

THE REPUBLIC OF INDONESIA
DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT
MINISTRY OF PUBLIC WORKS

THE MASTER PLAN ON WATER RESOURCES DEVELOPMENT
AND FEASIBILITY STUDY FOR URGENT FLOOD CONTROL AND
URBAN DRAINAGE IN SEMARANG CITY AND SUBURBS

FINAL REPORT
(DATA BOOK)

NOVEMBER 1993

JAPAN INTERNATIONAL COOPERATION AGENCY

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LIST OF REPORTS

MAIN REPORT

SUPPORTING REPORT

DATA BOOK

*The cost estimate was based on July 1992 price level
and expressed in Rupiah according to the exchange rate of
US\$1.00 = Indonesian Rupiah 2,033
and Japanese Yen 1.00 = Indonesian Rupiah 16.20
as of July 1992.*

SECTOR II

GEOLOGY AND SOIL MECHANICS

GEOLOGY AND SOIL MECHANICS

TABLE OF CONTENTS

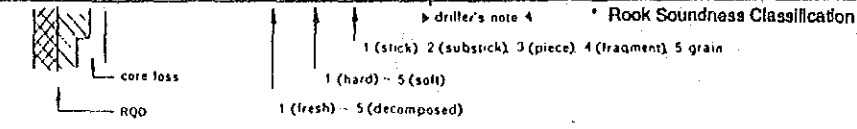
	<u>Page</u>
I Geological Investigation of Jajibarang Dam Site	
1. Geologic Log of Drillhole (B-1~3)	II -1
2. P-Q Curve	II -7
II Soil Investigation	
1. Borehole Logs (B-1~11)	II -10
2. Data Sheets of Laboratory Test	
(1) Summary of Laboratory Test	II -16
(2) Grain Size Distribution	II -16
3. Existing Data	
(1) Location Map of Existing Field Investigation	
: Hand Feed Boring, Auger Boring	II -22
(2) Available Data List of Existing Boring	
in West Floodway/Garang River	II -22
III Photo	
1. Core Samples : Jatibarang Dam Site (B-1~3)	II -23
2. Inspection of Drillhole Depth	II -26
3. Jatibarang Dam Site	II -27

GEOLOGIC LOG OF DRILL HOLE

SEMARANG PROJECT Jatibarang Dam HOLE No. B-1 (SHEET 1 OF 4)

LOCATION left bank DEPTH OF HOLE 70.0 m COMMENCED -
 ELEVATION 158.408 m DEPTH OF OVERBURDEN 0 m COMPLETED -
 COORDINATE _____ LENGTH OF ROCK DRILLING 70.0 m DRILLED BY _____
 ANGLE FROM HORIZONTAL _____ TOTAL LENGTH OF CORE _____ m LOGGED BY _____
 BEARING OF ANGLE HOLE _____ CORE RECOVERY _____ %

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT CASING	OBSERVATION OF CORE					WATER TABLE WATER PRESSURE TEST LEAKAGE OF DRILLING WATER	DEPTH	ELEVATION	
					COLOR	WEATHERING	HARDNESS	CORE CUTTING	R.S*				DESCRIPTION
0m			0-100%							0	158.408		
1	Volcanic Breccia	△	Metal, φ76mm	Reddish brown	4	9	5	D	CL	14.0	Volcanic breccia Tuff breccia is formal name based on the content of gravel. But existing data called "Volcanic Breccia". Accordingly, Volcanic breccia shall be used here. matrix; sandy tuff with granule gravel; φ5~30cm bigger size gravel are fresh and hard dacite, andesite plus andesite (lawn) matrix; 80~70% gravel; 20~30% bad sorting 0~12.6% heavily weathered 14.0~18.4%	40	158.408
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													

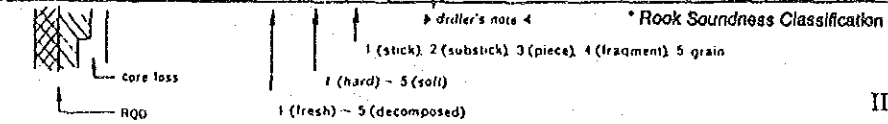


GEOLOGIC LOG OF DRILL HOLE

SEMARANG PROJECT Jatibarang Dam HOLE No. B-1 (SHEET 2 OF 4)

LOCATION left bank DEPTH OF HOLE 70.0 m COMMENCED -
 ELEVATION _____ m DEPTH OF OVERBURDEN 0 m COMPLETED -
 COORDINATE _____ LENGTH OF ROCK DRILLING 70.0 m DRILLED BY _____
 ANGLE FROM HORIZONTAL 90° TOTAL LENGTH OF CORE _____ m LOGGED BY _____
 BEARING OF ANGLE HOLE _____ CORE RECOVERY _____ %

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT CASING	OBSERVATION OF CORE					WATER TABLE WATER PRESSURE TEST LEAKAGE OF DRILLING WATER	DEPTH	ELEVATION	
					COLOR	WEATHERING	HARDNESS	CORE CUTTING	R.S*				DESCRIPTION
20m			0-100%							0	158.408		
1	Volcanic Breccia	△	Metal, φ76mm	Brown	3	3	4	CL	20.7	15.4	Original texture is remaining, but this is heavily weathered and easy to crush cores by hammer.	40	158.408
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													



GEOLOGIC LOG OF DRILL HOLE

SEMARANG PROJECT **Jatibarang Dam** HOLE No. **B-1** (SHEET 3 OF 4)
 LOCATION left bank DEPTH OF HOLE 70.0 m COMMENCED ---
 ELEVATION --- m DEPTH OF OVERBURDEN 0 m COMPLETED ---
 COORDINATE --- LENGTH OF ROCK DRILLING 70.0 m DRILLED BY ---
 ANGLE FROM HORIZONTAL 90° TOTAL LENGTH OF CORE --- m LOGGED BY ---
 BEARING OF ANGLE HOLE --- CORE RECOVERY --- %

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT CASING	OBSERVATION OF CORE					WATER TABLE WATER PRESSURE TEST LEAKAGE OF DRILLING WATER	DEPTH	ELEVATION
					COLOR	WEATHERING	HARDNESS	CORE CUTTING	R.S.			
0			0 → 100%								40	4.0m
0.5												
1												
1.5												
2												
2.5												
3												
3.5												
4												
4.5												
5												
5.5												
6												
6.5												
7												
7.5												
8												
8.5												
9												
50												
51												
52												
53												
54												
55												
56												
57												
58												
59												
60												

* Rock Soundness Classification
 1 (stick) 2 (substick) 3 (piece) 4 (fragment) 5 grain
 1 (hard) - 5 (soft)
 1 (fresh) - 5 (decomposed)

GEOLOGIC LOG OF DRILL HOLE

SEMARANG PROJECT **Jatibarang Dam** HOLE No. **B-1** (SHEET 4 OF 4)
 LOCATION left bank DEPTH OF HOLE 70.0 m COMMENCED ---
 ELEVATION --- m DEPTH OF OVERBURDEN 0 m COMPLETED ---
 COORDINATE --- LENGTH OF ROCK DRILLING 70.0 m DRILLED BY ---
 ANGLE FROM HORIZONTAL --- TOTAL LENGTH OF CORE --- m LOGGED BY ---
 BEARING OF ANGLE HOLE --- CORE RECOVERY --- %

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT CASING	OBSERVATION OF CORE					WATER TABLE WATER PRESSURE TEST LEAKAGE OF DRILLING WATER	DEPTH	ELEVATION
					COLOR	WEATHERING	HARDNESS	CORE CUTTING	R.S.			
0			0 → 100%								40	6.0m
0.5												
1												
1.5												
2												
2.5												
3												
3.5												
4												
4.5												
5												
5.5												
6												
6.5												
7												
7.5												
8												
8.5												
9												
70												

* Rock Soundness Classification
 1 (stick) 2 (substick) 3 (piece) 4 (fragment) 5 grain
 1 (hard) - 5 (soft)
 1 (fresh) - 5 (decomposed)

GEOLOGIC LOG OF DRILL HOLE

SEMARANG PROJECT Jatibarang Dam HOLE No. B-2 (SHEET 1 OF 4)

LOCATION	river bed	DEPTH OF HOLE	70.0 m	COMMENCED	---
ELEVATION	90.141 m	DEPTH OF OVERBURDEN	1.5 m	COMPLETED	---
COORDINATE	---	LENGTH OF ROCK DRILLING	68.5 m	DRILLED BY	---
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	---	LOGGED BY	---
BEARING OF ANGLE HOLE	---	CORE RECOVERY	---		

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT CASING	OBSERVATION OF CORE					WATER TABLE WATER PRESSURE TEST LEAKAGE OF DRILLING WATER	DEPTH	ELEVATION
					COLOR	WEATHERING	HARDNESS	CORE CUTTING	R.S.*			
0m			0-100								0m	90.141
0.20m					gray					0.20m		
1.5	river bed	river bed			gray						1.5	
2.5	T.S.S	T.S.S			2 4 4 CL						2.5	
3.6	VB	VB			2 3 2 CM						3.6	
3.9	T.S.S	T.S.S			1 3 4 CL						3.9	
4.9					1 3 4 CL						4.9	
5.8					1 3 2 CM						5.8	
6.3					1 4 4 CL						6.3	
7.0					1 3 3 CM						7.0	
8.0					1 3 4 CL						8.0	
10.1					1 2 3 2 CM						10.1	
10.7					1 3 4 CL						10.7	
11.2					1 3 4 CL						11.2	
15.3					1 3 2 4 CL						15.3	
15.8					1 2 2 CM						15.8	
16.8					1 2 4 CL						16.8	
17.8					1 3 1 CM						17.8	
19.0					1 3 2 CM						19.0	
20.0					1 3 (3) CL						20.0	

* Rock Soundness Classification
 1 (stick) 2 (substick) 3 (piece) 4 (fragment) 5 grain
 1 (hard) - 5 (soft)
 1 (fresh) - 5 (decomposed)

GEOLOGIC LOG OF DRILL HOLE

SEMARANG PROJECT Jatibarang Dam HOLE No. B-2 (SHEET 2 OF 4)

LOCATION	river bed	DEPTH OF HOLE	70.0 m	COMMENCED	---
ELEVATION	---	DEPTH OF OVERBURDEN	0 m	COMPLETED	---
COORDINATE	---	LENGTH OF ROCK DRILLING	70.0 m	DRILLED BY	---
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	---	LOGGED BY	---
BEARING OF ANGLE HOLE	---	CORE RECOVERY	---		

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT CASING	OBSERVATION OF CORE					WATER TABLE WATER PRESSURE TEST LEAKAGE OF DRILLING WATER	DEPTH	ELEVATION
					COLOR	WEATHERING	HARDNESS	CORE CUTTING	R.S.*			
0m			0-100								0m	90.141
20.5					1 3 (3)						20.5	
20.0-35.0m					2 3 CM						20.0-35.0m	
20.0m					1 3 4 CL						20.0m	
26.6					1 3 4 CL						26.6	
28.6					1 3 4 CL						28.6	
30.0					1 3 4 CL						30.0	
35.0-35.7m					1 2 2 2 CM						35.0-35.7m	
35.7					1 3 4 CL						35.7	
36.8					1 3 4 CL						36.8	
37.4					1 3 3 CM						37.4	
38.6					1 3 2 CM						38.6	
40.0					1 3 3						40.0	

* Rock Soundness Classification
 1 (stick) 2 (substick) 3 (piece) 4 (fragment) 5 grain
 1 (hard) - 5 (soft)
 1 (fresh) - 5 (decomposed)

GEOLOGIC LOG OF DRILL HOLE

PROJECT _____ HOLE No. B-2 (SHEET 3 OF 4)

LOCATION _____ DEPTH OF HOLE _____ m COMMENCED _____
 ELEVATION _____ m DEPTH OF OVERBURDEN _____ m COMPLETED _____
 COORDINATE _____ LENGTH OF ROCK DRILLING _____ m DRILLED BY _____
 ANGLE FROM HORIZONTAL _____ TOTAL LENGTH OF CORE _____ m LOGGED BY _____
 BEARING OF ANGLE HOLE _____ CORE RECOVERY _____ %

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT CASING	OBSERVATION OF CORE					WATER TABLE WATER PRESSURE TEST LEAKAGE OF DRILLING WATER	DEPTH	ELEVATION
					COLOR	WEATHERING	HARDNESS	CORE CUTTING	R.S.*			
0			0-100%								0	40.80m
1	VB	Δ			1	2	2	CM	70.7			
2		Δ			1	3	4	CL	72.0			
3										↑ Spring P = 3.0 kg/cm ² Q = 0		
4										P = 10 kg/cm ² Q = 64 l/min		
5												
6												
7												
8												
9												
50												
1												
2												
3												
4												
5												
6												
7												
8												
9												
60												

Driller's note 4 * Rock Soundness Classification
 1 (stick) 2 (substick) 3 (piece) 4 (fragment) 5 grain
 1 (hard) - 5 (soft)
 1 (fresh) - 5 (decomposed)

GEOLOGIC LOG OF DRILL HOLE

PROJECT _____ HOLE No. B-2 (SHEET 4 OF 4)

LOCATION _____ DEPTH OF HOLE _____ m COMMENCED _____
 ELEVATION _____ m DEPTH OF OVERBURDEN _____ m COMPLETED _____
 COORDINATE _____ LENGTH OF ROCK DRILLING _____ m DRILLED BY _____
 ANGLE FROM HORIZONTAL _____ TOTAL LENGTH OF CORE _____ m LOGGED BY _____
 BEARING OF ANGLE HOLE _____ CORE RECOVERY _____ %

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT CASING	OBSERVATION OF CORE					WATER TABLE WATER PRESSURE TEST LEAKAGE OF DRILLING WATER	DEPTH	ELEVATION
					COLOR	WEATHERING	HARDNESS	CORE CUTTING	R.S.*			
0			0-100%									40.60m
1	Slug	000										
2	Slug	000										
3												
4												
5												
6												
7												
8												
9												
70												
1												
2												
3												
4												
5												
6												
7												
8												
9												
0												

Driller's note 4 * Rock Soundness Classification
 1 (stick) 2 (substick) 3 (piece) 4 (fragment) 5 grain
 1 (hard) - 5 (soft)
 1 (fresh) - 5 (decomposed)

GEOLOGIC LOG OF DRILL HOLE

SEMARANG

PROJECT **Jatibarang Dam**

HOLE No. **B-3** (SHEET 1 OF 4)

LOCATION right bank DEPTH OF HOLE 70.0 m COMMENCED ---
 ELEVATION 171.782 m DEPTH OF OVERBURDEN --- m COMPLETED ---
 COORDINATE --- LENGTH OF ROCK DRILLING --- m DRILLED BY ---
 ANGLE FROM HORIZONTAL 90 ° TOTAL LENGTH OF CORE --- m LOGGED BY ---
 BEARING OF ANGLE HOLE --- CORE RECOVERY --- %

DEPTH	ROCK NAME	LOG	CORE RECOVERY	OBSERVATION OF CORE					DESCRIPTION	WATER TABLE WATER PRESSURE TEST LEAKAGE OF DRILLING WATER	DEPTH	ELEVATION
				COLOR	WEATHERING	HARDNESS	CORE CUTTING	R.S.*				
0m			0-100%							0	171.782	
0-23.5m	Volcanic breccia (VB)			brown	4	4	4	D	0-23.5m Volcanic breccia & matrix: tuffaceous sand & gravel; andesites sub-rounded to sub-angular φ 5 ~ 20cm 20 ~ 30%			
23.5-31.3m	Volcanic breccia (VB)			brownish grey	3	3	3	CL	23.5-31.3m & matrix; fine tuff & gravel; φ 0.2 ~ 10cm 10 ~ 20% content			
31.3-46.1m	Volcanic breccia			brownish	3	3	3	CL	31.3-46.1 & matrix; tuffaceous sand with granule			
46.1-56.5m	Volcanic breccia			brownish	3	3	3	CL	46.1-56.5 & gravel; 30-40% φ max 40cm, sub-rounded to sub-angular			
56.5-70.0m	Volcanic breccia			brownish	4	4	4	D				

driller's note 4 * Rock Soundness Classification
 1 (stick) 2 (substick) 3 (piece) 4 (fragment) 5 grain
 1 (hard) - 5 (soft)
 1 (fresh) - 5 (decomposed)

GEOLOGIC LOG OF DRILL HOLE

PROJECT

HOLE No. **B-3** (SHEET 2 OF 4)

LOCATION --- DEPTH OF HOLE --- m COMMENCED ---
 ELEVATION --- m DEPTH OF OVERBURDEN --- m COMPLETED ---
 COORDINATE --- LENGTH OF ROCK DRILLING --- m DRILLED BY ---
 ANGLE FROM HORIZONTAL --- TOTAL LENGTH OF CORE --- m LOGGED BY ---
 BEARING OF ANGLE HOLE --- CORE RECOVERY --- %

