINING OF BLOCK 3 IN KMML LEASEHOLD

**Geographical conditions**

The Chavara beach sand deposit is located near the town of Quilon which is north of Trivandrum on the western side of the southernmost tip of India (Fig.2). The heavy mineral deposit as a whole extends for about 23 km (14 miles) between Kayamkulam in the north (9° 8' 24"; 76° 27' 36") and Neendakara in the south (9° 56' 03"; 76° 32' 34").

The deposit has been subdivided into eight blocks, 4 of which have been assigned for development to the Kerala Minerals and Metals Ltd (KMML) and 4 to Indian Rare Earth Ltd (IRE). This report deals only with KMML Block III falling in Chavara, Panmana and Vadakumthala villages and having an area of 88.119 Ha.

**Infrastructure****Public utilities**

The area is well served by a net work of roads. The important Trivandrum Cherthala Canal (T.S. Canal) forms the eastern boundary of plot. This canal used to be an important waterway of south Kerala. It is now being developed as

## ANNEXURE XVIII 2

National Waterway No 3 by Inland Waterways Authority of India(I W W A I).

**↳ road, railways and other**

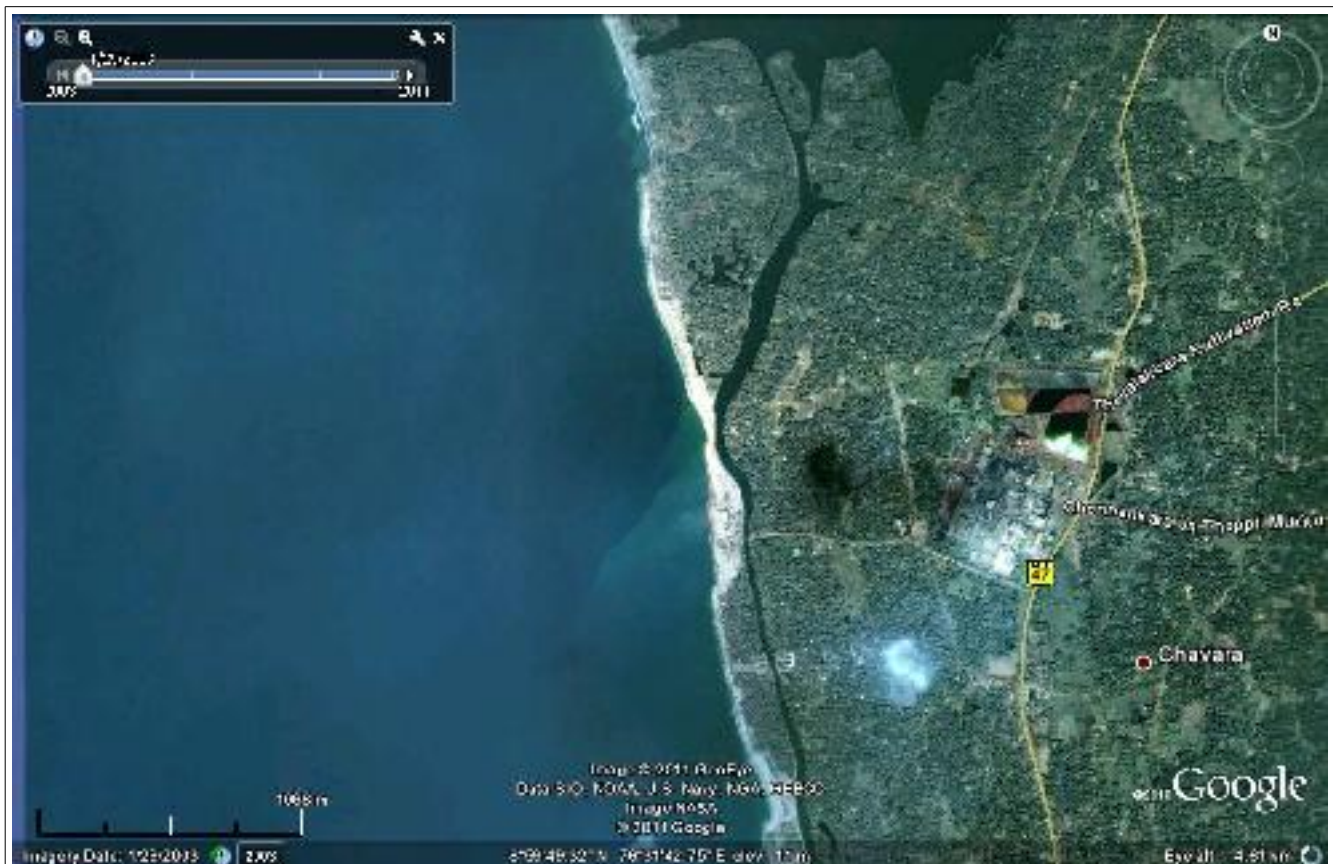
National Highway 47 passes to the east of the plot at a distance of about 2 kilometers. The plot is connected to the NH by an asphalt road starting at Sankaramangalam Jn. This road terminates on the eastern side of the TS canal.

The plot is accessed from there by a foot overbridge and a Jhankar (ferry)

↳ manpower

**Geology**

↳ structure, size, shape



A SATELLITE VIEW OF THE AREA

## ANNEXURE XVIII 3

“The Chavara beach sand deposit, also known as the Neendakara – Kayamkulam deposit, is a barrier beach extending over a length of 22.54 kms (14 miles) between two tidal channels, the southern at Neendakara of the Ashtamudi estuary and the northern at Kayamkulam of the Kayamkulam lagoon. It covers an area of about 400 hectares (about one thousand acres) with an average width of 200 metres (about one furlong) Fig.1. It has been the only deposit so far on the Indian Coast having heavy mineral contents ranging as high as 60 to 70%. Consequently this deposit has been under intensive mining for nearly fifty years and is reputed as one of the most important production and export centres of ilmenite in the world”.

Geomorphologically, the system appears to be a drowned bay feature where streams entered the ocean in the east – further east than the extremity of the deposit. The Bay was closed off by the barrier-beach, in time, due to the south to north transportation of sea borne sands. Rivers entering the ocean broke through progressive barrier beaches at different places from time to time and sand bars in the bay where likewise developed, cut and at times assisted in the concentration of heavy minerals.

***► Mineral content, grade, density***

Percentages of heavies is about 39. The average composition of the heavies for

## ANNEXURE XVIII 4

the whole of the block is approximately as follows:

Illemenite	68
Rutile	7
Leucoxene	2
Zircon	6
Monazite	1
Sillimanite and Kyanite	14
Balance silica sand	

The economic heavy minerals fall mainly in the size range – 60 + 120 mesh with the dominant fraction being – 60 + 80 mesh. The proportion of heavy mineral decreases with depth but the size range is similar. Quartz, however, becomes more abundant and larger in grain size with depth and there is also some tendency for the proportion of slimes to increase with depth.

***P reserve/resource quantity and quality***

For assessing the minable reserves, the lease area is divided into fields of 137m X 275 meters size. The reserve in each field was assessed using the data from detailed drilling and analysis by Atomic Minerals Dept. In case of fields at the boundary of the lease, percentage minable was estimated and the minable tonnage worked out. Detailed assessment is given below

## ANNEXURE XVIII 5

MINABLE RESERVES IN BLOCK 3					
(1)	(2)	(3)	(4)	(5)	(6)
FIELD NO	AREA MINABLE %	RESERVE IN THE FIELD metric tons	HM %	MINABLE RESERVES IN THE FIELD metric tons	Minable HM content metric tons
1F	25	640,000	9	160,000	13,824
1E	49	670,000	15	328,300	48,096
1D	22	670,000	15	147,400	21,933
2G	17	640,000	7	108,800	8,127
2F	97	640,000	6	620,800	39,172
2E	98	640,000	8	627,200	52,873
3G	44	640,000	9	281,600	24,527
3F	100	640,000	6	640,000	41,536
3E	100	640,000	7	640,000	43,520
4F	44	650,000	9	286,000	26,140
4E	99	650,000	11	643,500	68,726
4D	86	660,000	13	567,600	71,688
5E	54	710,000	26	383,400	101,141
5D	96	720,000	31	691,200	210,816
	<b>TOTAL</b>	<b>9,210,000</b>		<b>6,125,800</b>	<b>772,120</b>

### ***Legal Matters***

#### ***▸ Rights and ownership***

The land is entirely patta land and is being purchased by the company. The company follows a rehabilitation policy that is agreed to by all the stakeholders in the presence of the State Minister for Industries. A considerable portion of the land has already been purchased by the company.

## ANNEXURE XVIII 6

***▸ Socioeconomic impact studies***

KMML is the largest employer of the area. Mining has been going on in the area for the last 70 years. Dredge mining will help KMML to increase production of beach sand minerals. In this case, KMML will be self sufficient for raw material for its pigment plant.

***▸ Public acceptance***

There are two companies -M/s IRE Ltd and M/s KMML – which are engaged in beach sand mining in the area. IRE is a Govt of India undertaking under Ministry of Atomic Energy and KMML is a State Govt undertaking. These units are the major employers of the area and it is the ambition of the villagers to gain employment in either of the units. Additionally, the companies are mining a placer deposit containing a radio-active mineral Monazite. Removal of Monazite from the area reduces radiation risk to the population.

***▸ Land requirements***

The block No 3 has a total area of 88.119 Ha. The method of mining is surface mining . Hence all the lease area will be required for the operation.

***▸ Government factors***

KMML is owned by the Govt of Kerala. The State Govt is fully supportive of the company.

## ANNEXURE XVIII 7

***Operating***

The operations will be by opencast mining. There will be two types of mining: by collection of beach washings and by dredging of deposit.

***▸ rock mechanics***

There is no underground mining and no hard rocks are encountered in the mining operations.

***▸ mining equipment***

The equipments that will be used are the following

For Beach washing collection

1. Front end loader 1No
2. Bulldozer 1 No
3. Tipping trucks 10 ton capacity 4 nos

For dredge mining

The dredging scheme allows for pumping of concentrate to the shore and then by relay pumping to the stockpile at the dry plant. Tailing disposal is by pumping to- a disposal area using a long flexible line and a floating tailing stacker.

The design of the power supply for the dredge has been assumed as electric.

**Ancillary Mining Equipment**

A list of the major items of ancillary equipment is as follows:

Mobile Crane, 8 tonnes capacity

## ANNEXURE XVIII 8

Mobile Pipe Carriage, 5 tonnes capacity

Vehicle fleet, car, 4-wheel drive

Tractor and Mobile winch to transfer ground anchore

Swamp dozer, 90 hp

Shore based Mobile electrical sub-station with an earth leakage system

Mobile shore based effices, stores and workshops: 120m<sup>2</sup> floor area

Two-way radio

Surveying equipment

Water supply from the canal.

#### 4.4.6 Dredge – General

Essentially the dredge consists of seven basic sections:

1. Side pontoons with ballast tanks
2. Centre pontoon with machinery beds
3. Deck house with service gentry
4. Ladder with cutter and drive unit
5. Bow gantry
6. Control cabin module
7. Machinery – pumps, engines, winches etc.

#### Outline Specification for Suction Cutter Dredge

Dredge length – side Pontoons	25.3 m
Pontoon depth	1.52 m
Digging depth	15.3 m

#### Operation

Cable control – 6 drum dredging winch with P/S Bow and Stern Lines – 2 off each.

Ladder Hoist and Hand Line - 1 of each.

## ANNEXURE XVIII 9



A TYPICAL DREDGE

Each drum to be manually operated by 'Signal Box' type control lever from the control cabin. One lever will control such clutch and one lever will operate each brake which will be of a self energizing band type. For the operation outlined, a line pull of 5.230 kg would be sufficient. Power required will be approximately 15 kw.

#### Pumping Equipment

The main pump would be a Dredge Pump with an output of 800 t/h which would be transmitted by a totally enclosed, pressure lubricated chain drive, designed to operate at a continuous 500 kw through a fluid coupling.

## ANNEXURE XVIII 10

The above configuration would enable the center of gravity to be kept low and add stability to the dredge.

The motor would be a 500 kw T.E.F.C. machine. A 6.6 KV 50 Hertz 3 ph supply would enable power at reasonable voltage level to be taken from the floating treatment plant via trailing cable supported along the dredge delivery line.

#### Gland Seal Pump

High pressure pump to supply Gland seal water for the main pump. Approximately 11 KW.

#### Priming Pump<sup>4</sup>

High volume – medium pressure pump for priming main pump. The output from this unit is transferred to supply flushing water to the Cutterhead Rearing after the main pump has become operationa. ‘Bleed off’ supply Heat Exchanger for main pump for chain case cooling. (Approx. 11 KW).

#### Bilge Pump

Diaphragm type to handle accumulated spillage in the centre pontoon. Approximately 1.4 kw.

#### Chain Case Pump

High pressure gear pump to supply oil to chain drive through spray bars in chain case. Oil cooled by heat exchanger from ‘bleed off’ to cutter bearing. Approximately 1 KW.

#### Lubrication Pump

Supply cutter line shaft bearings, ladder pivot bearings from electrically driven 7 point automatic lubricator. Approximately 5 Kw.

#### Electric Motors

540 KW approximately, + Cutter 125 KW.

#### Light – Power

## ANNEXURE XVIII 11

6KW

Estimated Total Power Consumption

670 KW.

Ladder – Cutter Drive

The cutter would be driven by means of a line shaft supported in bearings and connected to an electric motor mounted at the top end of the ladder. Speed reduction by means of a heavy duty gear box enables maximum torque to be transmitted to the cutter.

Cutter Head Bearings & Stubshaft

Heavy duty unit equipped with roller bearings sealed from water and materials by special glands and water flushing rings.

Lubrication from automotive feed source

It is envisaged that a cutter of 60” diameter would be adequate.

Approximate power requirement would be 125 KW.

***• mining method***

The existing method of beach washing collection will be continued.

## ANNEXURE XVIII 12



AREA USED FOR BEACH WASHING COLLECTION

The proposed mining new scheme for the deposit is by means of a floating suction cutter dredge with an associated floating wet treatment plant with a dredge capacity of 600 tonnes per hour. The mining scheme is designed to leave the beach front in as safe a condition as currently exists.

