Fig. APP.2-13 DRILLING LOG

PROJECT	GEOLOGICAL SURVEY FOR MASTER PLAN STUDY ON POMPED STORAGE HYDROELECTRIC POWER DEVELOPMENT IN MAHARASTRA STATE ,INDIA						
CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY			**DATE**	12/DEC./1995 ~ 26/DEC./1995		
CONSULTANT	CONSULTING ENGINEERING SERVICES (I) PVT. LTD			**DRILLER**	DBM GEOTECHNICS AND CONSTRUCTIONS PVT.LTD		
B.H.No.	LM-5	**Elevation**	R.L. 174.073 m	**Total Depth**	60.00 m	**Location**	MARLESHWAR PROJECT SITE
Equipment and Method	SWENSKA	Rotary Coring Water Flush and with Diamond Bits		Diameter of Hole : NX (mm)		**Sheet No.**	OF

Elevation in m	Depth in m	Type of Rock	Description	Core Recovery --×-- (%) RQD [%]	Rock Classification	VP (km/s)	Water Table	N-Value	LUGEON VALUE 0 10 20 S. P. T N VALUE 0 10 20 30 40 50	U.C.S (kgf/cm²)	Remarks
172.94	1.13	RIVER DEPOSIT	BASALT BOULDER			0.90 km/s	1.10				
171.07	3.00	PORPHYRITIC AMYGDALOIDAL BASALT WITH SMALL TO MEDIUM PLAGIOCLASE PHENOCRYSTS AND SMALL TO LARGE WHITE AND AT PLACES GREEN INFILLINGS	1.13 to 3.00m PARTIALLY JOINT STAINED	[100] (100) [48] (100) [60] (91)	B	4.00 km/s			3.00		
161.63	12.44		DARK GREY VERY HARD FRESH BASALT METAL SOUND BY HAMMER BLOW 7.89 to 9.26m ZEOLITE VEIN	[100] (100) [100] (100) [98] (98) [100] (100) [96] (96) (96) [100] (100) [100] (100) [100] (100)	A				0 6.00 0 9.00 0 12.00	4.20 888 4.50	
157.07	17.00	VOLCANIC BRECCIA WITH TACHYLYTIC BASALT (RED TACHYLYTIC BASALT)	GENERALLY SOFT ROCK CONDITION PIECES ARE WAX COATED ON EXPOSURE TO THE ATOMOSPHERE THE ROCK DISINTIGRATES IN TO SOFT LOOSE MATERIAL 15.44 to 17.0m PIECES PARTIALLY HARD	[0] (100) [0] (100) [20] (100)	B ~ C				0 15.00 0	16.69 655 17.00	
152.42	21.65	AMYGDALOIDAL BASALT WITH SMALL TO MEDIUM PLAGIOCLASE PHENOCRYSTS AND SMALL TO LARGE WHITE AND AT PLACES GREEN INFILLINGS	RELATIVELY HARD LENGTH OF PIECE (11 TO 38CM)	[95] (95) [96] (96) [100] (100)	B				18.00 0 21.00		
147.89	26.18	VOLCANIC BRECCIA WITH TACHYLYTIC BASALT (RED TACHYLYTIC BASALT)	21.65 to 23.30m PIECE NO.90 & PIECE NO.91 TACHYLYTIC BASALT INJECTIONS ROCK HAS BECOME BROWN DUE TO HYDROTHERMAL ALTERATION PIECES ARE WAX COATED	[0] (100) [0] (97) [0] (98)	C				0 24.00 0		
		AMYGDALOIDAL BASALT		[100] (100) [97]					27.00		

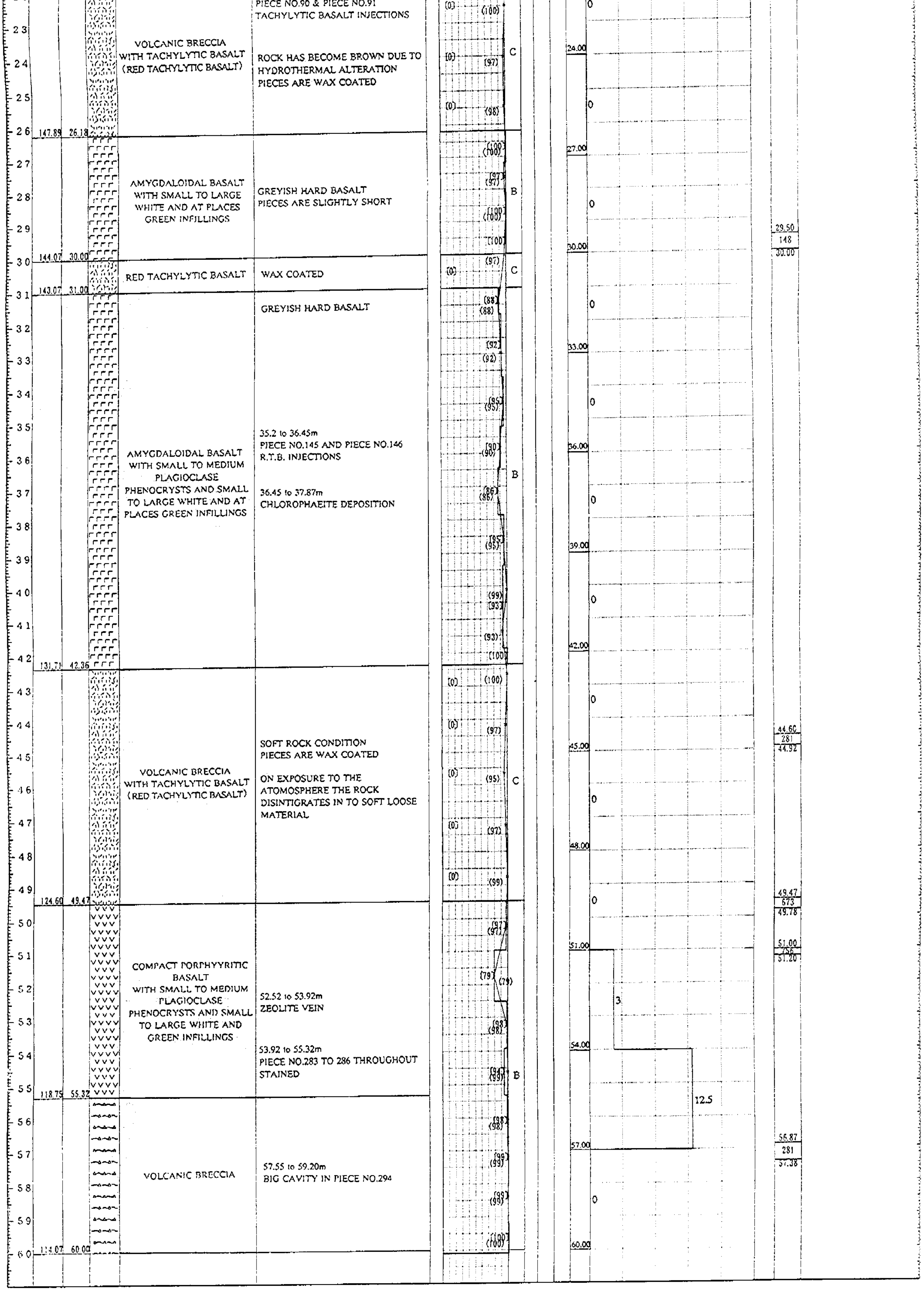
FIELD PERMEABILITY TEST (3 to 60m)

171.07	3.00	PORPHYRITIC AMYGDALOIDAL BASALT WITH SMALL TO MEDIUM PLAGIOCLASE PHENOCRYSTS AND SMALL TO LARGE WHITE AND AT PLACES GREEN INFILLINGS	DARK GREY VERY HARD FRESH BASALT METAL SOUND BY HAMMER BLOW 7.89 to 9.26m ZEOLITE VEIN	[100] (100) [100] (100) [98] (98) [100] (100) [96] (96) (96) [100] (100) [100] (100) [100] (100)	A	4.00 km/s
161.63	12.44	VOLCANIC BRECCIA WITH TACHYLYTIC BASALT (RED TACHYLYTIC BASALT)	GENERALLY SOFT ROCK CONDITION PIECES ARE WAX COATED ON EXPOSURE TO THE ATOMOSPHERE THE ROCK DISINTIGRATES IN TO SOFT LOOSE MATERIAL 15.44 to 17.0m PIECES PARTIALLY HARD	[0] (100) [0] (100) [20] (100)	B ~ C	
157.07	17.00	AMYGDALOIDAL BASALT WITH SMALL TO MEDIUM PLAGIOCLASE PHENOCRYSTS AND SMALL TO LARGE WHITE AND AT PLACES GREEN INFILLINGS	RELATIVELY HARD LENGTH OF PIECE (11 TO 38CM)	[95] (95) [96] (96) [100] (100)	B	
152.42	21.65	VOLCANIC BRECCIA WITH TACHYLYTIC BASALT (RED TACHYLYTIC BASALT)	21.65 to 23.30m PIECE NO.90 & PIECE NO.91 TACHYLYTIC BASALT INJECTIONS ROCK HAS BECOME BROWN DUE TO HYDROTHERMAL ALTERATION PIECES ARE WAX COATED	[0] (100) [0] (97) [0] (98)	C	
147.89	26.18	AMYGDALOIDAL BASALT WITH SMALL TO LARGE WHITE AND AT PLACES GREEN INFILLINGS	GREYISH HARD BASALT PIECES ARE SLIGHTLY SHORT	[100] (100) [97] (97) [100] (100) [100]	B	
144.07	30.00	RED TACHYLYTIC BASALT	WAX COATED	[0] (97)	C	
143.07	31.00	AMYGDALOIDAL BASALT WITH SMALL TO MEDIUM PLAGIOCLASE PHENOCRYSTS AND SMALL TO LARGE WHITE AND AT PLACES GREEN INFILLINGS	GREYISH HARD BASALT 35.2 to 36.45m PIECE NO.145 AND PIECE NO.146 R.T.B. INJECTIONS 36.45 to 37.87m CHLOROPHAEITE DEPOSITION	[88] (88) [92] (92) [95] (95) [90] (90) [86] (86) [95] (95) (99) [93] (93) [100]	B	
131.71	42.36	VOLCANIC BRECCIA	SOFT ROCK CONDITION PIECES ARE WAX COATED	[0] (100) [0] (97) [0]		

3.00	0
6.00	0
9.00	0
12.00	0
15.00	0
18.00	0
21.00	0
24.00	0
27.00	0
30.00	0
33.00	0
36.00	0
39.00	0
42.00	0
45.00	

FIELD PERMEABILITY TEST (3 to 60m)

4.20	888	4.50
16.69	655	17.00
29.50	148	30.00
44.50	281	44.92



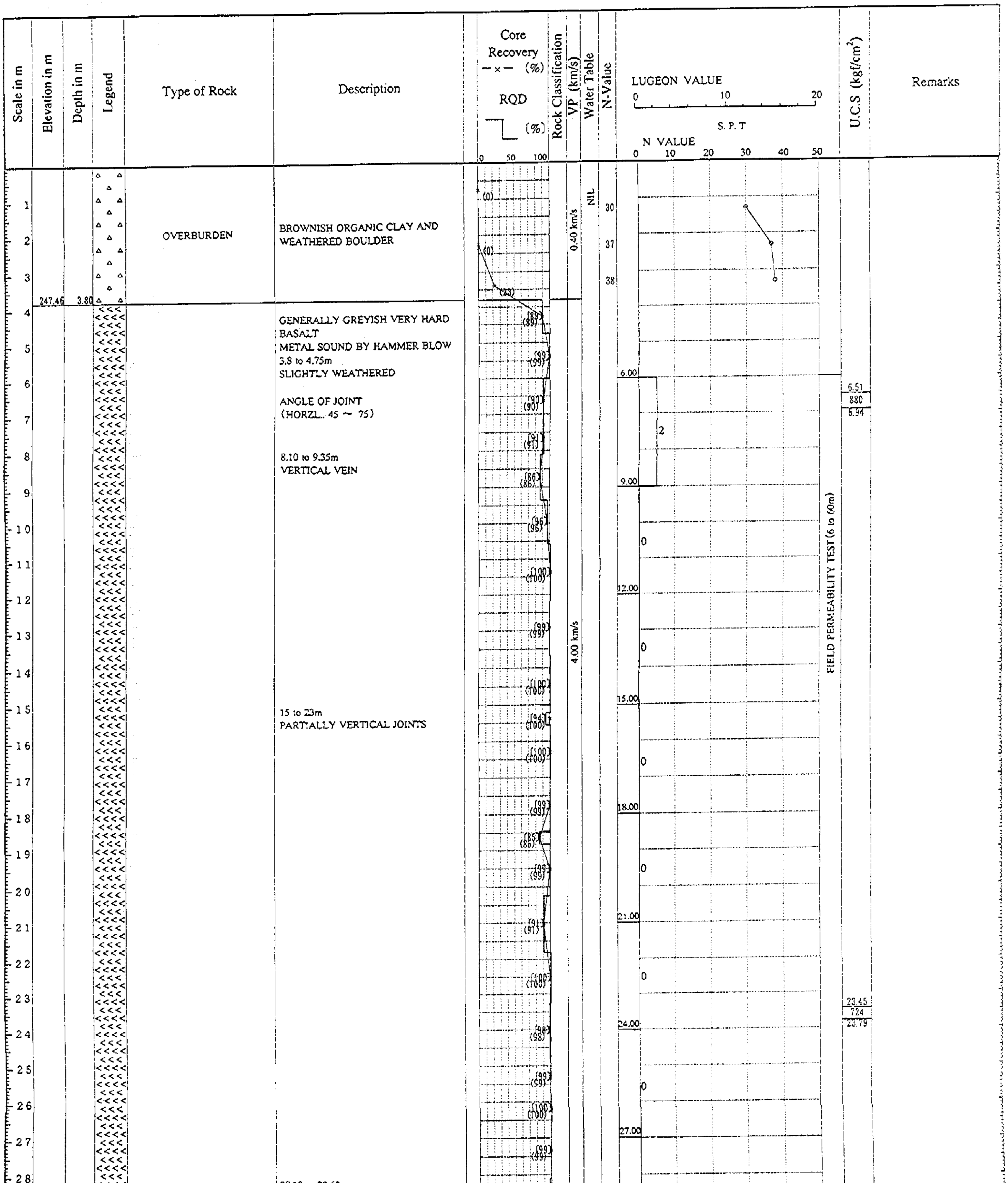
147.89	26.18	VOLCANIC BRECCIA WITH TACHYLYTIC BASALT (RED TACHYLYTIC BASALT)	PIECE NO.90 & PIECE NO.91 TACHYLYTIC BASALT INJECTIONS ROCK HAS BECOME BROWN DUE TO HYDROTHERMAL ALTERATION PIECES ARE WAX COATED	[0] (100) [0] (97) [0] (98)	C
144.07	30.00	AMYGDALOIDAL BASALT WITH SMALL TO LARGE WHITE AND AT PLACES GREEN INFILLINGS	GREYISH HARD BASALT PIECES ARE SLIGHTLY SHORT	[100] (100) [97] (97) [100] (100) [100]	B
143.07	31.00	RED TACHYLYTIC BASALT	WAX COATED	[0] (97)	C
131.71	42.36	AMYGDALOIDAL BASALT WITH SMALL TO MEDIUM PLAGIOCLASE PHENOCRYSTS AND SMALL TO LARGE WHITE AND AT PLACES GREEN INFILLINGS	GREYISH HARD BASALT 35.2 to 36.45m PIECE NO.145 AND PIECE NO.146 R.T.B. INJECTIONS 36.45 to 37.87m CHLOROPHAEITE DEPOSITION	[88] (88) [92] (92) [95] (95) [90] (90) [86] (86) [95] (95) (99) [93] (93) [100]	B
124.60	49.47	VOLCANIC BRECCIA WITH TACHYLYTIC BASALT (RED TACHYLYTIC BASALT)	SOFT ROCK CONDITION PIECES ARE WAX COATED ON EXPOSURE TO THE ATOMOSPHERE THE ROCK DISINTIGRATES IN TO SOFT LOOSE MATERIAL	[0] (100) [0] (97) [0] (95) [0] (97) [0] (99)	C
118.75	55.32	COMPACT PORPHYYRITIC BASALT WITH SMALL TO MEDIUM PLAGIOCLASE PHENOCRYSTS AND SMALL TO LARGE WHITE AND GREEN INFILLINGS	52.52 to 53.92m ZEOLITE VEIN 53.92 to 55.32m PIECE NO.283 TO 286 THROUGHOUT STAINED	[97] (97) [79] (79) [98] (98) [94] (99)	B
114.07	60.00	VOLCANIC BRECCIA	57.55 to 59.20m BIG CAVITY IN PIECE NO.294	[98] (98) [99] (99) [99] (99) [100] (100)	

	0
24.00	0
27.00	0
30.00	0
33.00	0
36.00	0
39.00	0
42.00	0
45.00	0
48.00	0
51.00	3
54.00	12.5
57.00	0
60.00	

29.50	148	30.00
44.60	281	44.92
49.47	673	49.78
51.00	756	51.20
56.87	281	57.38

Fig. APP.2-14 DRILLING LOG

PROJECT	GEOLOGICAL SURVEY FOR MASTER PLAN STUDY ON POMPED STORAGE HYDROELECTRIC POWER DEVELOPMENT IN MAHARASTRA STATE ,INDIA						
CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY			**DATE**	17/DEC./1995 ~ 3/JAN./1996		
CONSULTANT	CONSULTING ENGINEERING SERVICES (I) PVT. LTD			**DRILLER**	DBM GEOTECHNICS AND CONSTRUCTIONS PVT.LTD		
B.H.No.	LM-6	**Elevation**	R.L. 251.26 m	**Total Depth**	60.00 m	**Location**	MARLESHWAR PROJECT SITE
Equipment and Method	SWENSKA	Rotary Coring Water Flush and with Diamond Bits		Diameter of Hole : NX (mm)		**Sheet No.**	OF



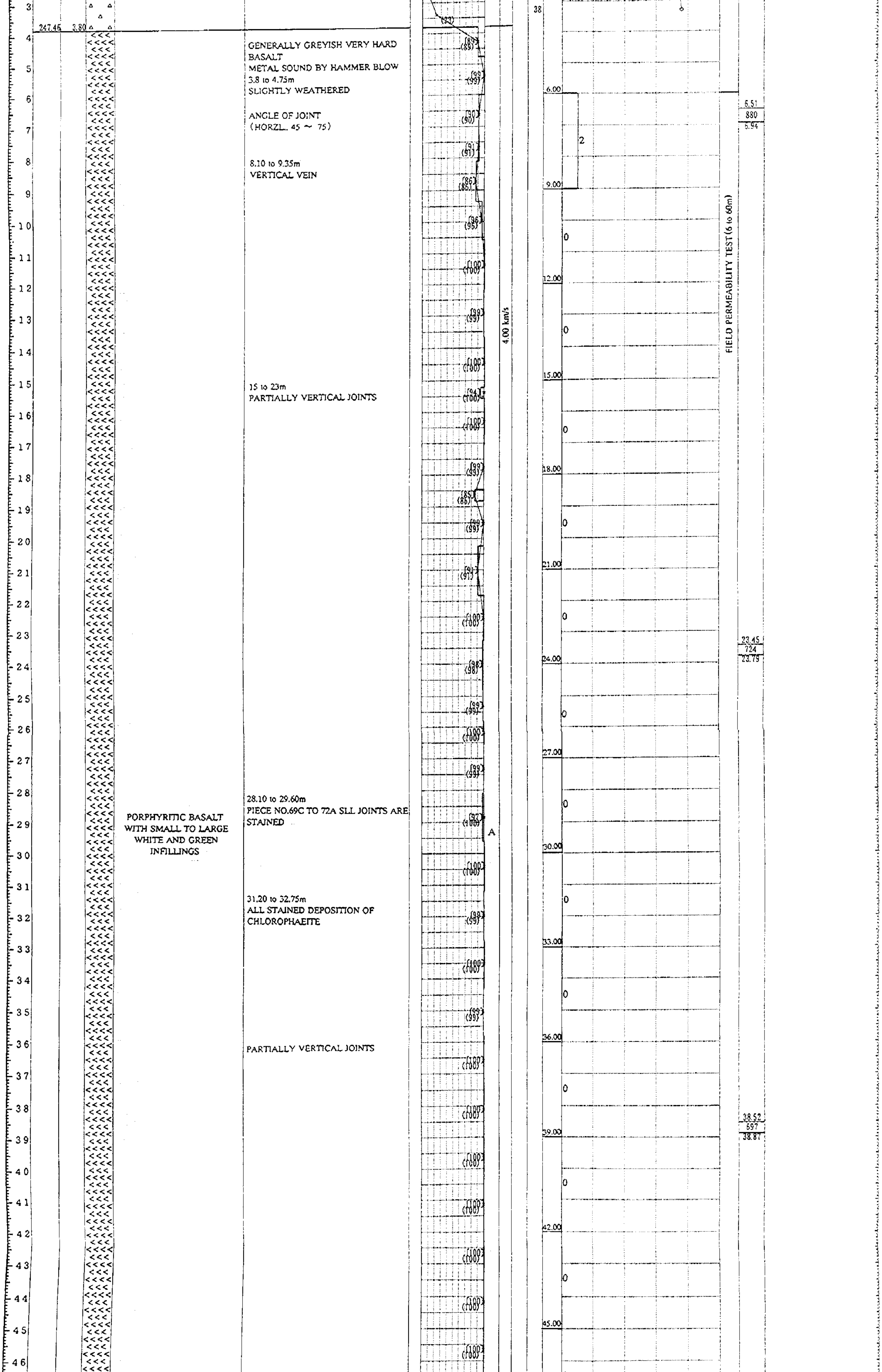
BROWNISH ORGANIC CLAY AND WEATHERED BOULDER

GENERALLY GREYISH VERY HARD BASALT
METAL SOUND BY HAMMER BLOW
3.8 to 4.75m
SLIGHTLY WEATHERED

ANGLE OF JOINT
(HORZL.. 45 ~ 75)

8.10 to 9.35m
VERTICAL VEIN

15 to 23m
PARTIALLY VERTICAL JOINTS



PORPHYRITIC BASALT
WITH SMALL TO LARGE
WHITE AND GREEN
INFILLINGS

GENERALLY GREYISH VERY HARD BASALT
METAL SOUND BY HAMMER BLOW
3.8 to 4.75m
SLIGHTLY WEATHERED

ANGLE OF JOINT
(HORZL. 45 ~ 75)