DEPTH	ROCK NAME	LOG	CORE RECOVERY	OBSERVATION OF CORE					DESCRIPTION	WATER TABLE WATER PRESSURE TEST LEAKAGE OF DRILLING WATER	DEPTH	ELEVATION
				COLOR	WEATHERING	HARDNESS	CORE CUTTING	R.S.*				
0m			0-100%							0	171.782	
0-23.5m	Volcanic breccia (VB)			brown	4	4	4	D	0-23.5m Volcanic breccia & matrix: tuffaceous sand & gravel; andesites sub-rounded to sub-angular φ 5 ~ 20cm 20 ~ 30%			
23.5-31.3m	Lapilli tuff			brownish grey	3	3	3	CL	23.5-31.3m & matrix; fine tuff & gravel; φ 0.2 ~ 10cm 10 ~ 20% content			
31.3-46.1m	Volcanic breccia			brownish	3	3	3	CL	31.3-46.1 & matrix; tuffaceous sand with granule			
46.1-56.5m	Volcanic breccia			brownish	3	3	3	CL	46.1-56.5 & gravel; 30-40% φ max 40cm, sub-rounded to sub-angular			
56.5-70.0m	Volcanic breccia			brownish	4	4	4	D				

driller's note 4 * Rock Soundness Classification
 1 (stick) 2 (substick) 3 (piece) 4 (fragment) 5 grain
 1 (hard) - 5 (soft)
 1 (fresh) - 5 (decomposed)

GEOLOGIC LOG OF DRILL HOLE

PROJECT _____ HOLE No. B-3 (SHEET 3 OF 4)

LOCATION right bank DEPTH OF HOLE _____ m COMMENCED _____
 ELEVATION _____ m DEPTH OF OVERBURDEN _____ m COMPLETED _____
 COORDINATE _____ LENGTH OF ROCK DRILLING _____ m DRILLED BY _____
 ANGLE FROM HORIZONTAL _____ TOTAL LENGTH OF CORE _____ m LOGGED BY _____
 BEARING OF ANGLE HOLE _____ CORE RECOVERY _____ %

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT CASING	OBSERVATION OF CORE					DESCRIPTION	WATER TABLE WATER PRESSURE TEST LEAKAGE OF DRILLING WATER	DEPTH	ELEVATION
					COLOR	WEATHERING	HARDNESS	CORE CUTTING	RS*				
0			0-100								0	4.3	
1	Volcanic breccia	D	100		grey	2	3	1	CM	76.1	Lu = 7.7 PL = 7.1 kg/cm ²	4.3	
2								2	CL	76.6			
3								3	CL	77.0			
4								4	CL	77.7			
5								5	CL	78.8			
6	Sandstone	D	100		dark brown	2	3	1	CM	79.0	Lu = 17.5 PL = 5.1 kg/cm ²	4.3	
7								2	CL	79.7			
8	Siltstone	D	100		yellowish grey	2	3	1	CM	49.7	Lu = 6.5 PL = 9.3 kg/cm ²	4.3	
9								2	CL	50.9			
10	Sandstone	D	100		yellowish	2	3	4	CL	51.8	Lu = 3.6 PL = 7.7 kg/cm ²	4.3	
11								1	CL	52.7			
12	Siltstone	D	100		brown	3	3	4	CL	53.0	Lu = 3.6 PL = 7.7 kg/cm ²	4.3	
13								2	CL	53.5			
14	Sandstone	D	100		yellowish	2	3	4	CL	54.8	Lu = 3.6 PL = 7.7 kg/cm ²	4.3	
15								1	CL	55.9			
16	Siltstone	D	100		brown	3	3	4	CL	56.8	Lu = 3.6 PL = 7.7 kg/cm ²	4.3	
17								2	CL	57.3			
18	Sandstone	D	100		yellowish	2	3	4	CL	57.8	Lu = 3.6 PL = 7.7 kg/cm ²	4.3	
19								1	CL	58.3			
20	Siltstone	D	100		brown	3	3	4	CL	58.8	Lu = 3.6 PL = 7.7 kg/cm ²	4.3	
21								2	CL	59.3			
22	Sandstone	D	100		yellowish	2	3	4	CL	59.8	Lu = 3.6 PL = 7.7 kg/cm ²	4.3	
23								1	CL	60.3			
24	Siltstone	D	100		brown	3	3	4	CL	60.8	Lu = 3.6 PL = 7.7 kg/cm ²	4.3	
25								2	CL	61.3			
26	Sandstone	D	100		yellowish	2	3	4	CL	61.8	Lu = 3.6 PL = 7.7 kg/cm ²	4.3	
27								1	CL	62.3			
28	Siltstone	D	100		brown	3	3	4	CL	62.8	Lu = 3.6 PL = 7.7 kg/cm ²	4.3	
29								2	CL	63.3			
30	Sandstone	D	100		yellowish	2	3	4	CL	63.8	Lu = 3.6 PL = 7.7 kg/cm ²	4.3	
31								1	CL	64.3			
32	Siltstone	D	100		brown	3	3	4	CL	64.8	Lu = 3.6 PL = 7.7 kg/cm ²	4.3	
33								2	CL	65.3			
34	Sandstone	D	100		yellowish	2	3	4	CL	65.8	Lu = 3.6 PL = 7.7 kg/cm ²	4.3	
35								1	CL	66.3			
36	Siltstone	D	100		brown	3	3	4	CL	66.8	Lu = 3.6 PL = 7.7 kg/cm ²	4.3	
37								2	CL	67.3			
38	Sandstone	D	100		yellowish	2	3	4	CL	67.8	Lu = 3.6 PL = 7.7 kg/cm ²	4.3	
39								1	CL	68.3			
40	Siltstone	D	100		brown	3	3	4	CL	68.8	Lu = 3.6 PL = 7.7 kg/cm ²	4.3	
41								2	CL	69.3			
42	Sandstone	D	100		yellowish	2	3	4	CL	69.8	Lu = 3.6 PL = 7.7 kg/cm ²	4.3	
43								1	CL	70.3			
44	Siltstone	D	100		brown	3	3	4	CL	70.8	Lu = 3.6 PL = 7.7 kg/cm ²	4.3	
45								2	CL	71.3			
46	Sandstone	D	100		yellowish	2	3	4	CL	71.8	Lu = 3.6 PL = 7.7 kg/cm ²	4.3	
47								1	CL	72.3			
48	Siltstone	D	100		brown	3	3	4	CL	72.8	Lu = 3.6 PL = 7.7 kg/cm ²	4.3	
49								2	CL	73.3			
50	Sandstone	D	100		yellowish	2	3	4	CL	73.8	Lu = 3.6 PL = 7.7 kg/cm ²	4.3	
51								1	CL	74.3			
52	Siltstone	D	100		brown	3	3	4	CL	74.8	Lu = 3.6 PL = 7.7 kg/cm ²	4.3	
53								2	CL	75.3			
54	Sandstone	D	100		yellowish	2	3	4	CL	75.8	Lu = 3.6 PL = 7.7 kg/cm ²	4.3	
55								1	CL	76.3			
56	Siltstone	D	100		brown	3	3	4	CL	76.8	Lu = 3.6 PL = 7.7 kg/cm ²	4.3	
57								2	CL	77.3			
58	Sandstone	D	100		yellowish	2	3	4	CL	77.8	Lu = 3.6 PL = 7.7 kg/cm ²	4.3	
59								1	CL	78.3			
60	Siltstone	D	100		brown	3	3	4	CL	78.8	Lu = 3.6 PL = 7.7 kg/cm ²	4.3	
61								2	CL	79.3			

driller's note 4 * Rock Soundness Classification
 1 (stick) 2 (substick) 3 (piece) 4 (fragment) 5 grain
 1 (hard) - 5 (soft)
 1 (fresh) - 5 (decomposed)

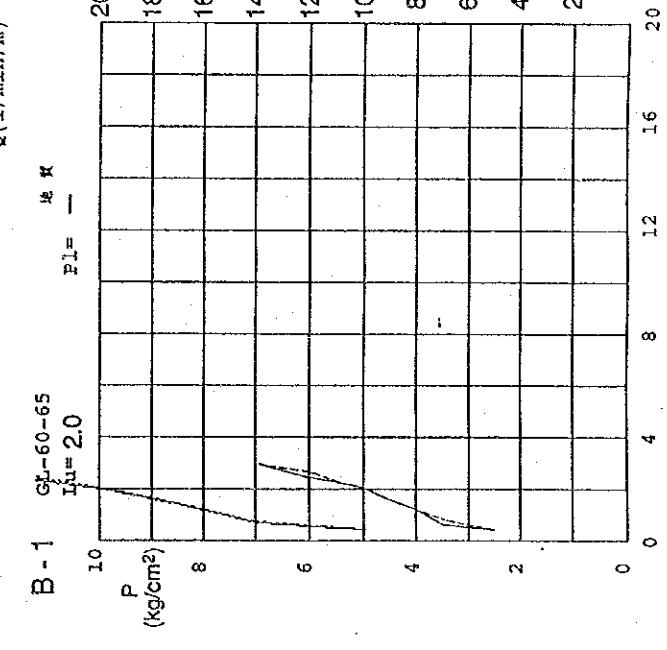
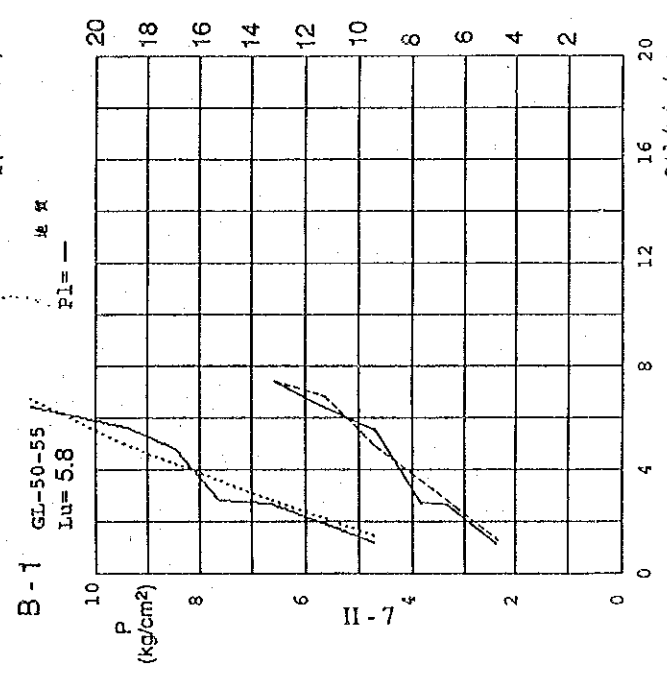
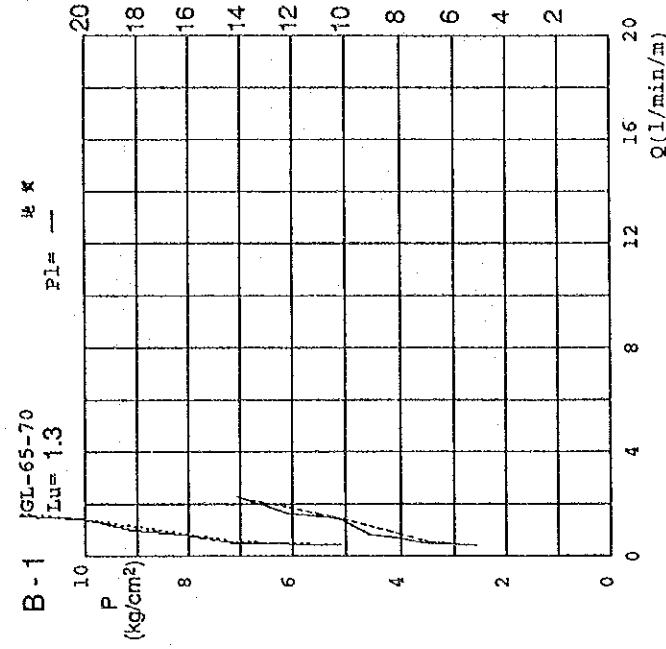
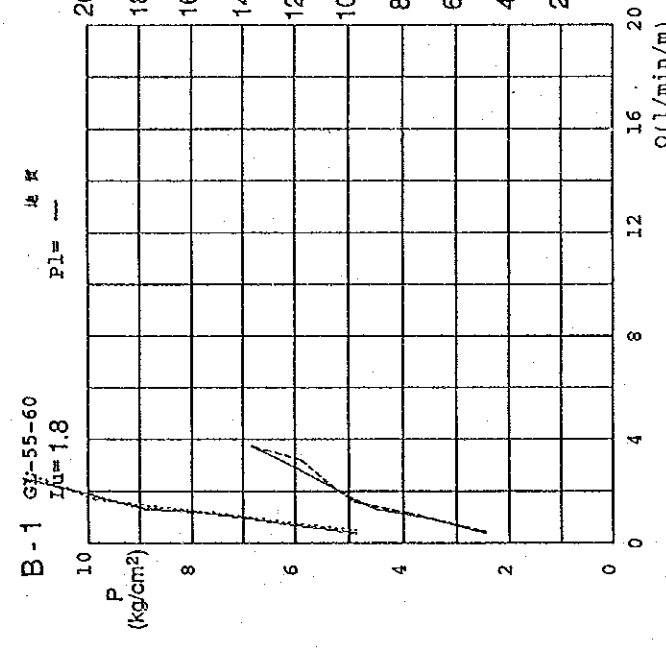
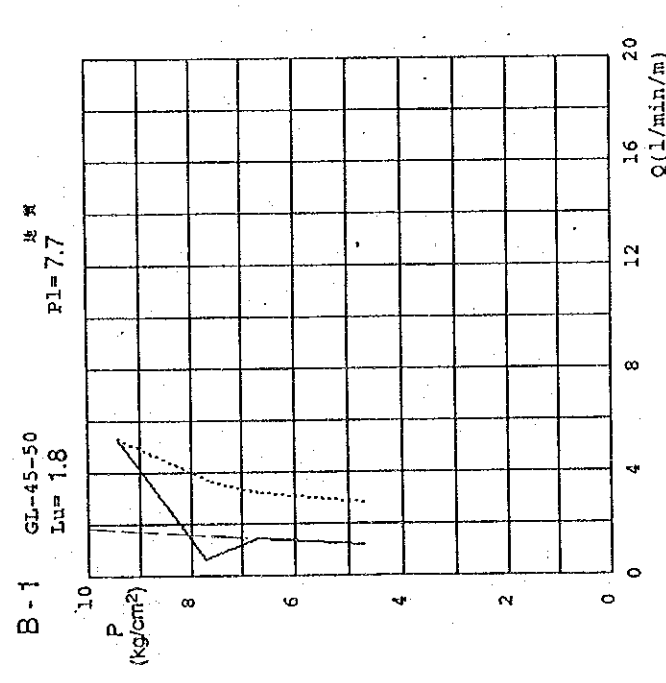
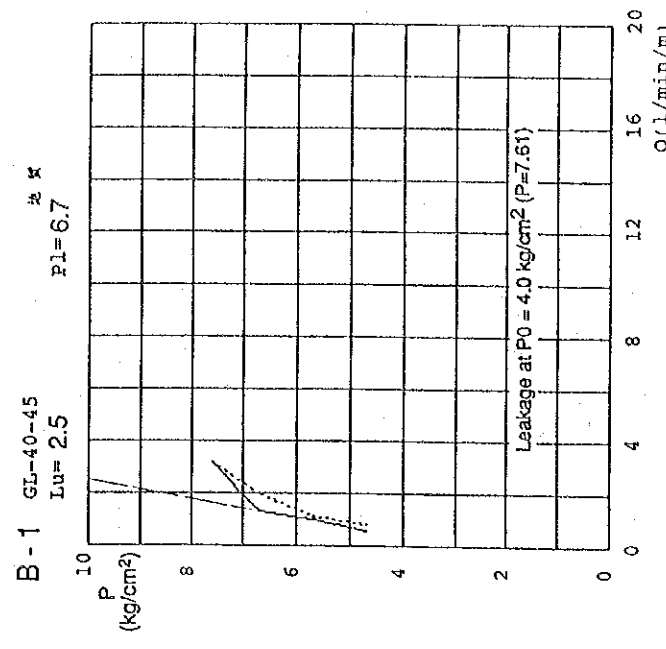
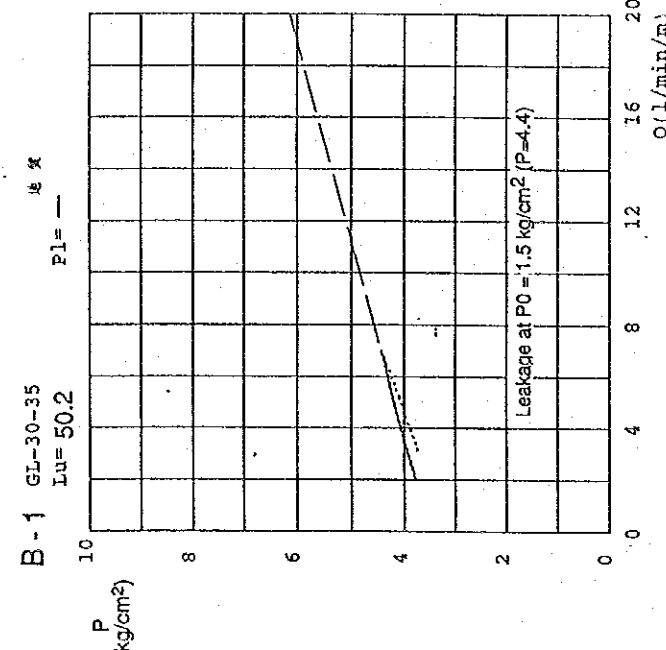
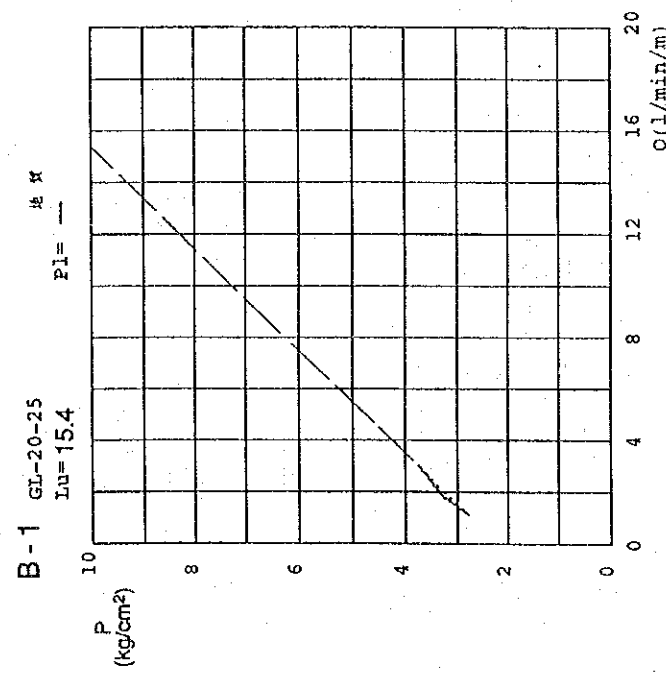
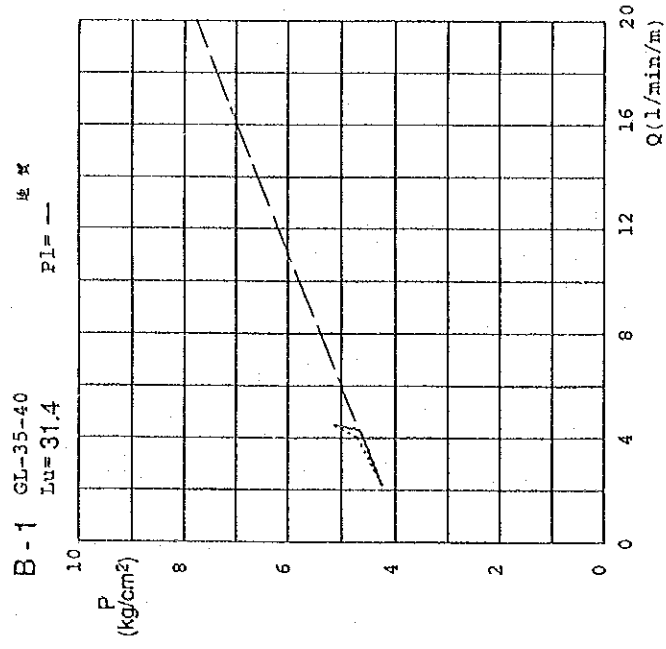
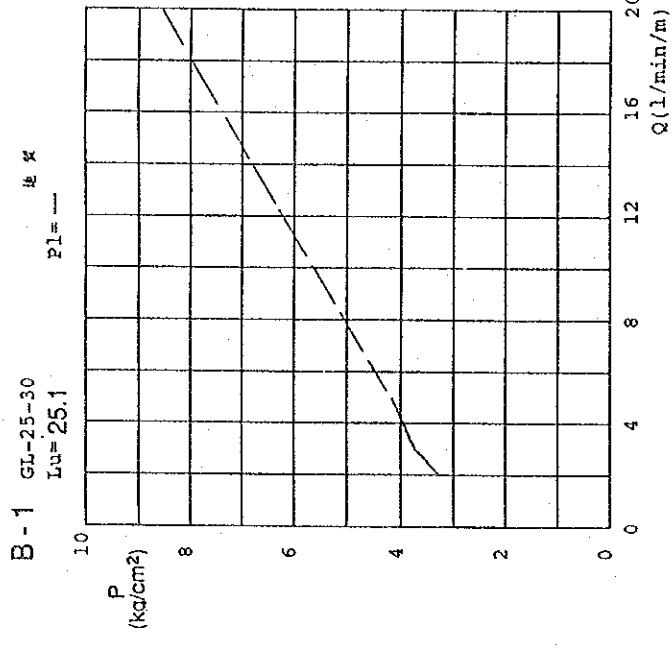
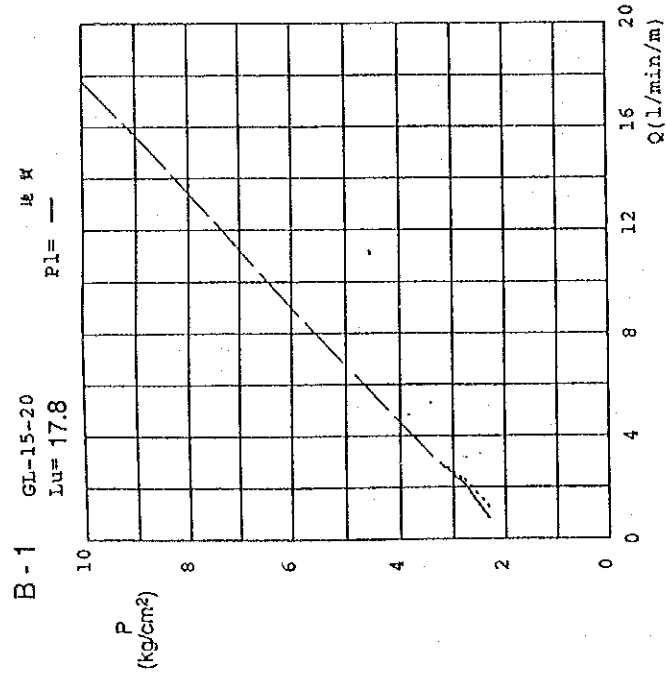
GEOLOGIC LOG OF DRILL HOLE