ANNEXURE XVIII 13



BEACH WASHING COLLECTION WORK IN PROGRESS

## ANNEXURE XVIII 14



AREA SUITABLE FOR DREDGE MINING

***b construction plan and schedule***

The company is dependent on government approvals for major projects. Hence the dredge purchase will be only after Govt approval.

***b appropriate technological pilot tests***

Dredge mining has been practiced by M/s IRE Ltd in the adjacent block which is a continuation of Block No 3. Regarding processing, Mineral Separation plant of KMML has been in operation for the last 50 years. Hence pilot plant tests are not

## ANNEXURE XVIII 15

required.

***Mill and processing plant***

Mineral Separation plant of KMML has been in operation for the last 50 years. Hence pilot plant tests are not required. The ore will be treated in the existing MS plant for separation based on various physical properties of the minerals.

**PHYSICAL PROPERTIES**

The minerals are separated by various physical means depending on their properties viz.

- Magnetic Susceptibility
- Electrical Conductivity and
- Specific Gravity.

Ilmenite, Leucoxene and Monazite are magnetic materials. The magnetic susceptibility of these materials is different. Ilmenite is more magnetic and Leucoxene and Monazite are feebly magnetic.

Regarding Electrical conductivity, all the Titanium containing minerals (i.e. Ilmenite, Leucoxene and Rutile) are conducting and all others are non-conducting.

The specific gravity the various Minerals are: -

1. Monazite - 5.20
2. Zircon - 4.70
3. Rutile -4.25

## ANNEXURE XVIII 16

4. Ilmenite -4.2
5. Leucoxene - 3.50
6. Sillimanite - 3.30
7. Quartz – 2.60

**SEPARATION OF MINERALS**

A flow sheet of the process followed here will be included in the Mining Plan.

***▮ tailings disposal***

Major part of the tailings will be generated in the Dredge-wet concentrator system. This tailing will be used for refilling the dredge pond as the dredge advances. Tailing from the dry processing plant will also be used for refilling the land to the original profile.

***▮ water management***

The deposit occurs between the sea and TS Canal. Both these water bodies are saline. The dredge pond will have saline water from the canal and the sea. No water is removed from the pond because all the water is returned to the pond from the dredge. The canal has unlimited supply of saline water. Hence specific water management plan is not required.

***▮ transportation***

Beach washing material will be transported to the MS plant in 10 ton capacity tipping trucks. The concentrate from Dredge -wet concentrator will also be transported to the MS plant in 10 ton capacity tipping trucks. The tailings from

## ANNEXURE XVIII 17

Dredge -wet concentrator will be pushed by bulldozer to refill the rear part of the dredge pond.

***Power supply***

Power supply will be by 11 KV line from KSEB

***Manpower/labour relations***

***The unit is under State govt and enjoys good labour relations.***

***Auxiliary facilities and services***

Auxiliary facilities and services as required will be provided. The processing plant incorporates most of the systems required as auxiliary facilities.

***Closure design***

The Dredge -wet concentrator tailings and MS plant tailings are used for reclaiming the dredged area. Hence closure of the mined area is part of the mining operations. The reclaimed area can be used for various purposes as directed by the State Govt. Detailed Closure Plan will be provided along with Mining Plan.

***Environment (if not dealt with in a separate study)***

Environmental Impact Assessment and environment impact management are dealt with in the mining Mining Plan in detail.

***Market analysis***

Ilmenite produced here is used in the pigment plant of KMML. Other products

## ANNEXURE XVIII 18

can be sold in open market. The current market prices are as below

## SALE/TRANSFER PRICE

<u>MINERAL</u>	<u>Rs per ton</u>
Ilmenite	5,118
Rutile	36,000
Zircon	54,500

***Financial Analysis***

## KMML MS UNIT PROFITABILITY

ITEM	2010-11
	Rs Lakhs
<b>Total income</b>	<b>4414.75</b>
Variable cost	1390.08
Fixed cost	2796.58
<b>Total cost</b>	<b>4186.66</b>
Profit	228.09

## ANNEXURE XVIII 19

**Capital cost**

Capital cost required for dredge will be about Rs 10 crores. However a dredge with wet concentration plant mounted on it will cost about Rs 100 crores.

**Cashflow forecast**

KMML is a profitable unit and has sufficient cash flow to meet any requirement for capital expenses.

**Operating cost**

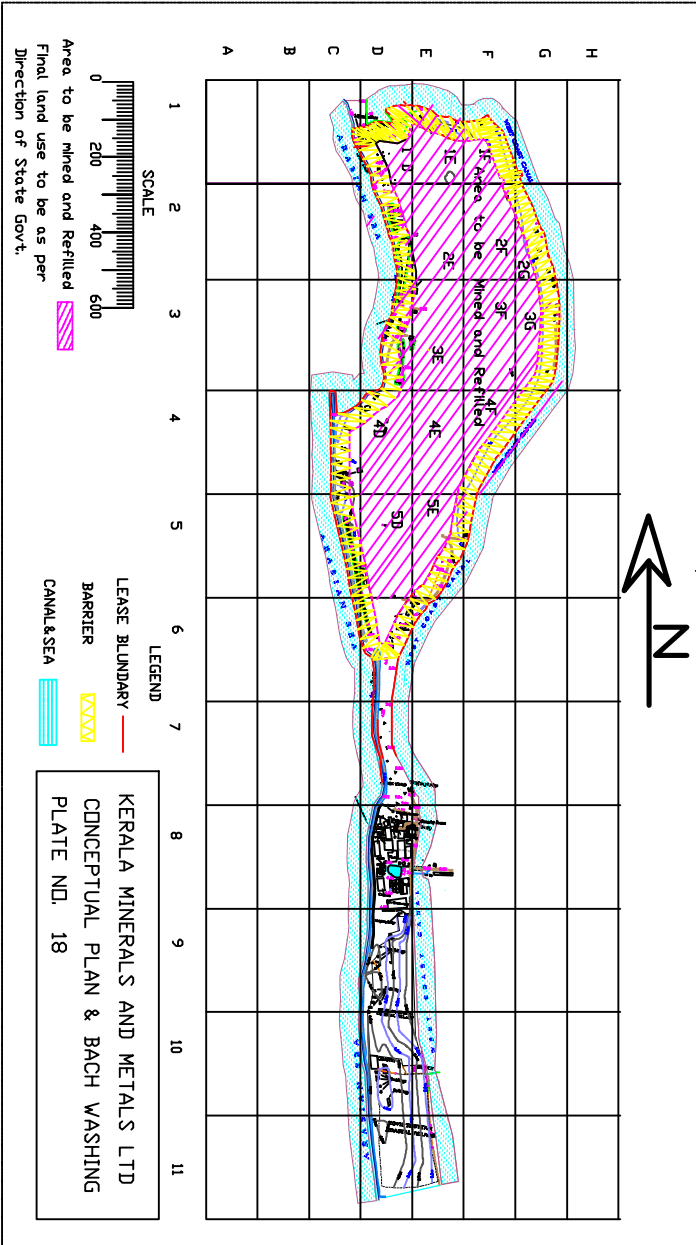
Summary of operating cost for mining and mineral separation unit is as below

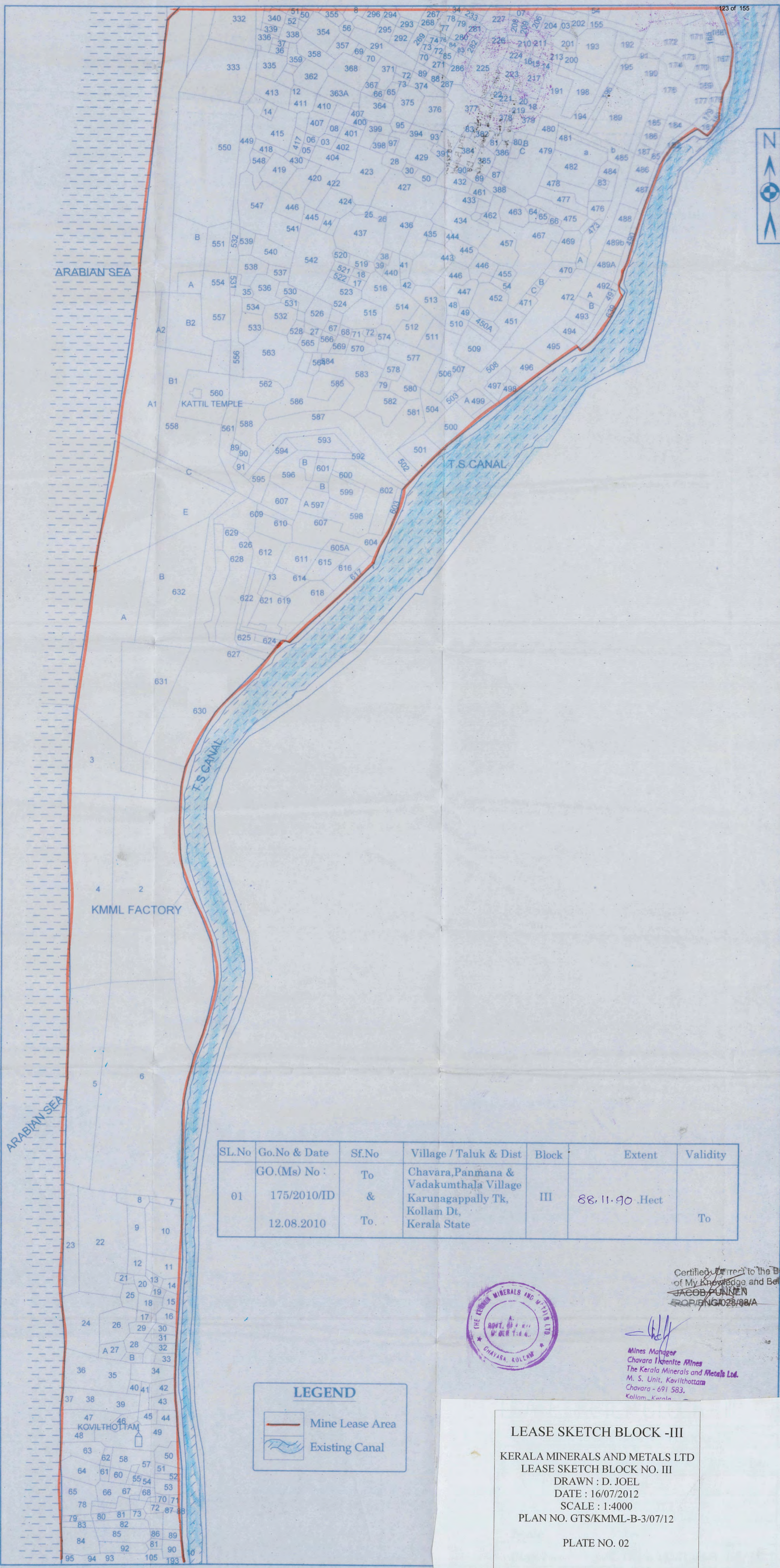
ITEM	2010-11
	Rs Lakhs
Employee cost	1,823.00
Repairs	139.37
Depreciation	252.00
Stores & Spares	215.10
Other administrative exp	367.11
<b>Total</b>	<b>2,796.58</b>

## ANNEXURE XVIII 20

***▸ Closure and Rehabilitation cost***

Mining method is such that no specific closure procedure is warranted. The dredge mining will also ensure simultaneous reclamation of the back side of the dredge pit. Hence special closure and rehabilitation cost will be very minimal.





SL.No	Go.No & Date	Sf.No	Village / Taluk & Dist	Block	Extent	Validity
01	GO.(Ms) No : 175/2010/ID 12.08.2010	To & To	Chavara, Panmana & Vadakumthala Village Karunagappally Tk, Kollam Dt, Kerala State	III	88.11.90 Hect	To

**LEGEND**

- Mine Lease Area
- Existing Canal



Certified to the Best  
of My Knowledge and Belief  
**JACOB PUNNEN**  
PROP/ENG/028/88/A

*[Signature]*  
Mines Manager  
Chavara Tchenite Mines  
The Kerala Minerals and Metals Ltd.  
M. S. Unit, Kovilthottam  
Chavara - 691 583,  
Kollam - Kerala

**LEASE SKETCH BLOCK - III**  
KERALA MINERALS AND METALS LTD  
LEASE SKETCH BLOCK NO. III  
DRAWN : D. JOEL  
DATE : 16/07/2012  
SCALE : 1:4000  
PLAN NO. GTS/KMML-B-3/07/12

PLATE NO. 02

*Plate No 2*

**KARTHIGAPALLY TALUK**  
(ALAPPUZHA DISTRICT)

**KOLLAM DISTRICT**  
SCALE 2 Cm. 1 Km.

**MAVELIKARA TALUK**  
(ALAPPUZHA DISTRICT)

**KUNNATHUR TALUK**

INDIAN OCEAN

**REFERENCE**

- District Boundary
- Taluk Boundary
- Village Boundary
- National Highway
- District Roads
- Other Roads
- Railway Line
- Lake & Rivers
- Taluk Head Quarters
- Name of Village
- Temple
- Church
- Mosque
- Village Office
- Panchayat Office
- Block Office
- Post Office
- Police Station
- Other Important Institution
- Hospital
- College
- High School
- Travellers Bungalow