8.10 to 9.35m
VERTICAL VEIN

15 to 23m
PARTIALLY VERTICAL JOINTS

28.10 to 29.60m
PIECE NO.69C TO 72A SLL JOINTS ARE STAINED

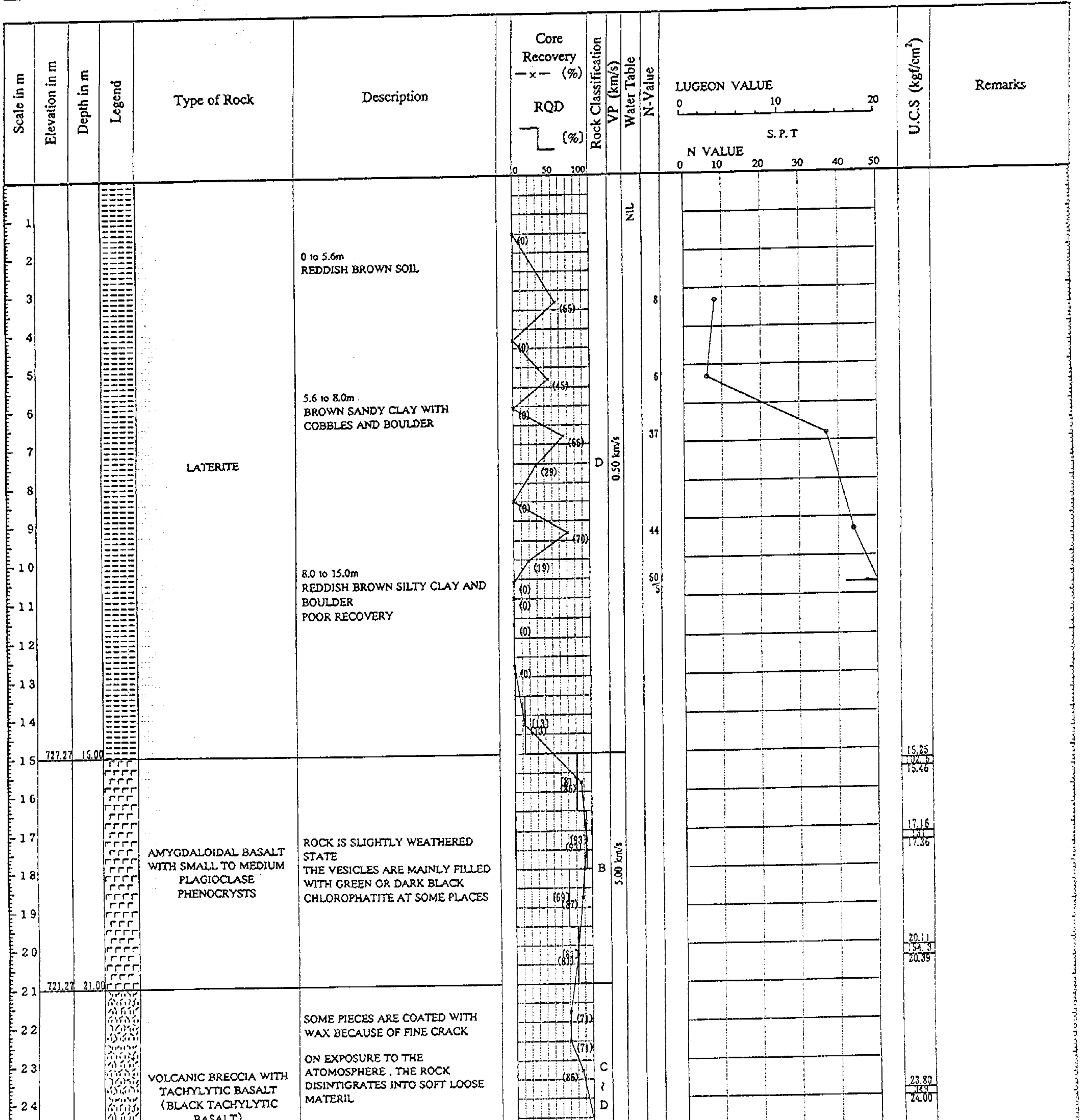
31.20 to 32.75m
ALL STAINED DEPOSITION OF CHLOROPHAEITE

PARTIALLY VERTICAL JOINTS

23					{100} (100)			0	23.45 724 23.75
24					{98} (98)		24.00		
25					{99} (99)			0	
26					{100} (100)				
27					{99} (99)		27.00		
28				28.10 to 29.60m PIECE NO.69C TO 72A SLL JOINTS ARE STAINED				0	
29			PORPHYRITIC BASALT WITH SMALL TO LARGE WHITE AND GREEN INFILLINGS		{97} (100)	A			
30					{100} (100)		30.00		
31				31.20 to 32.75m ALL STAINED DEPOSITION OF CHLOROPHAEITE				0	
32					{99} (99)				
33					{100} (100)		33.00		
34								0	
35					{99} (99)				
36				PARTIALLY VERTICAL JOINTS	{100} (100)		36.00		
37								0	
38					{100} (100)				38.52 697 38.87
39					{100} (100)		39.00		
40								0	
41					{100} (100)				
42							42.00		
43					{100} (100)			0	
44					{100} (100)				
45							45.00		
46					{100} (100)			0	
47					{100} (100)				47.57 830 47.95
48					{100} (100)		48.00		
49								0	
50					{100} (100)				
51					{100} (100)		51.00		
52					{100} (100)			0	
53					{100} (100)				
54	196.42	54.84			{94} (100)		54.00		
55					[0] (100)			0	
56			VOLCANIC BRECCIA WITH TACHYLITIC BASALT (RED TACHYLYTIC BASALT)	SOFT ROCK CONDITIONS SMALL PIECES ARE WAX COATED	[0] (100)	C			
57	194.20	57.06					57.00		
58			PORPHYRITIC BASALT	HARD BUT PIECES CONTAIN FINE CRACK	{100} (100)	B		1.5	57.93 144 58.27
59					{100} (100)				
60	191.26	60.00					60.00		

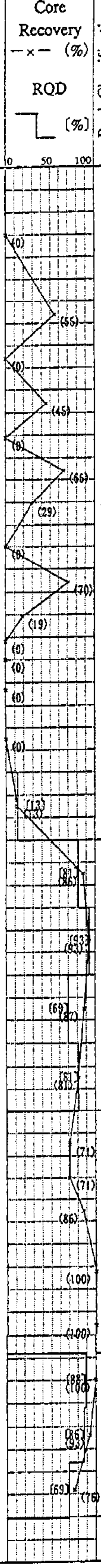
Fig. APP.2-15 **DRILLING LOG**

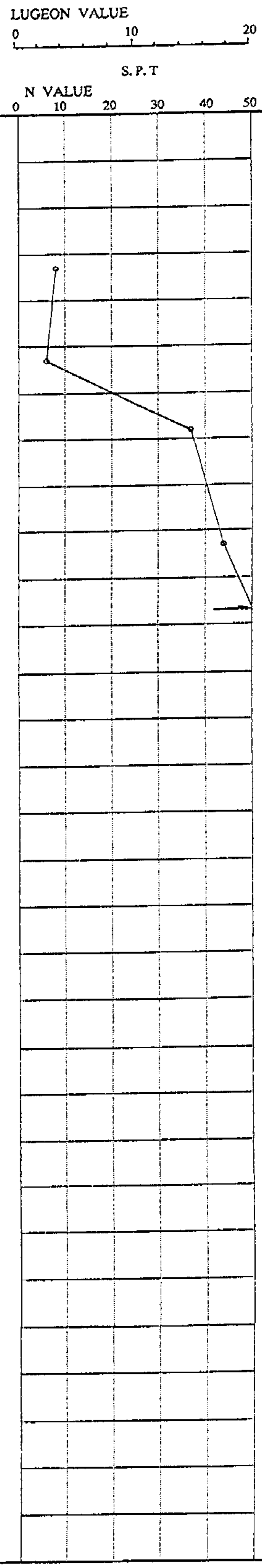
PROJECT	GEOLOGICAL SURVEY FOR MASTER PLAN STUDY ON POMPED STORAGE HYDROELECTRIC POWER DEVELOPMENT IN MAHARASTRA STATE ,INDIA						
CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY			**DATE**	30/OCT./1995 ~ 20/NOV./1995		
CONSULTANT	CONSULTING ENGINEERING SERVICES (I) PVT. LTD			**DRILLER**	DBM GEOTECHNICS AND CONSTRUCTIONS PVT.LTD		
B.H.No.	UH-1	**Elevation**	R.L. 742.27 m	**Total Depth**	30.00 m	**Location**	HEVALE PROJECT SITE
Equipment and Method	CALYX	Rotary Coring Water Flush and with Diamond Bits		Diameter of Hole : NX (mm)		**Sheet No.**	OF



Scale in m	Elevation in m	Depth in m	Type of Rock	Description	Rock Classification	VP (km/s)	Water Table	N-Value	U.C.S (kgf/cm²)	Remarks
0 – 15	727.27	15.00	LATERITE	0 to 5.6m REDDISH BROWN SOIL 5.6 to 8.0m BROWN SANDY CLAY WITH COBBLES AND BOULDER 8.0 to 15.0m REDDISH BROWN SILTY CLAY AND BOULDER POOR RECOVERY	D	0.50 km/s	NIL	8 6 37 44 50/5		
15 – 21	721.27	21.00	AMYGDALOIDAL BASALT WITH SMALL TO MEDIUM PLAGIOCLASE PHENOCRYSTS	ROCK IS SLIGHTLY WEATHERED STATE THE VESICLES ARE MAINLY FILLED WITH GREEN OR DARK BLACK CHLOROPHATITE AT SOME PLACES	B	5.00 km/s			15.25 102.6 15.46 17.16 131 17.36 20.11 154.3 20.39	
21 – 24			VOLCANIC BRECCIA WITH TACHYLYTIC BASALT (BLACK TACHYLYTIC BASALT)	SOME PIECES ARE COATED WITH WAX BECAUSE OF FINE CRACK ON EXPOSURE TO THE ATMOSPHERE , THE ROCK DISINTIGRATES INTO SOFT LOOSE MATERIL	C ~ D				23.80 349 24.00	

Elevation in m	Depth in m	Type of Rock	Description	Rock Classification	VP (km/s)	Water Table	N-Value	U.C.S (kgf/cm²)	Remarks
727.27	15.00	LATERITE	0 to 5.6m REDDISH BROWN SOIL 5.6 to 8.0m BROWN SANDY CLAY WITH COBBLES AND BOULDER 8.0 to 15.0m REDDISH BROWN SILTY CLAY AND BOULDER POOR RECOVERY	D	0.50 km/s	NIL	8 6 37 44 50/5		
721.27	21.00	AMYGDALOIDAL BASALT WITH SMALL TO MEDIUM PLAGIOCLASE PHENOCRYSTS	ROCK IS SLIGHTLY WEATHERED STATE THE VESICLES ARE MAINLY FILLED WITH GREEN OR DARK BLACK CHLOROPHATITE AT SOME PLACES	B	5.00 km/s			15.25 102.6 15.46 17.16 131 17.36 20.11 154.3 20.39	
715.87	26.40	VOLCANIC BRECCIA WITH TACHYLYTIC BASALT (BLACK TACHYLYTIC BASALT)	SOME PIECES ARE COATED WITH WAX BECAUSE OF FINE CRACK ON EXPOSURE TO THE ATOMOSPHERE , THE ROCK DISINTIGRATES INTO SOFT LOOSE MATERIL	C ~ D				23.80 36.9 24.00 26.40 416.3 26.70	
712.27	30.00	COMPACT PORPHYRITIC BASALT WITH SMALL TO MEDIUM PLAGIOCLASE PHENOCRYSTS	THE PHENOCRYSTS ARE IN CLUSTERS BEARING SMALL TO LARGE GREEN INFILLINGS	B				29.70 631.4 29.85	



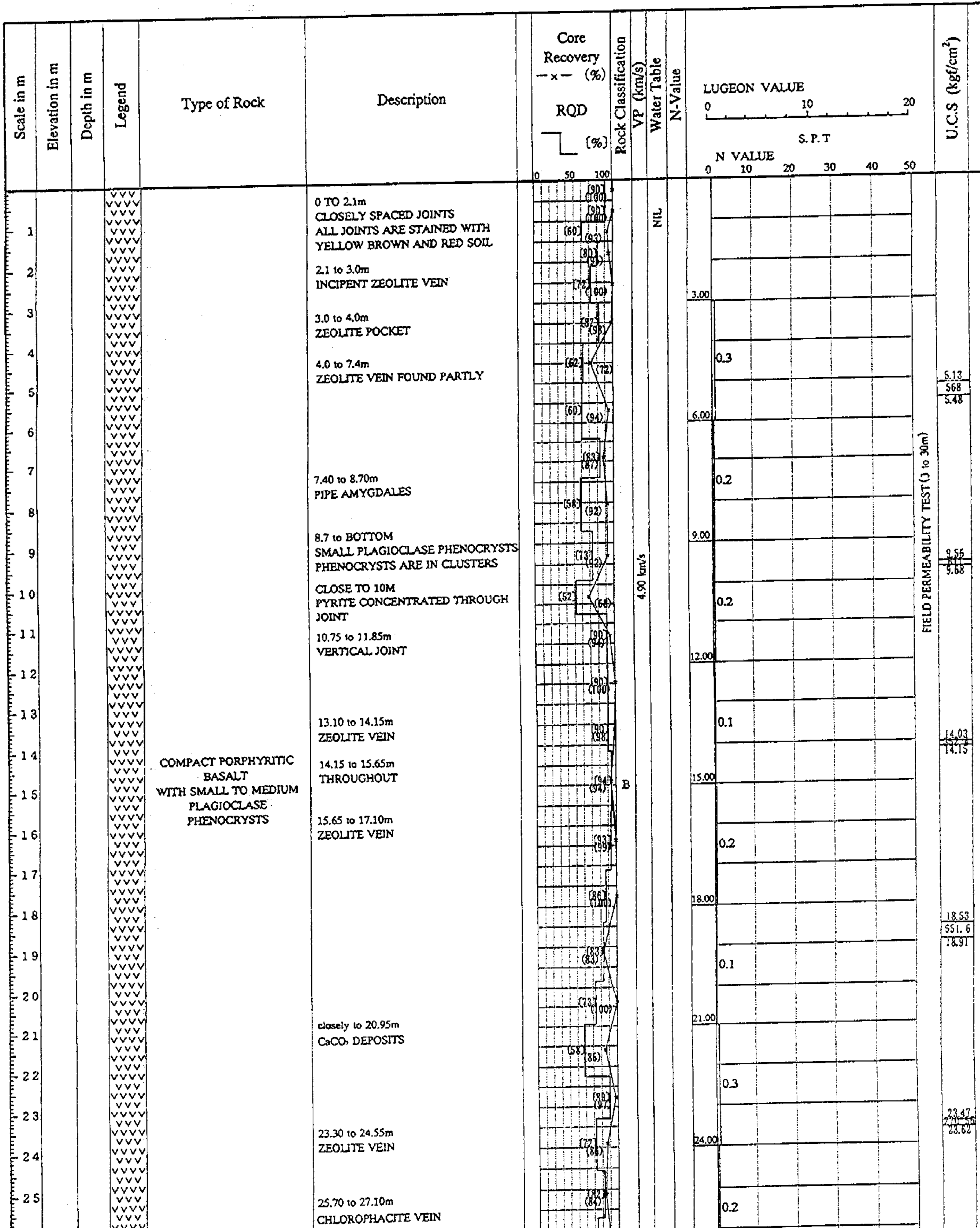


Scale in m: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

Fig. APP.2-16 DRILLING LOG

PROJECT	GEOLOGICAL SURVEY FOR MASTER PLAN STUDY ON POMPED STORAGE HYDROELECTRIC POWER DEVELOPMENT IN MAHARASTRA STATE ,INDIA				
CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY	**DATE**	29/OCT./1995 ~ 14/NOV./1995		
CONSULTANT	CONSULTING ENGINEERING SERVICES (I) PVT. LTD	**DRILLER**	DBM GEOTECHNICS AND CONSTRUCTIONS PVT.LTD		
B.H.No.	UH-2 **Elevation** R.L. 713.019 m	**Total Depth**	30.00 m	**Location**	HEVALE PROJECT SITE
Equipment and Method	CALYX Rotary Coring Water Flush and with Diamond Bits		Diameter of Hole : NX (mm)	**Sheet No.**	OF

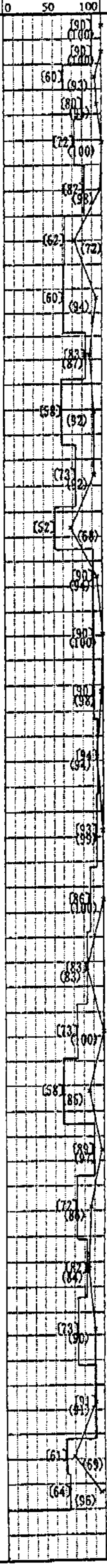
Scale in m	Elevation in m	Depth in m	Legend	Type of Rock	Description
			VVVV	COMPACT PORPHYRITIC BASALT WITH SMALL TO MEDIUM PLAGIOCLASE PHENOCRYSTS	0 TO 2.1m CLOSELY SPACED JOINTS ALL JOINTS ARE STAINED WITH YELLOW BROWN AND RED SOIL 2.1 to 3.0m INCIPENT ZEOLITE VEIN 3.0 to 4.0m ZEOLITE POCKET 4.0 to 7.4m ZEOLITE VEIN FOUND PARTLY 7.40 to 8.70m PIPE AMYGDALES 8.7 to BOTTOM SMALL PLAGIOCLASE PHENOCRYSTS PHENOCRYSTS ARE IN CLUSTERS CLOSE TO 10M PYRITE CONCENTRATED THROUGH JOINT 10.75 to 11.85m VERTICAL JOINT 13.10 to 14.15m ZEOLITE VEIN 14.15 to 15.65m THROUGHOUT 15.65 to 17.10m ZEOLITE VEIN closely to 20.95m $CaCO_3$ DEPOSITS 23.30 to 24.55m ZEOLITE VEIN 25.70 to 27.10m CHLOROPHACITE VEIN



Scale in m	Elevation in m	Depth in m	Legend	Type of Rock	Description	Rock Classification	VP (km/s)	Water Table	N-Value	Remarks
1			VVV		0 TO 2.1m CLOSELY SPACED JOINTS ALL JOINTS ARE STAINED WITH YELLOW BROWN AND RED SOIL			NIL		
2			VVV		2.1 to 3.0m INCIPENT ZEOLITE VEIN					
3			VVV		3.0 to 4.0m ZEOLITE POCKET					
4			VVV		4.0 to 7.4m ZEOLITE VEIN FOUND PARTLY					
7			VVV		7.40 to 8.70m PIPE AMYGDALES					
8			VVV		8.7 to BOTTOM SMALL PLAGIOCLASE PHENOCRYSTS PHENOCRYSTS ARE IN CLUSTERS		4.90 km/s			
10			VVV		CLOSE TO 10M PYRITE CONCENTRATED THROUGH JOINT					
11			VVV		10.75 to 11.85m VERTICAL JOINT					
13			VVV		13.10 to 14.15m ZEOLITE VEIN					
14			VVV	COMPACT PORPHYRITIC BASALT WITH SMALL TO MEDIUM PLAGIOCLASE PHENOCRYSTS	14.15 to 15.65m THROUGHOUT	B				
16			VVV		15.65 to 17.10m ZEOLITE VEIN					
21			VVV		closely to 20.95m CaCO₃ DEPOSITS					
23			VVV		23.30 to 24.55m ZEOLITE VEIN					
25			VVV		25.70 to 27.10m CHLOROPHACITE VEIN					
29			VVV		29.3 to 30m VERTICAL JOINT					
30	683.02	30.00								

Core Recovery —×— (%)

RQD ┐ (%)



LUGEON VALUE 0 10 20

S. P. T

N VALUE 0 10 20 30 40 50

FIELD PERMEABILITY TEST (3 to 30m)

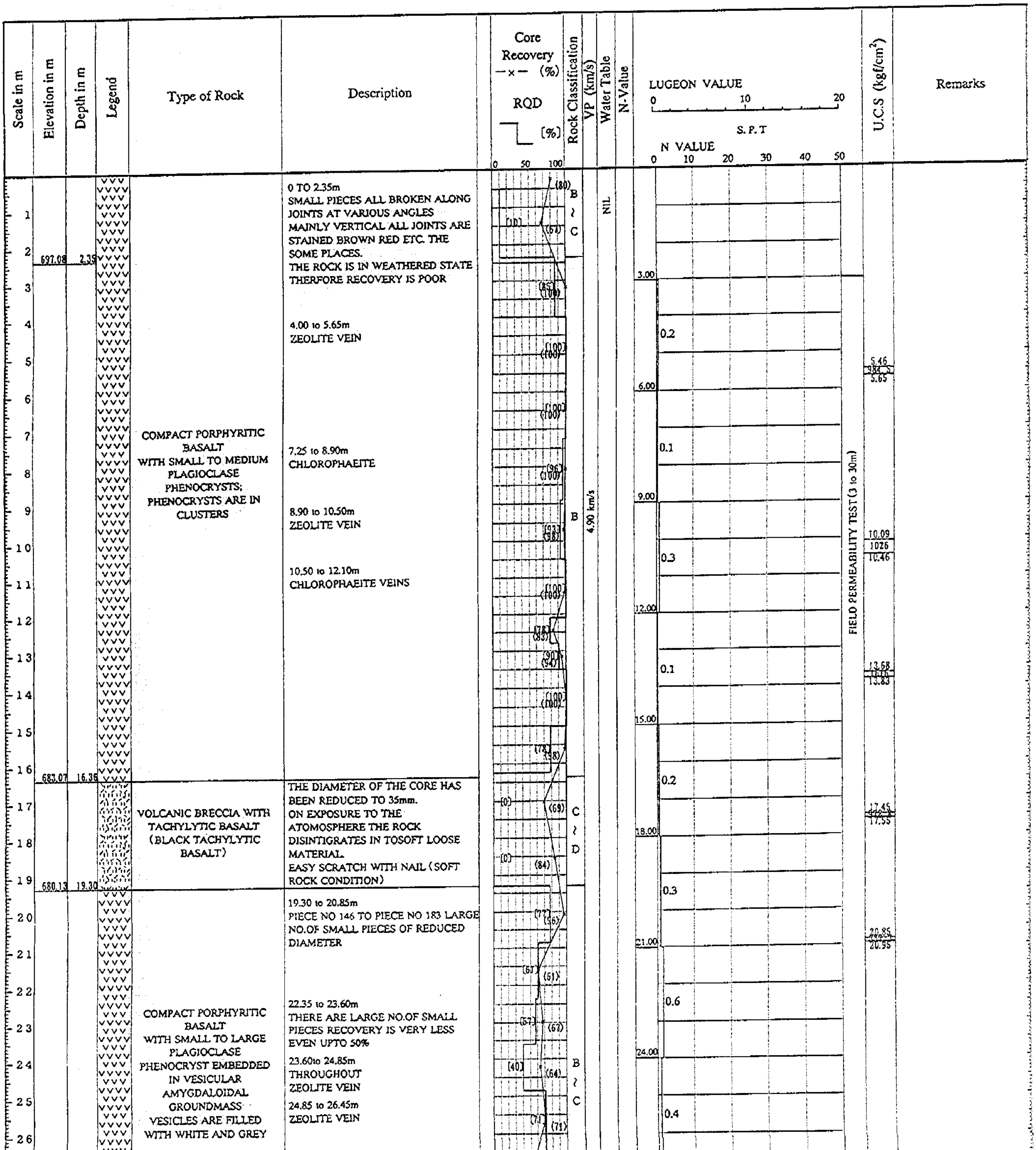
Depth	LUGEON VALUE
3.00	0.3
6.00	0.2
9.00	0.2
12.00	0.1
15.00	0.2
18.00	0.1
21.00	0.3
24.00	0.2
27.00	0.2
30.00	

U.C.S (kgf/cm^2)

5.13	568	5.48
9.56	511	9.68
14.03	[illegible]	14.15
18.53	651.6	18.91
23.47	[illegible]	23.62
29.30	598.[illegible]	29.47