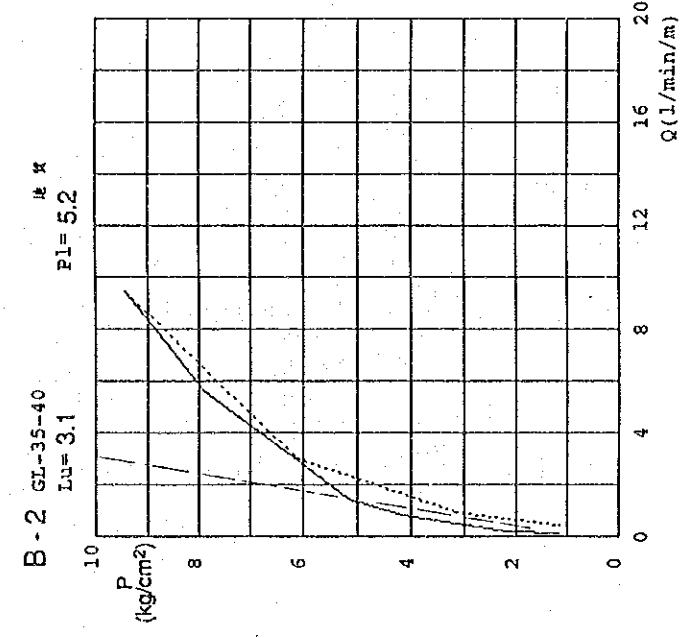
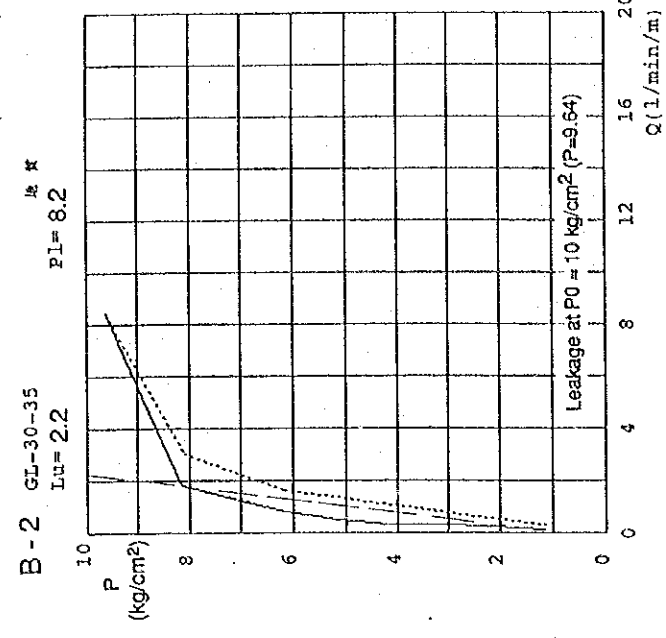
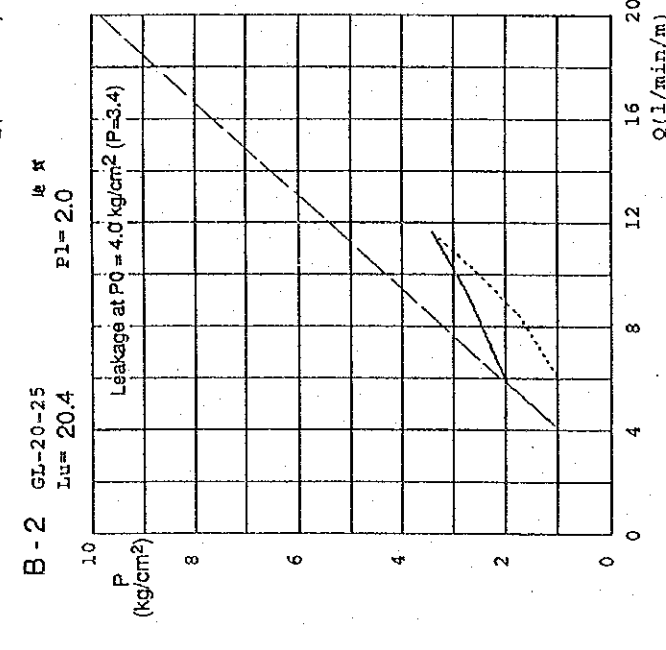
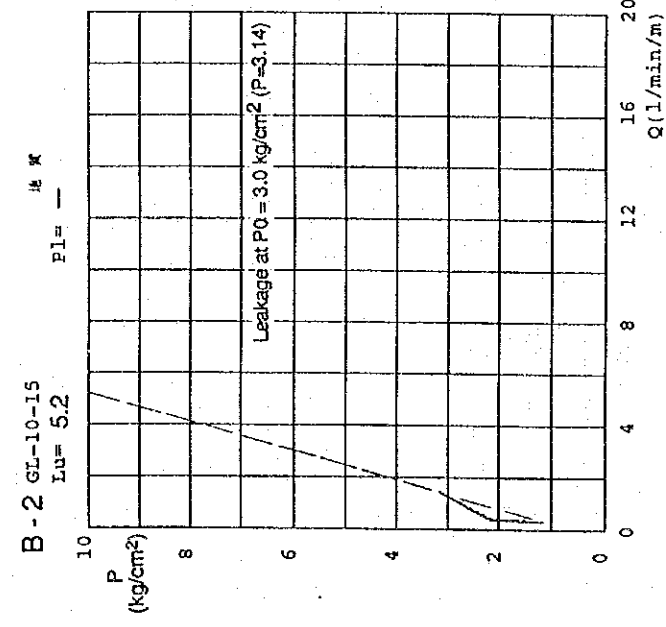
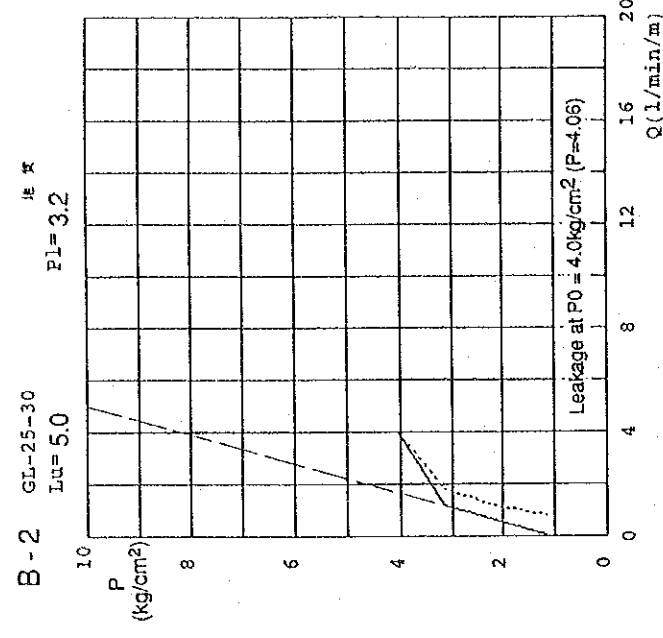
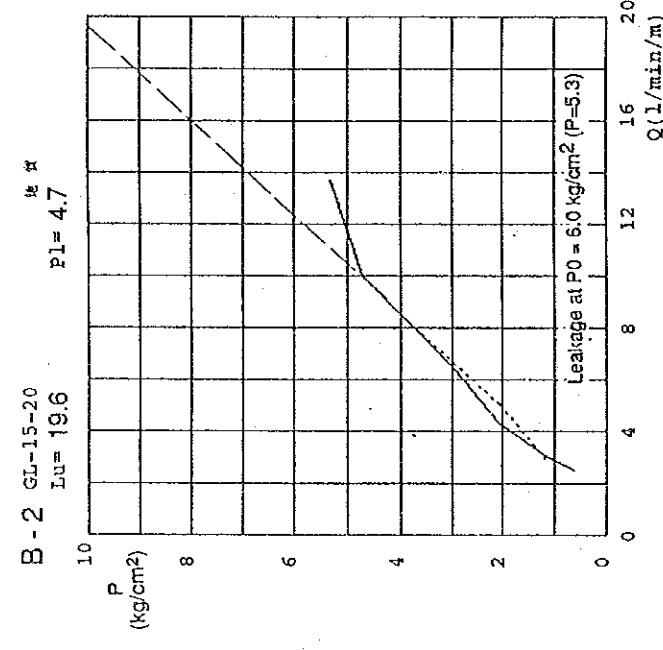
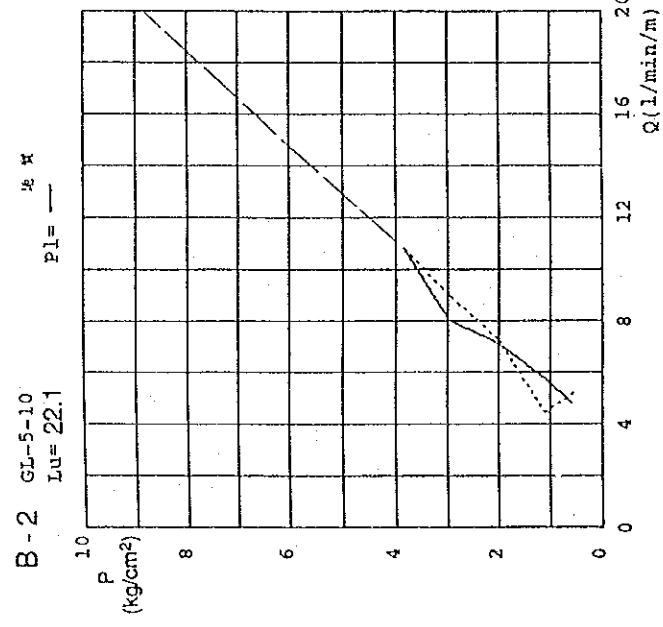
PROJECT _____ HOLE No. B-3 (SHEET 4 OF 4)