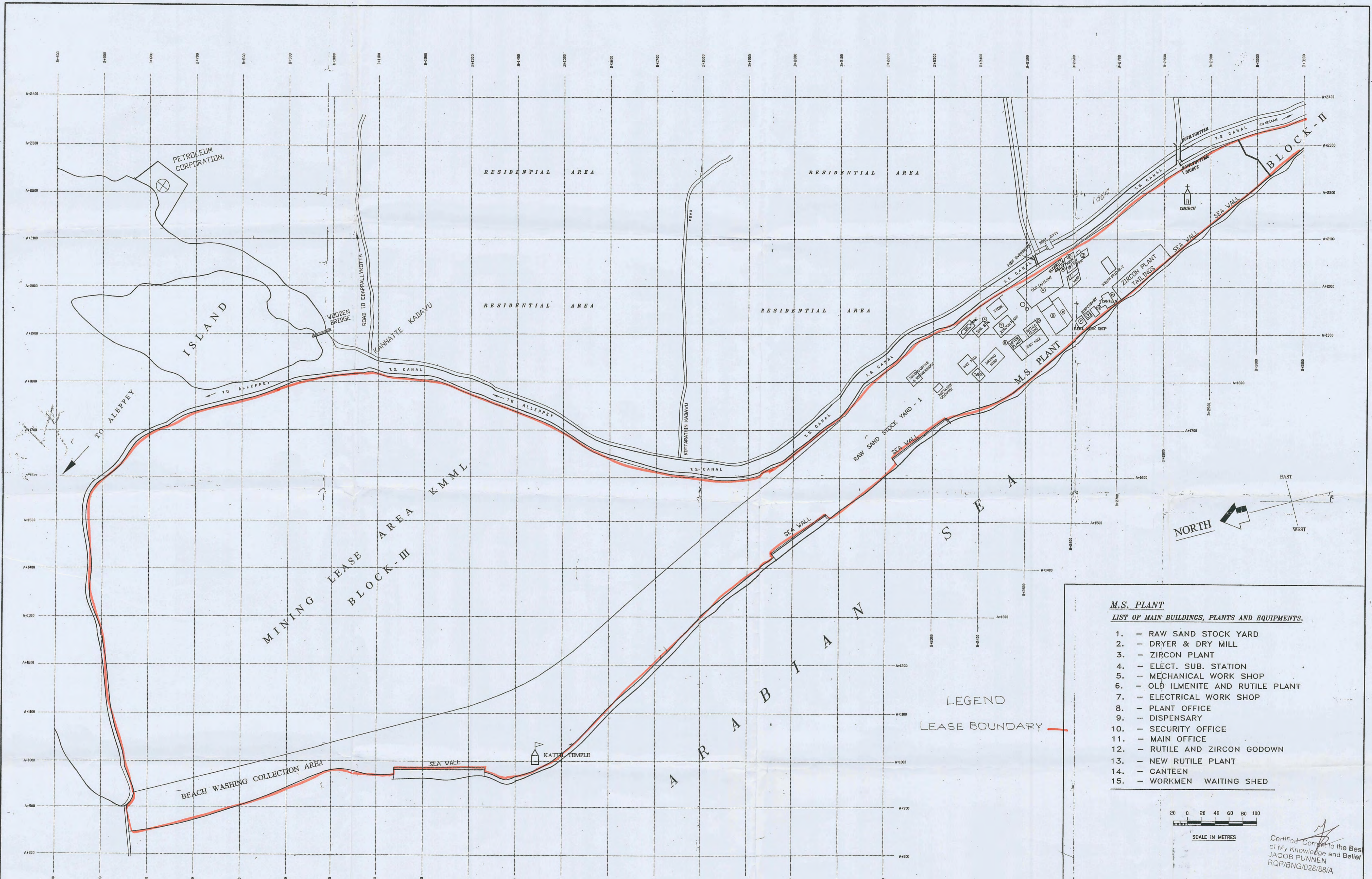
Total Population as per 2011 Census

Village	Total Population
Alappad	24931
Oachira	26932
Kulasekharapuram	24538
Karunagappally	24353
Kallelibhagam	20814
Vadakkumthala	19413
Ayanivelikulangara	22363
Panmana	29139
Chavara	41497
Thekkumbhagam	16925
Neendakara	17060
Mynagappally	39336
West Kallada	17958
Kollam	401683

KERALA MINERALS AND METALS LTD  
PLATE NO- 5  
KEY PLAN

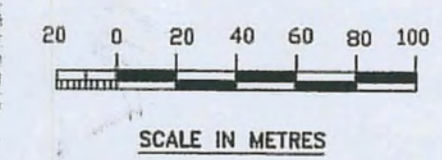






**M.S. PLANT**  
**LIST OF MAIN BUILDINGS, PLANTS AND EQUIPMENTS.**

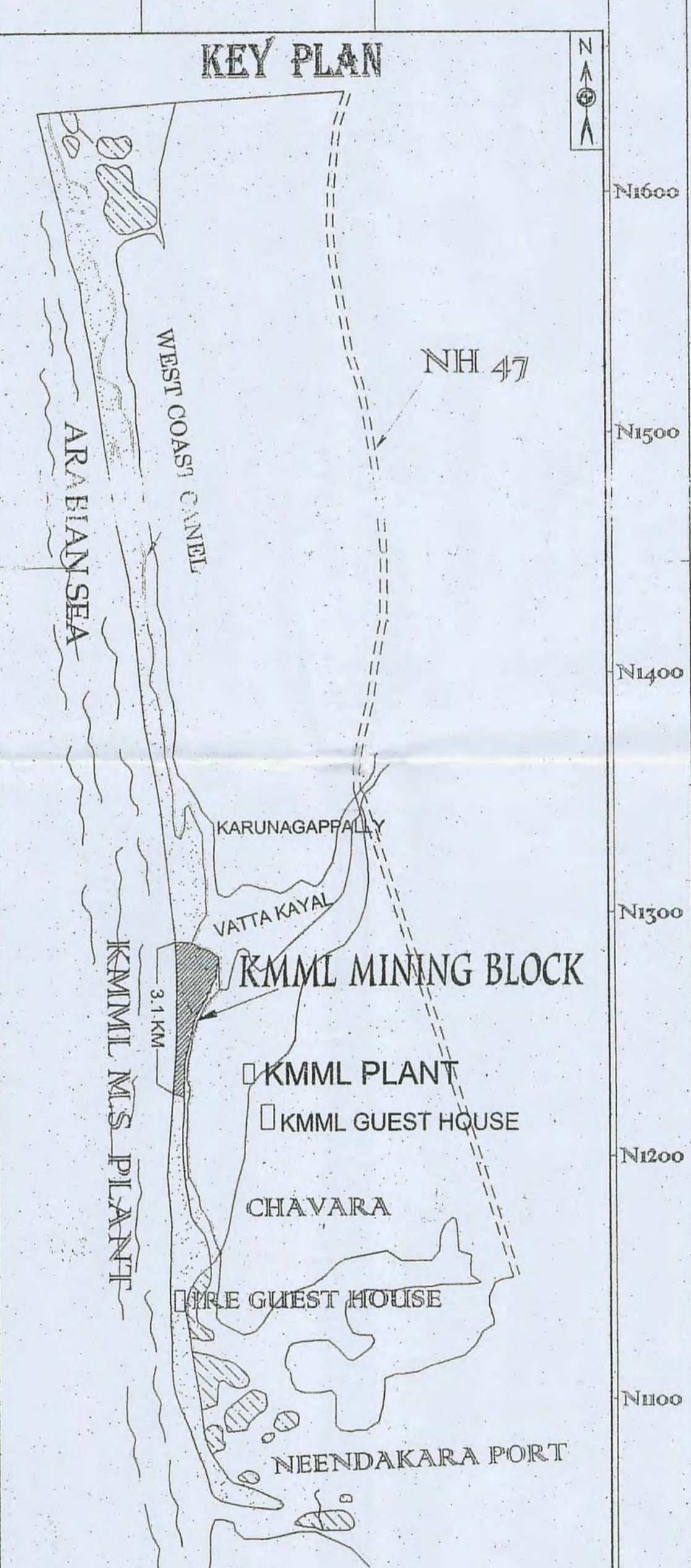
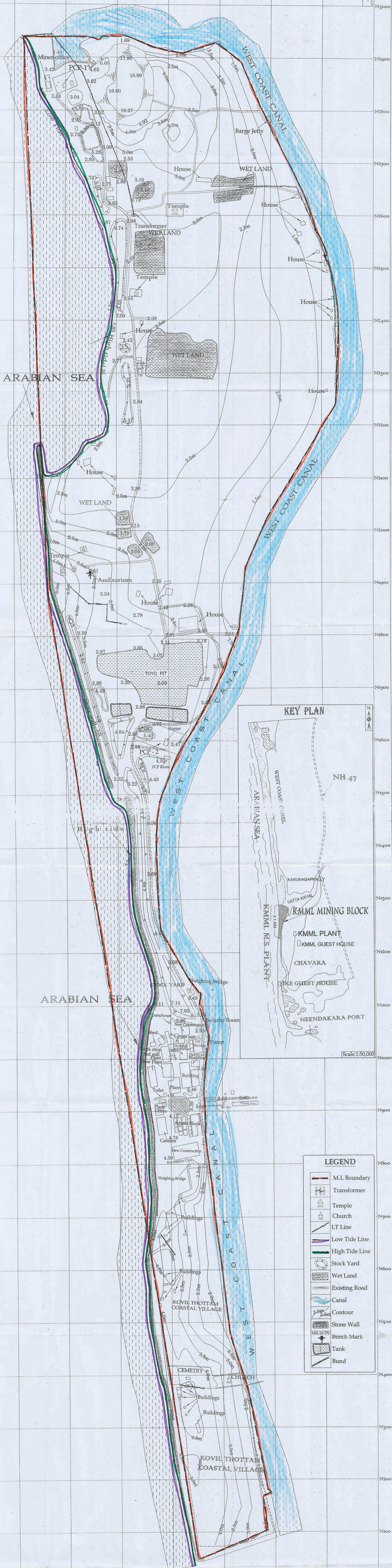
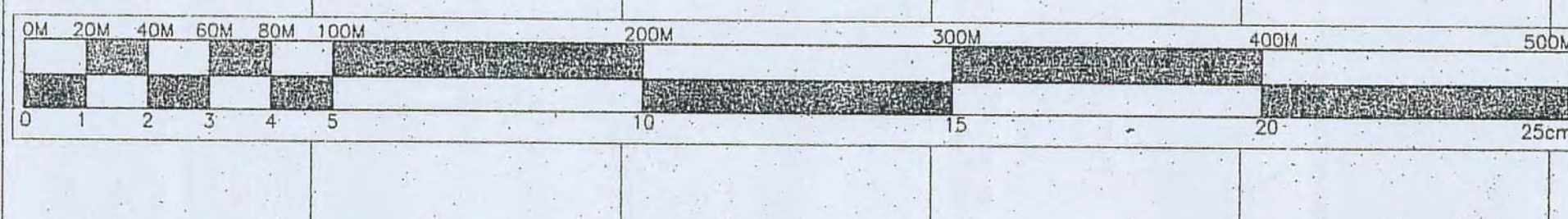
1. - RAW SAND STOCK YARD
2. - DRYER & DRY MILL
3. - ZIRCON PLANT
4. - ELECT. SUB. STATION
5. - MECHANICAL WORK SHOP
6. - OLD ILMENITE AND RUTILE PLANT
7. - ELECTRICAL WORK SHOP
8. - PLANT OFFICE
9. - DISPENSARY
10. - SECURITY OFFICE
11. - MAIN OFFICE
12. - RUTILE AND ZIRCON GODOWN
13. - NEW RUTILE PLANT
14. - CANTEEN
15. - WORKMEN WAITING SHED



Certified Correct to the Best of My Knowledge and Belief  
 JACOB PUNNEN  
 RQP/BNG/028/68/A

<b>Kmml</b> THE KERALA MINERALS AND METALS LTD; KOLLAM		GENERAL LAYOUT OF KMML M.S. PLANT MINING LEASE AREA (BLOCK-III) <b>COMPOSITE PLAN</b>	
DESIGN	INITIAL	DATE	
DRAWN	Ck.	13/06/06	
TRACED			
CHECKED			
APPROVED			
SCALE:- AS NOTED		SHEET: OF	REV.
DRG. NO: TP/PJ/MS/GEN.LAYOUT/6704			0

plate No. RA plate No. 19



**LEGEND**

- M.L Boundary
- Transformer
- Temple
- Church
- LT Line
- Low Tide Line
- High Tide Line
- Stock Yard
- Wet Land
- Existing Road
- Canal
- Contour
- Stone Wall
- Bench Mark
- Tank
- Bund

ML No	Ga.No & Date	SLNo	Village / Taluk & Dist	Block	Extent	Validity
01	30.(Ms) No: 175/2010/D & 31 To 632 12.08.2010	1 To 1212	Chavara, Panmana & Valakumthala Village, Karunagappally Tk, Kollam Dt, Kerala State	II	88.11.90 Hect	08/02/2010 To

Certified Correct to the Best of My Knowledge and Belief  
 JACOB PUNNEN  
 RGP/BNG/028/88/A