Fig. APP.2-17 DRILLING LOG

PROJECT	GEOLOGICAL SURVEY FOR MASTER PLAN STUDY ON POMPED STORAGE HYDROELECTRIC POWER DEVELOPMENT IN MAHARASTRA STATE ,INDIA						
CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY			**DATE**	27/OCT./1995 ~ 13/OCT./1995		
CONSULTANT	CONSULTING ENGINEERING SERVICES (I) PVT. LTD			**DRILLER**	DBM GEOTECHNICS AND CONSTRUCTIONS PVT.LTD		
B.H.No.	UH-3	**Elevation**	R.L. 699.434 m	**Total Depth**	30.00 m	**Location**	HEVALE PROJECT SITE
Equipment and Method	CALYX	Rotary Coring Water Flush and with Diamond Bits		Diameter of Hole : NX (mm)		**Sheet No.**	OF



Type of Rock (to 16.36 m): COMPACT PORPHYRITIC BASALT WITH SMALL TO MEDIUM PLAGIOCLASE PHENOCRYSTS; PHENOCRYSTS ARE IN CLUSTERS

Description:

0 TO 2.35m
SMALL PIECES ALL BROKEN ALONG JOINTS AT VARIOUS ANGLES MAINLY VERTICAL ALL JOINTS ARE STAINED BROWN RED ETC. THE SOME PLACES.
THE ROCK IS IN WEATHERED STATE THERFORE RECOVERY IS POOR

4.00 to 5.65m
ZEOLITE VEIN

7.25 to 8.90m
CHLOROPHAEITE

8.90 to 10.50m
ZEOLITE VEIN

10.50 to 12.10m
CHLOROPHAEITE VEINS

Type of Rock (16.36 to 19.30 m): VOLCANIC BRECCIA WITH TACHYLYTIC BASALT (BLACK TACHYLYTIC BASALT)

Description:

THE DIAMETER OF THE CORE HAS BEEN REDUCED TO 35mm.
ON EXPOSURE TO THE ATOMOSPHERE THE ROCK DISINTIGRATES IN TOSOFT LOOSE MATERIAL.
EASY SCRATCH WITH NAIL (SOFT ROCK CONDITION)

Type of Rock (from 19.30 m): COMPACT PORPHYRITIC BASALT WITH SMALL TO LARGE PLAGIOCLASE PHENOCRYST EMBEDDED IN VESICULAR AMYGDALOIDAL GROUNDMASS VESICLES ARE FILLED WITH WHITE AND GREY

Description:

19.30 to 20.85m
PIECE NO 146 TO PIECE NO 183 LARGE NO.OF SMALL PIECES OF REDUCED DIAMETER

22.35 to 23.60m
THERE ARE LARGE NO.OF SMALL PIECES RECOVERY IS VERY LESS EVEN UPTO 50%

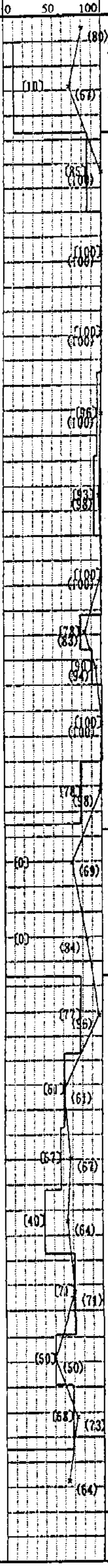
23.60to 24.85m
THROUGHOUT ZEOLITE VEIN

24.85 to 26.45m
ZEOLITE VEIN

Scale in m	Elevation in m	Depth in m	Legend	Type of Rock	Description
0–2	697.08	2.35	VVVV	COMPACT PORPHYRITIC BASALT WITH SMALL TO MEDIUM PLAGIOCLASE PHENOCRYSTS; PHENOCRYSTS ARE IN CLUSTERS	0 TO 2.35m SMALL PIECES ALL BROKEN ALONG JOINTS AT VARIOUS ANGLES MAINLY VERTICAL ALL JOINTS ARE STAINED BROWN RED ETC. THE SOME PLACES. THE ROCK IS IN WEATHERED STATE THERFORE RECOVERY IS POOR
3–16	683.07	16.30	VVVV		4.00 to 5.65m ZEOLITE VEIN 7.25 to 8.90m CHLOROPHAEITE 8.90 to 10.50m ZEOLITE VEIN 10.50 to 12.10m CHLOROPHAEITE VEINS
17–19	680.13	19.30		VOLCANIC BRECCIA WITH TACHYLYTIC BASALT (BLACK TACHYLYTIC BASALT)	THE DIAMETER OF THE CORE HAS BEEN REDUCED TO 35mm. ON EXPOSURE TO THE ATOMOSPHERE THE ROCK DISINTIGRATES IN TOSOFT LOOSE MATERIAL EASY SCRATCH WITH NAIL (SOFT ROCK CONDITION)
20–30	669.43	30.00	VVVV	COMPACT PORPHYRITIC BASALT WITH SMALL TO LARGE PLAGIOCLASE PHENOCRYST EMBEDDED IN VESICULAR AMYGDALOIDAL GROUNDMASS VESICLES ARE FILLED WITH WHITE AND GREY	19.30 to 20.85m PIECE NO 146 TO PIECE NO 183 LARGE NO.OF SMALL PIECES OF REDUCED DIAMETER 22.35 to 23.60m THERE ARE LARGE NO.OF SMALL PIECES RECOVERY IS VERY LESS EVEN UPTO 50% 23.60to 24.85m THROUGHOUT ZEOLITE VEIN 24.85 to 26.45m ZEOLITE VEIN 28.75 to 30.02m PIECE NO.228 TO PIECE NO 238 LARGE NO OF SMALL PIECES.SOME BROKEN ALONG JOINTS WHICH ARE STAINED. ROCK IS SLIGHTLY WEATHERED

Core Recovery —×— (%)

RQD (%)



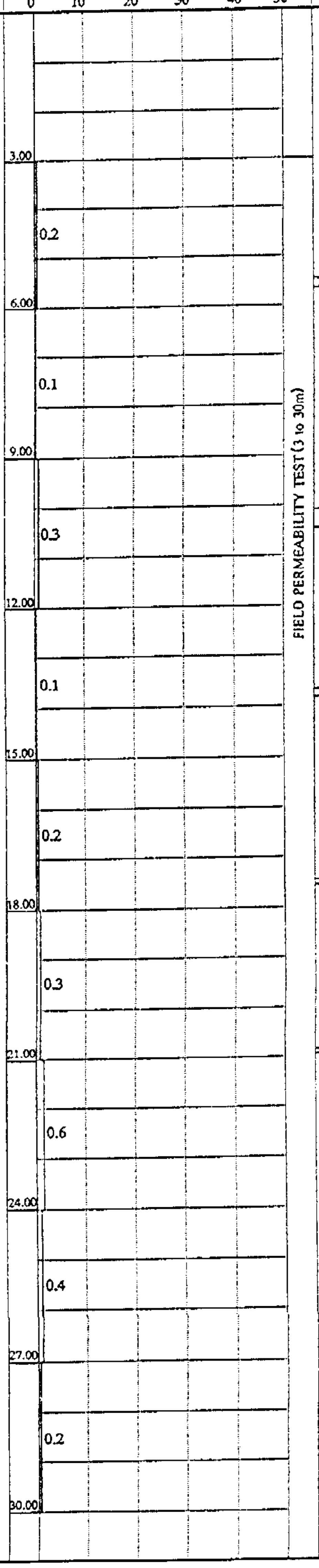
	(80)
[10]	(67)
(85)	(100)
(100)	(100)
(100)	(100)
(96)	(100)
(93)	(98)
(100)	(100)
(78)	(83)
(90)	(94)
(100)	(100)
(78)	(98)
[0]	(69)
[0]	(84)
(77)	(96)
(61)	(61)
(67)	(67)
[40]	(64)
(71)	(71)
(50)	(50)
(68)	(73)
	(64)

Rock Classification	VP (km/s)	Water Table	N-Value
B ~ C	4.90 km/s	NIL	
B			
C ~ D			
B ~ C			

LUGEON VALUE

S. P. T

N VALUE



3.00	0.2
6.00	0.1
9.00	0.3
12.00	0.1
15.00	0.2
18.00	0.3
21.00	0.6
24.00	0.4
27.00	0.2
30.00	

FIELD PERMEABILITY TEST (3 to 30m)

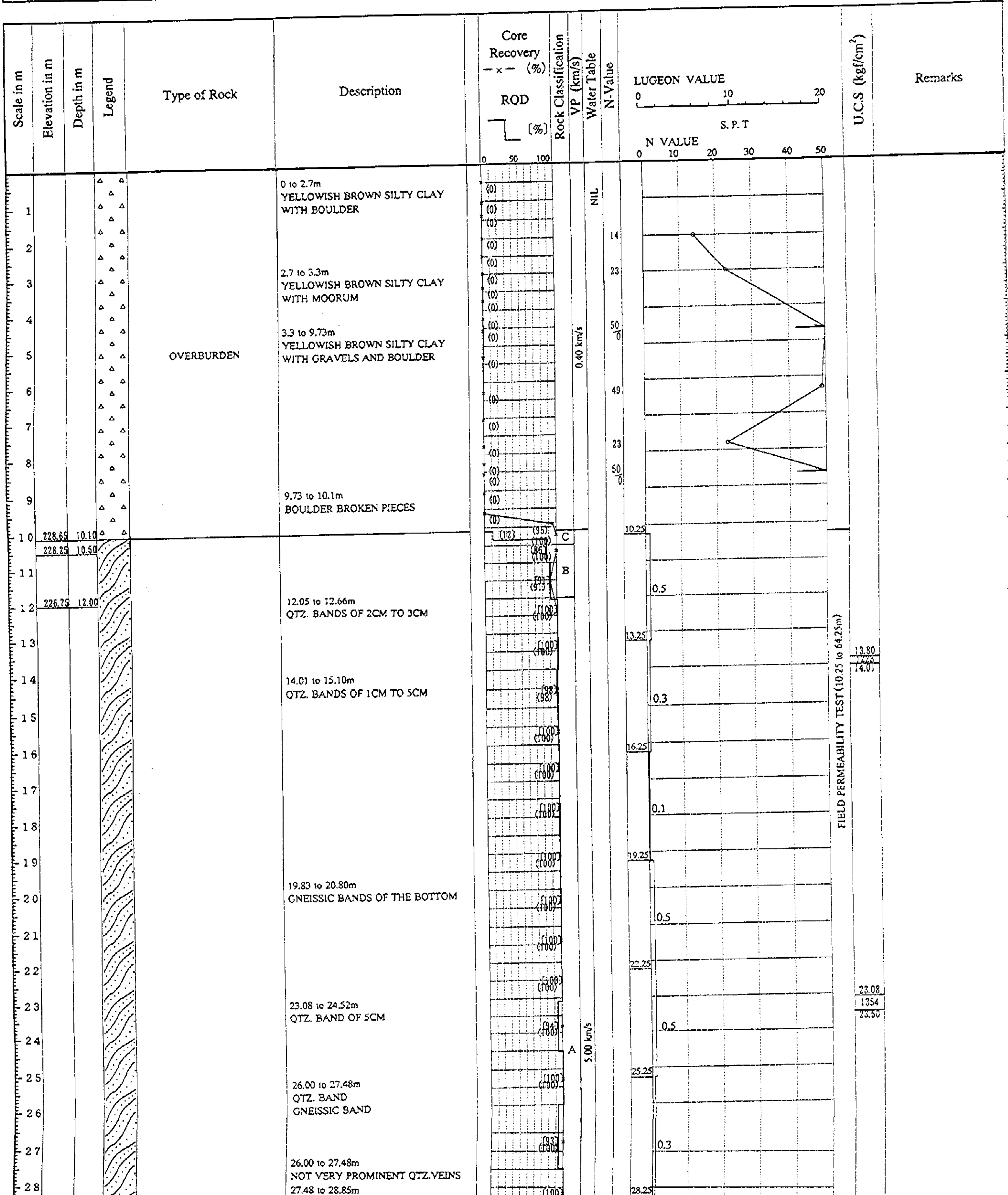
U.C.S (kgf/cm^2)

5.46	984.5	5.65
10.09	1026	10.46
13.68	[illegible]	13.83
17.45	[illegible]	17.55
20.85	[illegible]	20.95
28.65	[illegible]	28.75

Remarks

Fig. APP.2-18 DRILLING LOG

PROJECT	GEOLOGICAL SURVEY FOR MASTER PLAN STUDY ON POMPED STORAGE HYDROELECTRIC POWER DEVELOPMENT IN MAHARASTRA STATE ,INDIA						
CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY			**DATE**	11/NOV./1995 ~ 26/NOV./1995		
CONSULTANT	CONSULTING ENGINEERING SERVICES (I) PVT. LTD			**DRILLER**	DBM GEOTECHNICS AND CONSTRUCTIONS PVT.LTD		
B.H.No.	LH-1	**Elevation**	R.L. 238.751 m	**Total Depth**	65.00 m	**Location**	HEVALE PROJECT SITE
Equipment and Method	SWENSKA Rotary Coring Water Flush and with Diamond Bits			Diameter of Hole : NX (mm)		**Sheet No.**	OF



0 to 2.7m
YELLOWISH BROWN SILTY CLAY
WITH BOULDER

2.7 to 3.3m
YELLOWISH BROWN SILTY CLAY
WITH MOORUM

3.3 to 9.73m
YELLOWISH BROWN SILTY CLAY
WITH GRAVELS AND BOULDER

9.73 to 10.1m
BOULDER BROKEN PIECES

12.05 to 12.66m
QTZ. BANDS OF 2CM TO 3CM

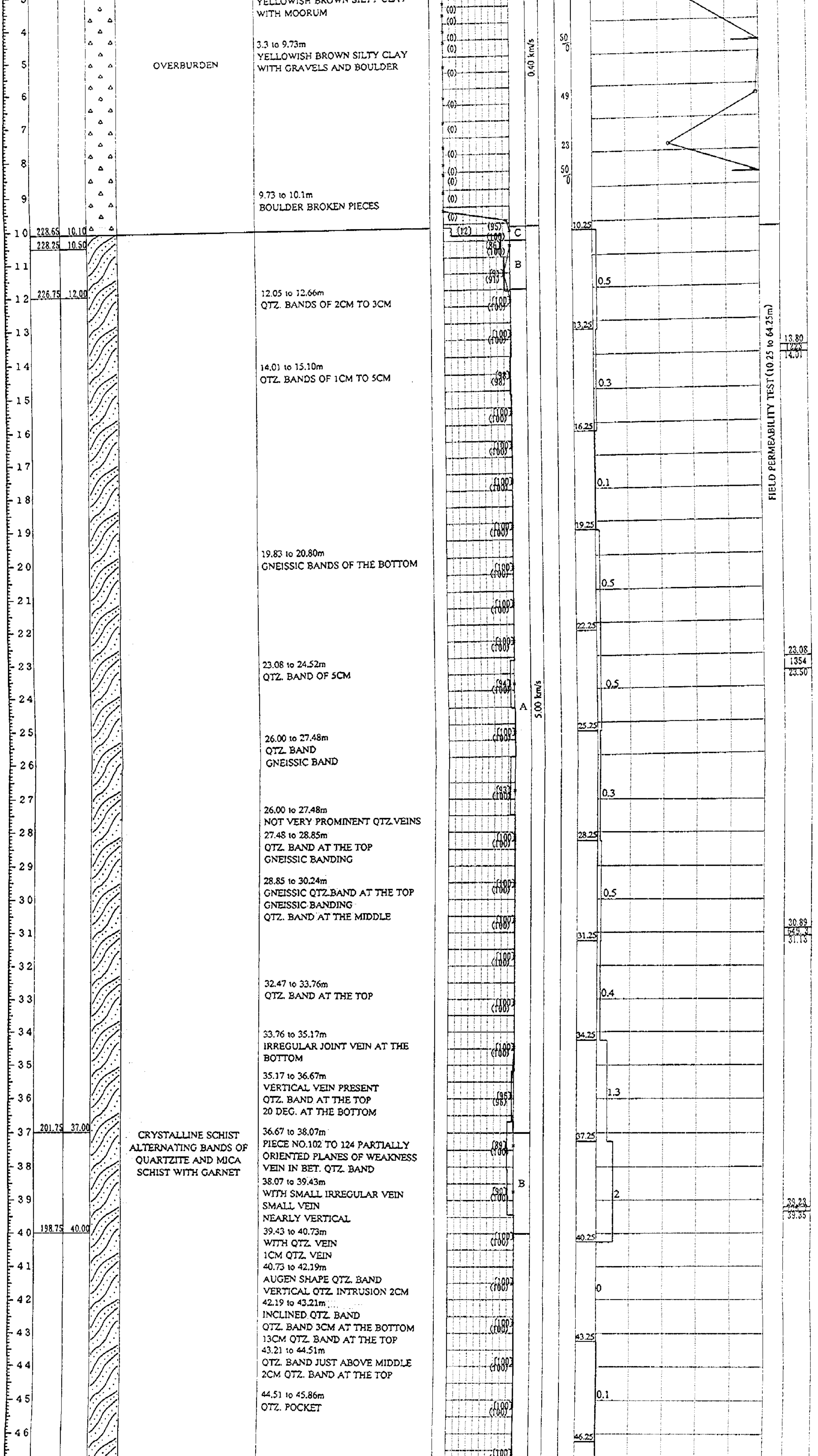
14.01 to 15.10m
QTZ. BANDS OF 1CM TO 5CM

19.83 to 20.80m
GNEISSIC BANDS OF THE BOTTOM

23.08 to 24.52m
QTZ. BAND OF 5CM

26.00 to 27.48m
QTZ. BAND
GNEISSIC BAND

26.00 to 27.48m
NOT VERY PROMINENT QTZ.VEINS
27.48 to 28.85m



YELLOWISH BROWN SILTY CLAY
WITH MOORUM

3.3 to 9.73m
YELLOWISH BROWN SILTY CLAY
WITH GRAVELS AND BOULDER

9.73 to 10.1m
BOULDER BROKEN PIECES

12.05 to 12.66m
QTZ. BANDS OF 2CM TO 3CM

14.01 to 15.10m
QTZ. BANDS OF 1CM TO 5CM

19.83 to 20.80m
GNEISSIC BANDS OF THE BOTTOM

23.08 to 24.52m
QTZ. BAND OF 5CM

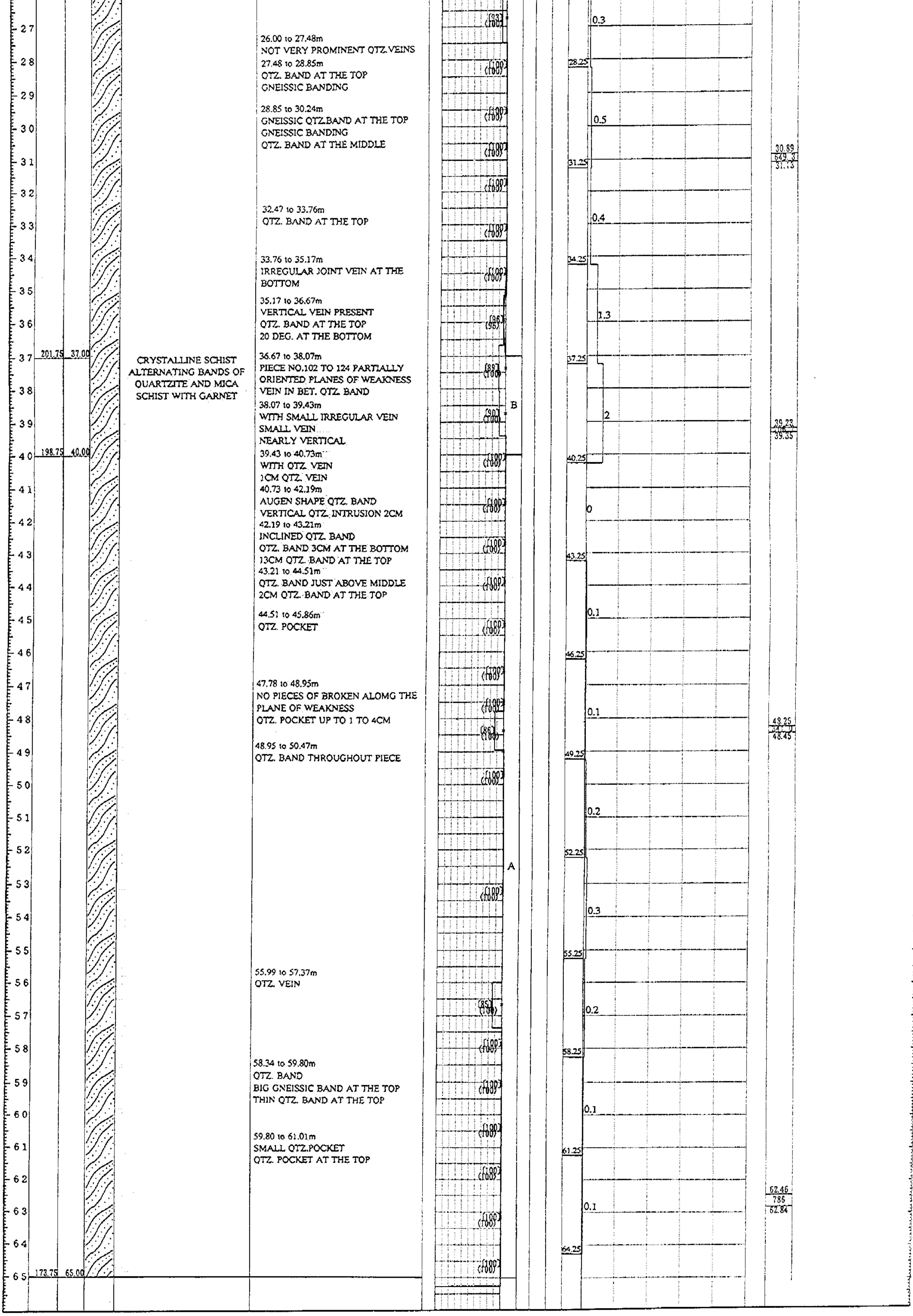
26.00 to 27.48m
QTZ. BAND
GNEISSIC BAND

26.00 to 27.48m
NOT VERY PROMINENT QTZ.VEINS
27.48 to 28.85m
QTZ. BAND AT THE TOP
GNEISSIC BANDING

28.85 to 30.24m
GNEISSIC QTZ.BAND AT THE TOP
GNEISSIC BANDING
QTZ. BAND AT THE MIDDLE

32.47 to 33.76m
QTZ. BAND AT THE TOP

33.76 to 35.17m
IRREGULAR JOINT VEIN AT THE BOTTOM
35.17 to 36.67m
VERTICAL VEIN PRESENT
QTZ. BAND AT THE TOP
20 DEG. AT THE BOTTOM
36.67 to 38.07m
PIECE NO.102 TO 124 PARTIALLY
ORIENTED PLANES OF WEAKNESS
VEIN IN BET. QTZ. BAND
38.07 to 39.43m
WITH SMALL IRREGULAR VEIN
SMALL VEIN
NEARLY VERTICAL
39.43 to 40.73m
WITH QTZ. VEIN
1CM QTZ. VEIN
40.73 to 42.19m
AUGEN SHAPE QTZ. BAND
VERTICAL QTZ. INTRUSION 2CM
42.19 to 43.21m
INCLINED QTZ. BAND
QTZ. BAND 3CM AT THE BOTTOM
13CM QTZ. BAND AT THE TOP
43.21 to 44.51m
QTZ. BAND JUST ABOVE MIDDLE
2CM QTZ. BAND AT THE TOP
44.51 to 45.86m
QTZ. POCKET