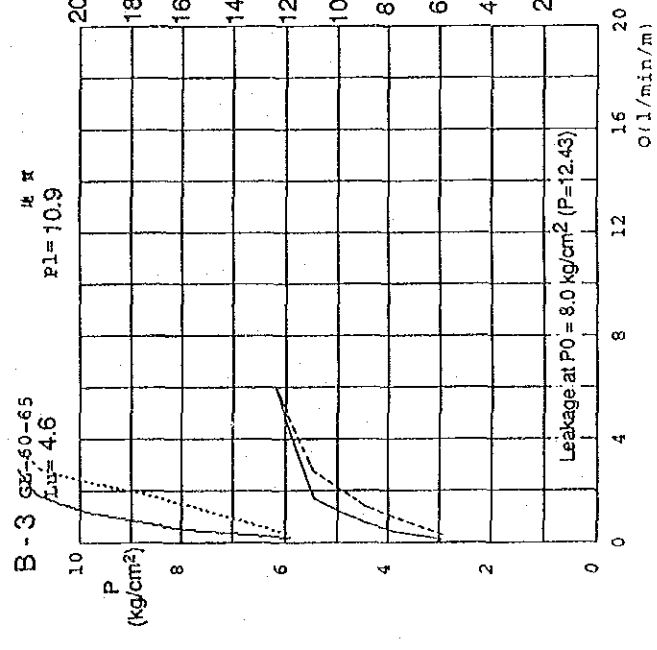
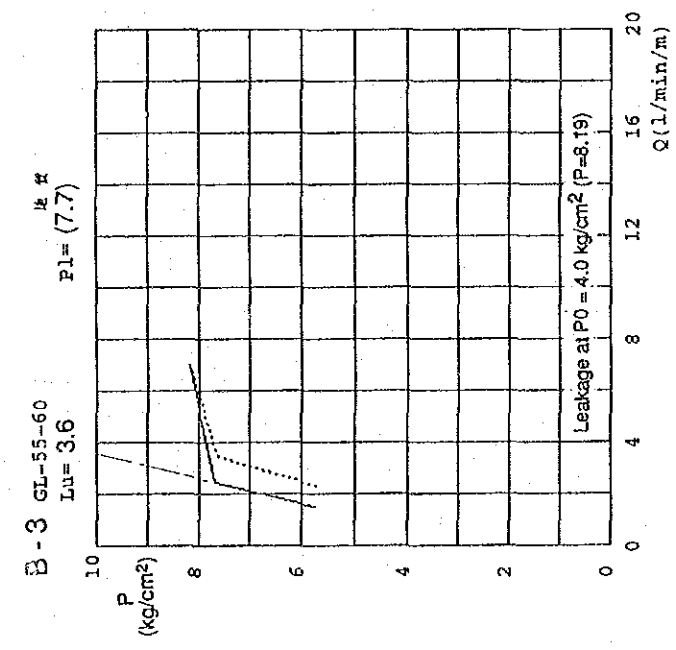
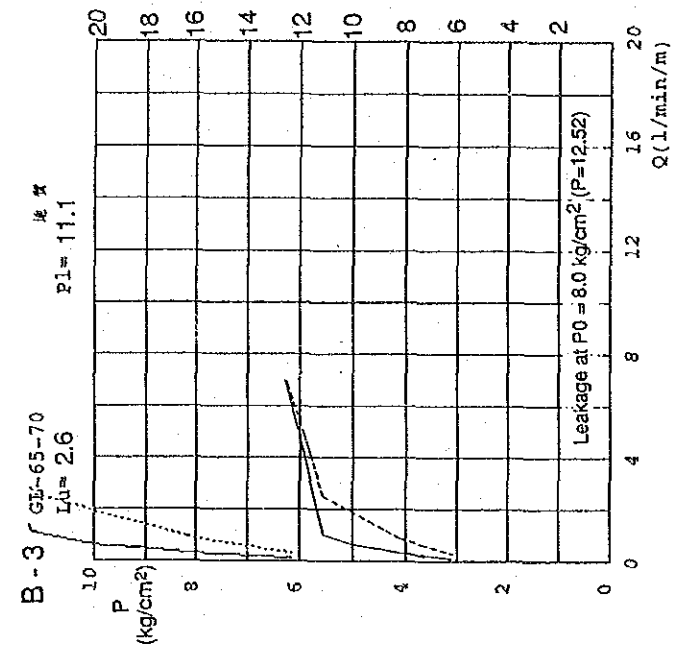
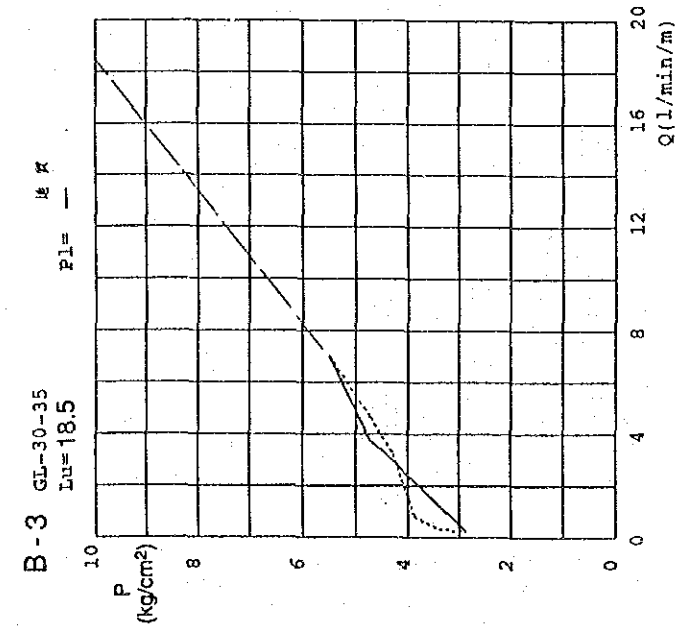
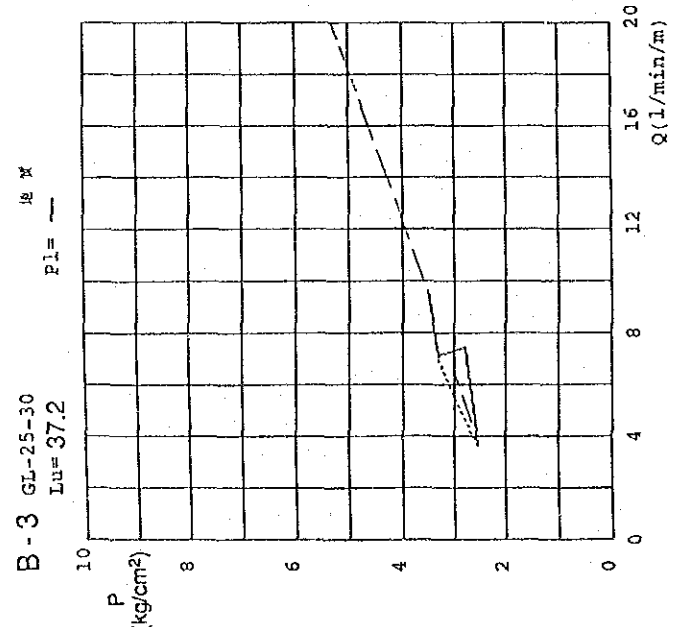
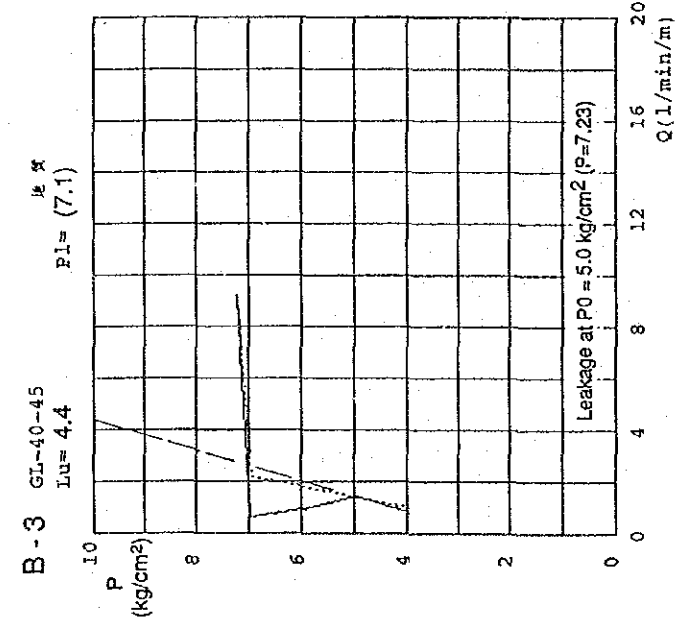
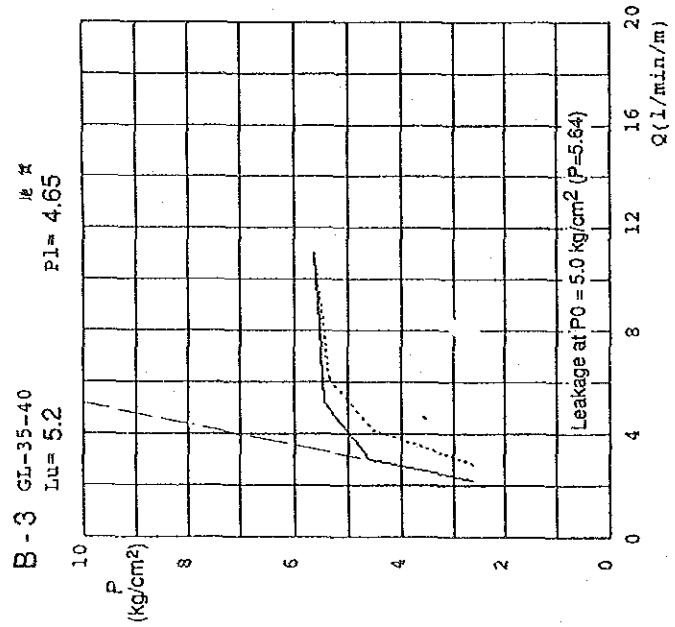
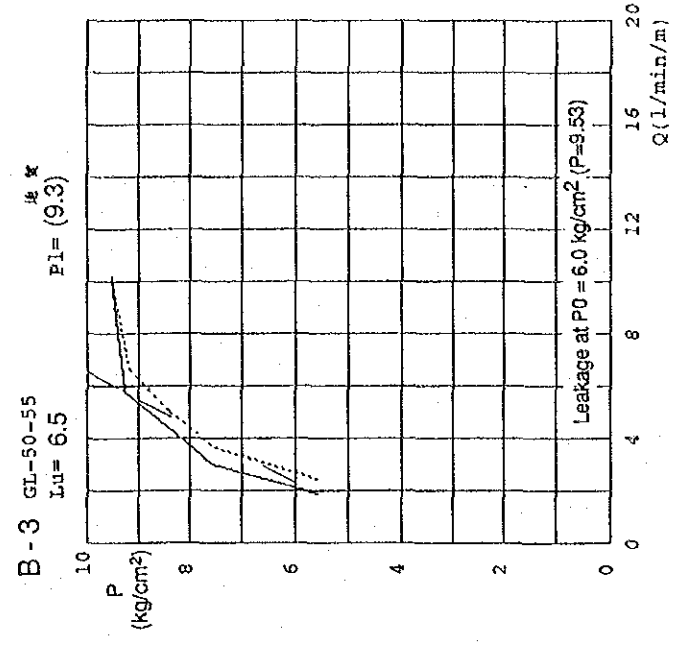
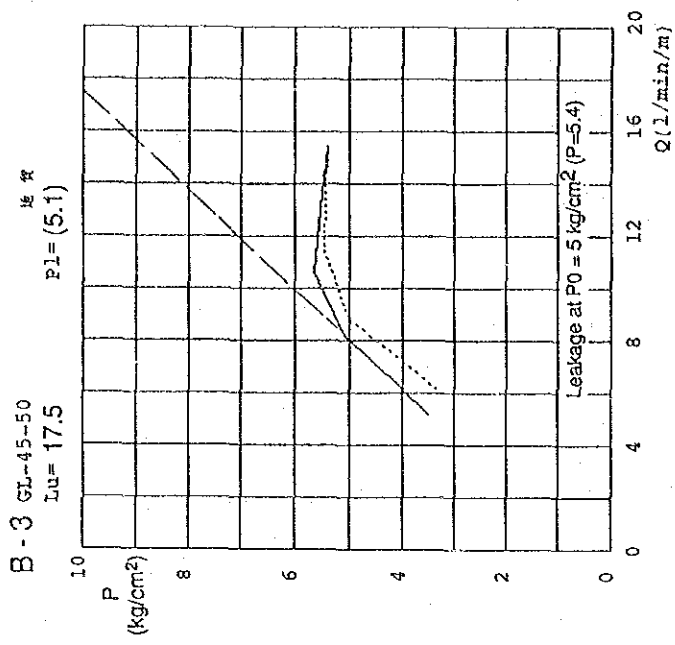
LOCATION right bank DEPTH OF HOLE _____ m COMMENCED _____
 ELEVATION _____ m DEPTH OF OVERBURDEN _____ m COMPLETED _____
 COORDINATE _____ LENGTH OF ROCK DRILLING _____ m DRILLED BY _____
 ANGLE FROM HORIZONTAL _____ TOTAL LENGTH OF CORE _____ m LOGGED BY _____
 BEARING OF ANGLE HOLE _____ CORE RECOVERY _____ %

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT CASING	OBSERVATION OF CORE					DESCRIPTION	WATER TABLE WATER PRESSURE TEST LEAKAGE OF DRILLING WATER	DEPTH	ELEVATION
					COLOR	WEATHERING	HARDNESS	CORE CUTTING	RS*				
0			0-100								0	4.3	
1	Volcanic breccia	D	100		black	2	3	1	CM	60.7	Lu = 7.6 PL = 10.9 kg/cm ²	4.3	
2								2	CL	61.2			
3								3	CL	61.7			
4								4	CL	62.2			
5								5	CL	62.7			
6	Sandstone	D	100		dark brown-grey	3	4	2	CL	65.9	Lu = 7.6 PL = 10.9 kg/cm ²	4.3	
7								1	CL	66.4			
8	Siltstone	D	100		dark brown-grey	2	3	1	CM	67.1	Lu = 7.6 PL = 10.9 kg/cm ²	4.3	
9								2	CL	67.6			
10	Sandstone	D	100		dark brownish grey	2	3	1	CM	69.3	Lu = 7.6 PL = 10.9 kg/cm ²	4.3	
11								2	CL	69.8			
12	Siltstone	D	100		dark brownish grey	2	3	1	CM	69.3	Lu = 7.6 PL = 10.9 kg/cm ²	4.3	
13								2	CL	69.8			
14	Sandstone	D	100		dark brownish grey	2	3	1	CM	70.0	Lu = 7.6 PL = 10.9 kg/cm ²	4.3	
15								2	CL	70.5			

driller's note 4 * Rock Soundness Classification
 1 (stick) 2 (substick) 3 (piece) 4 (fragment) 5 grain
 1 (hard) - 5 (soft)
 1 (fresh) - 5 (decomposed)







JICA JAPAN INTERNATIONAL COOPERATION AGENCY	<h1>BORE HOLE LOG</h1>	Boring No. : B-1
		Sheet : 1 of 1
		Total Depth : 20.00 m.
Project : MASTER PLAN ON WATER RESOURCES DEVELOPMENT AND FEASIBILITY STUDY FOR URGENT FLOOD CONTROL AND URBAN DRAINAGE IN SEMARANG CITY AND SUBURBS.	Date Commenced : 26.05.'92	Date Completed : 27.05.'92
Area Designation :	Driller : UMAN R., SAHLAN	Supervisor : TAHARA
Ground Elevation : + 1.999 m	Logged : EDDY S.	Drilling Machine : Y B M - 3E
Coordinates :		
Depth of G.W.L. : 0.80 m		

Date	Depth in Meter	Elevation	G.W.L. in Meter	Drilling Rate / 10 cm	Depth of Water Loss	Core Recovery (%)	R.Q.D (%)	Lithologic Symbol	Lithologic Unit	Method of sampling	SOIL / ROCK DESCRIPTION	Core Barrel / Bit Type	Casing Type	STANDARD PENETRATION TEST					REMARKS
														Number of Blows at Each 10cm			N - VALUE		
														N ₁	N ₂	N ₃	N - Value		
26.05.'92	1								SILT		0.00-0.72M, Silt containing some roots of plant and gravels, light brown, wet, soft-firm, non-plastic gravels, 0.0.3-3cm, sub-rounded.	S T C, Ø.73 mm (NX) CASSING, Ø.89 mm (NW), 18.70 M		3	3	6			
	2								SAND		0.72-1.88M, Silty sand with some gravels and trace of sand, brown, wet to moist-soft firm, non-plastic gravels, 0.0.3-1cm.			1	1	2			
	3								SAND		1.88-2.50M, Silty Sand with some clay, dark grey, very fine-fine-grained, well graded, very loose, uncemented.			1	1	3			
	4								SAND		2.50-3.00M, Clayey Silt with some sand, blackish grey, wet, very soft non-plastic.			1	1	2			
	5								SAND		3.00-6.72M, Silty Sand with trace of shell, brownish grey, very fine-medium grained, moderately graded, very loose, uncemented.			1	1	2			
	6								SAND		6.72-10.78M, Clayey Silt with trace of fine sand, dark grey, wet very soft, non-plastic to low-plasticity.			1	1	1			
	7								SAND					1	1	1			
	8								SAND					1	1	1			
	9								SAND					1	1	1			
	10								SAND					1	1	1			
	11								SAND					1	1	1			
	12								SAND					1	1	1			
	13								SAND					1	1	1			
	14								SAND					1	1	1			
	15								SAND					1	1	1			
	16								SAND					1	1	1			
	17								SAND					1	1	1			
	18								SAND					1	1	1			
	19								SAND					1	1	1			
20								SAND				1	1	2	4				
											19.10-20.00M, Silty Clay with trace of shell and wood, dark grey, wet, soft, low plasticity.								
											BOTTOM OF BORE HOLE.								