**CERTIFY THAT THIS PLAN IS CORRECT AND UPDATE ON : 18.11.2011**

**MINE SURVEYOR** **MINES MANAGER**

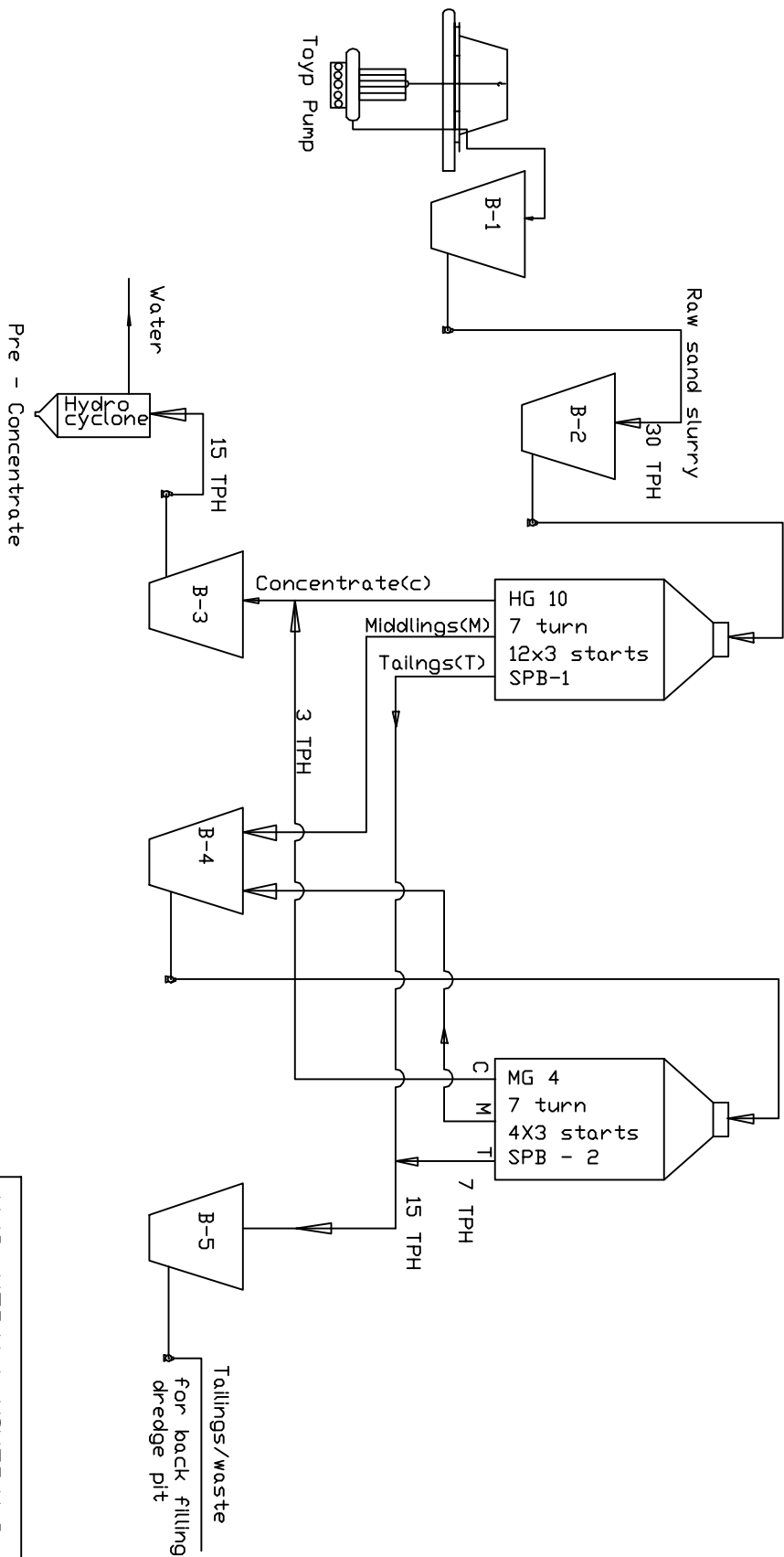
**D.JOEL**  
 Cert.No: 486 Dt: 28-04-97

**T.KARUNANITHY**  
 Cert.No: 124 Dt: 24.01.2003

**NAME OF THE LEASEE**  
 Kerala Minerals And Metals Ltd.  
 Kovilthottam Chavara,  
 Kollam - Dt, Kerala - State.  
**KERALA MINERALS AND METALS LTD.**

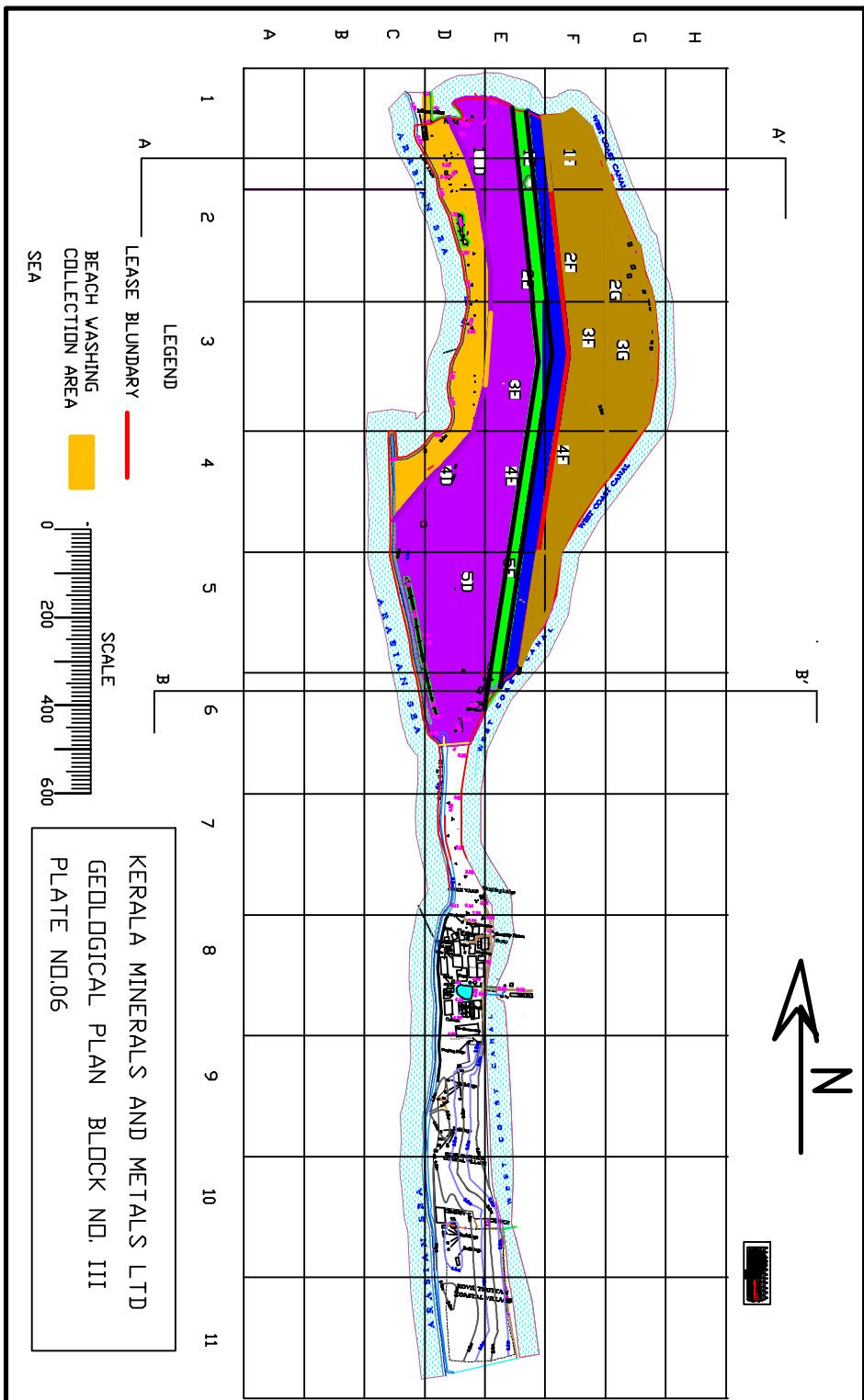
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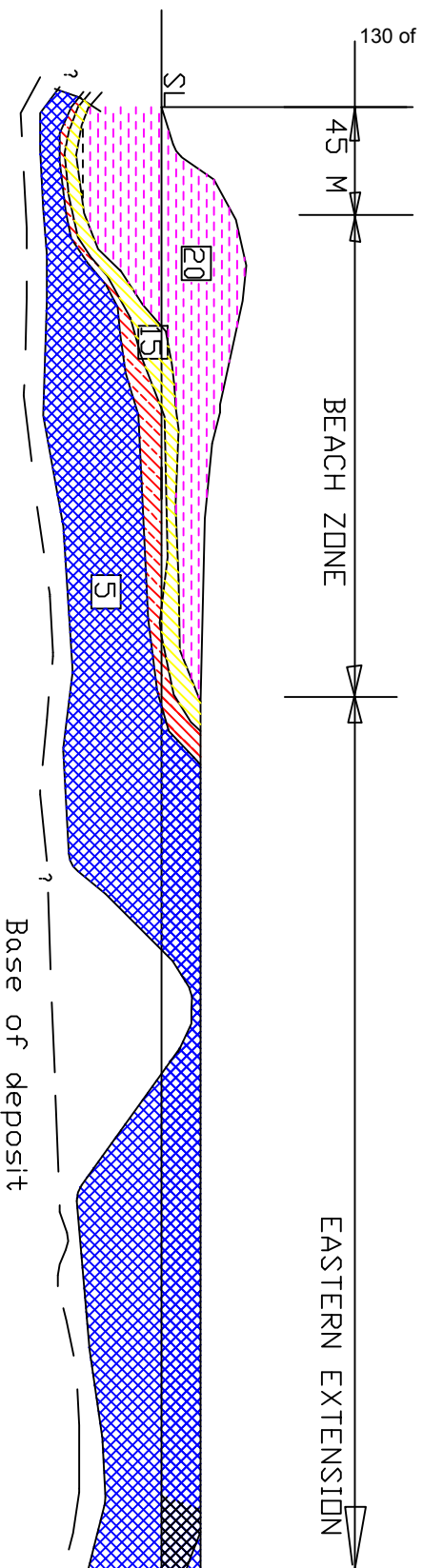
Drawn	: D.Joel
Date	: 18.11.2011
Scale	: 1:2000
Plan No	: GTS/KMML/11/11



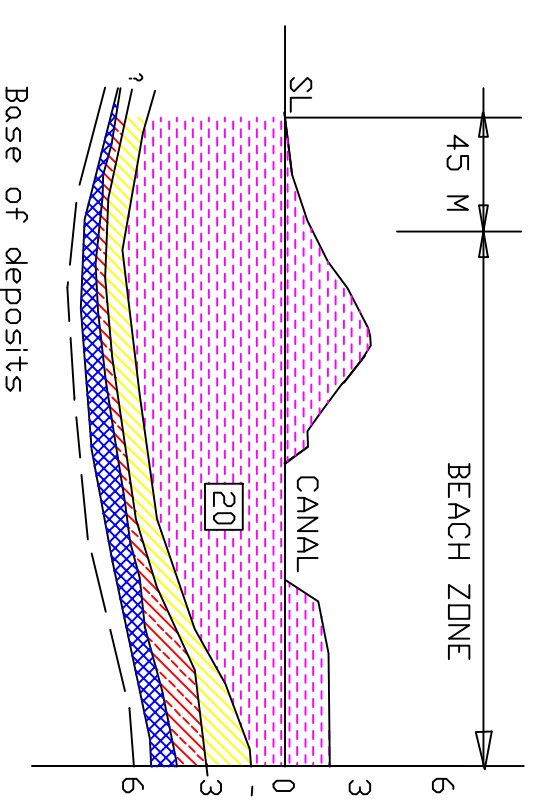
FLOW SHEET - PRECONCENTRATION PLANT  
 THE KERALA MINERALS AND METALS LIMITED  
 CAPACITY ENHANCEMENT OF MINERAL SEPARATION PLANT

M/S. KERALA MINERALS AND METALS LTD  
 FLOW SHEET - PRECONCENTRATION PLANT  
 PLATE NO. 16





TRAVERS 87 (Northern part of area.)



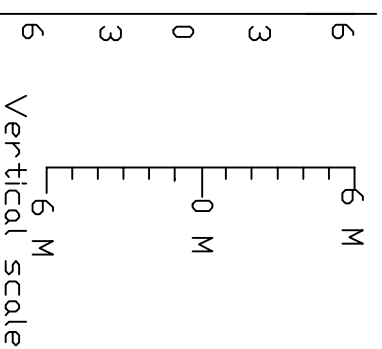
TRAVERS 63 (Southern part of area)

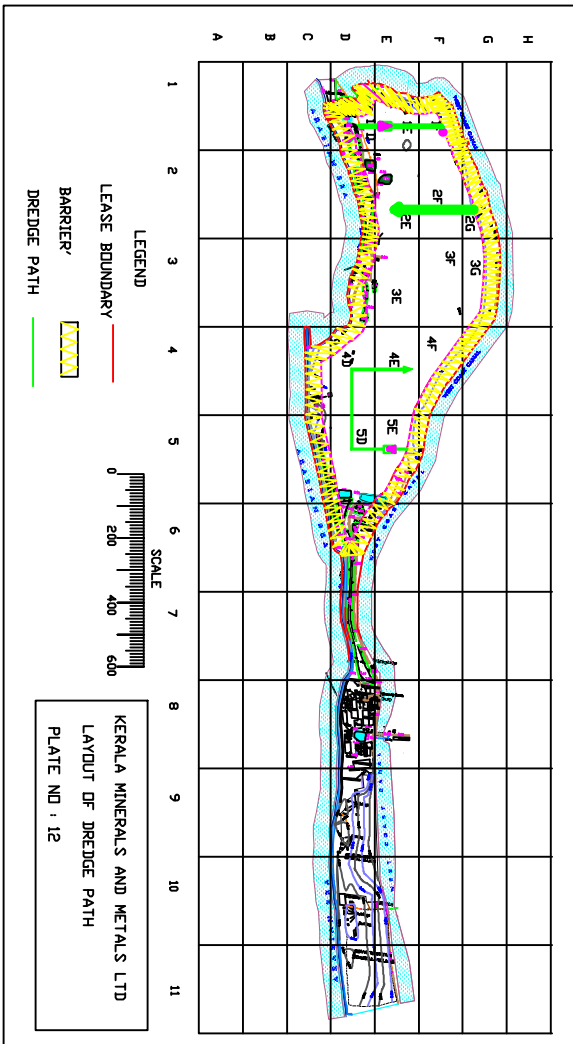
LEGEND

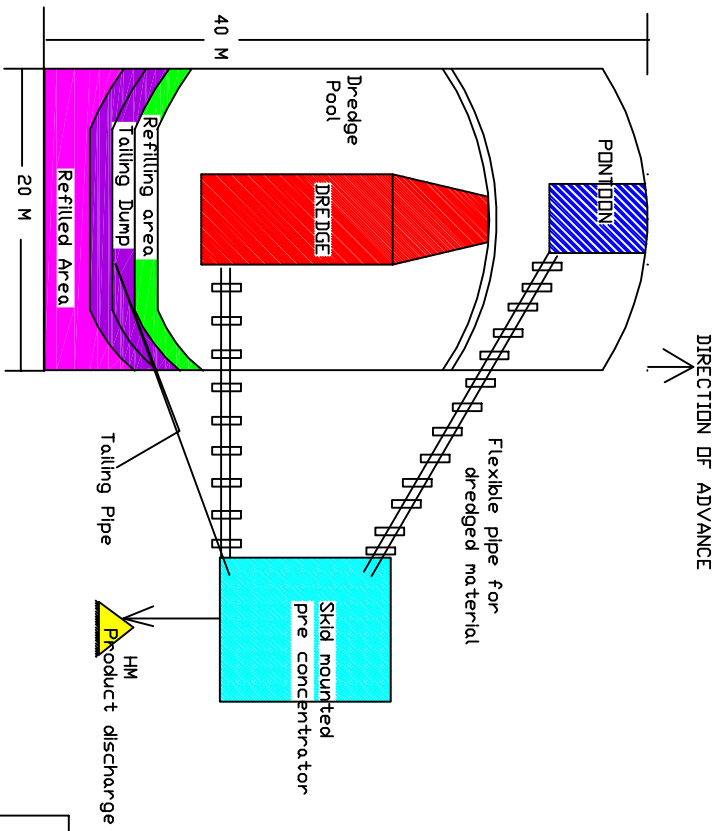
- H.M.CONTENT 20 AND ABOVE
- H.M.CONTENT 15 TD 20
- H.M.CONTENT 10 TD 15
- H.M.CONTENT 5 TD 10
- H.M.CONTENT BELOW 5
- Contours of total H.M. Grade
- Horizontal Scale