CRYSTALLINE SCHIST
ALTERNATING BANDS OF
QUARTZITE AND MICA
SCHIST WITH GARNET

26.00 to 27.48m
NOT VERY PROMINENT QTZ.VEINS

27.48 to 28.85m
QTZ. BAND AT THE TOP
GNEISSIC BANDING

28.85 to 30.24m
GNEISSIC QTZ.BAND AT THE TOP
GNEISSIC BANDING
QTZ. BAND AT THE MIDDLE

32.47 to 33.76m
QTZ. BAND AT THE TOP

33.76 to 35.17m
IRREGULAR JOINT VEIN AT THE BOTTOM

35.17 to 36.67m
VERTICAL VEIN PRESENT
QTZ. BAND AT THE TOP
20 DEG. AT THE BOTTOM

36.67 to 38.07m
PIECE NO.102 TO 124 PARTIALLY
ORIENTED PLANES OF WEAKNESS
VEIN IN BET. QTZ. BAND

38.07 to 39.43m
WITH SMALL IRREGULAR VEIN
SMALL VEIN
NEARLY VERTICAL

39.43 to 40.73m
WITH QTZ. VEIN
1CM QTZ. VEIN

40.73 to 42.19m
AUGEN SHAPE QTZ. BAND
VERTICAL QTZ. INTRUSION 2CM

42.19 to 43.21m
INCLINED QTZ. BAND
QTZ. BAND 3CM AT THE BOTTOM
13CM QTZ. BAND AT THE TOP

43.21 to 44.51m
QTZ. BAND JUST ABOVE MIDDLE
2CM QTZ. BAND AT THE TOP

44.51 to 45.86m
QTZ. POCKET

47.78 to 48.95m
NO PIECES OF BROKEN ALOMG THE
PLANE OF WEAKNESS
QTZ. POCKET UP TO 1 TO 4CM

48.95 to 50.47m
QTZ. BAND THROUGHOUT PIECE

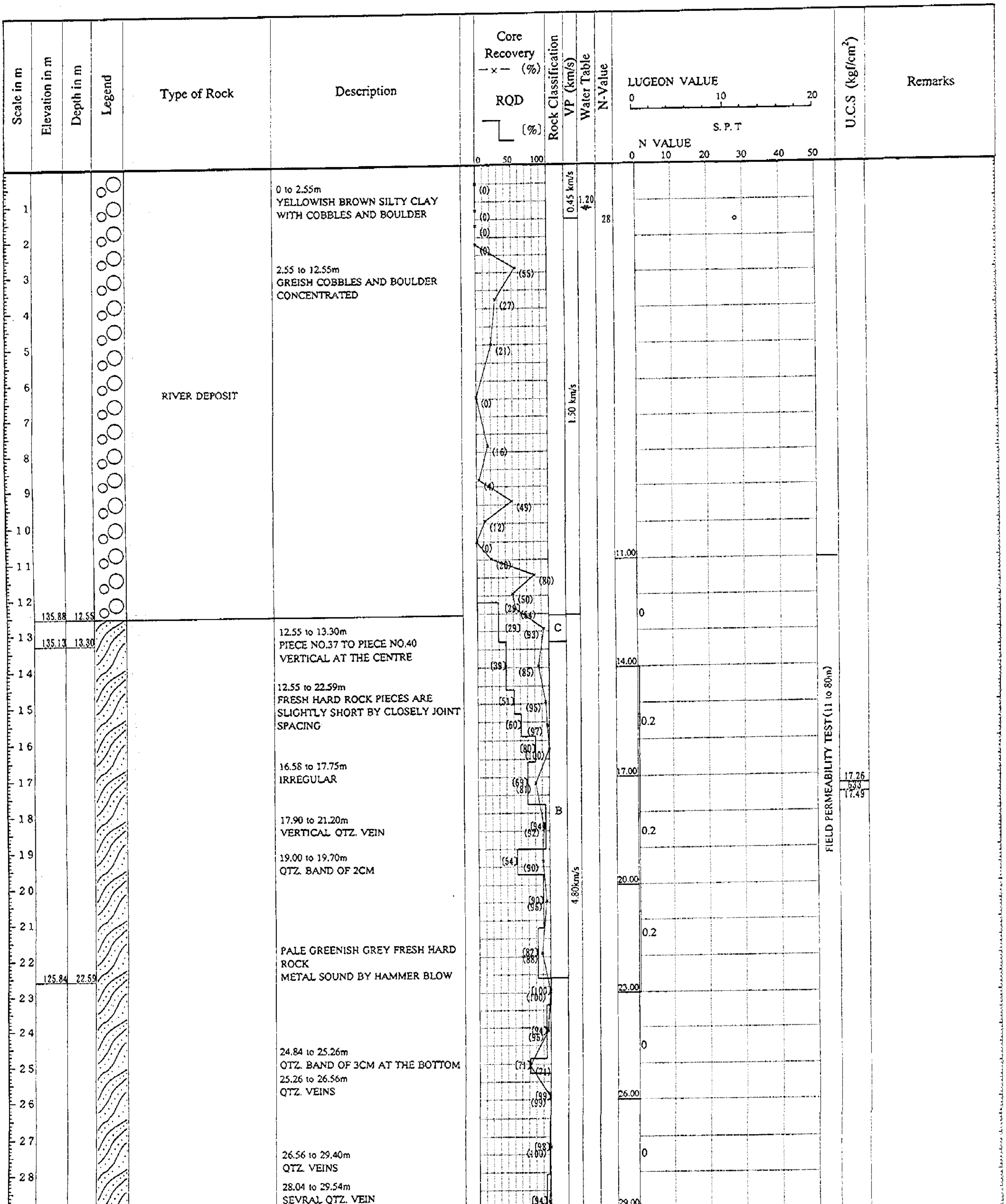
55.99 to 57.37m
QTZ. VEIN

58.34 to 59.80m
QTZ. BAND
BIG GNEISSIC BAND AT THE TOP
THIN QTZ. BAND AT THE TOP

59.80 to 61.01m
SMALL QTZ.POCKET
QTZ. POCKET AT THE TOP

Fig. APP.2-19 DRILLING LOG

PROJECT	GEOLOGICAL SURVEY FOR MASTER PLAN STUDY ON POMPED STORAGE HYDROELECTRIC POWER DEVELOPMENT IN MAHARASTRA STATE ,INDIA						
CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY			**DATE**	4/OCT./1995 ~ 13/NOV./1995		
CONSULTANT	CONSULTING ENGINEERING SERVICES (I) PVT. LTD			**DRILLER**	DBM GEOTECHNICS AND CONSTRUCTIONS PVT.LTD		
B.H.No.	LH-2	**Elevation**	R.L. 148.43 m	**Total Depth**	80.00 m	**Location**	HEVALE PROJECT SITE
Equipment and Method	SWENSKA	Rotary Coring Water Flush and with Diamond Bits		Diameter of Hole : NX (mm)		**Sheet No.**	OF



RIVER DEPOSIT

0 to 2.55m
YELLOWISH BROWN SILTY CLAY WITH COBBLES AND BOULDER

2.55 to 12.55m
GREISH COBBLES AND BOULDER CONCENTRATED

12.55 to 13.30m
PIECE NO.37 TO PIECE NO.40 VERTICAL AT THE CENTRE

12.55 to 22.59m
FRESH HARD ROCK PIECES ARE SLIGHTLY SHORT BY CLOSELY JOINT SPACING

16.58 to 17.75m
IRREGULAR

17.90 to 21.20m
VERTICAL QTZ. VEIN

19.00 to 19.70m
QTZ. BAND OF 2CM

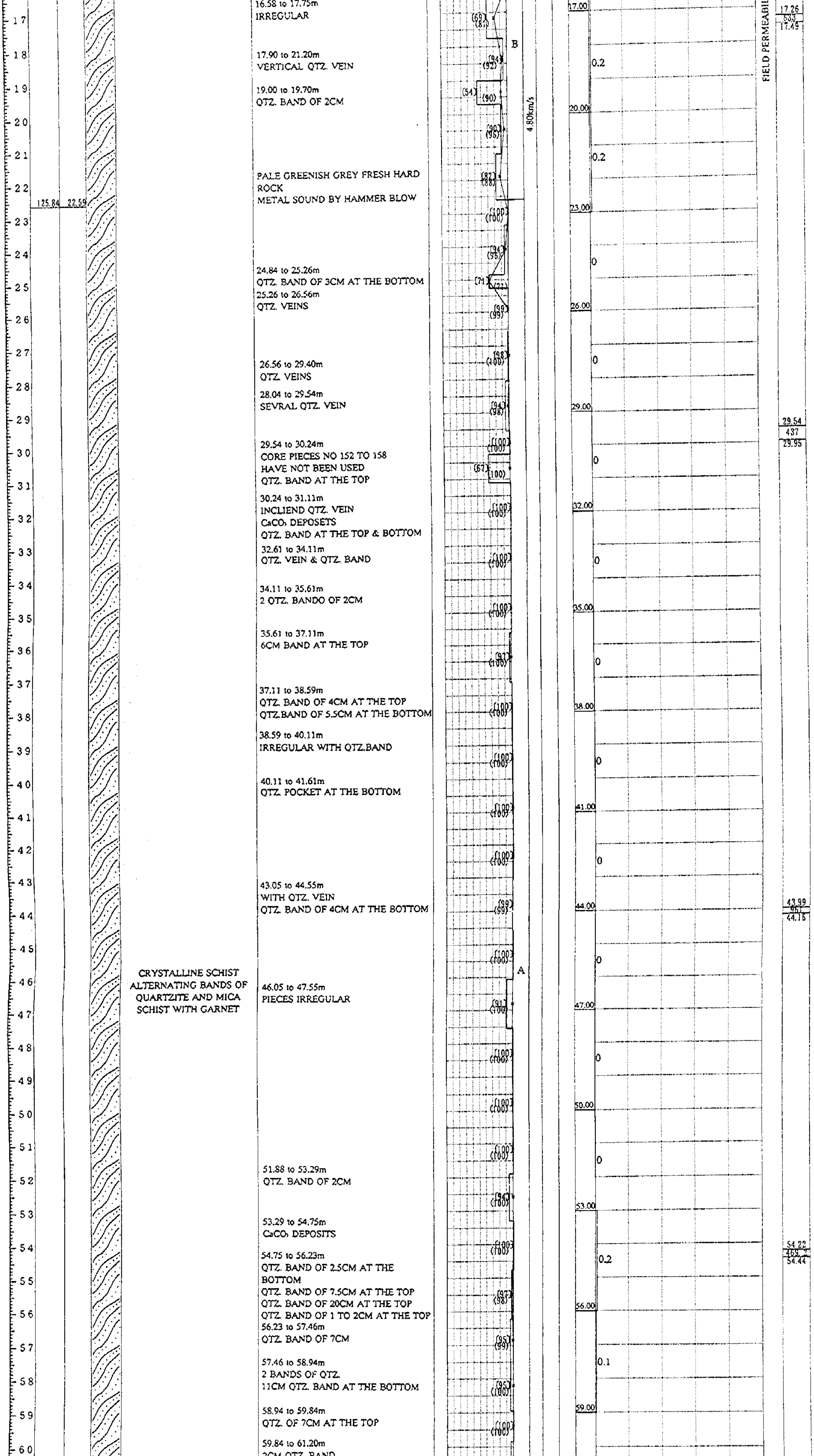
PALE GREENISH GREY FRESH HARD ROCK
METAL SOUND BY HAMMER BLOW

24.84 to 25.26m
QTZ. BAND OF 3CM AT THE BOTTOM

25.26 to 26.56m
QTZ. VEINS

26.56 to 29.40m
QTZ. VEINS

28.04 to 29.54m
SEVRAL QTZ. VEIN



16.58 to 17.75m
IRREGULAR

17.90 to 21.20m
VERTICAL QTZ. VEIN

19.00 to 19.70m
QTZ. BAND OF 2CM

PALE GREENISH GREY FRESH HARD
ROCK
METAL SOUND BY HAMMER BLOW

24.84 to 25.26m
QTZ. BAND OF 3CM AT THE BOTTOM
25.26 to 26.56m
QTZ. VEINS

26.56 to 29.40m
QTZ. VEINS

28.04 to 29.54m
SEVRAL QTZ. VEIN

29.54 to 30.24m
CORE PIECES NO 152 TO 158
HAVE NOT BEEN USED
QTZ. BAND AT THE TOP

30.24 to 31.11m
INCLIEND QTZ. VEIN
$CaCO_3$ DEPOSETS
QTZ. BAND AT THE TOP & BOTTOM

32.61 to 34.11m
QTZ. VEIN & QTZ. BAND

34.11 to 35.61m
2 QTZ. BANDO OF 2CM

35.61 to 37.11m
6CM BAND AT THE TOP

37.11 to 38.59m
QTZ. BAND OF 4CM AT THE TOP
QTZ.BAND OF 5.5CM AT THE BOTTOM

38.59 to 40.11m
IRREGULAR WITH QTZ.BAND

40.11 to 41.61m
QTZ. POCKET AT THE BOTTOM

43.05 to 44.55m
WITH QTZ. VEIN
QTZ. BAND OF 4CM AT THE BOTTOM

CRYSTALLINE SCHIST
ALTERNATING BANDS OF
QUARTZITE AND MICA
SCHIST WITH GARNET

46.05 to 47.55m
PIECES IRREGULAR

51.88 to 53.29m
QTZ. BAND OF 2CM

53.29 to 54.75m
$CaCO_3$ DEPOSITS

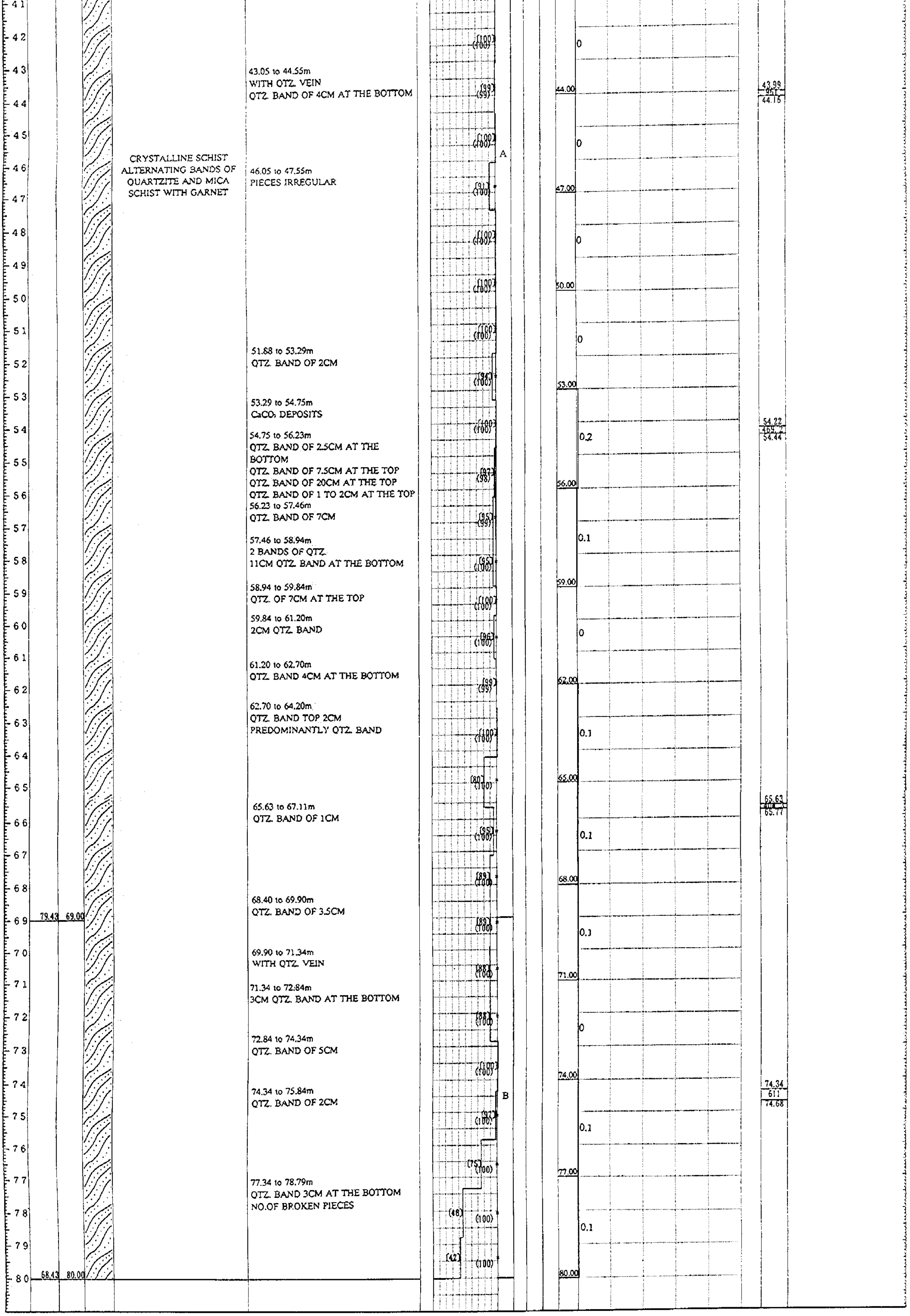
54.75 to 56.23m
QTZ. BAND OF 2.5CM AT THE
BOTTOM
QTZ. BAND OF 7.5CM AT THE TOP
QTZ. BAND OF 20CM AT THE TOP
QTZ. BAND OF 1 TO 2CM AT THE TOP

56.23 to 57.46m
QTZ. BAND OF 7CM

57.46 to 58.94m
2 BANDS OF QTZ.
11CM QTZ. BAND AT THE BOTTOM

58.94 to 59.84m
QTZ. OF 7CM AT THE TOP

59.84 to 61.20m
2CM QTZ. BAND



CRYSTALLINE SCHIST
ALTERNATING BANDS OF
QUARTZITE AND MICA
SCHIST WITH GARNET

43.05 to 44.55m
WITH QTZ. VEIN
QTZ. BAND OF 4CM AT THE BOTTOM

46.05 to 47.55m
PIECES IRREGULAR

51.88 to 53.29m
QTZ. BAND OF 2CM

53.29 to 54.75m
$CaCO_3$ DEPOSITS

54.75 to 56.23m
QTZ. BAND OF 2.5CM AT THE BOTTOM
QTZ. BAND OF 7.5CM AT THE TOP
QTZ. BAND OF 20CM AT THE TOP
QTZ. BAND OF 1 TO 2CM AT THE TOP

56.23 to 57.46m
QTZ. BAND OF 7CM

57.46 to 58.94m
2 BANDS OF QTZ.
11CM QTZ. BAND AT THE BOTTOM

58.94 to 59.84m
QTZ. OF 7CM AT THE TOP

59.84 to 61.20m
2CM QTZ. BAND

61.20 to 62.70m
QTZ. BAND 4CM AT THE BOTTOM

62.70 to 64.20m
QTZ. BAND TOP 2CM
PREDOMINANTLY QTZ. BAND

65.63 to 67.11m
QTZ. BAND OF 1CM

68.40 to 69.90m
QTZ. BAND OF 3.5CM

69.90 to 71.34m
WITH QTZ. VEIN

71.34 to 72.84m
3CM QTZ. BAND AT THE BOTTOM

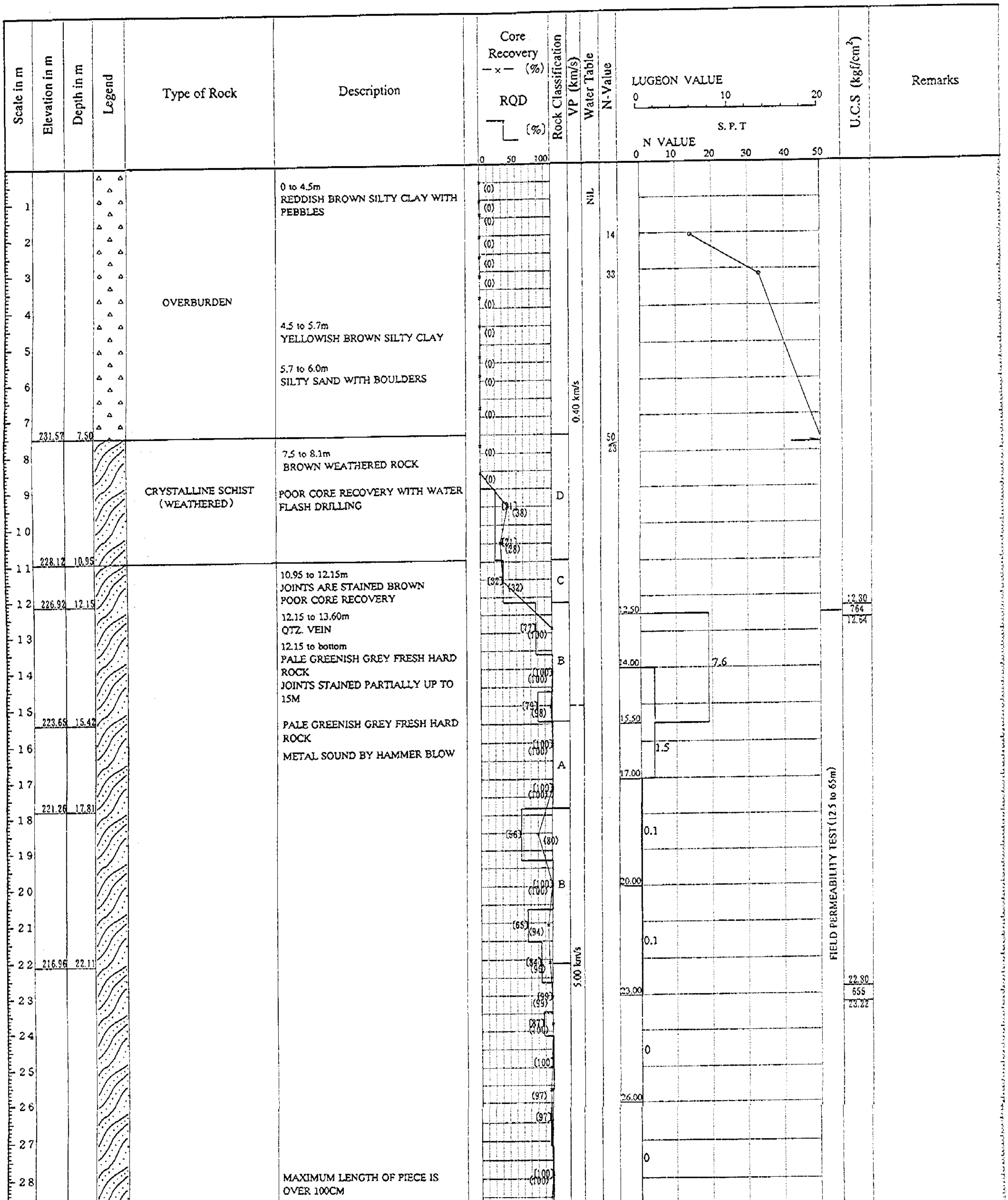
72.84 to 74.34m
QTZ. BAND OF 5CM

74.34 to 75.84m
QTZ. BAND OF 2CM

77.34 to 78.79m
QTZ. BAND 3CM AT THE BOTTOM
NO.OF BROKEN PIECES

Fig. APP.2-20 DRILLING LOG

PROJECT	GEOLOGICAL SURVEY FOR MASTER PLAN STUDY ON POMPED STORAGE HYDROELECTRIC POWER DEVELOPMENT IN MAHARASTRA STATE ,INDIA						
CLIENT	JAPAN INTERNATIONAL COOPERATION AGENCY			**DATE**	16/OCT./1995 ~ 10/NOV./1995		
CONSULTANT	CONSULTING ENGINEERING SERVICES (I) PVT. LTD			**DRILLER**	DBM GEOTECHNICS AND CONSTRUCTIONS PVT.LTD		
B.H.No.	LH-3	**Elevation**	R.L. 239.071 m	**Total Depth**	65.00 m	**Location**	HEVALE PROJECT SITE
Equipment and Method	SWENSKA	Rotary Coring Water Flush and with Diamond Bits		Diameter of Hole : NX (mm).		**Sheet No.**	OF