JICA JAPAN INTERNATIONAL COOPERATION AGENCY	<h1>BORE HOLE LOG</h1>	Boring No. : B-2
		Sheet : 1 of 1
		Total Depth : 20.00 m.
Project : MASTER PLAN ON WATER RESOURCES DEVELOPMENT AND FEASIBILITY STUDY FOR URGENT FLOOD CONTROL AND URBAN DRAINAGE IN SEMARANG CITY AND SUBURBS.	Date Commenced : 23.05.'92	Date Completed : 24.05.'92
Area Designation :	Driller : UMAN, SAHLAN	Supervisor : TAHARA
Ground Elevation : + 1.868 M	Logged : EDDY S.	Drilling Machine : Y B M - 3E
Coordinates :		
Depth of G.W.L. : 1.15 m		

Date	Depth in Meter	Elevation	G.W.L. in Meter	Drilling Rate / 10 cm	Depth of Water Loss	Core Recovery (%)	R.Q.D (%)	Lithologic Symbol	Lithologic Unit	Method of sampling	SOIL / ROCK DESCRIPTION	Core Barrel / Bit Type	Casing Type	STANDARD PENETRATION TEST					REMARKS
														Number of Blows at Each 10cm			N - VALUE		
														N ₁	N ₂	N ₃	N - Value		
23.05.'92	1								SILT		0.00-0.22M, Silty Silt Containing Some roots of plant dark brown, wet, firm, non-plastic.	S T C, Ø.73 mm (NX) CASSING, Ø.89 mm (NW), 18.70 M		2	2	1	5		
	2								SAND		0.22-0.42M, Gravelly Sand - Containing Some roots of plant whitish brown, medium grained, moderately graded, very loose, uncemented.			1	1	2			
	3								SAND		0.42-0.70M, Silt with trace of roots of plant, dark brown wet, firm, non-plastic.			1	1	2			
	4								SAND					1	1	1			
	5								SAND					1	1	1			
	6								SAND					1	1	2			
	7								SAND					1	1	1			
	8								SAND					1	1	1			
	9								SAND					1	1	1			
	10								SAND					1	1	1			
	11								SAND					1	1	1			
	12								SAND					1	1	1			
	13								SAND					1	1	1			
	14								SAND					1	1	1			
	15								SAND					1	1	1			
	16								SAND					1	1	1			
	17								SAND					1	1	1			
	18								SAND					1	1	1	3		
	19								SAND					3	4	4	10		
20								SAND				3	5	5	13				
											18.62-20.00M, Silty Clay, brownish dark grey, moist, stiff, low plasticity.								
											BOTTOM OF BORE HOLE.								

BORE HOLE LOG

Boring No. : B-3
Sheet : 1 of 1
Total Depth : 20.00 m.

Project :	MASTER PLAN ON WATER RESOURCES DEVELOPMENT AND FEASIBILITY STUDY FOR URGENT FLOOD CONTROL AND URBAN DRAINAGE IN SEMARANG CITY AND SUBURBS	Date Commenced :	20.05.'92
Area Designation :		Date Completed :	21.05.'92
Ground Elevation :	2.416 m	Angle :	VERTICAL , Bearing : 0°
Coordinates :		Driller :	UMAN R., SAHLAN
Depth of G.W.L. :	1.15 m	Supervisor :	TAHARA
		Logged :	EDDY S.
		Drilling Machine :	Y B M - 3E

Date	Depth in Meter	Elevation	G.W.L. in Meter	Drilling Rate / 10 cm	Depth of Water Loss	Core Recovery (%)	R. Q. D (%)	Lithologic Symbol	Lithologic Unit	Method of sampling	SOIL / ROCK DESCRIPTION	STANDARD PENETRATION TEST					REMARKS								
												Number of Blows at Each 10cm				GRAPHICS									
												N - VALUE													
												N ₁	N ₂	N ₃	N ₄	N - Value									
20.05.'92	1								CLAY & SILT		0.00-0.42M, Silt containing some roots of plant with trace of fine sand, dark brown, wet, soft, non-plastic.	1	2	2	5										
	2								SHALLOW MARINE DEPOSITS		0.42-1.00M, Silt containing some organic & anorganic matters, occasionally gravels blackish-dark brown, wet, soft, non-plastic.	1	1	1	3										
	3										1.00-2.70M, Sandy silt, dark brown to greyish light brown, very soft, non-plastic.	1			1										
	4										2.70-6.00M, Silty Clay, occasionally with fine sand and organic matters, brownish grey to grey, wet, very soft-soft, low plasticity.	1	1		2										
	5										6.00-16.62M, Very soft clay, occasionally with fine sand and silt greenish light grey to dark grey wet, medium plasticity.	1	1	1	3										
	6										16.62-20.00M, Clayey silt with occasionally sand intercalation dark brown, moist, stiff to very stiff, low non plastic.	3	5	7	15										
21.05.'92	17										19.63-19.70M, sand intercalation.	1	8	8	19										
	18											5	8	11	24										
	19																								
	20																								
	21																								
	22																								
	23																								
	24																								
	25																								

BORE HOLE LOG

Boring No. : B-4
Sheet : 1 of 1
Total Depth : 20.00 m.

Project :	MASTER PLAN ON WATER RESOURCES DEVELOPMENT AND FEASIBILITY STUDY FOR URGENT FLOOD CONTROL AND URBAN DRAINAGE IN SEMARANG CITY AND SUBURBS	Date Commenced :	17.05.'92
Area Designation :		Date Completed :	18.05.'92
Ground Elevation :	2.425	Angle :	VERTICAL , Bearing : 0°
Coordinates :		Driller :	UMAN R. & SAHLAN
Depth of G.W.L. :	1.65 m	Supervisor :	TAHARA
		Logged :	EDDY S.
		Drilling Machine :	Y B M - 3 E

Date	Depth in Meter	Elevation	G.W.L. in Meter	Drilling Rate / 10 cm	Depth of Water Loss	Core Recovery (%)	R. Q. D (%)	Lithologic Symbol	Lithologic Unit	Method of sampling	SOIL / ROCK DESCRIPTION	STANDARD PENETRATION TEST					REMARKS								
												Number of Blows at Each 10cm				GRAPHICS									
												N - VALUE													
												N ₁	N ₂	N ₃	N ₄	N - Value									
17.05.'92	1								CLAY & SILT		0.00-0.50M, Silt containing some roots of plant and Organic matters, dark brown, wet, soft, non-plastic.	1	1	2	4										
	2								SHALLOW MARINE DEPOSITS		0.54-3.00M, Flood deposits, with Organic & unorganic materials, cemented by silt.	1			1										
	3										3.00-13.80M, Very soft silty - Clay, Occasionally Mollusk & Brachy Pod Scelletsals, grey, wet, medium plasticity.	1	1	1	3										
	4											1			1										
	5											1			1										
	6											1			1										
	7											1			1										
	8											1			1										
	9											1			1										
	10											1			1										
	11											1			1										
	12											1			1										
	13											1			1										
	14											1			1										
	15											1			1										
	16											1			1										
	17											6	6	7	17										
	18											6	4	4	12										
	19											7	8	9	24										
	20											6	8	11	25										
	21											3	5	6	14										
	22											7	7	7	21										
	23											3	5	5	13										
	24																								
	25																								

BORE HOLE LOG

Boring No. : B-5
Sheet : 1 of 1
Total Depth : 20.00 m.

Project : MASTER PLAN ON WATER RESOURCES DEVELOPMENT AND
FEASIBILITY STUDY FOR URGENT FLOOD CONTROL AND
URBAN DRAINAGE IN SEMARANG CITY AND SUBURBS
Date Commenced : 13.05.'92
Date Completed : 15.05.'92
Angle : VERTICAL, Bearing : 0°
Area Designation :
Driller : UMAN R. & SAHLAN
Ground Elevation : + 2.785 M
Supervisor : TAHARA
Coordinates :
Logged : EDDY S.
Depth of G.W.L. : 1.65 m
Drilling Machine : Y B M-3E

1 Date	2 Depth in Meter	3 Elevation	4 G.W.L. in Meter	5 Drilling Rate / 10cm	6 Depth of Water Loss	7 Lithologic Symbol Lithologic Unit Method of sampling	8 SOIL / ROCK DESCRIPTION	9 Core Barrel / Bit Type Casing Type S.T.C - MC, φ. 75 mm	10 STANDARD PENETRATION TEST				11 REMARKS	12					
									Number of Blows at Each 10cm	GRAPHICS					N - VALUE				
										N ₁	N ₂	N ₃							
13.05.'92	1					SILT	0.00-0.10M, Clayey Silt containing some roots of plant, dark-brown, moist, very soft, medium plastic.		1	1	1	3							
	2					SILT	0.10-1.90M, Clayey Silt, light-brown, wet, very soft, medium plastic.		1	1	1	3							
	3					SILT	1.90-3.20M, Clayey Silt, brownish gray wet, very soft, medium plastic.		1	1	2	4							
	4					SAND	3.20-4.90M, Silty Sand with trace gravels and organic matters (Coral & Mollusk scollatae), dark grey, very fine-fine grained, well graded, loose, poorly unconsolidated.		5	5	5	15							MEDIUM DENSE LAYERS
	5					SAND	4.90-6.00M, Gravelly Sand contains some Mollusks scollatae, dark gray to black, medium to coarse grained, loose-medium density, poorly cemented-uncemented, Gravel, 0.3mm-2cm, sub-rounded.		1	1	1	3							MEDIUM DENSE LAYERS
	6					SILT & CLAY	6.00-8.20M, Clayey Silt Contains some Mollusk scollatae, trace of coarse sand and gravels, dark grey spotted white, wet, very soft-soft, medium plastic.		1	1	1	3							SOFT LAYERS
	7					SHALLOW MARINE DEPOSITS SILT & CLAY	8.20-9.30M, Silty Clay contains some organic matters (Mollusk-Scollatae), dark grey, wet, very soft, medium to highly plastic.		1	1	1	3							SOFT LAYERS
	8					SILT & CLAY	9.30-9.60M, Silty sand with trace of organic matters, fine grained, well-graded, very loose-loose, uncemented.		1	1	2	4							SOFT LAYERS
	9					SILT & CLAY	9.60-14.20M, Silty Clay with some organic matters and trace of sand, dark grey, wet, soft, medium plastic.		3	9	9	21							SOFT LAYERS
	10					SAND	14.20-15.00M, Silty sand with trace of gravels, dark grey, fine to medium grained, well graded, medium dense, poorly cemented, Gravel, 0.3mm-3mm, sub-rounded.		5	8	8	21							MEDIUM DENSE LAYERS
	11					SILT & CLAY	15.00-15.80M, Gravelly sand, dark grey, medium-coarse grained, well graded, medium dense, poorly cemented, Gravel, 0.3mm-2cm, sub-rounded.		4	5	5	14							MEDIUM DENSE LAYERS
	12					SILT & CLAY	15.80-16.00M, Silty sand with some gravels, dark grey, fine-medium grained, well graded, medium dense, poorly cemented, Gravel, 0.3mm-1cm.		4	5	11	20							MEDIUM DENSE LAYERS
	13					SILT	16.00-18.00M, Gravelly sandy Silt with intercalation of sand lenses, dark grey, wet, firm-stiff, low to non plastic, Gravel, 0.3mm-2.50cm, sub-rounded to sub-angular.		4	8	9	21							MEDIUM DENSE LAYERS
	14					SILT	18.00-20.00M, Silty clay, occasionally gravels (0.3mm-8mm), grayish dark brown-light brownish grey, moist, very soft-stiff medium to highly plastic.		6	8	10	24							MEDIUM DENSE LAYERS
	15						BOTTOM OF BORE HOLE.												

BORE HOLE LOG

Boring No. : B-6
Sheet : 1 of 1
Total Depth : 20.00 m.

Project : MASTER PLAN ON WATER RESOURCES DEVELOPMENT AND
FEASIBILITY STUDY FOR URGENT FLOOD CONTROL AND
URBAN DRAINAGE IN SEMARANG CITY AND SUBURBS
Date Commenced : 13.05.'92
Date Completed : 15.05.'92
Angle : VERTICAL, Bearing : 0°
Area Designation :
Driller : ULI S., A.KARYADI
Ground Elevation : + 7.541 M
Supervisor : TAHARA
Coordinates :
Logged : EDDY S.
Depth of G.W.L. : 2.10 m
Drilling Machine : KEKEN, OE-2L

1 Date	2 Depth in Meter	3 Elevation	4 G.W.L. in Meter	5 Drilling Rate / 10cm	6 Depth of Water Loss	7 Lithologic Symbol Lithologic Unit Method of sampling	8 SOIL / ROCK DESCRIPTION	9 Core Barrel / Bit Type Casing Type S.T.C, φ. 73 mm	10 STANDARD PENETRATION TEST				11 REMARKS	12					
									Number of Blows at Each 10cm	GRAPHICS					N - VALUE				
										N ₁	N ₂	N ₃							
14.05.'92	1					SILT	0.00-1.65M, Clayey Silt with occasional sand and trace of organic matters, grayish brown to dark brown, wet, soft, low plasticity.		1	2	3	6							
	2					SILT	1.65-1.90M, Silty Sand with trace of gravels, brown, medium to fine grained, well graded, loose, uncemented.		1	1	1	3							SOFT LAYER
	3					SAND	1.90-2.50M, Very Soft silty clay, grayish brown to brownish grey, wet, medium plasticity.		1	2	2	5							SOFT LAYER
	4					SILT	2.50-5.20M, Sandy Silt with trace of sand, dark grey, wet, very soft to soft, low plasticity.		2	2	3	7							SOFT LAYER
	5					SAND	5.20-7.25M, Gravelly silty Sand with some silt and sand intercalation, dark grey, coarse-very coarse grained, well graded, loose-medium density, poorly cemented-uncemented, Gravel, 0.3mm-5cm, sub-rounded to sub-angular.		10	14	8	32							DENSE LAYER
	6					SAND	7.25-7.60M, Gravelly sand with some silt, dark grey, 0.3mm-5cm, sub rounded sub angular, poorly graded to very loose, uncemented.		12	13	19	44							DENSE LAYER
	7					SILT & CLAY	7.60-8.00M, Gravelly Sand with some silt, brownish dark grey, medium to coarse grained, medium density to loose, poorly cemented, Gravel, 0.3mm-0.8cm.		5	7	11	23							DENSE LAYER
	8					SILT	8.00-8.27M, Gravelly Sand with trace of silt, dark grey, medium to very coarse grained, medium density, poorly cemented, Gravel, 0.3mm-0.8cm.		2	1	2	5							DENSE LAYER
	9					SAND	8.27-8.60M, Gravelly Silty Sand with trace of silt, brownish dark grey, medium coarse grained, medium density, poorly cemented, Gravel, 0.3mm-2.5cm.		2	2	3	7							DENSE LAYER
	10					SILT	8.60-10.30M, Clayey Silt, greenish dark grey, wet, very soft-soft, low plasticity.		3	5	7	15							DENSE LAYER
	11					SILT	10.30-17.10M, Clayey silt with trace of clay and gravels, occasionally Sand, brownish dark grey to grayish dark brown, wet firm-stiff, low to medium plasticity.		6	6	8	20							DENSE LAYER
	12					SILT	15.00-17.10M, stiff-very stiff, dark brown.		4	6	6	16							DENSE LAYER
	13					GRAVELS	17.10-17.30M, Boulders and gravels, 4.5cm-8cm.		6	8	7	27							DENSE LAYER
	14					GRAVELS	17.30-20.00M, Gravelly sand Silt, occasionally coarse sand, dark brown-brownish dark grey, 0.3mm-8cm, poorly graded, density well cemented medium cemented, Gravelly Sandy Silt, dark brown moist, soft-firm, non-plastic.		7	9	11	22							DENSE LAYER
	15						BOTTOM OF BORE HOLE.		50			>50							VERY DENSE LAYER

JICA
JAPAN INTERNATIONAL COOPERATION AGENCY

BORE HOLE LOG

Project : MASTER PLAN ON WATER RESOURCES DEVELOPMENT AND FEASIBILITY STUDY FOR URGENT FLOOD CONTROL AND URBAN DRAINAGE IN SEMARANG CITY AND SUBURBS			Boring No. : B-7		
Area Designation :			Date Commenced : 17.05.'92		
Ground Elevation : + 7.881 m			Date Completed : 18.05.'92		
Coordinates :			Angle : VERTICAL, Bearing : 0°		
Depth of G.W.L. : 1.95 m			Driller : ULI S., A.KARYADI		
			Supervisor : TAHARA		
			Logged : EDDY S.		
			Drilling Machine : KOKEN-OE 2L		