All dimensions are meter

KERALA MINERALS AND METALS LTD  
GEOLOGICAL CROSS SECTION  
OF BLOCK III  
PLATE ND. 07



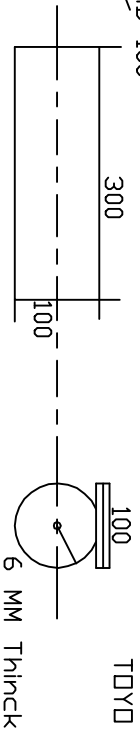
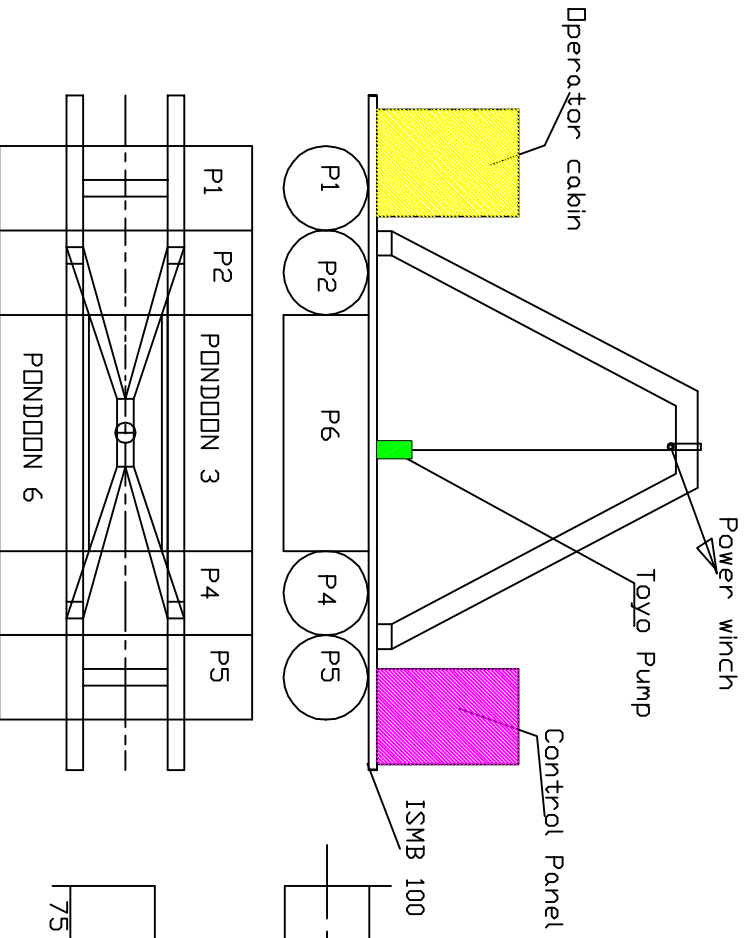




- LEGEND
- DREDGE
  - REFILLING AREA
  - REFILLED AREA
  - PONTOON
  - HM PRODUCT DISCHARGE
  - SKID MOUNTED PRE CONCENTRATOR
  - TAILING DUMP

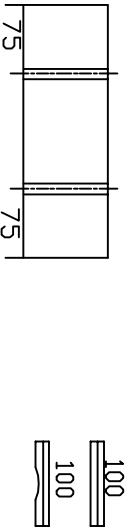


M/S. KERALA MINERALS AND METALS LTD.  
 PLATE NO. 11  
 LAYOUT OF PONTOON & DREDGE OPERATION  
 SCALE - 1: 200



LEGEND

- OPERATOR CABIN
- CONTROL PANNEL
- TOYO PUMP

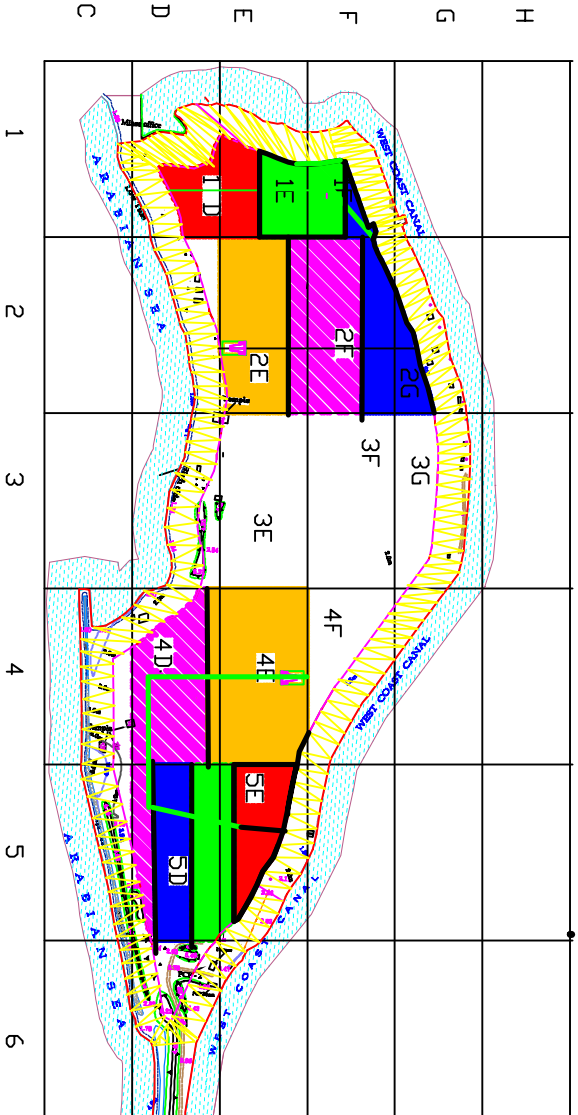


KERALA MINERALS AND METAKS LTD.  
PONTODN OF DREDGE  
PLATE ND. 13

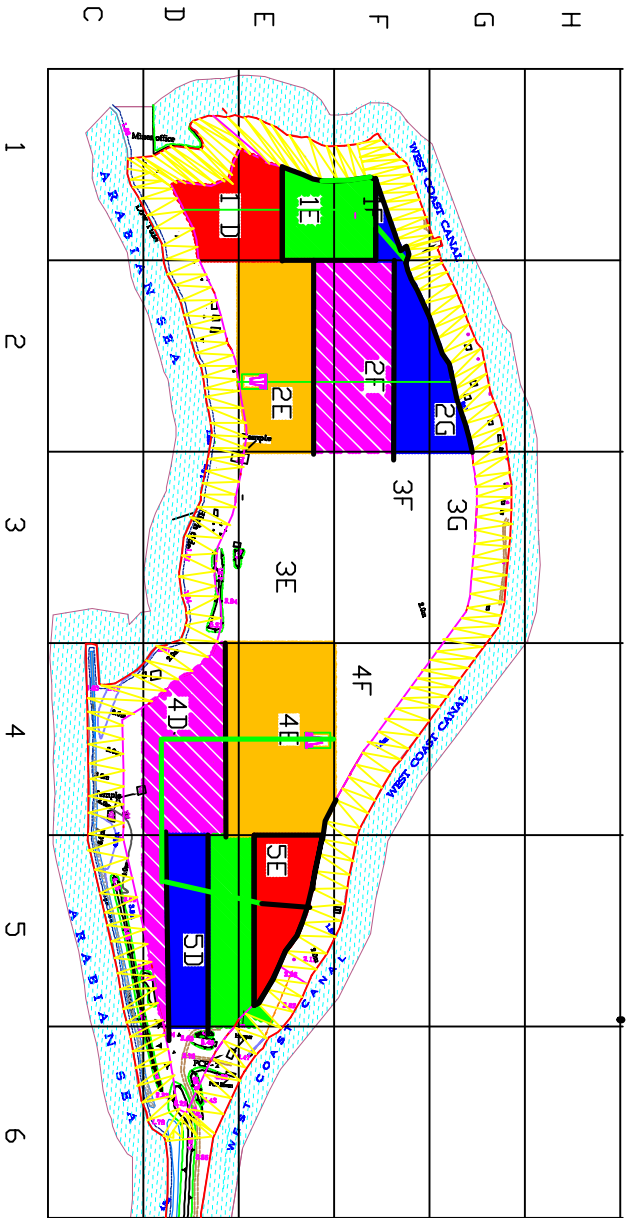


**LEGEND**

- Lease Boundary ————
- Dredge Path ————
- T.S.Canal ————
- Barrier ————
- Area to be afforested in
  - 02 year ————
  - 03 year ————
  - 04 year ————
  - 05 year ————
  - 06 year ————



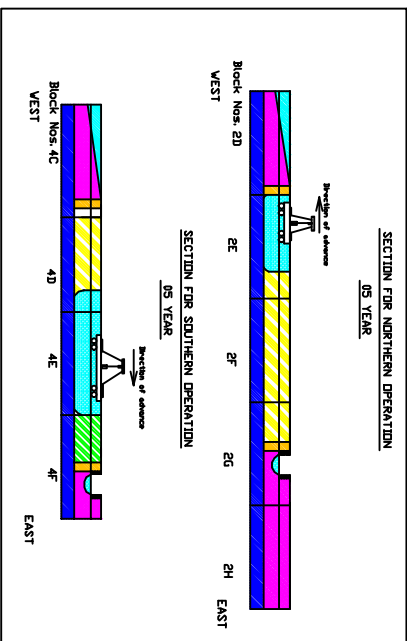
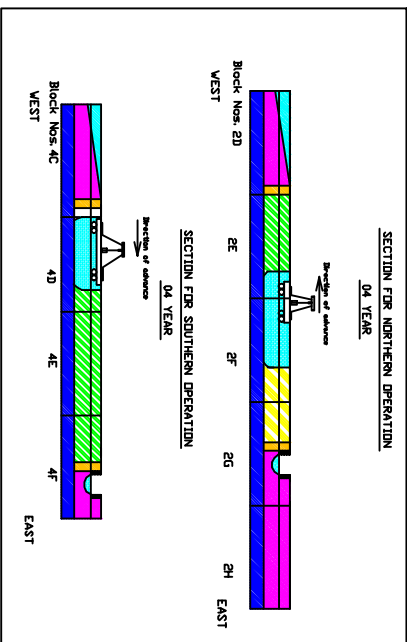
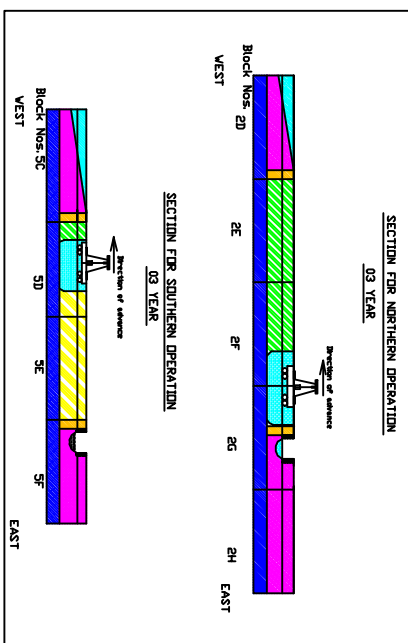
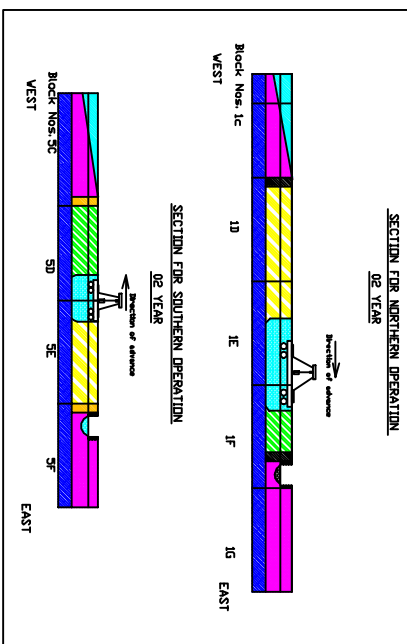
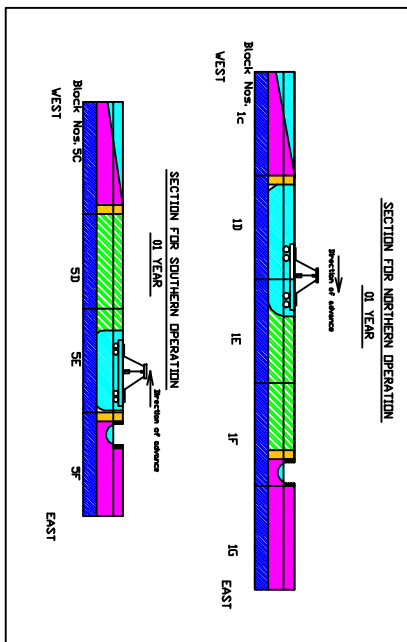
**M/S. KERALA MINERALS AND METALS LTD.**  
**PROGRESSIVE MINE CLOSURE &**  
**AFFORESTATION PLAN**  
**PLATE NO. 23**