0 to 4.5m
REDDISH BROWN SILTY CLAY WITH PEBBLES

4.5 to 5.7m
YELLOWISH BROWN SILTY CLAY

5.7 to 6.0m
SILTY SAND WITH BOULDERS

7.5 to 8.1m
BROWN WEATHERED ROCK

POOR CORE RECOVERY WITH WATER FLASH DRILLING

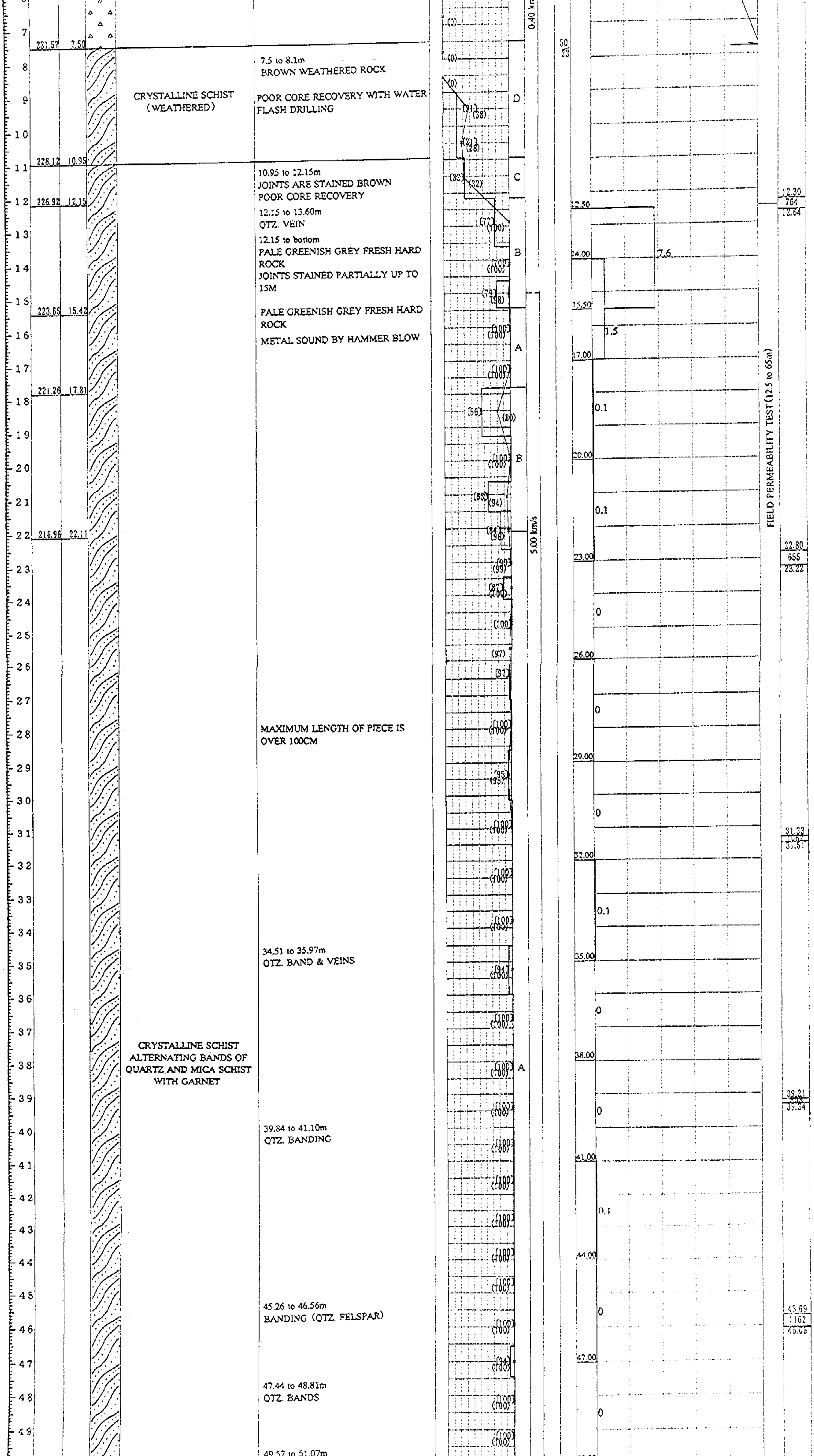
10.95 to 12.15m
JOINTS ARE STAINED BROWN
POOR CORE RECOVERY

12.15 to 13.60m
QTZ. VEIN

12.15 to bottom
PALE GREENISH GREY FRESH HARD ROCK
JOINTS STAINED PARTIALLY UP TO 15M

PALE GREENISH GREY FRESH HARD ROCK
METAL SOUND BY HAMMER BLOW

MAXIMUM LENGTH OF PIECE IS OVER 100CM



7.5 to 8.1m
BROWN WEATHERED ROCK

POOR CORE RECOVERY WITH WATER FLASH DRILLING

10.95 to 12.15m
JOINTS ARE STAINED BROWN
POOR CORE RECOVERY

12.15 to 13.60m
QTZ. VEIN

12.15 to bottom
PALE GREENISH GREY FRESH HARD ROCK
JOINTS STAINED PARTIALLY UP TO 15M

PALE GREENISH GREY FRESH HARD ROCK

METAL SOUND BY HAMMER BLOW

MAXIMUM LENGTH OF PIECE IS OVER 100CM

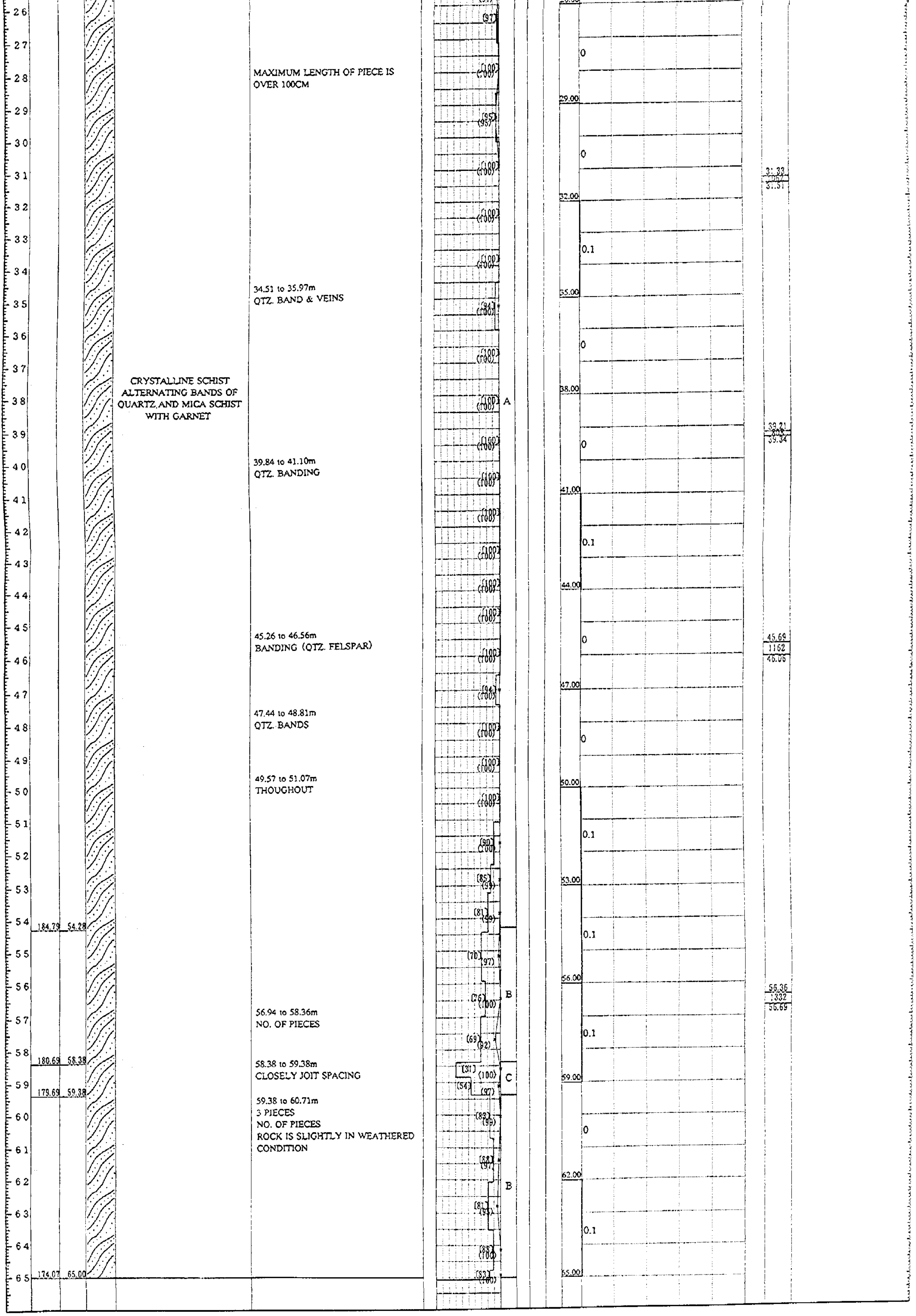
34.51 to 35.97m
QTZ. BAND & VEINS

39.84 to 41.10m
QTZ. BANDING

45.26 to 46.56m
BANDING (QTZ. FELSPAR)

47.44 to 48.81m
QTZ. BANDS

49.57 to 51.07m



184.79	54.28
180.69	58.38
179.69	59.38
174.07	65.00

CRYSTALLINE SCHIST
ALTERNATING BANDS OF
QUARTZ AND MICA SCHIST
WITH GARNET

MAXIMUM LENGTH OF PIECE IS OVER 100CM

34.51 to 35.97m
QTZ. BAND & VEINS

39.84 to 41.10m
QTZ. BANDING

45.26 to 46.56m
BANDING (QTZ. FELSPAR)

47.44 to 48.81m
QTZ. BANDS

49.57 to 51.07m
THOUGHOUT

56.94 to 58.36m
NO. OF PIECES

58.38 to 59.38m
CLOSELY JOIT SPACING

59.38 to 60.71m
3 PIECES
NO. OF PIECES
ROCK IS SLIGHTLY IN WEATHERED CONDITION

	(97)	
[100]	(100)	
[95]	(95)	
[100]	(100)	
[100]	(100)	
[100]	(100)	
[94]	(100)	
[100]	(100)	
[100]	(100)	A
[100]	(100)	
[100]	(100)	
[100]	(100)	
[100]	(100)	
[100]	(100)	
[100]	(100)	
[100]	(100)	
[94]	(100)	
[100]	(100)	
[100]	(100)	
[100]	(100)	
[90]	(100)	
[85]	(99)	
[81]	(99)	
[70]	(97)	
[76]	(100)	B
[69]	(92)	
[31]	(100)	C
[54]	(97)	
[83]	(99)	
[88]	(97)	B
[87]	(93)	
[88]	(100)	
[83]	(100)	

	0
29.00	0
32.00	0.1
35.00	0
38.00	0
41.00	0.1
44.00	0
47.00	0
50.00	0.1
53.00	0.1
56.00	0.1
59.00	0
62.00	0.1
65.00	

31.33	1067	31.51
39.21	808	39.34
45.69	1162	46.06
56.36	1332	56.69

Appendix 3 Laboratory Test

Table APP.3-1 Lower Jalond Test-I-(1)

SR. NO.	BORE HOLE NO.	CORE NO.	DEPTH m.	DIAMETER cms.	LENGTH cms.	D : H	UNIAXIAL COMPRESSIVE STRENGTH kg/cm^2	POROSITY %	WATER ABSORPTION %	DRY DENSITY gm/cc	ULTRASONIC TEST m/sec
1	LJ-1	101	14.05/14.25	5.4	10.80	1:2	71	2.01	0.32	2.89	4.362
2	LJ-1	122	19.40/20.80	5.4	10.80	1:2	1506	1.02	0.34	2.97	4.954
3	LJ-1	153	24.60/25.40	5.4	10.80	1:2	415	3.23	1.22	2.64	3.816
4	LJ-1	200	33.65/35.10	5.4	10.90	1:2.02	502	3.21	1.19	2.68	3.385
5	LJ-1	265	47.00/48.50	5.7	11.3	1:1.98	314	4.02	1.57	2.56	3.256
6	LJ-1	305	59.00/60.55	5.4	10.80	1:2	262	3.87	1.59	2.45	3.506
7	LJ-2	9	2.25/3.35	5.4	10.80	1:2	546	3.16	1.21	2.62	3.636

NOTE : All samples were soaked in water for 24 hrs. before testing.

Table APP.3-2 Lower Jalond Test-I-(2)

SR. NO.	BORE HOLE NO.	CORE NO.	DEPTH m.	DIAMETER cms.	LENGTH cms.	D : H	UNIAXIAL COMPRESSIVE STRENGTH kg/cm^2	POROSITY %	WATER ABSORPTION %	DRY DENSITY gm/cc	ULTRASONIC TEST m/sec
8	LJ-2	99	10.45/11.55	5.4	10.90	1:2.02	1070	2.12	0.74	2.94	5.190
9	LJ-2	167	28.20/28.55	5.4	10.90	1:2.02	314	3.06	2.03	2.71	3.231
10	LJ-2	223	37.00/38.65	5.4	10.90	1:2.02	415	3.43	1.30	2.63	3.527
11	LJ-2	371	51.00/52.5	5.4	10.90	1:2.02	589	2.72	1.02	2.67	4.504
12	LJ-2	435	67.60/69.00	5.4	10.80	1:2	1048	2.52	0.88	2.87	4.576
13	LJ 3	80	12.10/13.30	5.85	11.5	1:1.97	800	2.67	0.99	2.70	3.979
14	LJ 3	126	23.85/25.20	5.85	11.4	1:1.95	781	2.72	1.02	2.67	4.435

NOTE : All samples were soaked in water for 24 hrs. before testing.

Table APP.3-3 Lower Jalond Test-I-(3)

SR. NO.	BORE HOLE NO.	CORE NO.	DEPTH m.	DIAMETER cms.	LENGTH cms.	D : H	UNIAXIAL COMPRESSIVE STRENGTH kg/cm^2	POROSITY %	WATER ABSORPTION %	DRY DENSITY gm/cc	ULTRASONIC TEST m/sec
15	LJ-3	181	37.85/39.20	6.85	12.70	1:2.17	632	3.17	1.20	2.64	3.713
16	LJ-3	208	49.50/50.85	5.85	11.50	1:1.97	614	3.30	1.25	2.63	4.323
17	LJ-3	263	67.55/68.65	5.85	11.50	1:1.97	484	4.20	1.69	2.48	3.585

NOTE : All samples were soaked in water for 24 hrs. before testing.

Table APP.3-4 Lower Jalond Test-I-(4)

SR. NO.	BORE HOLE NO.	CORE NO.	DEPTH m.	DIAMETER cms.	LENGTH cms.	D : H	UNIAXIAL COMPRESSIVE STRENGTH kg/cm^2	POROSITY %	WATER ABSORPTION %	DRY DENSITY gm/cc	ULTRASONIC TEST m/sec
1	UM1	29	29.50/29.61	5.4	10.00	1:1.85	238	2.9	1.31	2.34	3.017
2	UM1	36	30.60/30.73	5.4	10.00	1:1.85	451	2.3	1.29	2.66	4.613
3	UM1	57	33.10/33.30	5.4	10.00	1:1.85	383	2.0	0.87	2.64	4.281
4	UM1	113	38.40/39.90	5.4	10.00	1:1.85	513	2.1	0.79	2.67	4.310
5	UM1	135	47.40/48.90	5.4	10.00	1:1.85	349	2.5	0.95	2.62	4.830
6	UM1	148	51.60/53.00	5.4	10.00	1:1.85	412	2.4	0.93	2.63	4.807
7	UM1	163	55.75/57.25	5.4	10.00	1:1.85	437	2.2	0.83	2.65	4.716
8	UM1	184	58.25/59.70	5.4	10.00	1:1.85	457	2.7	1.00	2.58	4.219

NOTE : All samples were soaked in water for 24 hrs. before testing.

Table APP.3-5 Lower Jalond Test-I-(5)

SR. NO.	BORE HOLE NO.	CORE NO.	DEPTH m.	DIAMETER cms.	LENGTH cms.	D : H	UNIAXIAL COMPRESSIVE STRENGTH kg/cm^2	POROSITY %	WATER ABSORPTION %	DRY DENSITY gm/cc	ULTRASONIC TEST m/sec
9	UM2	59B	16.45/17.95	5.4	10.00	1:1.85	618	3.1	1.22	2.53	4.115
10	UM2	84	20.90/22.30	5.4	10.00	1:1.85	873	2.6	0.93	2.74	4.716
11	UM2	108	31.10/32.60	5.4	10.00	1:1.85	976	2.2	0.78	2.82	4.230
12	UM2	137	39.15/39.40	5.4	10.00	1:1.85	839	2.1	0.75	2.79	4.873
13	UM2	167A	48.80/49.00	5.4	10.00	1:1.85	863	2.3	0.51	2.81	4.881
14	UM2	180B	51.60/53.10	5.4	10.00	1:1.85	1092	1.5	0.54	2.80	4.385
15	UM2	192B	54.60/56:10	5.4	10.00	1:1.85	873	2.2	0.77	2.85	4.310
16	UM2	198	56.10/57.60	5.4	10.00	1:1.85	1236	1.0	0.36	2.81	4.761

NOTE : All samples were soaked in water for 24 hrs. before testing.

Table APP.3-6 Lower Jalond Test-I-(6)

SR. NO.	BORE HOLE NO.	CORE NO.	DEPTH m.	DIAMETER cms.	LENGTH cms.	D : H	UNIAXIAL COMPRESSIVE STRENGTH kg/cm^2	POROSITY %	WATER ABSORPTION %	DRY DENSITY gm/cc	ULTRASONIC TEST m/sec
17	UM3	85	32.15/33.65	5.4	10.00	1:1.85	571	4.9	1.88	2.59	4.323
18	UM3	111	37.65/39.15	5.4	10.00	1:1.85	1026	3.4	1.22	2.78	4.784
19	UM3	131C	41.91/42.13	5.4	10.00	1:1.85	533	4.1	1.38	2.65	4.317
20	UM3	139	43.15/44.65	5.4	10.00	1:1.85	856	4.2	1.52	2.74	4.476
21	UM3	166	48.15/48.46/	5.4	10.00	1:1.85	527	4.8	1.83	2.65	4.323
22	UM3	181	51.20/52.70	5.4	10.00	1:1.85	537	4.9	1.86	2.63	4.444
23	UM3	198	55.70/57.20	5.4	10.00	1:1.85	393	5.1	1.96	2.60	4.464
24	UM3	222	59.80/60.00	5.4	10.00	1:1.85	424	4.9	2.03	2.62	4.316
25	UM4	2	4.5/6.00	7.5	8.5	1:1.13	102	9.8	4.26	2.31	2.153
26	UM4	117C	29.45/30.20	5.4	10.00	1:1.85	388	4.4	1.69	2.64	4.107
27	UM5	13	5.00/6.15	7.5	8.5	1:1.13	196	8.2	3.33	2.45	2.341

NOTE : All samples were soaked in water for 24 hrs. before testing.

Table APP.3-7 Lower Jalond Test-I-(7)

SR. NO.	BORE HOLE NO.	CORE NO.	DEPTH m.	DIAMETER cms.	LENGTH cms.	D : H	UNIAXIAL COMPRESSIVE STRENGTH kg/cm^2	POROSITY %	WATER ABSORPTION %	DRY DENSITY gm/cc	ULTRASONIC TEST m/sec
28	UM5	102	26.50/28.00	5.4	10.00	1:1.18	473	3.0	1.12	2.69	4.285
29	UM5	113	28.00/29.50	5.4	10.00	1:1.85	393	2.3	0.82	2.80	4.901

NOTE : All samples were soaked in water for 24 hrs. before testing.

Table APP.3-8 Lower Jalond Test-I-(8)

SR. NO.	BORE HOLE NO.	CORE NO.	DEPTH m.	DIAMETER cms.	LENGTH cms.	D : H	UNIAXIAL COMPRESSIVE STRENGTH kg/cm^2	POROSITY %	WATER ABSORPTION %	DRY DENSITY gm/cc	ULTRASONIC TEST m/sec
1	LM1	17	9.00/9.40	5.4	10.00	1:1.85	527	1.7	0.60	2.92	4.194
2	LM1	18	9.45/9.60	5.4	10.00	1:1.85	592	1.9	0.50	2.87	4.593
3	LM1	63A	21.92/23.40	5.4	10.00	1:1.85	677	1.5	0.49	3.01	4.329
4	LM1	84A	31.09/32.59	5.4	10.00	1:1.85	218	7.4	3.10	2.38	2.531
5	LM1	116	44.83/46.41	5.4	10.00	1:1.85	589	4.7	1.87	2.51	4.688
6	LM1	137	52.48/53.98	5.4	10.00	1:1.85	494	2.6	0.94	2.73	4.267
7	LM1	152	56.96/58.49	5.4	10.00	1:1.85	655	3.2	1.24	2.57	4.566

NOTE : All samples were soaked in water for 24 hrs. before testing.

Table APP.3-9 Lower Jalond Test-I-(9)

SR. NO.	BORE HOLE NO.	CORE NO.	DEPTH m.	DIAMETER cms.	LENGTH cms.	D : H	UNIAXIAL COMPRESSIVE STRENGTH kg/cm^2	POROSITY %	WATER ABSORPTION %	DRY DENSITY gm/cc	ULTRASONIC TEST m/sec
8	LM2	18	8.00/9.60	5.4	10.00	1:1.85	875	2.7	0.99	2.76	4.106
9	LM2	99	22.15/23.65	5.4	10.00	1:1.85	371	4.6	1.80	2.53	3.952
10	LM2	128A	31.87/33.33	5.4	10.00	1:1.85	120	10.1	4.62	2.19	2.197
11	LM2	171	44.18/45.68	5.4	10.00	1:1.85	961	2.2	0.78	2.84	4.524
12	LM2	237	57.60/59.10	5.4	10.00	1:1.85	284	5.2	2.15	2.41	3.021

NOTE : All samples were soaked in water for 24 hrs. before testing.

Table APP.3-10 Lower Jalond Test-I-(10)

SR. NO.	BORE HOLE NO.	CORE NO.	DEPTH m.	DIAMETER cms.	LENGTH cms.	D : H	UNIAXIAL COMPRESSIVE STRENGTH kg/cm²	POROSITY %	WATER ABSORPTION %	DRY DENSITY gm/cc	ULTRASONIC TEST m/sec
13	LM3	34B	9.40/10.90	5.4	10.00	1:1.85	862	2.0	0.69	2.81	4.520
14	LM3	74	21.15/22.61	5.4	10.00	1:1.85	1463	1.1	0.37	2.96	4.761
15	LM3	100	28.58/29.63	5.4	7.5	1:1.39	109	10.2	4.79	2.14	1.689
16	LM3	181	46.28/47.78	5.4	10.00	1:1.85	568	6.4	2.53	2.52	4.048
17	LM3	218	53.34/56.84	5.4	10.00	1:1.85	567	2.9	1.06	2.71	4.202
18	LM4	13	9.00/10.25	5.4	10.00	1:1.85	770	7.8	3.12	2.50	4.328
19	LM4	41	20.20/20.68	5.4	10.00	1:1.85	375	3.1	1.21	2.46	4.461
20	LM4	67	34.80/36.35	5.4	10.00	1:1.85	306	6.7	2.58	2.60	3.378
21	LM4	102C	44.20/45.76	5.4	10.00	1:1.85	131	10.0	4.33	2.30	2.538
22	LM4	139	58.13/59.47	5.4	10.00	1:1.85	489	4.4	1.66	2.65	4.444

NOTE : All samples were soaked in water for 24 hrs. before testing.