1	2	3	4	5	6	7	8	9	10	11						12			
										STANDARD PENETRATION TEST							REMARKS		
										Number of Blows at Each 10cm			GRAPHICS					CORING	
										N ₁	N ₂	N ₃	N - VALUE						DISTURBED SAMPLING NO
Date	Depth in Meter	Elevation	G.W.L in Meter	Drilling Rate /10cm	Depth of Water Loss	Core Recovery (%)	R.Q.D (%)	Lithologic Symbol	Lithologic Unit	Method of sampling	SOIL / ROCK DESCRIPTION	Core Barrel/Bit Type	Casing Type	N ₁	N ₂	N ₃	N - Value	SPT	
15.05.'92	1											0.00-0.13M, Silt with some roots of plant and trace of fine sand, dark brown, wet-stiff non-plastic.	2	2	2	6			
	2											0.13-0.48M, Silty Sand containing some roots of plant, light brown, very fine-fine grained, well graded, medium dense, poorly cemented.	1	2	2	5			
	3											0.48-2.33M, Silt with trace of Sand, light to dark brown, wet, soft, low plasticity.	1	1	1	3			
	4		2.00									2.33-5.71M, Silt with Occasional Silty Sand and Sand, brownish dark grey-dark grey, very soft to soft, non-plastic.	3	2	3	7			
	5											5.71-6.70M, Silty Sand, brownish dark grey, fine-medium grained, well graded, medium density cemented.	2	0	0	10			
	6											6.40-6.70M, Gravels, ϕ 3mm-1cm.	18	27	31	>50			
	7											6.70-8.00M, Gravely silty sand, greyish dark brown, medium to very coarse grained, poorly graded, medium to high density, poorly well cemented.	13	19	23	>50			
	8											8.65-11.30M, Clayey Silt with some Sand, light grey, wet, soft, low to medium plasticity.	3	3	3	8			
	9											11.30-16.20M, Silt Sand with trace of Clay and Silt, light grey-dark grey, very fine-fine grained, well graded, medium density, poorly cemented.	2	4	4	10			
	10											15.80-16.20M, Gravels, ϕ 3mm-2cm.	3	4	5	12			
	11											16.20-16.75M, Silt with trace of Sand, light-dark grey, soft, wet, low plasticity.	5	5	5	15			
	12		1.95									16.75-17.10M, Silty Sand with some gravels and silts, dark grey, fine-medium grained, medium dense, poorly cemented.	4	4	5	13			
	13											17.10-20.00M, Gravely Silty Sand, dark grey, medium-very coarse grained, poorly graded, medium to high density, poorly cemented to well cemented. Gravels, ϕ 3mm-8cm, sub rounded sub angular.	5	6	5	16			
	14												8	10	10	28			
	15												11	6	10	31			
	16												39	50	>50				
	17												50	>50	>50				
	18		2.30										50	>50	>50				
	19																		
	20																		
	21																		
	22																		
	23																		
	24																		
	25																		

JICA
JAPAN INTERNATIONAL COOPERATION AGENCY

BORE HOLE LOG

Project : MASTER PLAN ON WATER RESOURCES DEVELOPMENT AND FEASIBILITY STUDY FOR URGENT FLOOD CONTROL AND URBAN DRAINAGE IN SEMARANG CITY AND SUBURBS			Boring No. : B-8		
Area Designation :			Date Commenced : 21.05.'92		
Ground Elevation : 9.769 m			Date Completed : 22.05.'92		
Coordinates :			Angle : VERTICAL, Bearing : 0°		
Depth of G.W.L. : 2.10 m			Driller : ULI S., A.KARYADI		
			Supervisor : TAHARA		
			Logged : EDDY S.		
			Drilling Machine : KOKEN - OE 2L		

1	2	3	4	5	6	7	8	9	10	11						12			
										STANDARD PENETRATION TEST							REMARKS		
										Number of Blows at Each 10cm			GRAPHICS					CORING	
										N ₁	N ₂	N ₃	N - VALUE						DISTURBED SAMPLING NO
Date	Depth in Meter	Elevation	G.W.L in Meter	Drilling Rate /10cm	Depth of Water Loss	Core Recovery (%)	R.Q.D (%)	Lithologic Symbol	Lithologic Unit	Method of sampling	SOIL / ROCK DESCRIPTION	Core Barrel/Bit Type	Casing Type	N ₁	N ₂	N ₃	N - Value	SPT	
21.05.'92	1											0.00-0.15M, Sandy Silt containing some roots of plant, dark brown, wet, soft, non-plastic.	1	2	2	5			
	2											0.15-3.40M, Silt with trace of fine Sand, brown, very soft to soft, low-plasticity.	1	1	2	4			
	3											3.40-4.50M, Silty Sand, occasionally Silt, brownish grey to grey, very fine to medium grained, moderately graded, medium density, weakly cemented.	2	1	2	5			
	4		2.40									4.50-5.50M, Gravely Sand, occasionally Silt, brown, medium to coarse grained, poorly graded, medium density, weakly cemented.	4	4	5	13			
	5											5.50-10.00M, Sand & Gravels with some silt, dark brown, medium - very coarse grained, poorly graded, medium to high density, medium to well cemented.	8	7	8	23			
	6											- Gravels, ϕ 3mm - 1cm.	50	>50	>50				
	7											5.50-10.00M, Sand & Gravels with some silt, dark brown, medium - very coarse grained, poorly graded, medium to high density, medium to well cemented.	16	16	19	>50			
	8											- Gravels & Boulders, ϕ 3mm - 12 cm, sub-rounded, sub - angular.	27	50	>50				
	9												31	50	>50				
	10																		
	11																		
	12																		
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BORE HOLE LOG

Boring No. : B-9
Sheet : 1 of 1
Total Depth : 10.00 m.

Project : MASTER PLAN ON WATER RESOURCES DEVELOPMENT AND
FEASIBILITY STUDY FOR URGENT FLOOD CONTROL AND
URBAN DRAINAGE IN SEMARANG CITY AND SUBURBS

Area Designation :
Ground Elevation : + 7.795 M
Coordinates :
Depth of G.W.L : 0.90 M

Date Commenced : 26.05.'92
Date Completed : 27.05.'92
Angle : VERTICAL , Bearing : 0°
Driller : ULI , A.KARYADI
Supervisor : TAHARA
Logged : EDDY S.
Drilling Machine : KOKEN-OE 2 I.

Date	Depth in Meter	Elevation	G.W.L in Meter	Drilling Rate / 40 cm	Depth of Water Loss	Core Recovery (%)	R. Q. D (%)	Lithologic Symbol	Lithologic Unit	Method of sampling	SOIL / ROCK DESCRIPTION	STANDARD PENETRATION TEST					REMARKS		
												Number of Blows at Each 10cm			N - VALUE			CORING	DISTURBED SAMPLING
												N ₁	N ₂	N ₃	N - Value				
25.05.'92	1		0.90						SILT		0.00-0.20M, Silty Sand containing some gravels, dark brown, fine grained, well graded, medium density poorly cemented. - Gravels, ϕ 0.5-3 cm.	6	9	9	24				
	2								CLAY SAND		0.20-0.50M, Gravelly Silty Sand, dark brown, fine to medium grained, well graded, medium density poorly cemented. Gravels, ϕ 3-6 cm.	9	11	12	32				
	3								COASTAL DEPOSITS		0.50-1.00M, Gravelly silt with trace of fine sand, dark brown wet, stiff to very stiff, non-plastic.	12	12	11	37				
	4										1.00-4.25M, Silty Sand gravels occasionally silt intercalation, blackish brown. Fine to coarse grained, poorly graded, dense, medium to well cemented.	15	11	12	38				
26.05.'92	5		0.90								4.25-6.15M, Silty Clay, blackish brown, wet, stiff, low plasticity.	3	3	5	11				
	6										6.15-6.50M, Silty Sand, occasionally gravels, dark grey, medium density, poorly cemented. Gravels, ϕ 0.5-1 cm.	5	6	6	17				
	7										6.50-7.00M, Silt with gravels, with trace of sand, greenish-dark grey, wet, hard, non-plastic. Gravels, ϕ 0.3-4 cm.	13	15	15	43				
	8										7.00-7.48M, Silty Sand, occasionally gravels, dark grey, medium grained, well graded, medium density, poorly cemented. Gravels, ϕ 0.3-4 cm.	50			50				
	9										7.48-8.15M, Silt with gravels and boulders, occasionally trace of sand, greyish dark brown, wet, hard, non-plastic. Gravels & Boulders, ϕ 0.3cm-15cm	25	50		50				
	10										8.15-10.00M, Sandy Silt containing some gravels, brown-greenish brown, wet, very hard, non-plastic. - Gravels, ϕ 0.5-0.8 cm.	38	50		50				
	11																		
	12																		
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BORE HOLE LOG


Boring No. : B-10
Sheet : 1 of 1
Total Depth : 10.00 m.

Project : MASTER PLAN ON WATER RESOURCES DEVELOPMENT AND
FEASIBILITY STUDY FOR URGENT FLOOD CONTROL AND
URBAN DRAINAGE IN SEMARANG CITY AND SUBURBS


Area Designation :
Ground Elevation : + 12.584 M
Coordinates :
Depth of G.W.L : 2.70 m

Date Commenced : 28.05.'92
Date Completed : 30.05.'92
Angle : VERTICAL , Bearing : 0°
Driller : ULI , A.KARYADI
Supervisor : TAHARA
Logged : EDDY S.
Drilling Machine : KOKEN-OE 2L.

Date	Depth in Meter	Elevation	G.W.L in Meter	Drilling Rate / 40 cm	Depth of Water Loss	Core Recovery (%)	R. Q. D (%)	Lithologic Symbol	Lithologic Unit	Method of sampling	SOIL / ROCK DESCRIPTION	STANDARD PENETRATION TEST					REMARKS		
												Number of Blows at Each 10cm			N - VALUE			CORING	DISTURBED SAMPLING
												N ₁	N ₂	N ₃	N - Value				
28.06.'92	1										0.00-0.70M, Sandy Silt containing some roots of plant with trace of fine sand, dark brown, moist, firm, non-plastic.	3	5	5	13				
	2										0.70-2.77M, Silty Sand occasionally with Sand of Silt intercalations, light brown, very fine to fine grained, well graded, medium density, weakly cemented.	5	3	4	12				
	3										2.77-10.00M, Gravels & Boulders alternate - Silt, Sandy Silt and Sand, - Gravels & Boulders with ϕ 0.3-32 cm, sub rounded to sub-angular, poorly graded, mostly very loose uncemented, consist of fresh andesitic rocks and decomposed of lapilli tuff. - Silt and Sandy Silt, mostly dark brown, occasionally tuffaceous, wet to wet, firm-very stiff, non plastic-low plasticity.	50			>50				
	4										- Sand, dark brown to brownish dark grey, fine to coarse grained, moderately graded, loose to medium density, uncemented to weakly cemented.	50			>50				
	5										- Gravely Silt, dark brown, wet firm-very stiff, non-plastic. - Gravels ϕ 0.5-0.6cm.	50			>50				
	6																		
	7																		
	8																		
	9																		
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 JICA JAPAN INTERNATIONAL COOPERATION AGENCY	<h1>BORE HOLE LOG</h1>	Boring No. : B-11
		Sheet : 1 of 2
		Total Depth : 28.00 m.
Project :	MASTER PLAN ON WATER RESOURCES DEVELOPMENT AND FEASIBILITY STUDY FOR URGENT FLOOD CONTROL AND URBAN DRAINAGE IN SEMARANG CITY AND SUBURBS	Date Commenced : 28.05.'92
		Date Completed : 31.05.'92
		Angle : VERTICAL , Bearing : 0°
Area Designation :		Driller : ULI S., A.KARYADI
Ground Elevation :	+ 4.302 M	Supervisor : TAHARA
Coordinates :		Logged : EDDY S.
Depth of G.W.L. :	1.45 m	Drilling Machine : KOKEN-OE 2L

1	2	3	4	5	6	7	8	9	10	11					12											
										Date	Depth in Meter	Elevation	G.W.L in Meter	Drilling Rate/10 cm		Depth of Water Loss	Lithologic Symbol	Lithologic Unit	Method of sampling	SOIL / ROCK DESCRIPTION	STANDARD PENETRATION TEST					REMARKS
																					Core Barrel/Bit Type	Casing Type	Number of Blows at Each 10cm			
										N ₁	N ₂	N ₃	N - Value													
														10	20	30	40	50								
28.05.'92	1					SAND	0.00-1.25M, Silty Sand containing some roots of plant, dark brown-light brown, fine to medium grained, well-graded, very loose, uncemented.			1	1	2	4													
	2					SILT	1.23-2.23M, Sandy Silt occasionally sand, silt and gravels, light brown, soft-fine, wet, low-plasticity.			2	2	2	6													
	3					RIVER CHANNEL	2.23-6.00M, Gravelly tuffaceous, Silt with some sand, clay and boulders, reddish light brown spotted white, wet, stiff, non-plastic.			2	3	3	8													
	4					SILT & GRAVELS	Gravels & Boulders, ϕ .08-38 cm.			3	5	4	12													
	5									5	5	5	15													
	6									8	7	7	22													
	7					SILT & GRAVELS	6.00-10.25M, Alternating between Gravels, tuffaceous Silt, gravelly tuffaceous Sandy Silt, and gravelly Sandy Silt.			11	17	28	>50													
	8						- Gravels, pebbles and boulders, ϕ .0.3cm-10cm.			21	50	>50														
	9						- Silt, dark brown, wet, firm-stiff non-plastic.			20	50	>50														
	10									34	50	>50														
	11					SILT & GRAVELS	10.25-15.00M, Alternating between Sand, gravelly sand, Gravels, pebbles and boulders.			50	>50															
	12						- Sand, gravelly Sand, mostly brown, fine to medium grained, well graded, medium to high weakly cemented-well cemented.			50	>50															
	13						- Gravels, pebbles and boulders, ϕ .0.3cm-40cm.			27	50	>50														
	14									50	>50															
	15					SILT & GRAVELS	15.00-20.25M, Gravelly Sandy Silt occasionally gravels and pebbles, light brown to dark brown, wet to wet, stiff to hard, non-plastic.			22	34	24	>50													
	16									31	35	50	>50													
	17									19	27	37	>50													
	18									27	50	>50														
	19						- Gravels & pebbles, ϕ .0.5-3cm.			35	50	>50														
	20									39	50	>50														
	21					SAND & GRAVEL	20.25-26.40M, Well cemented Gravelly Silty Sand, alternating - Silt or sandy Silt with some gravels and boulders of Andesite - yellowish dark brown to yellowish brown, fine-medium grained, well graded, very dense.			36	50	>50														
	22									34	50	>50														
	23									37	50	>50														
	24									50	>50															

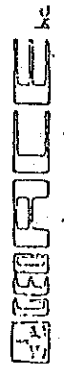
 JICA JAPAN INTERNATIONAL COOPERATION AGENCY	<h1>BORE HOLE LOG</h1>	Boring No. : B-11
		Sheet : 2 of 2
		Total Depth : 28.00 m.
Project :	MASTER PLAN ON WATER RESOURCES DEVELOPMENT AND FEASIBILITY STUDY FOR URGENT FLOOD CONTROL AND URBAN DRAINAGE IN SEMARANG CITY AND SUBURBS	Date Commenced : 28.05.'92
		Date Completed : 31.05.'92
		Angle : VERTICAL , Bearing : 0°
Area Designation :		Driller : ULI S., A.KARYADI
Ground Elevation :	+ 4.302 M	Supervisor : TAHARA
Coordinates :		Logged : EDDY S.
Depth of G.W.L. :	1.45 m	Drilling Machine : KOKEN-OE 2 L

1	2	3	4	5	6	7	8	9	10	11					12											
										Date	Depth in Meter	Elevation	G.W.L in Meter	Drilling Rate/10 cm		Depth of Water Loss	Lithologic Symbol	Lithologic Unit	Method of sampling	SOIL / ROCK DESCRIPTION	STANDARD PENETRATION TEST					REMARKS
																					Core Barrel/Bit Type	Casing Type	Number of Blows at Each 10cm			
										N ₁	N ₂	N ₃	N - Value													
														10	20	30	40	50								
31.05.'92	25									50	>50															
	26						26.40-28.00M, Same as the above, decomposed up volcanic breccia, heavily weathered.			50	>50													3rd		
	27									50	>50															
	28						BOTTOM OF BORE HOLE			50	>50															
	29																									
	30																									
	31																									
	32																									
	33																									
	34																									
	35																									