**LEGEND**

- Lease Boundary ————
- Dredge Path ————
- T.S.Canal ————
- Barrier ————
- Mining area
- 01 year ————
- 02 year ————
- 03 year ————
- 04 year ————
- 05 year ————

**M/S. KERALA MINERALS AND METALS LTD.**  
**YEARLY PRODUCTION PLAN**  
**BLOCK NO. III**  
**PLATE NO. 14**



- LEGEND
- BEACH SAND
  - REFILLED AREA
  - BARRIER
  - POND / CANAL
  - PROVEN DEPOSIT
  - BASEMENT



M/S. KERALA MINERALS AND METALS LTD.  
YEARLY PRODUCTION SECTIONS IN BLOCK NO. III  
01 (2012) TO 05 (2016) YEARS  
SCALE 1:8000  
PLATE NO. 15

**HTL, LTL AND CRZ OF KMML MINING BLOCKS BETWEEN  
NEENDAKARA AND KAYAMKULAM TIDAL INLETS, KERALA**



**Centre for Earth Science Studies  
Thiruvananthapuram 695 031, Kerala**

January 2013

**HTL, LTL AND CRZ OF KMML MINING BLOCKS BETWEEN  
NEENDAKARA AND KAYAMKULAM TIDAL INLETS, KERALA**

*Prepared for*

**KERALA MINERALS AND METALS LIMITED**

**CENTRE FOR EARTH SCIENCE STUDIES  
THIRUVANANTHAPURAM 695031**



**January 2013**

**CENTRE FOR EARTH SCIENCE STUDIES**  
**DOCUMENTATION PAGE**

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2. TYPE OF REPORT	CRZ STATUS REPORT
3. TITLE	HTL, LTL AND CRZ OF KMML MINING BLOCKS BETWEEN NEENDAKARA AND KAYAMKULAM TIDAL INLETS, KERALA
4. AUTHORS TECH. SUPPORT PROJECT FELLOWS	K. V. THOMAS D. RAJU, M.K. RAFEEQUE & M.K. SREERAJ BADAREES K.O, ABHI R. ARAVIND, NEELIMA.T
5. KEY WORDS	Sea coast, backwater, barrier beach, backwater islands, KMML, placer deposits, CRZ, cadastral map , land use, coastal erosion, seawalls, High Tide Line (HTL), Low Tide Line (LTL), mangroves, inter-tidal zone, CRZ categories
6. ABSTRACT	The CRZ status report is prepared for the mining blocks of KMML along Neendakara-Chavara-Panmana-Alappad coast. The HTL has been demarcated both on the canal/ <i>kayal</i> bank and seacoast. The HTL and LTL are identified based on geomorphic signatures in the field and demarcated on base maps of 1:4000 scale. Mangroves and other inter-tidal zones are demarcated. The 500 m and 200 m regulation lines are provided for the seacoast. The CRZ on the banks of canal/ <i>kayal</i> is shown landward of the HTL. The CRZ categories consist of CRZ IA, CRZ IB, CRZ III and CRZ IV.
7.DISTRIBUTION STATEMENT	NOT FOR CIRCULATION
8. INSTITUTION	KERALA MINERALS AND METALS LIMITED, CHAVARA

## CONTENTS

	Page No.
1. Introduction	1
2. Location	1
3. Objective	1
4. Approach & Data Source	2
4.1 <i>Coastal Regulation Zone (CRZ)</i>	2
4.2 <i>Approach</i>	3
4.3 <i>Data Source</i>	4
4.4 <i>Influence of Tidal action</i>	4
5. Geomorphology and Landuse	5
6. Identification of HTL, LTL and CRZ	5
7. CRZ for the state of Kerala	6
8. HTL/LTL and CRZ for the project area	6
8.1 <i>Neendakara (Block - I)</i>	7
8.2 <i>Chavara-Ponmana (Block - III)</i>	7
8.3 <i>Cheriyazheekkal (Block - V)</i>	8
8.4 <i>Azheekkal (Block- VII)</i>	8
9.0 Summary and Conclusions	8
REFERENCES	

### LIST OF FIGURES

Fig 1. Location Map

Fig 2. CRZ Map of the proposed site

### PLATES

Plate 1: HTL is along the embankment on the sides of the backwater/canal

Plate 2: A view of T S canal

Plate 3: HTL getting modified due to slumping seawalls

Plate 4: Seawall as HTL along seacoast

## HTL, LTL AND CRZ OF KMML MINING BLOCKS BETWEEN NEENDAKARA AND KAYAMKULAM TIDAL INLETS, KERALA

### 1. Introduction

The heavy mineral (black sand) deposits along the Kollam coast in Kerala, better known as “Chavara deposits”, are concentrated along the 22.5 km long Neendakara-Chavara-Panmana-Alappad coast lying between Neendakara ( $8^{\circ}56'9''N$ ;  $76^{\circ}32'15''E$ ) and Kayamkulam ( $9^{\circ}08'16''N$ ;  $76^{\circ}27'37''E$ ) tidal inlets. The entire coastal stretch is divided into 8 blocks and these blocks are leased to Indian Rare Earths Ltd (IREL) and Kerala Minerals and Metals Ltd (KMML) for mining. Out of the 4 blocks (I, III, V & VII) leased to KMML, mining is now taking place from Block III, i.e. Chavara-Panmana Block. The KMML, envisages renewal of mining licences and extension of mining to other mining blocks. As part of the requirements for getting environmental clearance, KMML has requested Centre for Earth Science Studies (CESS) Thiruvananthapuram, to prepare CRZ status report delineating the High Tide Line (HTL), Low Tide Line (LTL) and Coastal Regulation Zone (CRZ) for the mining blocks. The KMML mining blocks where the present study is carried out are within or close to Coastal Regulation Zone (MoEF, 2011) and falls in Map Nos. 15,16,17,18 and 19 of the Coastal Zone Management Plan of Kerala (CZMP, 1995; MoEF, 1996).

### 2. Location

This coast is located in Kollam District of Kerala (Fig 1) spread over Neendakara, Chavara, Panmana and Alappad grama panchayats. The study site is bounded by Kayamkulam inlet in the north and Neendakara inlet in the south. Lakshadweep Sea is in its west while the T-S canal forms the eastern boundary. The area under consideration extends from  $8^{\circ}56'9''N$  to  $9^{\circ}6'27.21''N$  and from  $76^{\circ}28'33''E$  to  $76^{\circ}32'30.26''E$ .

### 3. Objective




The objectives of the study are:

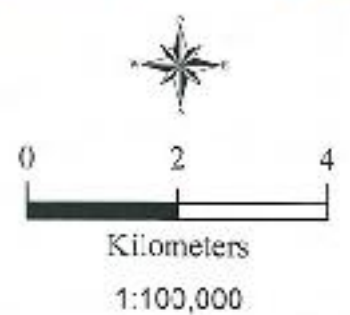
- Delineation of the HTL and LTL for the 4 mining blocks (I, III, V & VII) leased for KMML for heavy mineral mining along the Neendakara-Panmana-Alappad-Karunagappally coastal zone



Fig 1: Location Map

**Legend**

-  Road
-  Railway
-  Waterbody



0 2 4  
Kilometers  
1:100,000

- Demarcation of the Coastal Regulation Zone (CRZ) for the project site and providing remarks on its categories with respect to the Coastal Zone Management Plan of the State

#### 4. Approach & Data Source

##### 4.1 Coastal Regulation Zone (CRZ)

All developmental activities in the CRZ are regulated through the CRZ Notification (MoEF, 2011). The Government of India Notification [S.O.19 (E) dated 6.1.2011] under Section 3(1) and Section 3(2) (v) of the Environment (Protection) Act, 1986 and Rule 5(3) (d) of Environment (Protection) Rules, 1986 has redefined the CRZ. Accordingly the CRZ has been declared as ‘the coastal stretches of the country and the water area up to its territorial water limit’ (MoEF, 2011). The CRZ consists of:

1. Land area from the High Tide Line (HTL) to 500 m on the landward side along the sea front.
2. Land area between the HTL to 100 m or width of the creek whichever is less on the landward side along the tidal influenced water bodies that are connected to the sea and the distance up to which development along such tidal influenced water bodies is to be regulated shall be governed by the distance up to which tidal effects are experienced which is determined based on salinity concentration of 5 parts per thousand (ppt) measured during the driest period of the year and distance upto which tidal effects are experienced should be clearly identified and demarcated accordingly in the Coastal Zone Management Plans (CZMPs). Tidal influenced water bodies mean the water bodies influenced by tidal effects from sea, in the bays, estuaries, rivers, creeks, backwaters, lagoons, ponds connected to the sea or creeks and the like.
3. Land area falling between the hazard line and 500 m from HTL on the landward side, in case of seafront and between the hazard line and 100 m line in case of tidal influenced water body. The word ‘hazard line’ denotes the line demarcated by Ministry of Environment and Forests (MoEF) through the Survey of India (SoI) taking into account tides, waves, sea level rise and shoreline changes.
4. Land area between HTL and Low Tide Line (LTL), which will be termed as the inter-tidal zone.



5. Water and the bed area between the LTL to the territorial water limit (12 nm) in case of sea and the water and the bed area between LTL at the bank to the LTL on the opposite side of the bank, of tidal influenced water bodies.

The CRZ Notification (MoEF 2011) categorizes Coastal Regulation Zones as CRZ I, CRZ II, CRZ III and CRZ IV based on whether the area is ecologically sensitive, developed, undeveloped or water body and its bed. Ecologically sensitive and important areas and the inter-tidal zone constitute CRZ I. The former is CRZ IA and the latter is CRZ IB. The areas that have already been developed upto or close to the shoreline are categorized as CRZ II. Areas that are relatively undisturbed belong to CRZ III. The water area and the bed constitute CRZ IV.

In view of the unique coastal systems of backwater and backwater islands along with space constraint along the coastal stretches of the state of Kerala, the CRZ (on the landward side) in the islands within the backwaters have been defined as 50 m from the High Tide Line on the landward side (MoEF 2011). The CRZ Notification of 2011 has also defined Critical Vulnerable Coastal Areas (CVCA), which includes Sunderbans, and other identified ecological sensitive areas in which 'Vembanad in Kerala' is also included.

The Ministry of Environment & Forests, Govt of India has issued the new CRZ notification in January 2011 (CRZ 2011) in supersession of CRZ 1991 except as respects things done or omitted to be done before such supersession. At the same time the Coastal Zone Management Plan (CZMP) approved in 1996 remains valid for 2 years or till a new CZMP is prepared and got approved.

#### **4.2 Approach**

The coastal zone of the proposed area has been studied using toposheets and satellite imageries for a preliminary appraisal of the landform and land use of the area. The CZMP (1995) of the State was referred to ascertain the probable sites where the coastal regulations are applicable. Ground details were observed in the field through a reconnoiter investigation. Cadastral maps in 1:4000 scale, giving survey plot information, have been used as the base map on which the site has been superimposed. The HTL and LTL were located in the field with respect to survey plots. Being plotted in cadastral maps in 1:4000 scale, the HTL and CRZ



boundaries are locatable in the field with respect to survey plots with sufficient accuracy.

Key elements of the general approach followed in the study are:

- To delineate HTL, LTL and CRZ based on the Coastal Regulation Zone notification (CRZ 2011)
- To gather information on status of eco-systems (such as mangroves, tidal flats, sand dunes, etc.) in the proposed development site and its vicinity.
- To observe and record geomorphologic signatures for identifying HTL and map the distance to HTL with respect to survey plots.
- To prepare the CRZ map delineating the HTL and LTL in cadastral scale.

#### 4.3 Data Source

Different sets of data were used for compilation of the final map and preparation of the CRZ report. The principal data sources are listed below:

1. Survey of India Toposheets
2. Satellite imagery
3. Cadastral maps
4. CZMP maps
5. Hydrographic charts
6. Field mapping

#### 4.4 Influence of Tidal action

Coastal zone regulations are restricted to the sea coast and banks of water bodies influenced by tidal action. Therefore tidal range is an important parameter that decides the extent of CRZ. Tidal range data with respect to Chart Datum pertaining to Kollam as provided in the Hydrographic chart no.2032 (NHO, 1990), is given below:

<b>Tide at Kollam</b>	<b>Height (m)</b>
Mean Higher High Water	0.90
Mean Lower High Water	0.90
Mean sea level	0.70
Mean Higher Low Water	0.60
Mean Lower Low Water	0.30



The distance up to which development along bays, estuaries, creeks and backwaters is regulated under CRZ, depends on the landward extent of tidal influence. The distance up to which tidal influence is experienced is fixed based on salinity concentration of 5 parts per thousand (MoEF, 2011; 2002). The same for T S Canal and Adjoining waterbodies bordering the proposed development site were inferred from the Coastal Zone Management Plan of Kerala (CZMP, 1995).

### 5. Geomorphology and landuse

Neendakara-Chavara-Panmana-Alappad coast is rich in beach placers popularly known as *black sands*. It is a barrier beach sandwiched between the Lakshadweep Sea and the backwater-canal system. The heavy mineral deposits extend also on the eastern side of the backwater system. The backwater is connected to the sea through the tidal inlets at Azheekal (Kayamkulam inlet) and Neendakara. *Vattakayal* is a backwater system spread over Ponmana and Alappad. The sea coast separating *Vattakayal* with the sea is very narrow during the monsoon season. The coast has moderately high wave energy and is microtidal. The coastal areas are constituted by fishing villages. Coconut and mixed vegetation are the dominant landuse categories. The coastal stretch has seawalls constructed except at the mining sites. The beaches at the mining sites are getting modified. Wide beaches have now accreted immediately south of the breakwater at Kayamkulam inlet wherever well defined berms are present. The sides of the backwaters are protected with embankments in most of the places. Patches of mangroves are present in few places on the banks of the backwater/canal. The T-S canal/backwater is being developed as National Waterway. The general landuse is settlement with thick coconut trees. Kayamkulam and Neendakara inlets are developed into fishing harbours with breakwaters.