Table APP.3-11 Lower Jalond Test-I-(11)

SR. NO.	BORE HOLE NO.	CORE NO.	DEPTH m.	DIAMETER cms.	LENGTH cms.	D : H	UNIAXIAL COMPRESSIVE STRENGTH kg/cm^2	POROSITY %	WATER ABSORPTION %	DRY DENSITY gm/cc	ULTRASONIC TEST m/sec
23	LM5	24C	3.34/4.50	5.4	10.00	1:1.85	888	1.4	0.49	2.87	4.736
24	LM5	68	15.44/17.00	5.4	10.00	1:1.85	655	2.4	0.89	2.75	4.464
25	LM5	131B	29.28/30.78	5.4	10.00	1:185	148	10.8	4.82	2.24	2.409
26	LM5	185	43.42/44.92	5.4	10.00	1:1.85	2818	10.8	3.97	2.18	2.867
27	LM5	256	49.47/50.60	5.4	10.00	1:1.85	673	3.3	1.56	2.72	4.318
28	LM5	265	51.00/51.20	5.4	10.00	1:1.85	756	2.1	0.38	2.83	4.548
29	LM5	292B	56.87/57.55	5.4	10.00	1:1.85	281	4.8	1.91	2.54	4.361
30	LM6	17	6.00/7.25	5.4	10.00	1:1.85	880	3.9	1.40	2.79	4.830
31	LM6	63A	23.25/24.80	5.4	10.00	1:1.85	724	4.0	1.44	2.77	4.736
32	LM6	82B	37.37/38.87	5.4	10.00	1:1.85	697	7.3	3.17	2.29	4.729
33	LM6	95A	47.57/49.13	5.4	10.00	1:1.85	830	4.0	1.45	2.77	3.194
34	LM6	118	57.06/58.69	5.4	10.00	1:1.85	144	6.8	2.77	2.45	2.857

NOTE : All samples were soaked in water for 24 hrs. before testing.

Table APP.3-12 Lower Jalond Test-I-(12)

SR. NO.	BORE HOLE NO.	CORE NO.	DEPTH m.	DIAMETER cms.	LENGTH cms.	D : H	UNIAXIAL COMPRESSIVE STRENGTH kg/cm^2	POROSITY %	WATER ABSORPTION %	DRY DENSITY gm/cc	ULTRASONIC TEST m/sec
1	UH1	19	15.46/15.76	5.4	10.58	1:2.35	102.6	6.1	2.55	2.39	2.646
2	UH1	23	17.16/17.39	5.4	10.30	1:1.92	131.0	5.5	2.46	2.41	2.687
3	UH1	40	20.11/20.39	5.4	10.27	1:1.90	154.3	5.3	3.10	2.38	3.011
4	UH1	76	23.80/24.00	5.4	10.80	1:2.0	349.0	4.9	1.91	2.55	3.678
5	UH1	103	26.40/26.70	5.4	10.80	1:2.0	416.3	2.7	1.08	2.71	4.122
6	UH1	128	29.70/29.85	5.4	10.80	1:2.0	631.4	1.9	0.81	2.76	4.358
7	UH2	44	5.13/5.48	5.4	10.30	1:1.92	568.0	3.7	1.33	2.71	4.030
8	UH2	78	9.56/9.68	5.4	10.00	1:1.85	611.0	2.2	0.79	2.81	3.939
9	UH2	111	14.03/14.15	5.4	10.00	1:1.85	352.4	3.1	1.22	2.51	4.297
10	UH2	142	18.53/18.91	5.4	10.70	1:1.98	651.6	7.3	3.17	2.43	4.262
11	UH2	197	23.47/23.62	5.4	10.00	1:1.85	270.56	4.8	1.89	2.61	3.541
12	UH2	238	29.30/29.47	5.4	10.00	1:1.85	598.3	2.5	0.87	2.79	4.233

NOTE : All samples were soaked in water for 24 hrs. before testing.

Table APP.3-13 Lower Jalond Test-I-(13)

SR. NO.	BORE HOLE NO.	CORE NO.	DEPTH m.	DIAMETER cms.	LENGTH cms.	D : H	UNIAXIAL COMPRESSIVE STRENGTH kg/cm^2	POROSITY %	WATER ABSORPTION %	DRY DENSITY gm/cc	ULTRASONIC TEST m/sec
13	UH3	38	5.46/5.65	5.4	10.00	1:1.85	984.5	2.1	0.58	2.79	4.803
14	UH3	63	10.09/10.46	5.4	10.00	1:1.85	1026	0.7	0.20	2.99	4.510
15	UH3	95	13.68/13.83	5.4	10.00	1:1.85	1616	0.5	0.17	3.18	4.905
16	UH3	120	17.45/17.55	5.4	10.00	1:1.85	978.8	2.2	0.68	2.81	4.916
17	UH3	192	20.85/20.95	5.4	9.00	1:1.67	337.3	3.6	2.66	2.71	3.017
18	UH3	240	28.65/28.75	5.4	8.00	1:1.48	320.1	3.1	1.33	2.58	2.403

NOTE : All samples were soaked in water for 24 hrs. before testing.

Table APP.3-14 Lower Jalond Test-I-(14)

SR. NO.	BORE HOLE NO.	CORE NO.	DEPTH m.	DIAMETER cms.	LENGTH cms.	D : H	UNIAXIAL COMPRESSIVE STRENGTH kg/cm^2	POROSITY %	WATER ABSORPTION %	DRY DENSITY gm/cc	ULTRASONIC TEST m/sec
1	LH1	33	13.80/14.01	5.4	10.7	1:1.98	1223	0.7	0.22	3.08	4.885
2	LH1	61	23.08/23.50	5.4	10.7	1:1.98	1354	0.6	0.20	3.13	4.841
3	LH1	91	30.89/31.13	5.4	10.7	1:1.98	649.3	1.9	0.96	2.51	4.204
4	LH1	123	39.23/39.35	5.4	10.7	1:1.98	706.7	2.7	0.97	2.81	4.067
5	LH1	161	48.25/48.45	5.4	10.7	1:1.98	341.0	4.5	1.78	2.57	3.413
6	LH1	212	62.46/62.84	5.4	10.7	1:1.98	786	2.0	0.71	2.86	4.354
7	LH2	83	17.26/17.49	5.4	10.7	1:1.98	633	2.3	0.81	2.82	3.892
8	LH2	159	29.54/29.95	5.4	10.7	1:1.98	437	4.1	1.56	2.65	3.794
9	LH2	215	43.99/44.16	5.4	10.7	1:1.98	961	0.9	0.32	2.93	4.297
10	LH2	262	54.22/54.44	5.4	10.7	1:1.98	469.2	2.5	1.31	2.70	4.198
11	LH2	324	65.63/65.77	5.4	10.7	1:1.98	404.3	2.8	1.51	2.77	3.998
12	LH2	390	74.34/74.68	5.4	10.7	1:1.98	611	2.2	0.78	2.81	3.905

NOTE : All samples were soaked in water for 24 hrs. before testing.

Table APP.3-15 Lower Jalond Test-I-(15)

SR. NO.	BORE HOLE NO.	CORE NO.	DEPTH m.	DIAMETER cms.	LENGTH cms.	D : H	UNIAXIAL COMPRESSIVE STRENGTH kg/cm^2	POROSITY %	WATER ABSORPTION %	DRY DENSITY gm/cc	ULTRASONIC TEST m/sec
13	LH3	7	12.30/12.64	5.4	10.70	1:1.98	764	2.0	0.71	2.85	4.163
14	LH3	69B	22.80/23.22	5.4	10.70	1:1.98	655	2.1	0.75	2.84	4.131
15	LH3	89A	31.33/31.51	5.4	10.70	1:1.98	1062	1.7	0.50	2.91	4.230
16	LH3	110	39.21/39.34	5.4	10.70	1:1.98	808	1.5	0.53	2.89	4.196
17	LH3	134	45.69/46.06	5.4	10.70	1:1.98	1162	0.7	0.64	2.98	4.314
18	LH3	189	56.36/56.69	5.4	10.70	1:1.98	1332	0.6	0.60	3.10	4.930

NOTE : All samples were soaked in water for 24 hrs. before testing.

Table APP.3-16 Lower Jalond Test-II-(1)

Sr No.	B. H. No.	CODE	DEPTH (m) from/to	E ($x10^6$ kg/cm^2)	v	Tensile strength (kg/cm^2)	Specific gravity
1	LJ-1	122	19.40/20.80	0.93	0.31	70.0	2.97
2	LJ-1	101	14.05/14.25	0.48	0.22	40.0	2.89
3	LJ-1	153	24.60/25.40	0.53	0.27	41.0	2.85
4	LJ-1	200	33.65/35.10	0.15	0.025	28.0	2.76
5	LJ-1	265	47.00/48.50	0.34	0.15	30.0	2.85
6	LJ-1	305	59.00/60.55	0.47	0.19	36.0	2.86
7	LJ-2	9	2.25/3.35	0.30	0.09	50.5	2.82
8	LJ-2	99	10.45/11.45	0.79	0.25	51.0	2.90
9	LJ-2	167	28.20/28.55	0.36	0.21	31.0	2.71
10	LJ-2	223	37.00/38.65	0.15	0.05	45.0	2.91
11	LJ-2	371	51.00/52.50	0.26	0.23	36.0	2.87
12	LJ-2	435	67.60/69.00	0.80	0.29	68.0	2.78
13	LJ-3	80	12.10/13.30	0.93	0.50	34.0	2.87
14	LJ-3	126	23.85/26.20	0.30	0.32	39.0	2.87
15	LJ-3	181	37.85/38.20	0.37	0.15	37.5	2.94
16	LJ-3	208	49.50/50.85	0.22	0.33	58.0	2.84
17	LJ-3	263	67.55/68.65	0.29	0.22	40.0	2.84

Table APP.3-17 Lower Jalond Test-II-(2)

Sr No.	B. H. No.	CODE	DEPTH (m) from/to	E (x10^6 kg/cm^2)	v	Tensile strength (kg/cm^2)	Specific gravity
1	UM1	29	29.50/29.61	0.48	0.31	26.3	2.62
2	UM1	36	30.60/30.73	0.64	0.28	42.8	2.71
3	UM1	57	33.10/33.30	0.61	0.31	43.1	2.71
4	UM1	113	38.40/39.90	0.61	0.22	51.1	2.78
5	UM1	135	47.40/48.90	0.45	0.28	38.3	2.71
6	UM1	148	51.60/53.00	0.56	0.23	59.1	2.97
7	UM1	163	55.75/57.25	0.83	0.23	70.8	2.81
8	UM1	184	58.25/59.70	0.55	0.24	53.4	2.78
9	UM2	59B	16.45/17.95	0.73	0.29	169.3	2.78
10	UM2	84	20.90/22.30	0.74	0.23	72.3	2.77
11	UM2	108	31.10/32.60	0.63	0.18	84.3	3.01
12	UM2	137	39.15/39.40	0.68	0.24	71.1	2.78
13	UM2	167A	48.80/49.00	0.77	0.23	76.3	2.77
14	UM2	180B	51.60/53.10	0.97	0.21	110.6	2.79
15	UM2	192B	54.60/56.10	0.91	0.22	80.1	2.73
16	UM2	198	56.10/57.60	1.01	0.20	140.1	2.80
17	UM3	85	32.15/33.65	0.83	0.24	67.3	2.80
18	UM3	111	37.65/39.15	1.03	0.21	11.3	2.78
19	UM3	131C	41.91/42.13	0.61	0.24	67.4	2.69

Table APP.3-18 Lower Jalond Test-II-(3)

Sr No.	B. H. No.	CODE	DEPTH (m) from/to	E ($x10^6$ kg/cm^2)	v	Tensile strength (kg/cm^2)	Specific gravity
20	UM3	139	43.15/44.65	0.71	0.17	80.3	2.96
21	UM3	166	48.15/48.46	0.59	0.27	51.9	2.77
22	UM3	181	51.20/52.70	0.63	0.27	64.6	2.79
23	UM3	198	55.70/57.20	0.54	0.28	49.3	2.68
24	UM3	222	59.80/60.00	0.53	0.27	46.1	2.69
25	UM4	2	4.5/6.00	0.46	0.30	28.3	2.59
26	UM4	117C	29.45/30.20	0.62	0.31	49.1	2.76
27	UM5	13	5.00/6.15	0.43	0.28	38.8	2.61
28	UM5	102	26.50/28.00	0.54	0.18	98.76	2.95
29	UM5	113	28.00/29.50	0.61	0.31	40.8	2.59

Table APP.3-19 Lower Jalond Test-II-(4)

Sr No.	B. H. No.	CODE	DEPTH (m) from/to	E ($x10^6$ kg/cm^2)	v	Tensile strength (kg/cm^2)	Specific gravity
1	LM1	17	9.00/9.40	0.97	0.22	91.2	2.79
2	LM1	18	9.45/9.60	0.99	0.26	89.7	2.79
3	LM1	63A	21.92/23.40	0.89	0.21	106.3	2.80
4	LM1	84A	31.09/32.59	0.49	0.27	19.4	2.24
5	LM1	116	44.83/46.41	0.83	0.23	86.0	2.97
6	LM1	137	52.48/53.98	1.43	0.24	41.4	2.79
7	LM1	152	56.96/58.49	0.68	0.28	81.3	2.84
8	LM2	18	8.00/9.60	0.55	0.26	62.7	2.75
9	LM2	99	22.15/23.65	0.51	0.27	44.7	2.69
10	LM2	128A	31.87/33.33	0.44	0.32	19.30	2.61
11	LM2	171	44.18/45.68	0.93	0.23	78.3	2.81
12	LM2	237	57.60/59.10	0.50	0.31	56.3	2.73
13	LM3	34B	9.40/10.90	0.83	0.22	61.9	2.80
14	LM3	74	21.15/22.61	0.84	0.20	115.3	2.96
15	LM3	100	28.58/29.63	0.43	0.32	44.8	2.73
16	LM3	181	46.28/47.78	0.93	0.22	98.7	2.68
17	LM3	218	53.34/56.84	0.88	0.18	102.50	2.95
18	LM4	13	9.00/10.25	0.89	0.23	69.2	2.81
19	LM4	41	20.20/20.68	0.76	0.24	58.4	2.77

Table APP.3-20 Lower Jalond Test-II-(5)

Sr No.	B. H. No.	CODE	DEPTH (m) from/to	E (x10^6 kg/cm^2)	v	Tensile strength (kg/cm^2)	Specific gravity
20	LM4	67	34.80/36.35	0.57	0.23	93.23	2.71
21	LM4	102C	44.20/45.76	0.51	0.28	26.3	2.61
22	LM4	139	58.13/59.47	0.62	0.21	91.70	3.00
23	LM5	24C	3.34/4.50	0.88	0.22	128.19	2.82
24	LM5	68	15.44/17.00	0.84	0.24	68.7	2.76
25	LM5	131B	29.28/30.78	0.69	0.28	19.0	2.75
26	LM5	185	43.42/44.92	0.43	0.28	94.98	2.69
27	LM5	256	49.47/50.60	0.51	0.27	54.3	2.61
28	LM5	265	51.00/51.20	0.49	0.27	61.7	2.62
29	LM5	292B	56.87/57.55	0.98	0.23	102.3	2.78
30	LM6	17	6.00/7.25	1.08	0.21	124.3	2.81
31	LM6	63A	23.25/24.80	1.21	0.22	156.4	2.79
32	LM6	82B	37.37/38.87	1.13	0.23	113.1	2.79
33	LM6	95A	47.57/49.13	0.84	0.24	64.1	2.61
34	LM6	118	57.06/58.69	0.10	0.27	19.90	2.81

Table APP.3-21 Lower Jalond Test-II-(6)

Sr No.	B. H. No.	CODE	DEPTH (m) from/to	E (x10^6 kg/cm^2)	v	Tensile strength (kg/cm^2)	Specific gravity
1	UH1	19	15.46/15.76	0.440	0.32	20.47	2.69
2	UH1	23	17.16/17.39	0.123	0.23	70.3	2.71
3	UH1	40	20.11/20.39	0.083	0.28	59.7	2.75
4	UH1	76	23.80/24.00	1.012	0.21	107.3	2.85
5	UH1	103	26.40/26.70	0.173	0.07	98.1	2.84
6	UH2	44	5.13/5.48	0.256	0.22	94.1	2.97
7	UH2	78	9.56/9.68	0.213	0.21	121.9	2.88
8	UH2	111	14.03/14.15	0.503	0.155	110.3	2.87
9	UH2	142	18.53/18.91	0.281	0.19	138.0	2.94
10	UH2	197	23.47/23.62	0.274	0.22	93.5	2.84
11	UH3	38	5.46/5.65	0.056	0.38	19.3	2.75
12	UH3	63	10.09/10.46	1.555	0.19	137.7	2.94
13	UH3	95	13.68/13.83	(1.52)	0.19	134.3	2.89
14	UH3	120	17.45/17.55	0.231	0.23	98.3	2.85
15	UH3	192	20.85/20.95	0.243	0.22	101.4	2.85

Table APP.3-22 Lower Jalond Test-II-(7)

Sr No.	B. H. No.	CODE	DEPTH (m) from/to	E ($x10^6 kg/cm^2$)	v	Tensile strength (kg/cm^2)	Specific gravity
	LH1	33	13.80/14.01	0.259	0.147	126.0	2.78
	LH1	61	23.08/23.50	0.498	0.162	127.0	2.78
	LH1	123	39.23/39.35	0.254	0.092	124.8	2.80
	LH1	161	48.25/48.45	0.321	0.158	119.3	2.79
	LH1	212	62.46/62.84	0.312	0.172	113.2	2.80
	LH2	83	17.26/17.49	0.472	0.169	133.8	2.78
	LH2	159	29.54/29.95	0.504	0.151	129.5	2.80
	LH2	214	43.99/44.16	0.167	0.161	132.4	2.80
	LH2	262	54.22/54.44	0.413	0.146	121.3	2.83
	LH2	324	65.63/65.77	1.135	0.164	134.8	2.79
	LH3	7	12.30/12.64	0.488	0.09	118.5	2.96
	LH3	69B	22.80/23.22	0.360	0.166	134.63	2.79
	LH3	89A	31.33/31.51	0.351	0.158	118.7	2.75
	LH3	134	45.69/46.06	0.397	0.178	121.13	2.81
	LH3	189	56.36/56.69	1.625	0.153	135.85	2.82

PROCTOR COMPACTION TEST

SITE:- M/P STUDY ON P S H P D LOWER JALOND

LOCATION:- L J P 1

TYPE OF TEST STANDARD PROCTOR COMPATION TEST

MAX DRY DENSITY:- 1.395 gm cc

OPTIMUM MOISTURE CONTENT:- 29%

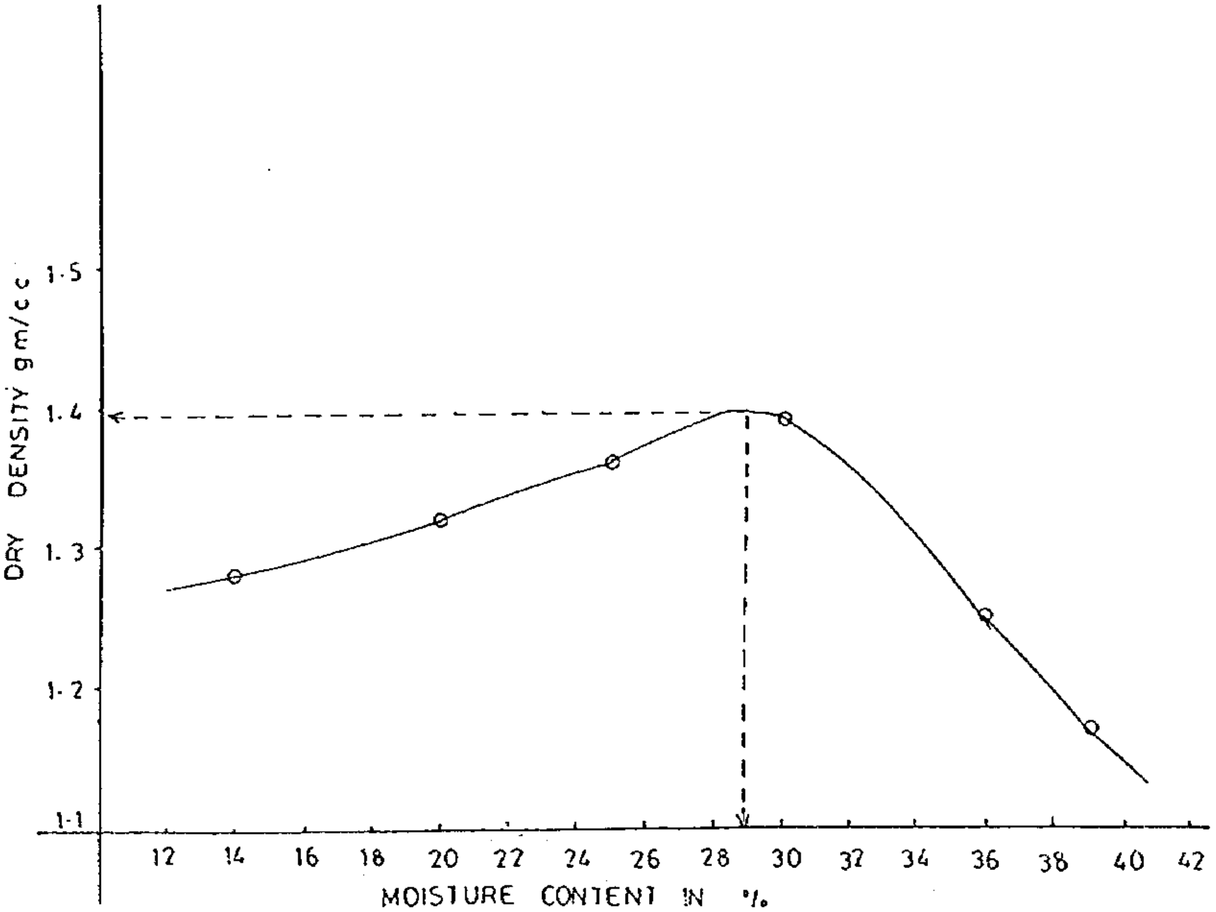


Fig. APP.3-1 Laboratory Compaction Test (Jalond Site, LJP-1)