1) Summary of Laboratory Test

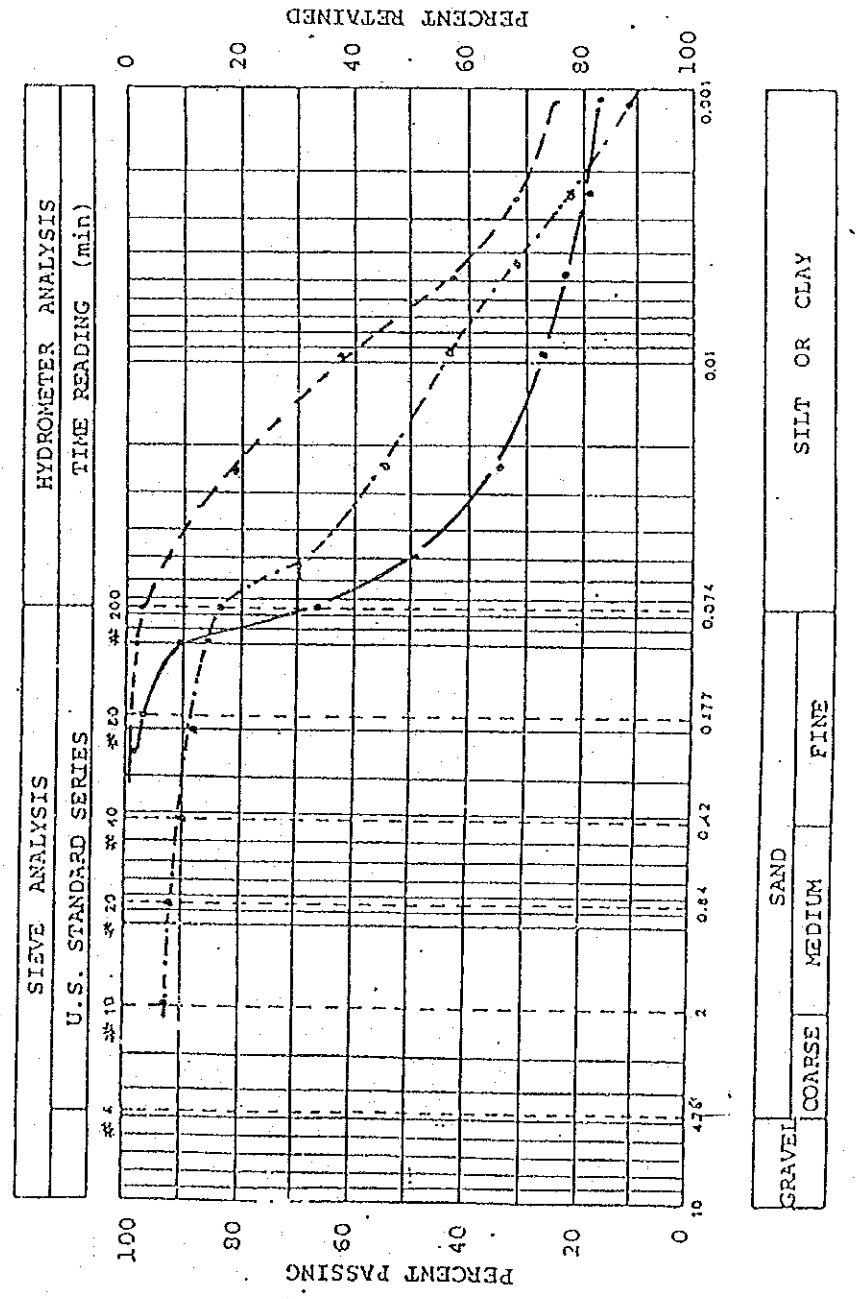
Boring No.	Sample Depth (m)	Soil Layer	N-Value	Specific Gravity ; G	Water Content ; Wn (%)	Particle Size		
						Clay (%)	Sand (%)	Gravel (%)
B-1	5.40 ~ 5.70	Ac1	2	2.848	36.258	64.3	35.7	0
	10.40 ~ 10.70	Ac1	1	2.647	74.227	98.9	1.1	0
	15.30 ~ 15.70	Ac1	1	2.699	69.198	85.5	14.5	0
B-2	5.35 ~ 5.70	Ac1	2	2.597	62.819	80.0	20.0	0
	10.40 ~ 10.70	Ac1	1	2.549	92.456	97.7	2.3	0
	15.40 ~ 15.70	Ac1	1	2.543	70.987	97.4	2.6	0
B-3	5.30 ~ 5.60	Ac1	2	2.584	44.597	98.4	1.6	0
	10.35 ~ 10.70	Ac1	1	2.746	46.251	97.1	2.9	0
	15.20 ~ 15.70	Ac1	2	2.792	50.217	99.0	1.0	0
B-4	5.00 ~ 5.30	Ac1	1	2.698	54.473	72.7	27.3	0
	10.00 ~ 10.30	Ac1	3	2.683	68.941	91.3	8.7	0
	16.15 ~ 16.50	Ac2	24	2.640	27.496	72.4	27.6	0
B-5	4.70 ~ 5.00	As1	15	2.876	17.010	37.4	57.1	5.5
	9.60 ~ 10.00	Ac1	3	2.728	49.374	83.2	13.8	3.0
	11.50 ~ 12.00	Ac1	4	2.681	50.948	86.5	13.5	0
B-6	4.60 ~ 5.00	As1'	7	2.747	51.187	73.5	26.1	0.4
	5.30 ~ 5.60	As1'	32	2.847	15.425	43.7	47.2	9.1
	9.60 ~ 10.00	Ac1'	7	2.848	39.275	59.5	40.5	0
	14.60 ~ 15.00	Ac1'	27	2.751	45.191	95.4	4.6	0
B-7	2.00 ~ 2.30	rd	5	2.715	53.644	89.6	10.4	0
	9.30 ~ 9.70	Ac1'	8	2.842	36.259	40.8	59.2	0
	10.20 ~ 10.35	Ac1'	10	2.751	28.879	65.6	34.4	0
B-8	2.35 ~ 2.70	rd	5	2.795	49.661	76.0	24.0	0
	7.20 ~ 7.40	Ag	>50	2.843	16.368	29.4	42.6	28.0
B-9	2.30 ~ 2.50	As1'	37	2.830	13.578	49.9	31.1	19.0
	5.15 ~ 5.40	Ac1'	17	2.732	64.128	92.8	7.2	0
B-10	1.30 ~ 1.70	rd	12	2.694	30.142	80.8	19.2	0
	6.00 ~ 6.35	VB	>50	2.744	20.410	59.6	22.4	18.0
B-11	3.40 ~ 3.70	rd	12	2.623	43.241	54.6	45.4	0
	9.20 ~ 9.40	Ag	>50	2.751	38.800	34.7	55.3	10.0
	17.00 ~ 17.20	Ac2'	>50	2.541	19.380	37.4	62.6	0

DATA BOOK (2.12)



GRAIN SIZE DISTRIBUTION
UNIFIED SOIL CLASSIFICATION

PROJECT : FLOOD CONTROL AND URBAN DRAINAGE
 LOCATION : SEMARANG , CENTRAL JAVA
 HOLE No. : B-1
 DEPTH (m) : 5.40-5.70 ; 10.40-10.70 ; 15.30-15.70
 REMARKS : (———) (- - - -) (- · - · - · -)



SIEVE No.	PERCENT RETAINED		
	A	B	C
4 - 10	-	-	6.42
10 - 40	1.60	0.10	5.96
40 - 200	34.10	1.00	2.14
< 200	64.30	58.90	85.48

$C_u = \frac{D_{60}}{D_{10}}$
 $C_c = \frac{(D_{30})^2}{D_{10}D_{60}}$

BOORCE Inc.

GRAIN SIZE DISTRIBUTION

UNIFIED SOIL CLASSIFICATION

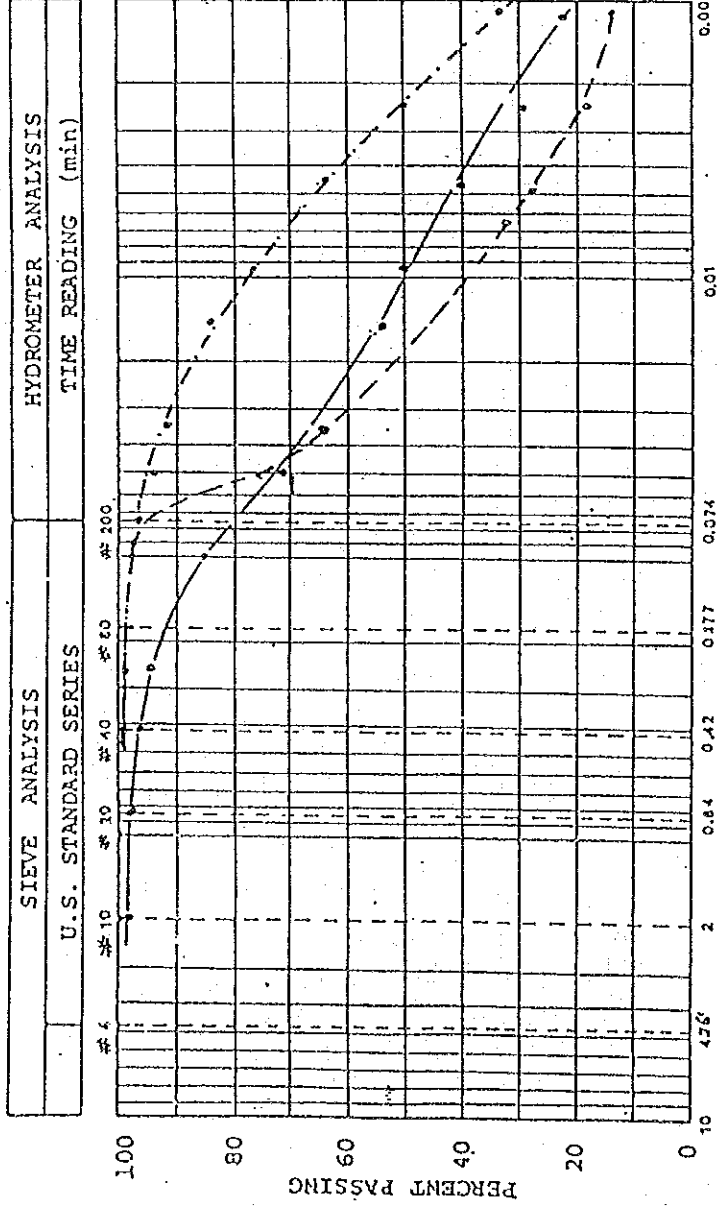
PROJECT : FLOOD CONTROL AND URBAN DRAINAGE

LOCATION : SEMARANG; CENTRAL JAVA

HOLE No. : B-2

DEPTH (m) : 5.35-5.70 ; 10.40-10.70 ; 15.40-15.70

REMARKS : (-----) (-----) (-----) (-----)



App: 2.5.10

BOORCE Inc.

GRAIN SIZE DISTRIBUTION

UNIFIED SOIL CLASSIFICATION

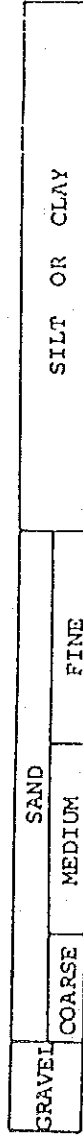
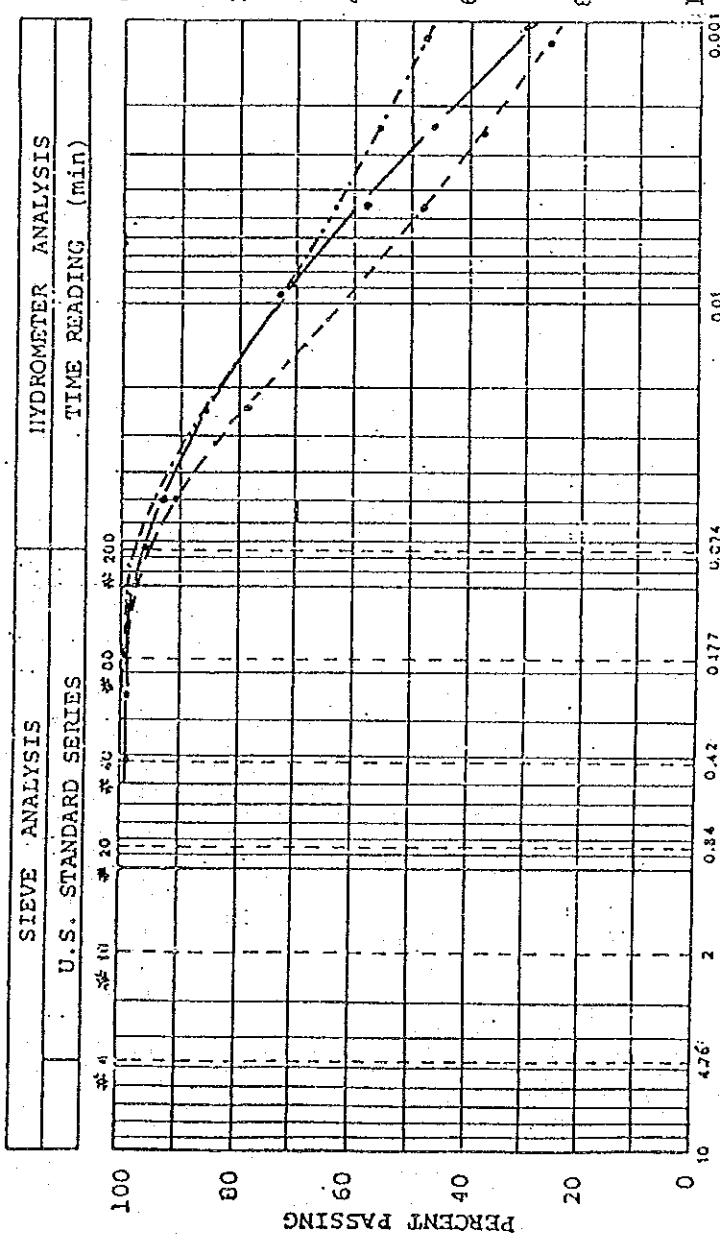
PROJECT : FLOOD CONTROL AND URBAN DRAINAGE

LOCATION : SEMARANG; CENTRAL JAVA

HOLE No. : B-3

DEPTH (m) : 5.30-5.60 ; 10.35-10.70 ; 15.20-15.70

REMARKS : (-----) (-----) (-----) (-----)



App: 2.5.11

PERACE inc

GRAIN SIZE DISTRIBUTION

UNIFIED SOIL CLASSIFICATION

PROJECT : FLOOD CONTROL AND URBAN DRAINAGE

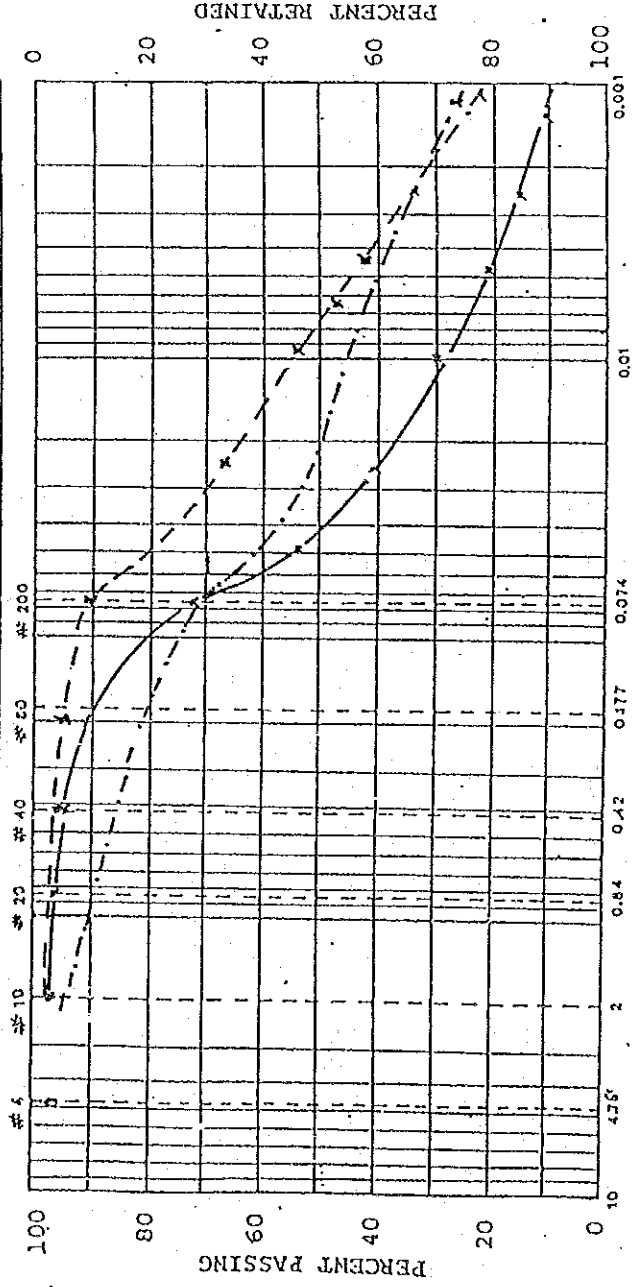
LOCATION : SEMARANG, CENTRAL JAVA

HOLE No. : B-4

DEPTH (m) : 5.00-5.30 ; 10.00-10.30 ; 16.15-16.50

REMARKS : (-----) (-----) (-----)

SIEVE ANALYSIS		HYDROMETER ANALYSIS	
U.S. STANDARD SERIES		TIME READING (min)	



App: 2.5.12.