### 6. Identification of HTL, LTL and CRZ

The CRZ Notification (2011; 1991) defines "HTL as the line on the land, upto which the highest water line reaches during the spring tide". The HTL/LTL has to be identified based on the coastal geomorphologic signatures in the field/satellite imageries/aerial photographs following the guidelines of MoEF (MoEF, 2011; 1999). In many places seawalls have no frontal beaches or have only seasonal beaches. Here the HTL is along the line of the seawalls. Wherever wide beaches with distinct berm crests are present, the HTL is along the line of monsoon berm crest. The LTL is seaward of the seasonal beaches or the intertidal zone. The



backwater/*kayal* bordering the proposed site has embankments on its sides. Hence the line of embankments has been used as the geomorphic signature for identifying the HTL. The intertidal zone is narrow in many places. Once the HTL/LTL is identified, the distances to these are measured with respect to the survey plot boundaries identified in the field. ‘Disto Plus’ laser distometer was used for precision distance measurements. Trimble GeoXT GPS was used for getting the positions. An appraisal of existing land use/landform in the project area is carried out to identify any ecologically sensitive and important areas to be categorized as CRZ IA or IB. The CZMP of the State (CZMP, 1995) and the CRZ (2011) have been referred for CRZ categorisation in addition to a detailed appraisal of existing landuse in the project area.

### **7. CRZ for the State of Kerala**

Though the CRZ (2011) is effective since January 2011, the Coastal Zone Management Plan (CZMP, 1995) approved in 1996 remains valid for 2 years or till a new CZMP is prepared based on CRZ (2011). As per the CZMP (1995), the Kerala coast consists of CRZ I, CRZ II and CRZ III since the then CRZ IV (Andamans and Lakshadweep and small islands) was absent in Kerala. The CRZ (2011) has now included the water body and the bed also as part of CRZ and redefined CRZ IV as tidal influenced water body and the bed.

As per CRZ (2011), the CRZ along the Kerala coast consists of CRZ I, CRZ II, CRZ III and CRZ IV categories. The major CRZ I categories include the seasonal beach, tidal flats and mangroves. The CRZ, except those categorized as CRZ I, in the corporations and municipal councils are CRZ II while those in gramapanchayats have been categorized as CRZ III. The CRZ III has a No Development Zone (NDZ), which extends upto 200 m landward of the HTL. The water body part including nearshore waters and the backwaters and the bed are CRZ IV. The CRZ on the landward side for backwater islands is limited to 50 m landward from the HTL for Kerala (CRZ 2011). Mangroves and other sensitive ecosystems are further categorized as CRZ IA and the area between the HTL and LTL (intertidal zone) as CRZ IB.

### **8. HTL/LTL and CRZ for the project area**

The sea coast has seawalls almost all along the coast. The HTL is along the landward boundary of seawalls. The backwater has embankments on its sides in most of the banks. The HTL is along the embankments of the backwater. The



HTL and CRZ are given in detail in the CRZ map (Fig. 2). Along the sea coast the CRZ extends landward from the HTL up to a distance of 500 m. Along the banks of the backwater and adjoining water bodies, the CRZ extends landward from the HTL up to a distance equal to the width of the water body subject to a maximum of 100 m. Since the width of the waterbody is more than 100 m, the landward CRZ is 100 m. Being in gramapanchayat, the CRZ other than CRZ I and CRZ IV is CRZ III. The area between the HTL and LTL (intertidal zone) is CRZ IB. The water and the bed area between LTL at the bank to the LTL on the opposite side of the bank of the backwater is CRZ IV. Isolated mangroves are found on the banks of the *Backwaters/Canal*. These are CRZ IA. The extent is too small to be shown in the CRZ map. Project site is categorized as CRZ III as per the CRZ (2011; 1991) and CZMP (1995).

### **8.1 Neendakara (Block - I): Sheet 1-3**

The Block I extends from Neendakara inlet towards north upto Puthanthura in Neendakara panchayat. The CRZ maps are given in 3 sheets. It has the seacoast and also the inlet. The entire coastal stretch of this area is protected by seawall. There are no mining sites operating here. The CRZ of the area belongs to CRZ III. The coastal waters upto 12 nm and the bed are CRZ IV.

### **8.2 Chavara-Ponmana (Block - III): Sheet 1-3**

The southern sector of this block is in Chavara panchayat while the north sector is in Panamana panchayat. Ponmana mining site is located here. The area north to *Kattil* temple is the active mining site of KMML. Extensive mining takes place in this sector. The morphological signatures are constantly getting modified due to mining activities. From *Kovilhottam* to *Kattil* the sea coast is protected by seawalls. Severe erosion has occurred in the mining sites and adjacent areas. The *Vatta kayal* located in the mining sites has opened up a new inlet resulting from severe erosion. The T.S. canal and adjoining waterbodies separate the barrier beach sector from the rest of mainland. There are few small patches of mangroves on the banks of *Vatta kayal*, the area of which is not large enough to map them in the scale used. Being a grama panchayat the CRZ other than CRZ I and CRZ IV is CRZ III. The seasonal beach between the HTL and LTL (intertidal zone), wherever it is present, is CRZ I(B). The mangroves (though not shown here due to scale limitations) are CRZ IA. The water bodies and the bed are CRZ IV.

### 8.3 Cheriyaazheekkal (Block - V): Sheet 1-2

This is in Alappad panchayat. The shoreline of the entire block is protected by seawalls which are regularly maintained. The undulations in the seawall indicate to the slumping of seawalls and reconstruction of affected sectors. It has a few islands in the backwater. The barrier beach area is sandwiched between the sea and T-S Canal. Here also a few small patches of mangroves on the banks of T S Canal are observed, the area of which is not large enough to map them in the scale used. The backwater islands have 50 m CRZ while the sea coast has 500 m CRZ on the landward side. The mangroves (though not shown here due to scale limitations) are CRZ IA. The water bodies and the bed consisting of the coastal waters upto 12 nm and the backwater and canal are CRZ IV. Being a grama panchayat the CRZ other than CRZ I and CRZ IV is CRZ III.

### 8.4 Azheekal (Block - VII): Sheet 1-5

This sector is also in Alappad panchayat extending from *Kattikadavu/Kakkahuruth* in the south to *Srayikad* groins in north. The T S Canal is running north-south separating the barrier beach part from other land area. There are seawalls along almost the entire coastal stretch in this sector and three groins at Srayikad. There is a seasonal beach of about 40 to 50 m present in the groin cells. Being in a grama panchayat the CRZ landward of the HTL, other than C RZ. I, is CRZ III. The seasonal beaches are CRZ IB while mangroves are CRZ IA. Water bodies and the bed consisting of coastal waters and the backwater/T S Canal are CRZ IV.

## 9. Summary and conclusions

- HTL, LTL and CRZ mapping was done on large scale maps of 1:4000.
- The HTL and LTL are demarcated by taking into consideration the geomorphic signatures that are discernible in the field such as berms, mangroves, seawalls and embankments.
- 500 m landward of the HTL is the CRZ along the seacoast other than the intertidal zone and the coastal waters. In the *kayal*/backwater and canals the same is 100 m or width of the water body whichever is less. The backwater islands have a CRZ of 50 m on the banks.



- The CRZ categories are identified based on the CZMP of the State and coastal ecosystems and morphologies identified during field mapping.
- Being in panchayat, the CRZ except those categorised as CRZ IA, CRZ IB and CRZ IV belongs to CRZ III.
- The seasonal beach and other intertidal zones are CRZ IB.
- Mangrove vegetations are present as small patches the coverage of which are not large enough to map in the scale used and these belongs to CRZ IA
- Mining of placer deposits rich in heavy minerals is permissible in CRZ subject to conditions.

## REFERENCES

- CZMP, 1995. Coastal Zone Management Plan of Kerala, 1995. Dept. of Science Technology and Environment, Government of Kerala, 77p.
- MoEF, 2011. Notification No. S.O.19 (E) dated 6.1.2011, Ministry of Environment and Forest, Government of India, New Delhi.
- MoEF, 1991. Notification No.S.0114 dated 19<sup>th</sup> February, 1991, Ministry of Environment and Forest, Government of India, New Delhi.
- MoEF, 1996. Letter No. J-17011/23/92-1A III dated 27<sup>th</sup> September 1996 to the Chief Secretary, Govt. of Kerala. Ministry of Environment and Forest, Government of India, New Delhi.
- MoEF, 1999. Letter No.J.17011/8/92-1A III dated 4 January 1999 to the Chief Secretary of Coastal States. Ministry of Environment and Forest, Government of India, New Delhi.



## PLATES



Plate 1: HTL is along the embankment on the sides of the backwater/canal



Plate 2: A view of T S canal

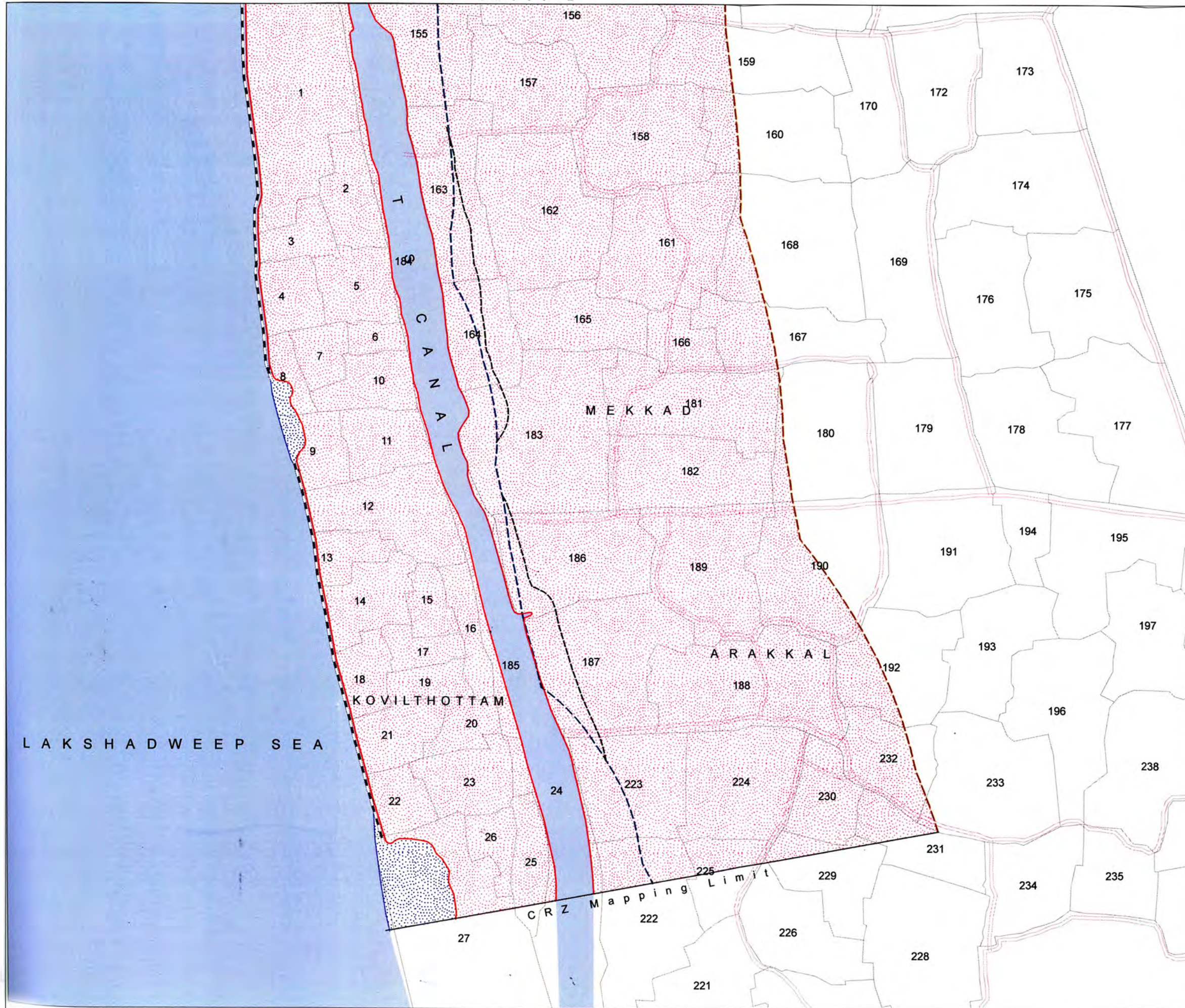


Plate 3: HTL getting modified due to slumping seawalls

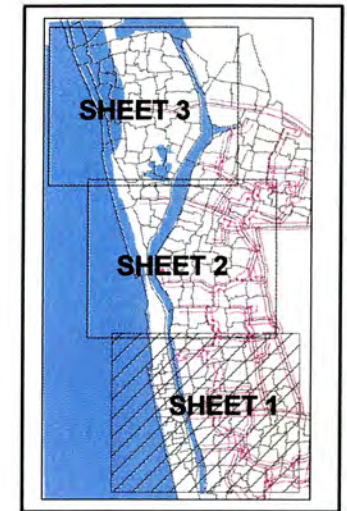


Plate 4: Seawall as HTL along seacoast

Continued to Sheet - 2



Block III: Sheet - 1




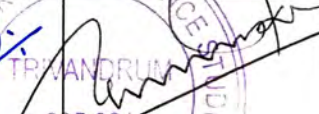
Legend

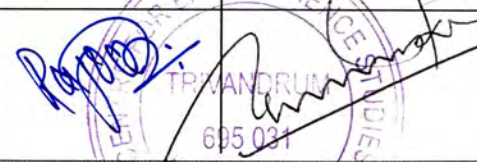
- Road
- High Tide Line
- Low Tide Line
- 200m CRZ Line
- 500m CRZ Line
- Seawall
- Inter Tidal Zone CRZ IB
- CRZ Landward of HTL CRZ III
- Waterbody CRZ IV
- 191 Plots