PRPD. BY CHOUDHARY	DRN BY SABIR	CHD BY NAIK	DRG NO. 166

D B M GEOTECHNICS AND CONSTRUCTION PVT. LTD. MUMBAI

LABORATARY COMPACTION TEST

SITE:- C E S JALOND

LOCATION:- PIT NO 2 L J P 2 ALICHY VADI TO MERDI

TYPES OF TEST:- STANDERED PROCTOR COMPACTION TEST

MAX DRY DENSITY:- 1·46 gm/cc

OPTIMUM MOISTUR CONENT:- 21 %

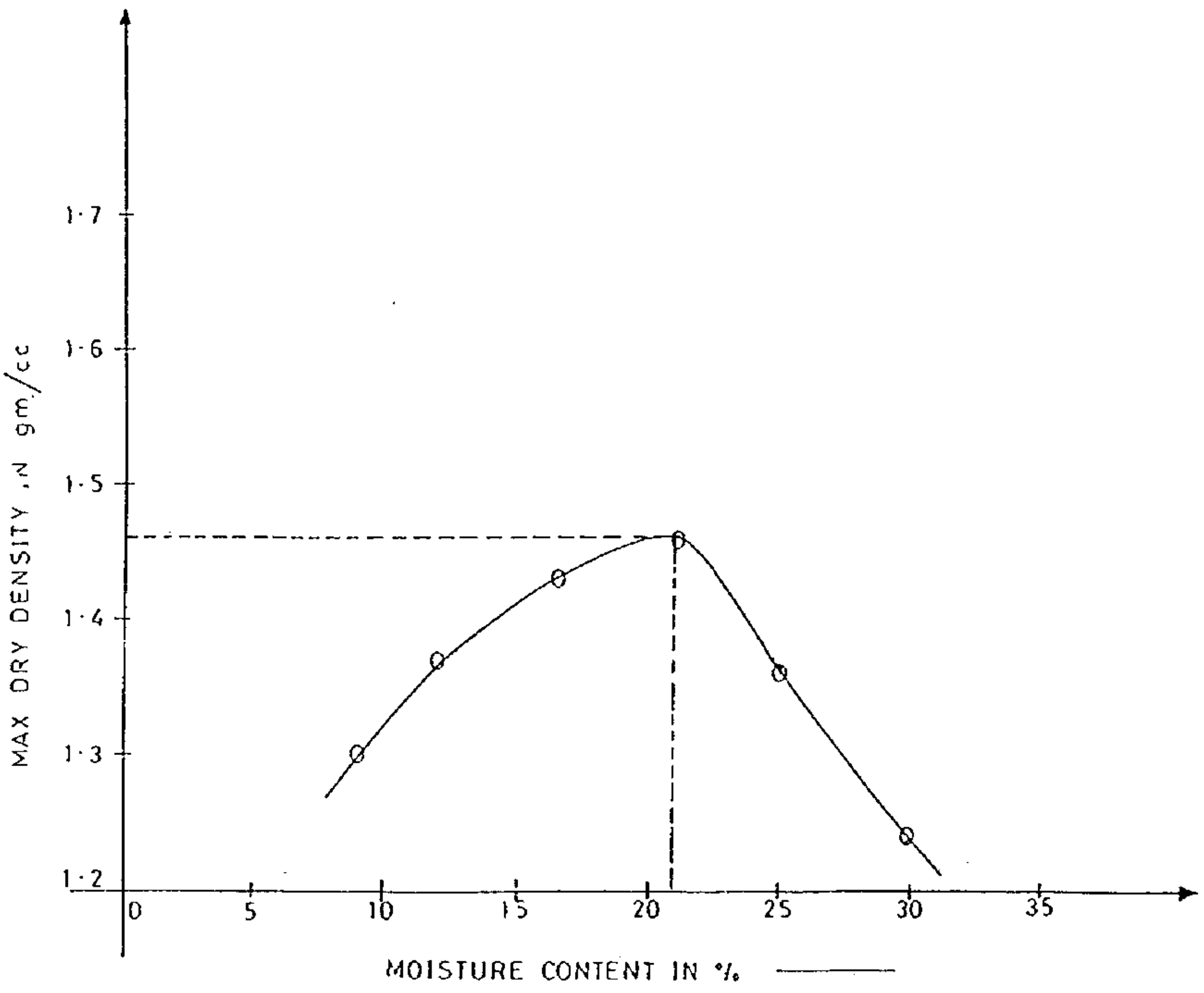


Fig. APP.3-2 Laboratory Compaction Test (Jalond Site, LJP-2)

DRN BY:- PRAVIN	PRD BY: CHOUDHARY	CHD BY

ITE: CES JALAND

Table APP.3-23 Laboratory Physical Test (Jalond Site, LJP-1～2)

SOIL TEST DATA SHEET

ORE OLE/ PIT NO.	DEPTH	SAMPLE TYPE UD/D	DENSITY		NATURAL MOISTURE CONTENT	MECHANICAL ANALYSIS				CONSISTENCY LIMITS			SOIL CLASSI-FICATION (I.S.)	SHEAR STRENGTH TEST			CONSOLIDATION TEST		SPECIFIC GRAVITY	OTHER TESTS (SEE LEGEND)	REMARKS
	m		WET gm/cc	DRY gm/cc	%	GRAVEL %	SAND %	SILT %	CLAY %	LIQUID %	PLASTIC %	PLASTICITY INDEX %		TYPE	COHESION kg/cm²	ϕ Deg.	COMP. INDEX (Lab)	INITIAL VOIDS RATIO e_o			
JP1	Borrow		omc																		
	Pit	D	29	1.39	08	60	24	− 1	6 −	NP	—			—	—	—	—	—	—		
P2	Borrow																				
	Pit	D	21	1.46	06	15	25	30	30	36	20	16		—	—	—	—	—	—	2.65	

HEM : CHEMICAL ANALYSIS TEST
OMP : COMPACTION TEST
S : DIRECT SHEAR TEST
: PERMEABILITY TEST
S : FREE SWELL TEST

Tuu : TRIAXIAL TEST UNCONSOLIDATED UNDRAINED
Tcu : TRIAXIAL TEST CONSOLIDATED UNDRAINED
Tcd : TRIAXIAL TEST CONSOLIDATED DRAINED
NP : NON PLASTIC
SL : SHRINKAGE LIMIT TEST

SP : SWELLING PRESSURE OR SWELLING POTENTIAL TEST
RM : ON REMOULDED SOIL
VL : LABORATORY VANE SHEAR TEST
UC : UNCONFINED COMPRESSION TEST

DRG. NO.:

BM GEOTECHNICS & CONSTRUCTIONS PVT. LTD.

LBORATORY COMPACTION TEST

SITE: CES MARLESHWAR

LOCATION: UMP 1

TYPES OF TEST: STANDERED PROCTOR COMPACTION TEST

MAX DRY DENSITY: 1·55 gm/cc

OPTIMUM MOISTURE CONTENT: 22 %

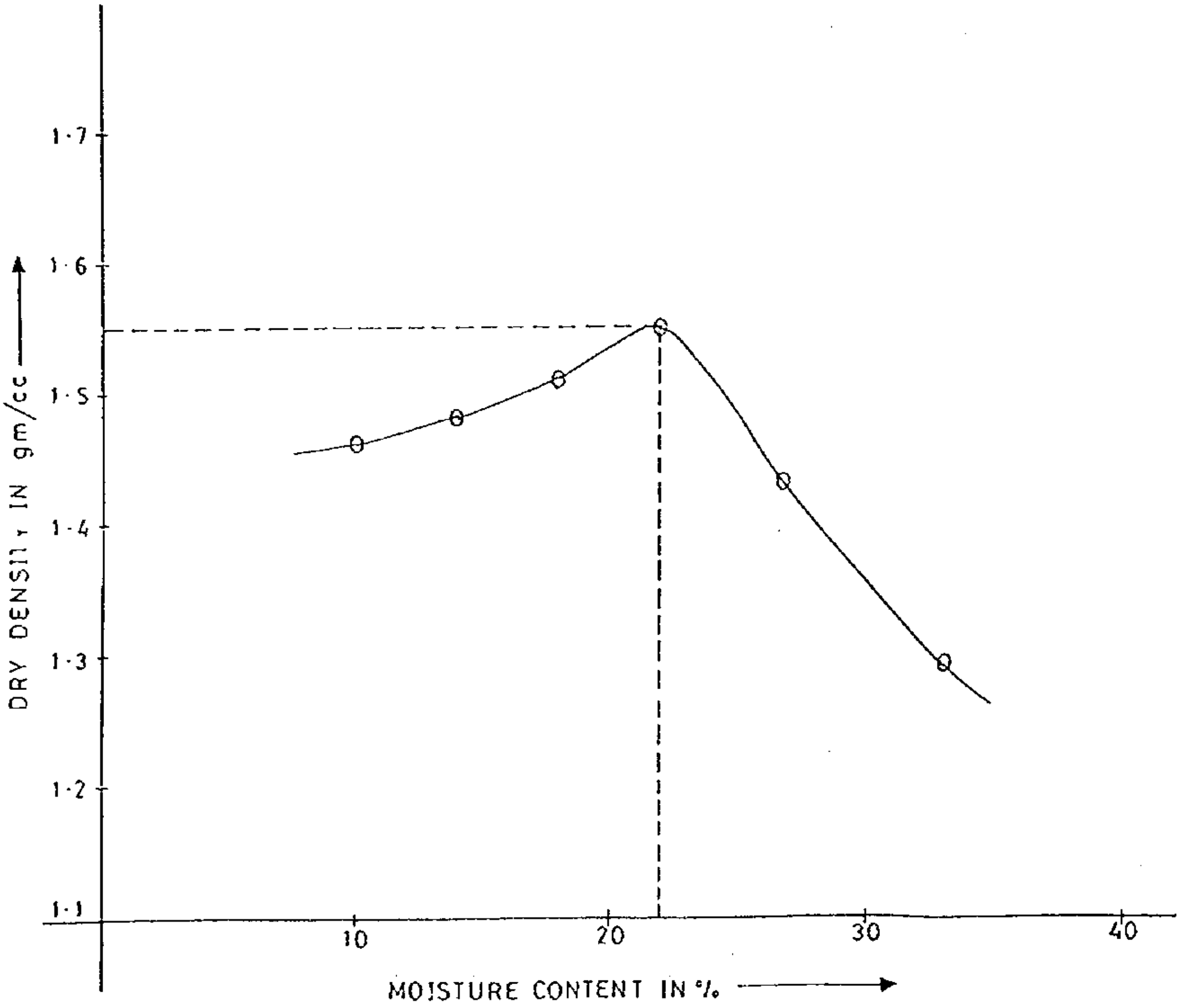


Fig. APP.3-3 Laboratory Compaction Test (Upper Marleshwar Site, UMP-1)

DRAWN BY: PRAVIN	CHD BY:- CHOUDHARY	DRG NO:

D B M GEOTECHNICS AND CONSTRUCTION PVT LTD.

PROCTOR COMPACTION TEST

SITE :- M/P STUDY ON PSHPD MARLESHWAR

LOCATION :- UMP 2

TYPE OF TEST :- STANDARD PROCTOR COMPACTION TEST

OPTIMUM MOISTURE CONTENT :- 18.5

MAX. DRY DENSITY :- 1·81 gm/cc

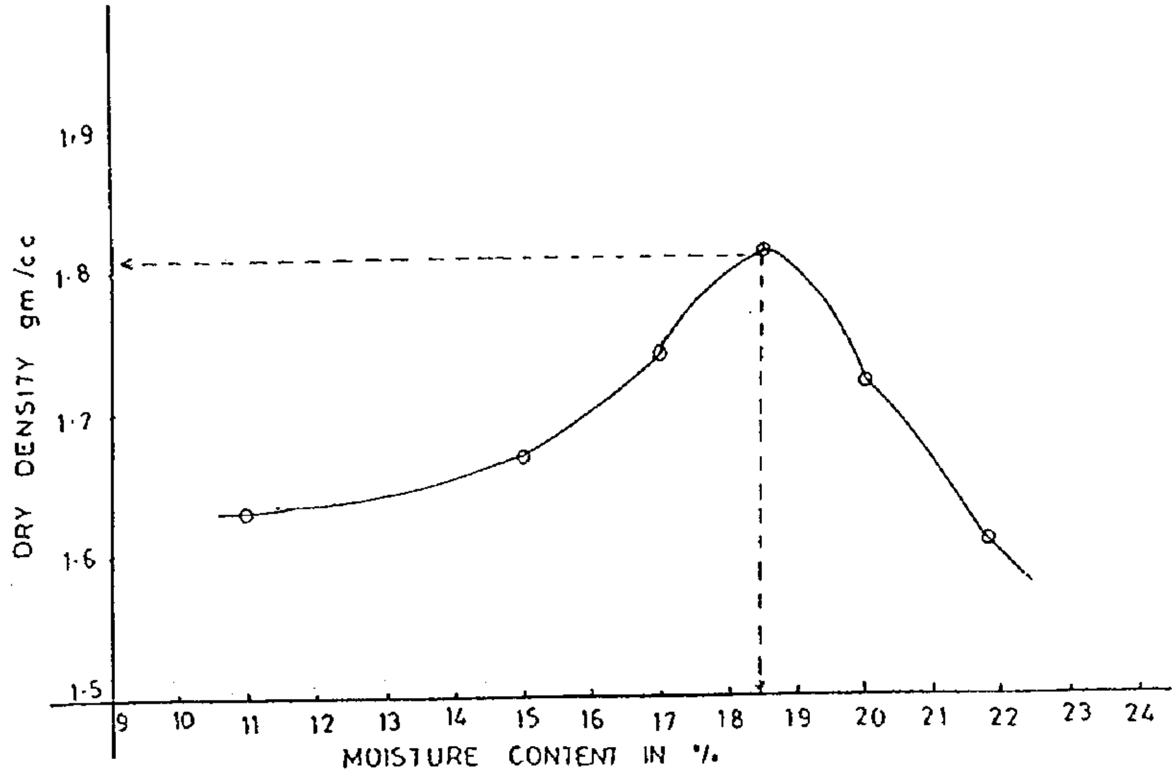


Fig. APP.3-4 Laboratory Compaction Test (Upper Marleshwar Site, UMP-2)

PRPD. BY: CHOUDHARY	DRN. BY:- SABIR	CHD. BY:- NAIK	DRG. NO. 161

D B M GEOTECHNICS AND CONSTRUCTIONS PVT. LTD. MUMBAI

LABORATORY COMPACTION TEST

SITE: CES MARLESHWAR
LOCATION: LMP 1
TYPES OF TEST: STANDERED PROCTOR TEST
MAX DRY DENSITY: 1·455 gm/cc
OPTIMUM MOISTURE CONTENT: 30·5%

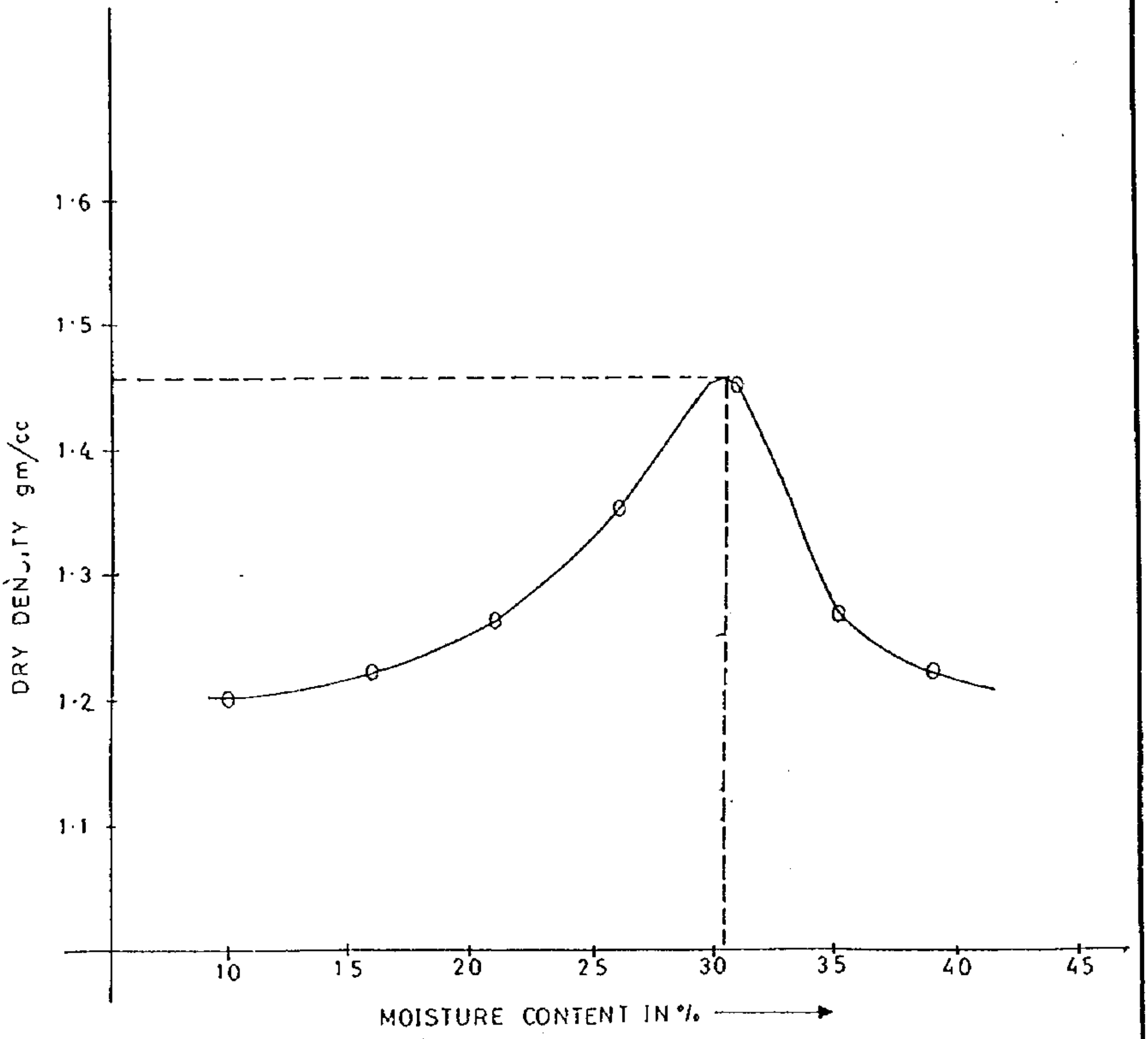


Fig. APP.3-5 Laboratory Compaction Test (Lower Marleshwar Site, LMP-1)

DRAWN BY: PRAVIN | CHD BY: CHOUDHARY | DRG NO:

D B M GEOTECHNICS AND CONSTRUCTION PVT. LTD.

LABORATORY COMPACTION TEST

SITE: CES MARLESHWAR

LOCATION: LMP 2

TYPES OF TEST: STANDERED PROCTOR COMPACTION TEST

MAX DRY DENSITY: 1·505 gm/cc

OPTIMUM MOITURE CONTENT: 23 %

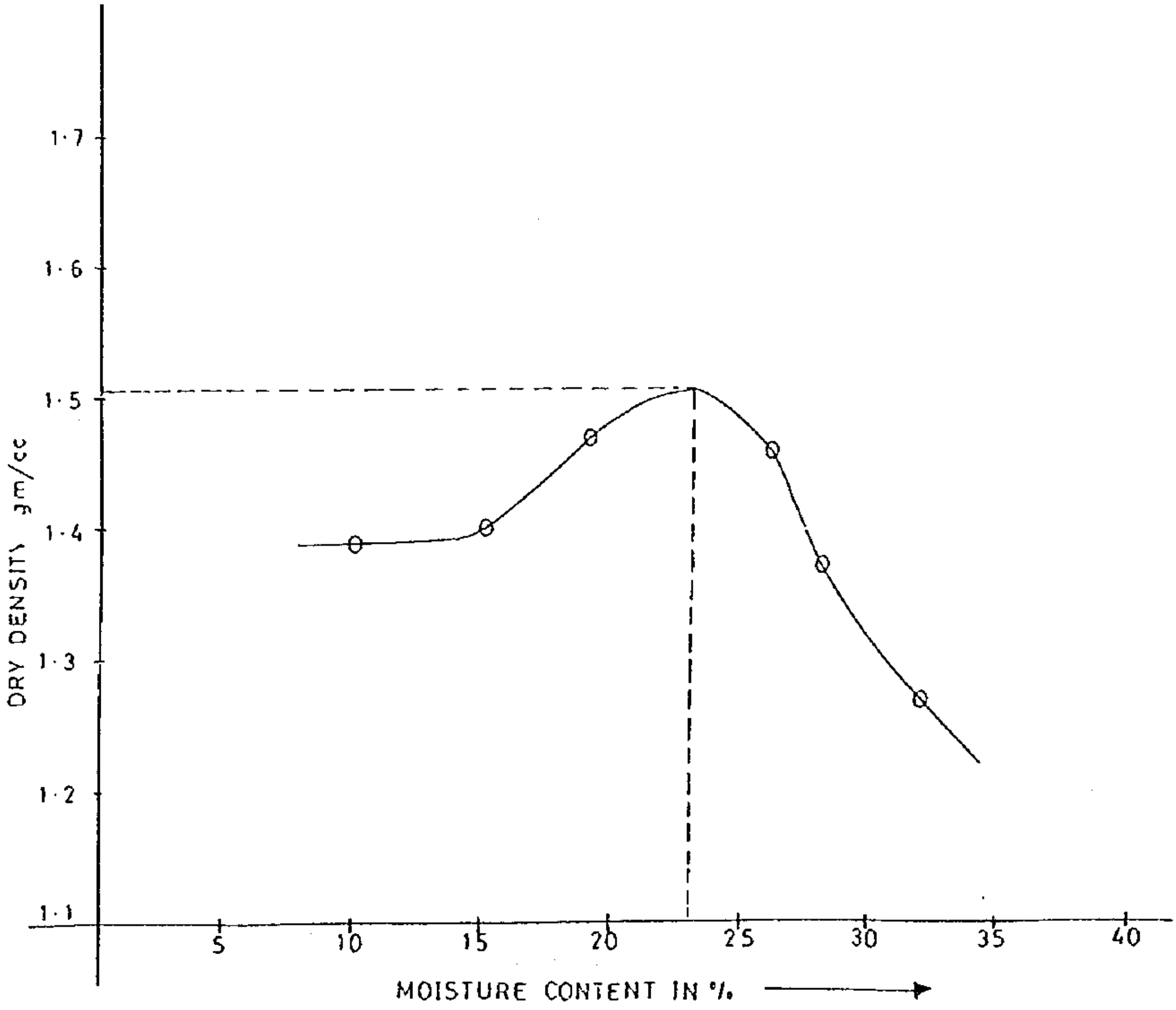


Fig. APP.3-6 Laboratory Compaction Test (Lower Marleshwar Site, LMP-2)

DRAWN BY: PRAVIN	CHD BY: CHOUDHARY	DRG NO:

D B M GEOTECHNICS AND CONSTRUCTION PVT LTD.

SITE: Table APP.3-24 Laboratory Physical Test (Marleshwar Site, UMP-1 ~ UMP-2)

SOIL TEST DATA SHEET

IORE OLE/ PIT NO.	DEPTH m	SAMPLE TYPE UD/D	MAX. DRY DENSITY GM/CC	OPTM. MOIST. CONT %	NATURAL MOISTURE CONTENT %	MECHANICAL ANALYSIS				CONSISTENCY LIMITS			SOIL CLASSIFICATION (I.S.)	SHEAR STRENGTH TEST			CONSOLIDATION TEST		SPECIFIC GRAVITY	OTHER TESTS (SEE LEGEND)	REMARKS
						GRAVEL %	SAND %	SILT %	CLAY %	LIQUID %	PLASTIC %	PLASTICITY INDEX %		TYPE	COHESION kg/cm²	φ Deg.	COMP. INDEX (Lab)	INITIAL VOIDS RATIO eo			
UMP1	—	D	30·5	1·445	17	03	20	40	37	42	23	19	CI	—	—	—	—	—	2·65		
UPM2	—	D	23	1·505	12	10	38	26	26	47	26	21	CI	—	—	—	—	—	2·66		
UMP1	—	D	22	1·55	04	16	35	28	21	46	25	21	—	—	—	—	—	—	2·67		
UMP2	—	D	18·5	1·81	04	40	54	06		—	NP	—	—	—	—	—	—	—	—		

EM : CHEMICAL ANALYSIS TEST
MP : COMPACTION TEST
: DIRECT SHEAR TEST
: PERMEABILITY TEST
: FREE SWELL TEST

Tuu : TRIAXIAL TEST UNCONSOLIDATED UNDRAINED
Tcu : TRIAXIAL TEST CONSOLIDATED UNDRAINED
Tcd : TRIAXIAL TEST CONSOLIDATED DRAINED
NP : NON PLASTIC
SL : SHRINKAGE LIMIT TEST

SP : SWELLING PRESSURE OR SWELLING POTENTIAL TEST
RM : ON REMOULDED SOIL
VL : LABORATORY VANE SHEAR TEST
UC : UNCONFINED COMPRESSION TEST

DRG. NO.:

BM GEOTECHNICS & CONSTRUCTIONS PVT. LTD.