HTL, LTL and CRZ of mining site Block-III for KMML, Chavara Kollam

Mapped during	Scale
April 2011	 Meters 1:4,000

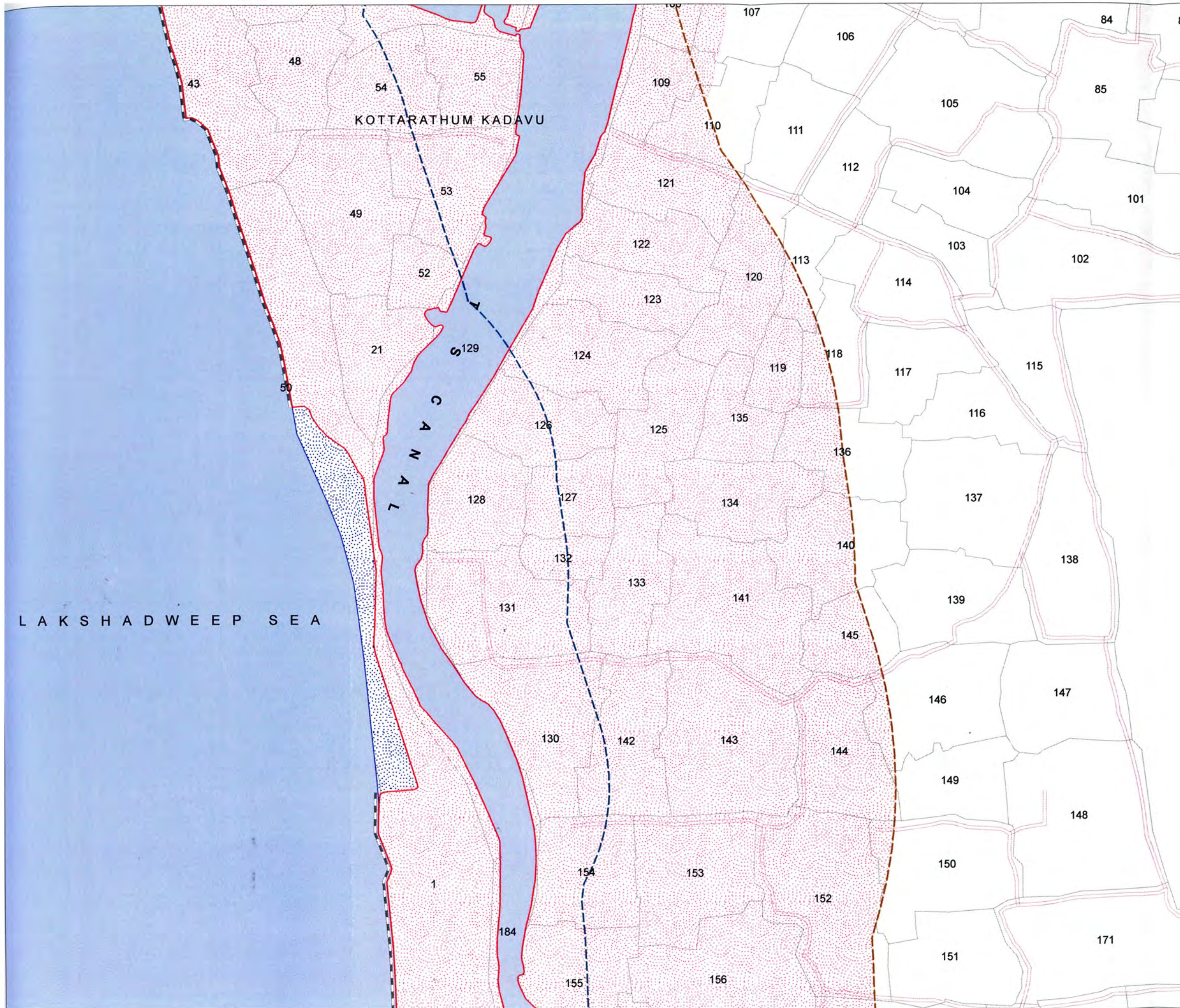
Checked by \_\_\_\_\_ Approved by \_\_\_\_\_



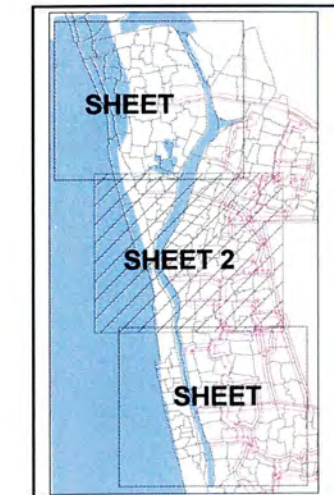
 Centre for Earth Science Studies  
Akkulam, Thiruvikkal P.O  
Thiruvananthapuram 31

Continued to sheet - 3



Continued from sheet - 1

Block III: Sheet - 2



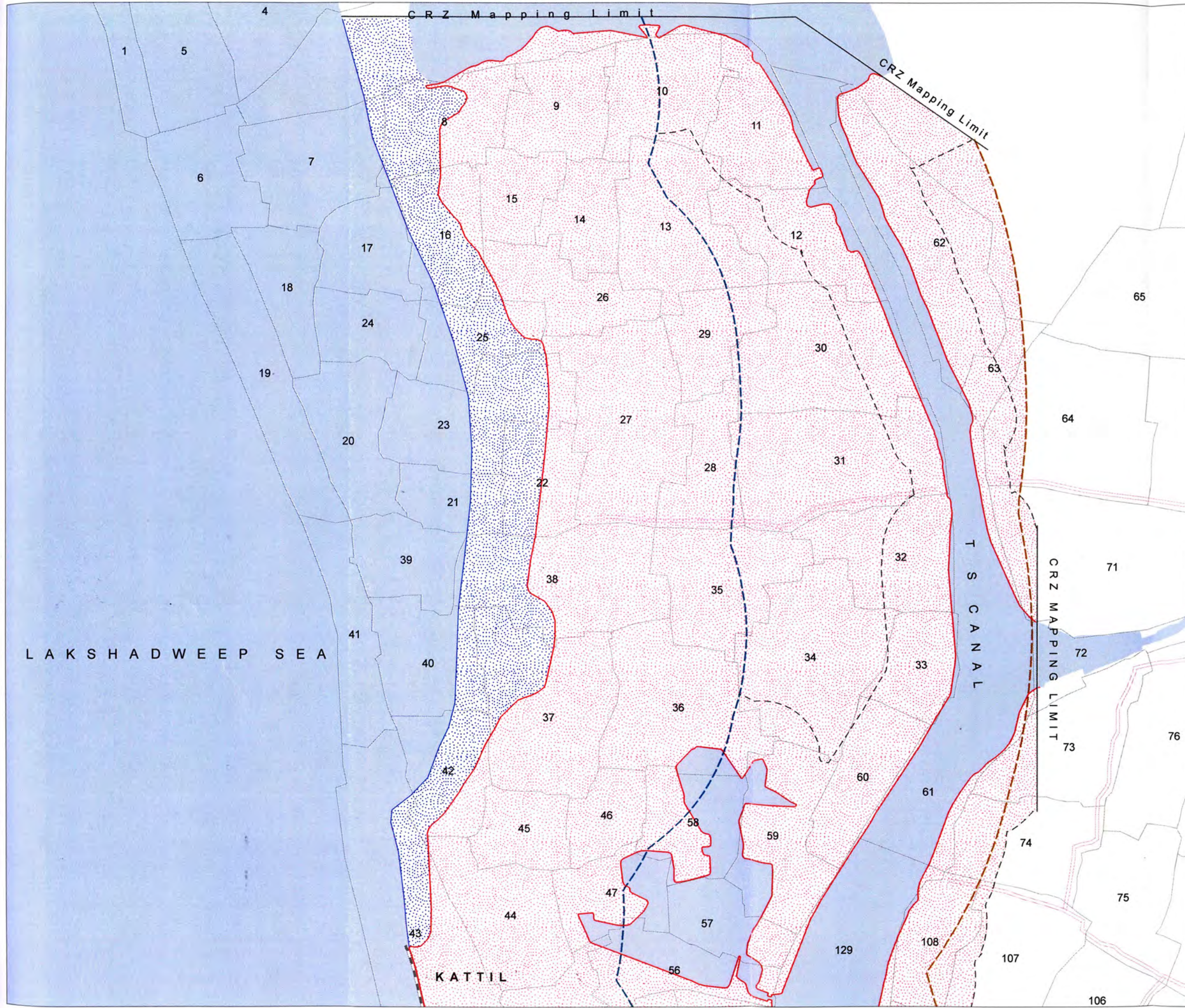
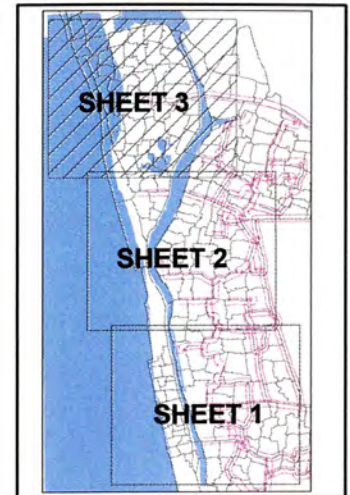
**Legend**

- Road
- High Tide Line
- Low Tide Line
- 200m CRZ Line
- 500m CRZ Line
- CRZ Line for Canal
- Seawall
- CRZ Landward of HTL CRZ III
- Inter Tidal Zone CRZ IB
- Waterbody CRZ IV
- 141 Plots

**HTL, LTL and CRZ of mining site Block - III for KMML, Chavara Kollam**

<b>Mapped during</b>	<b>Scale</b>
April 2011	<p>Meters 1:4,000</p>
Checked by	Approved by
<p>Centre for Earth Science Studies Akkulam, Thuvuvikkal P.O Thiruvananthapuram 31</p>	

Block III: Sheet - 3



Continued from sheet - 2

Legend

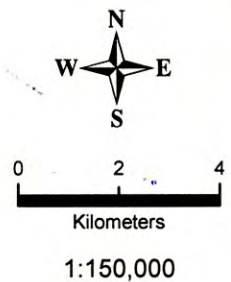
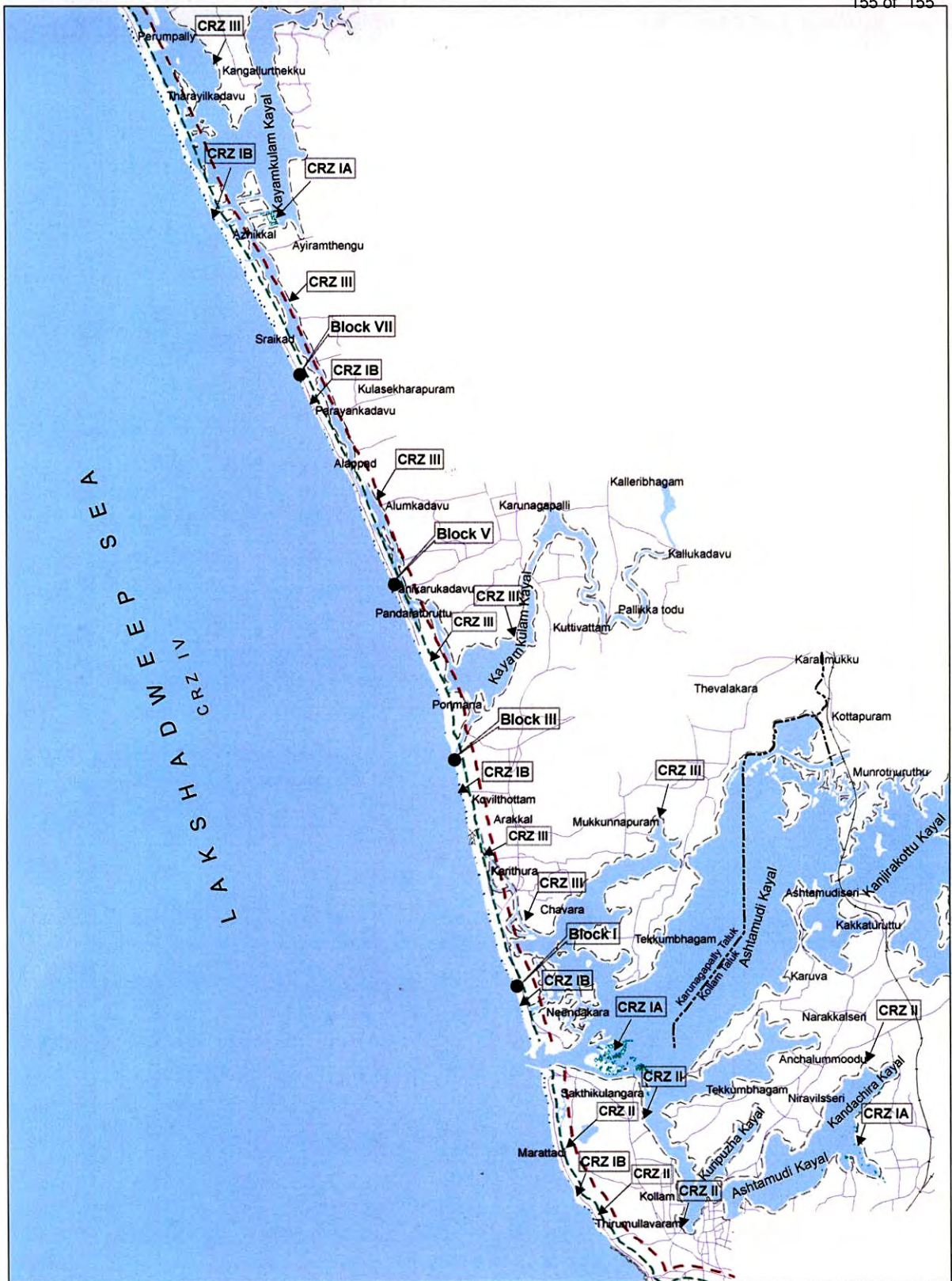
- Road
- High Tide Line
- Low Tide Line
- 200m CRZ Line
- 500m CRZ Line
- CRZ Line for Canal
- Seawall
- Inter Tidal Zone CRZ IB
- CRZ Landward of HTL CRZ III
- Waterbody CRZ IV
- Plots

HTL, LTL and CRZ of mining site Block-III for KMML, Chavara Kollam

Mapped during	Scale
April 2011	 Meters 1:4,000

Checked by \_\_\_\_\_ Approved by \_\_\_\_\_

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P. B. NO. 12



CRZ Categories in 7km around the proposed mining sites of KMML, Chavara