LABORATORY COMPACTION TEST

SITE :- MASTER PLAN STUDY ON PSHPD UPPER HEVALE

LOCATION :- UHP 1

TYPE OF TEST :- STANDARD PROCTER TEST

MAX. DRY DENSITY :- 1·60 gm/cc

OPTIMUM MOISTURE CONTENT :- 26 %

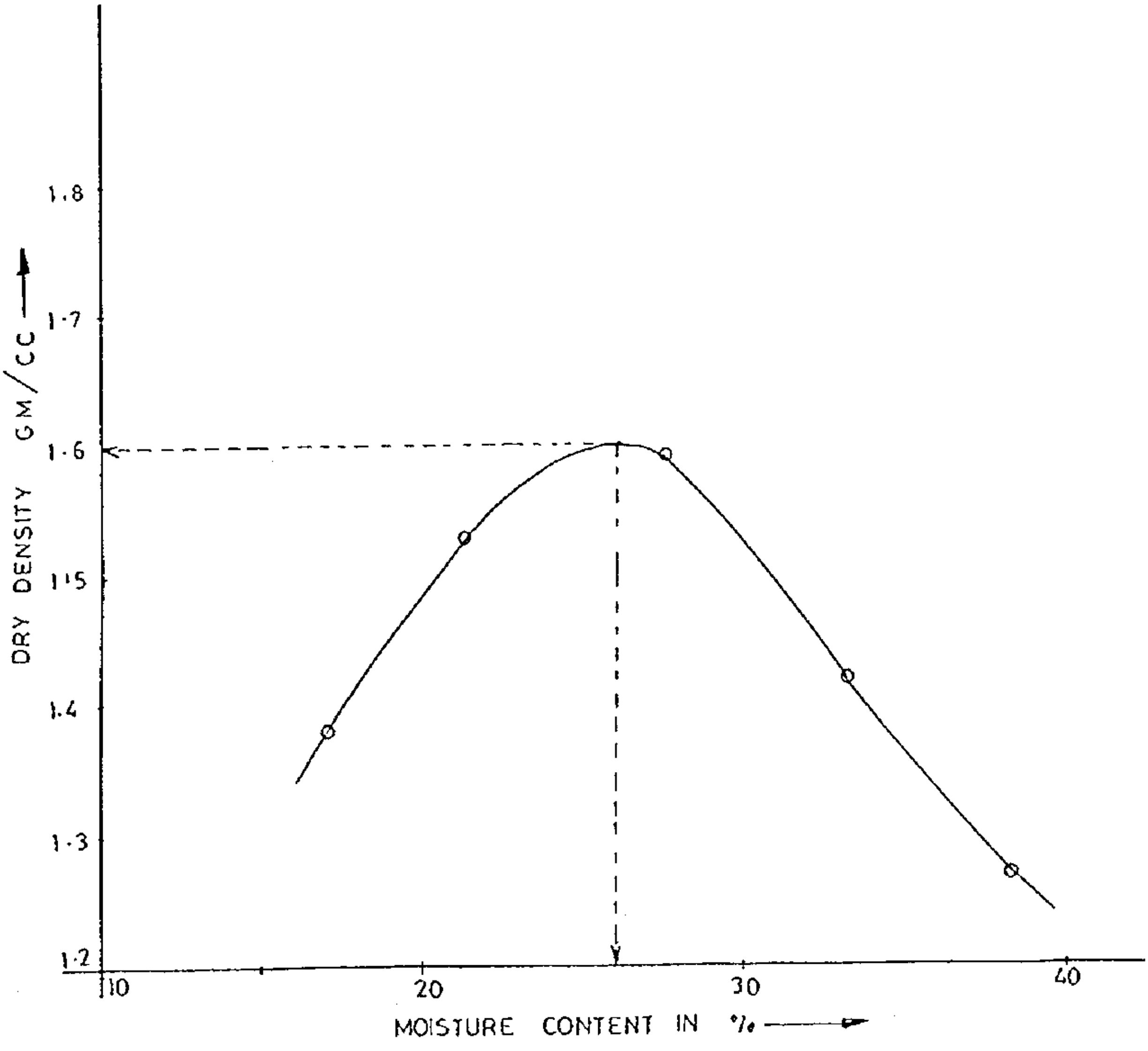


Fig. APP.3-7 Laboratory Compaction Test (Upper Hevale Site, UHP-1)

DRAWN BY: SABIR	CHD BY: SINGH	DRG. NO. 161

LABORATORY COMPACTION TEST

SITE:- MASTER PLAN STUDY ON PSHPD UPPER HEVALE

LOCATION :- UHP 2

TYPE OF TEST :- STANDARD PROCTOR TEST

MAX. DRY DENSITY :- 1·57 gm/cc

OPTIMUM MOISTER CONTENT 29·40 %

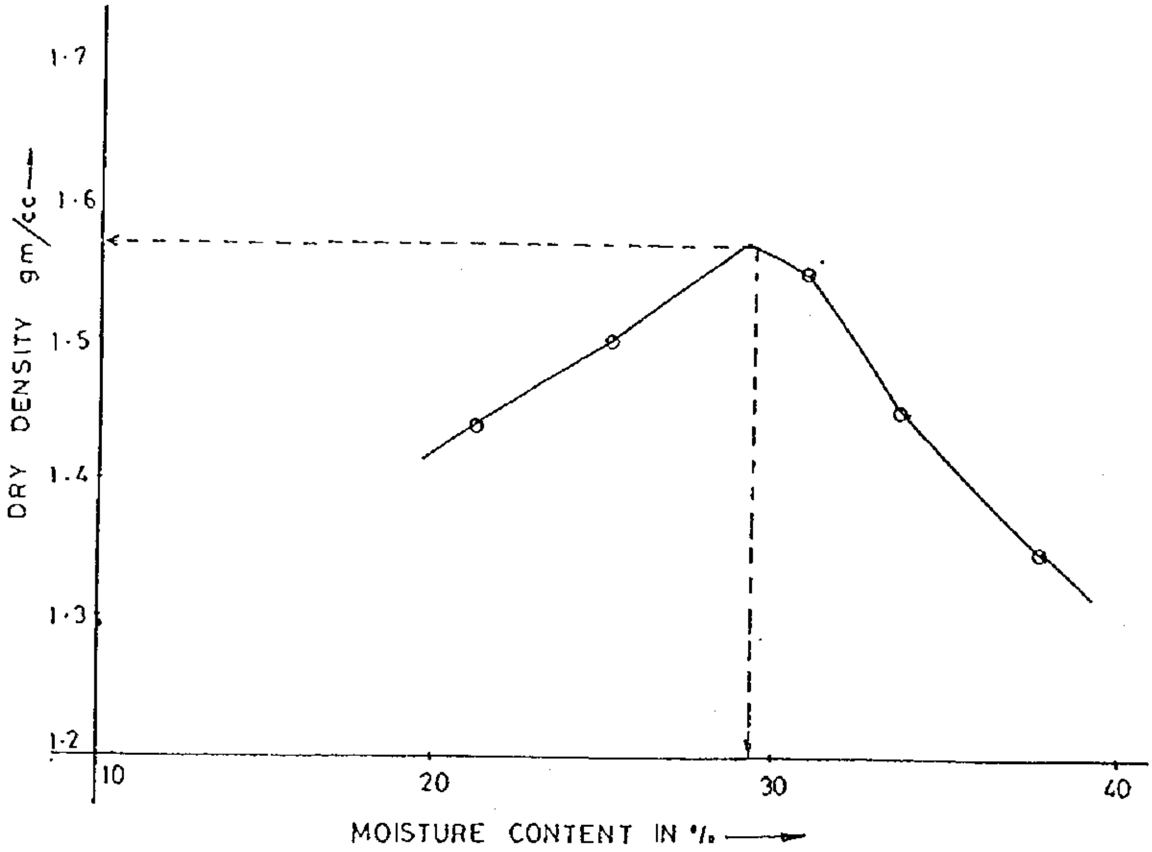


Fig. APP.3-8 Laboratory Compaction Test (Upper Hevale Site, UHP-2)

DRAWN BY: SABIR | CHD BY : SINGH | DRG NO : 161

DBM GEOTECHNICS AND CONSTRUCTIONS PVT. LTD.

LABORATORY COMPACTION TEST

SITE: MASTER PLAN STUDY ON PSHPD LOWER HEVALE

LOCATION: L H P 1

TYPE OF TEST: STANDARD PROCTOR TEST

MAX.DRY DENSITY: 1·535 gm/cc

OPTIMUM MOISTURE CONTENT: 26 %

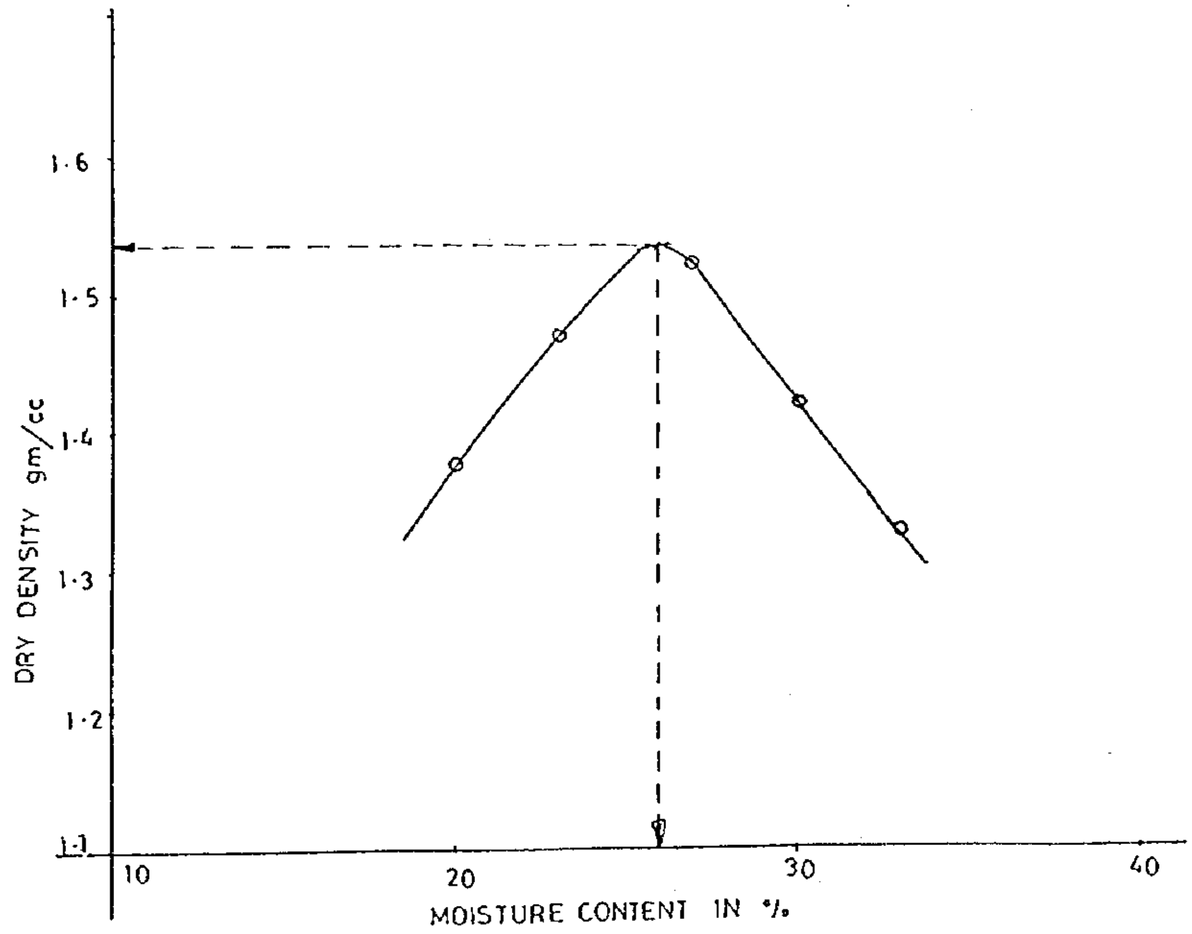


Fig. APP.3-9 Laboratory Compaction Test (Lower Hevale Site, LHP-1)

DRAWN BY: SABIR | CHD BY: SINGH | DRG NO. 161

DBM GEOTECHNICS AND CONSTRUCTIONS PVT. LTD

LABORATORY COMPACTION TEST

SITE: MASTER PLAN STUDY ON PSHPD LOWER HEVALE

LOCATION LHP 2

TYPE OF TEST STANDARD PROCTOR TEST

MAX. DRY DENSITY: 1·545 gm

OPTIMUM MOISTURE CONTENT: 26·4 %

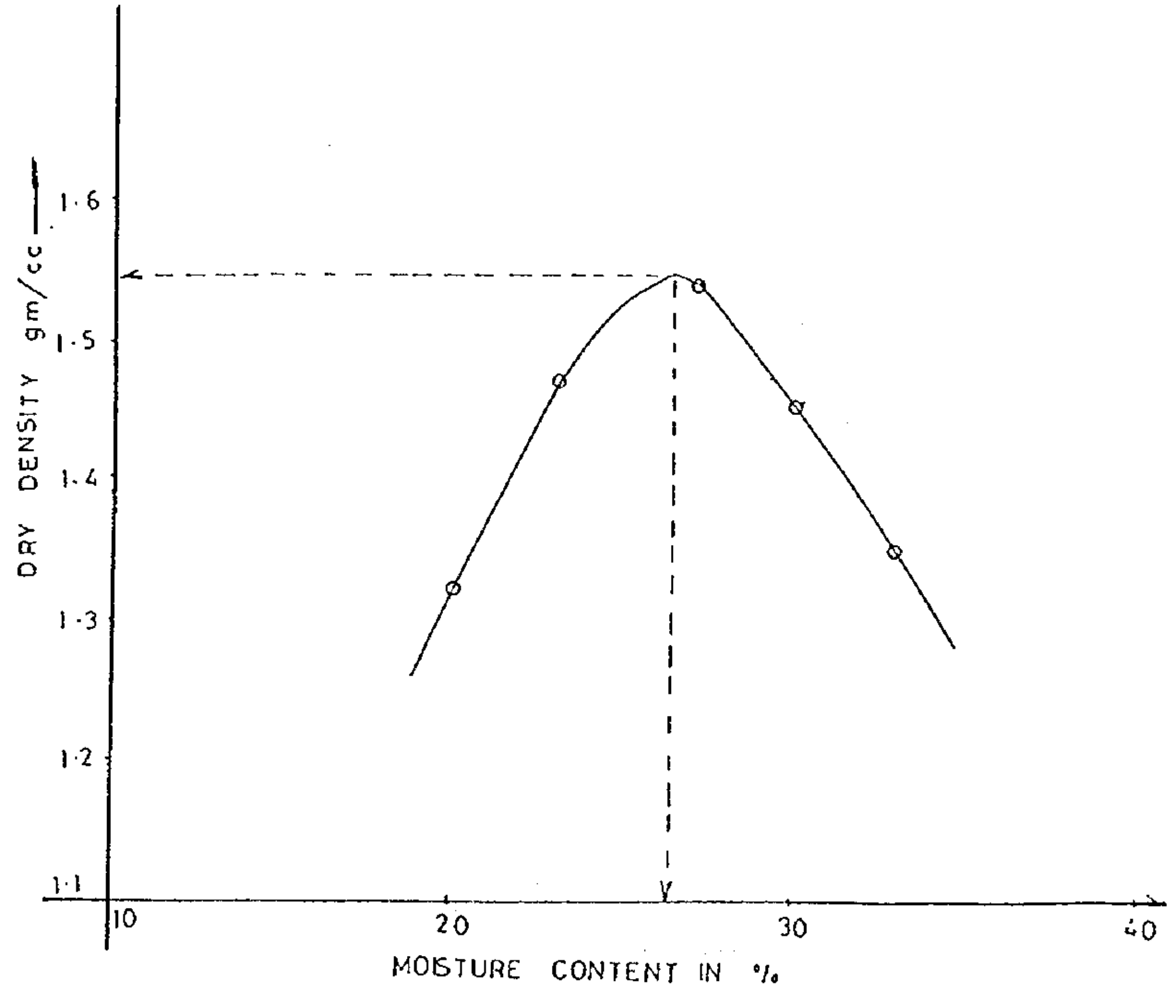


Fig. APP.3-10 Laboratory Compaction Test (Lower Hevale Site, LHP-2)

DRAWN BY : SABIR	CHD BY : SINGH	DRG. NO 161

DBM GEOTECHNICS AND CONSTRUCTIONS PVT LTD.

SITE: Table APP.3-25 Laboratory Physical Test (Hevale Site, UHP-1～LHP-2)

SOIL TEST DATA SHEET

BORE HOLE/ PIT NO.	DEPTH m	SAMPLE TYPE UD/D	MAX. DRY DENSITY GM/C.C	OPTM. MOIST. CONT. %	NATURAL MOISTURE CONTENT %	MECHANICAL ANALYSIS				CONSISTENCY LIMITS			SOIL CLASSI-FICATION (I.S.)	SHEAR STRENGTH TEST			CONSOLIDATION TEST		SPECIFIC GRAVITY	OTHER TESTS (SEE LEGEND)	REMARKS
						GRAVEL %	SAND %	SILT %	CLAY %	LIQUID %	PLASTIC %	PLAST-ICITY INDEX %		TYPE	COHE-SION kg/cm²	φ Deg.	COMP. INDEX (Lab)	INITIAL VOIDS RATIO e₀			
UH1	3.00/ /3.60	D	–	–	–	05	23	35	37	47	26	21	CI	–	–	–	–	–	2.65		
UH1	9.00/ /9.60	D	–	–	–	00	28	35	37	45	24	21	CI	–	–	–	–	–	2.65		
UHP1	TRIAL PIT	D	1.60	26	7	05	40	28	27	43	23	20	CI	–	–	–	–	–	2.72		
UHP2	TRIAL PIT	D	1.57	29.4	7	10	33	29	28	44	24	20	CI	–	–	–	–	–	2.68		

CHEM : CHEMICAL ANALYSIS TEST
COMP : COMPACTION TEST
DS : DIRECT SHEAR TEST
K : PERMEABILITY TEST
FS : FREE SWELL TEST
Tuu : TRIAXIAL TEST UNCONSOLIDATED UNDRAINED
Tcu : TRIAXIAL TEST CONSOLIDATED UNDRAINED
Tcd : TRIAXIAL TEST CONSOLIDATED DRAINED
NP : NON PLASTIC
SL : SHRINKAGE LIMIT TEST
SP : SWELLING PRESSURE OR SWELLING POTENTIAL TEST
RM : ON REMOULDED SOIL
VL : LABORATORY VANE SHEAR TEST
UC : UNCONFINED COMPRESSION TEST

DRG. NO.: 161

DBM GEOTECHNICS & CONSTRUCTIONS PVT. LTD.

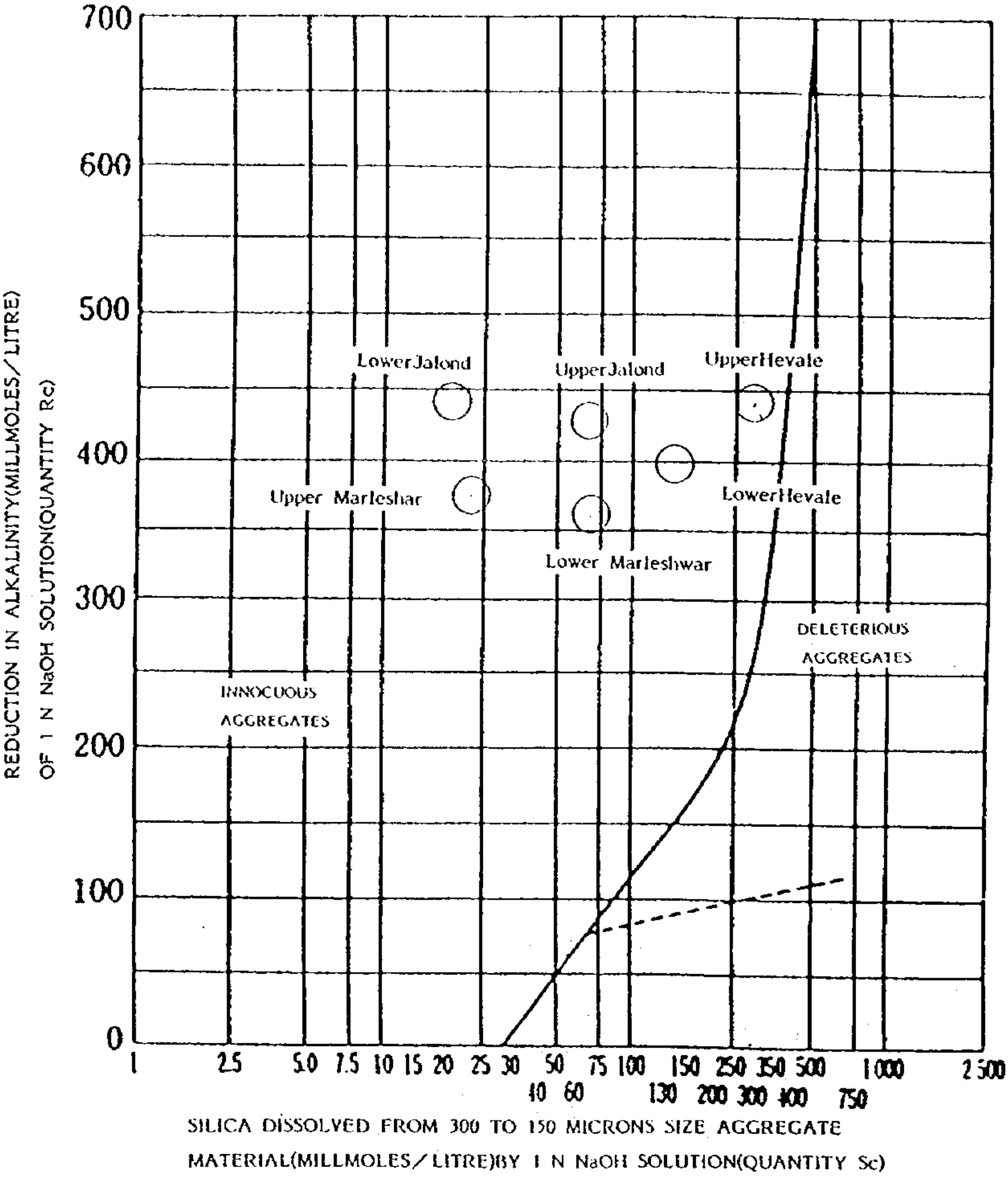


Fig. APP.3-11 Illustration of Division Between Innocuous and Deleterious Aggregates on Basis Reduction in Alkalinity Test

JICA