PERACE inc

GRAIN SIZE DISTRIBUTION

UNIFIED SOIL CLASSIFICATION

PROJECT : FLOOD CONTROL AND URBAN DRAINAGE

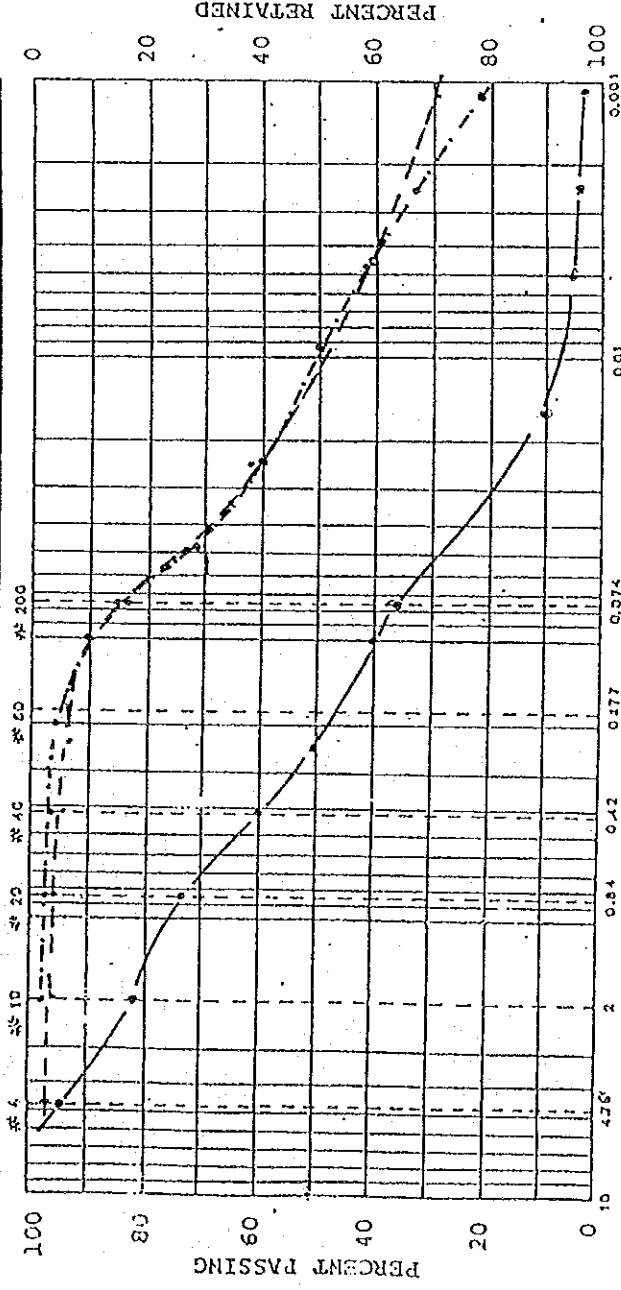
LOCATION : SEMARANG, CENTRAL JAVA

HOLE No. : B-5

DEPTH (m) : 4.70-5.00 ; 9.60-10.00 ; 11.50-12.00

REMARKS : (-----) (-----) (-----)

SIEVE ANALYSIS		HYDROMETER ANALYSIS	
U.S. STANDARD SERIES		TIME READING (min)	



App: 2.5.13



GRAIN SIZE DISTRIBUTION

UNIFIED SOIL CLASSIFICATION

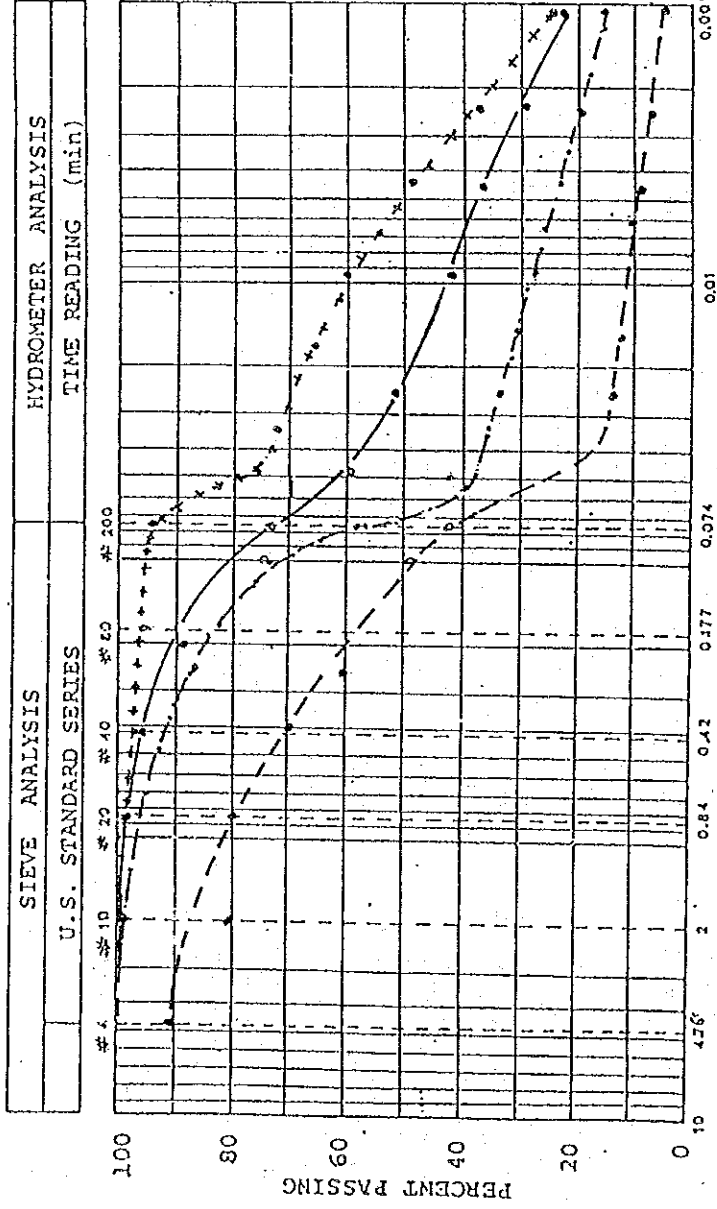
PROJECT : FLOOD CONTROL AND URBAN DRAINAGE

LOCATION : SEMARANG, CENTRAL JAVA

HOLE No. : B-6

DEPTH (m) : 4.60-5.00 ; 5.30-5.60 ; 9.60-10.00 ; 14.60-15.00

REMARKS : (---) (-----) (-----) + + + + +



App: 2.5.14.

58

GRAIN SIZE DISTRIBUTION

UNIFIED SOIL CLASSIFICATION

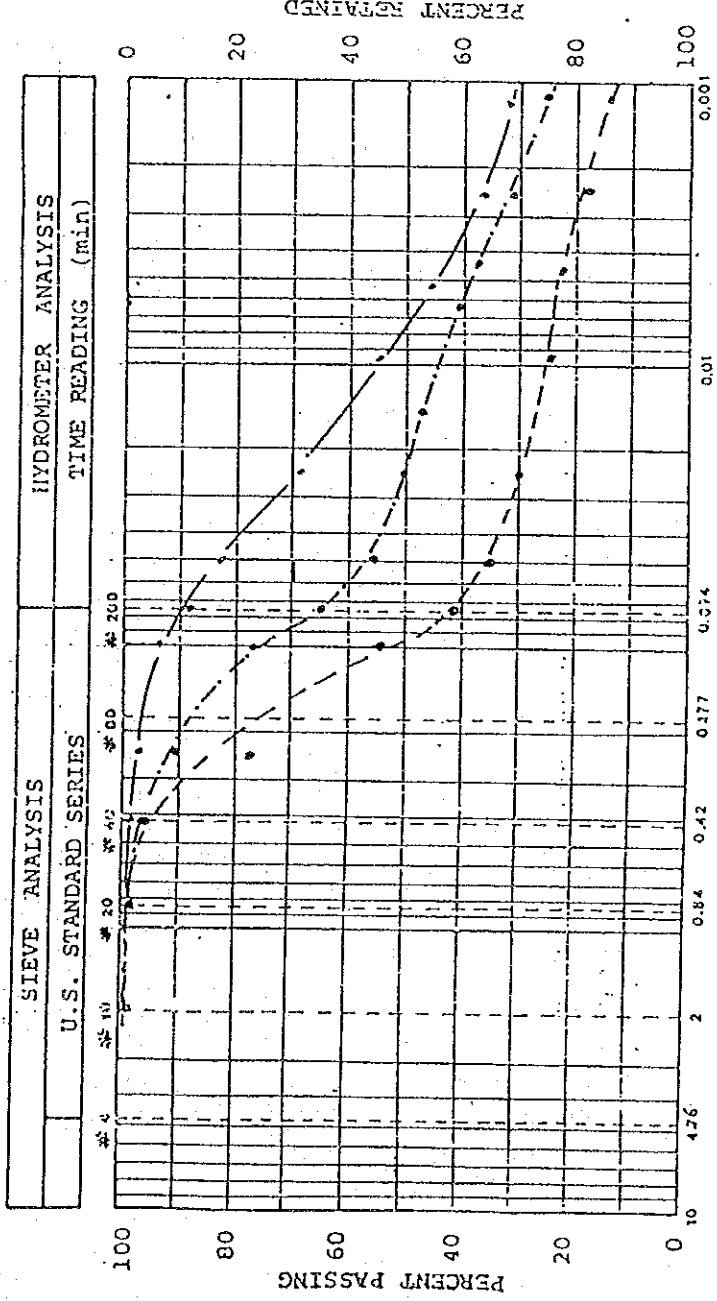
PROJECT : FLOOD CONTROL AND URBAN DRAINAGE

LOCATION : SEMARANG, CENTRAL JAVA

HOLE No. : B-7

DEPTH (m) : 2.00-2.30 ; 9.30-9.70 ; 10.20-10.35

REMARKS : (---) (-----) (-----)



App: 2.5.15

59

GRAIN SIZE DISTRIBUTION

UNIFIED SOIL CLASSIFICATION

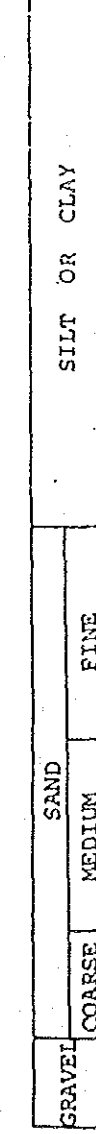
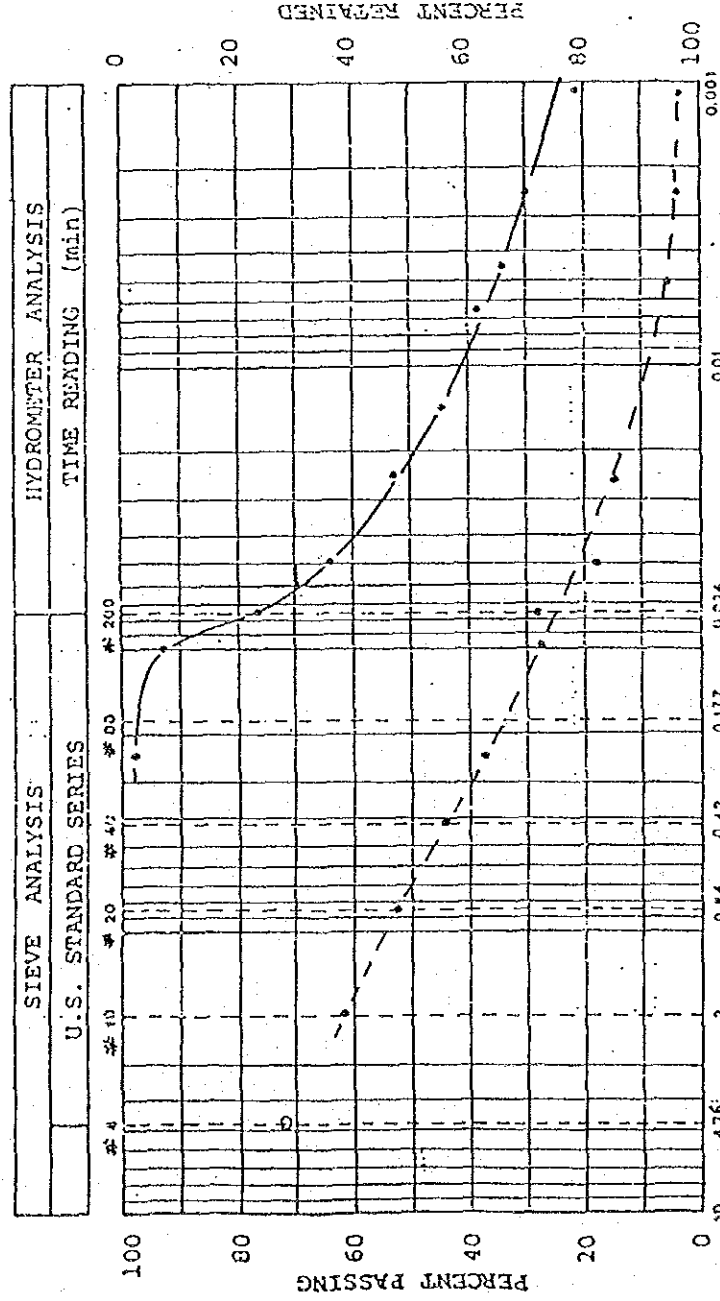
PROJECT : FLOOD CONTROL AND URBAN DRAINAGE

LOCATION : SEMARANG, CENTRAL JAVA

HOLE No. : B-8

DEPTH (m) : 2.35-2.70 ; 7.20-7.40

REMARKS : () (---)



SIEVE No.	PERCENT RETAINED		
	A	B	C
4 - 10	-	38.70	
10 - 40	1.10	16.50	
40 - 200	22.90	15.40	
< 200	76.00	29.40	
Cu = $\frac{D_{60}}{D_{10}}$			
Cc = $\frac{(D_{30})^2}{D_{10} \times D_{60}}$			

GRAIN SIZE DISTRIBUTION

UNIFIED SOIL CLASSIFICATION

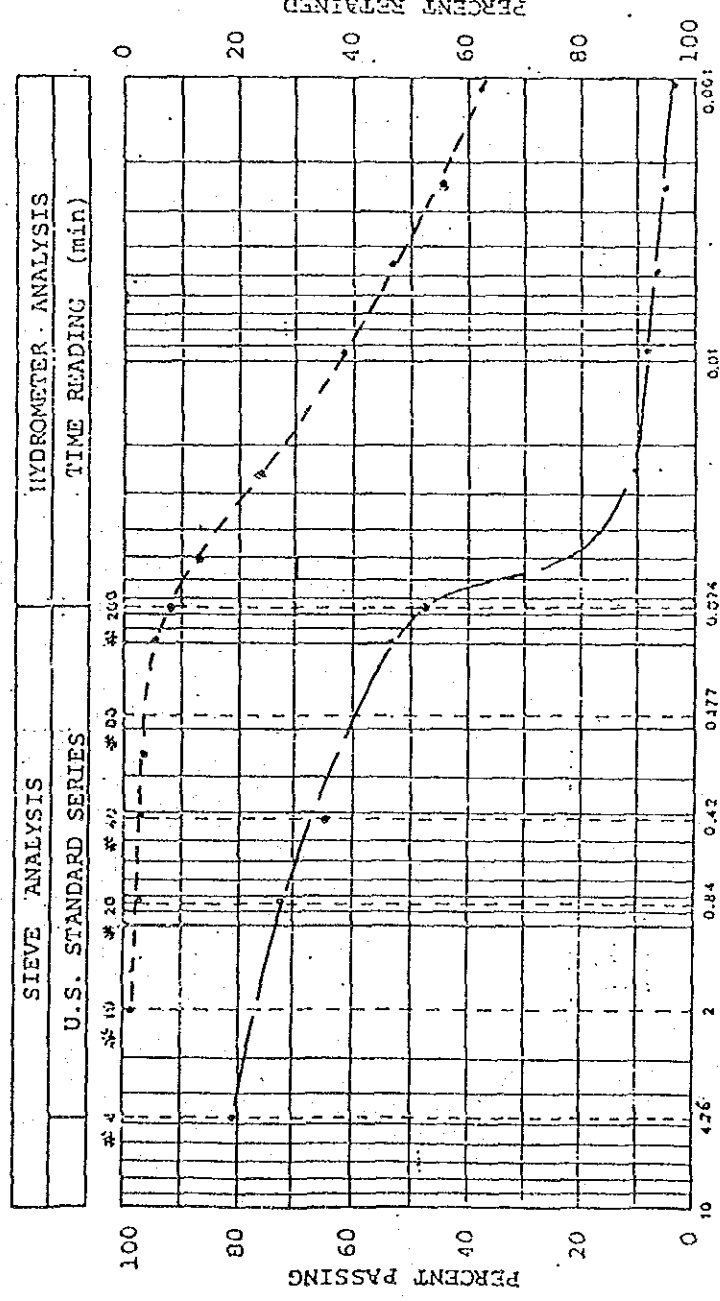
PROJECT : FLOOD CONTROL AND URBAN DRAINAGE

LOCATION : SEMARANG, CENTRAL JAVA

HOLE No. : B-9

DEPTH (m) : 2.20-2.50 ; 5.15-5.40

REMARKS : () (---)



SIEVE No.	PERCENT RETAINED		
	A	B	C
4 - 10	8.76	1.40	
10 - 40	13.82	2.29	
40 - 200	7.68	3.49	
< 200	49.94	92.82	
Cu = $\frac{D_{60}}{D_{10}}$			
Cc = $\frac{(D_{30})^2}{D_{10} \times D_{60}}$			

BOORACE INC

GRAIN SIZE DISTRIBUTION

UNIFIED SOIL CLASSIFICATION

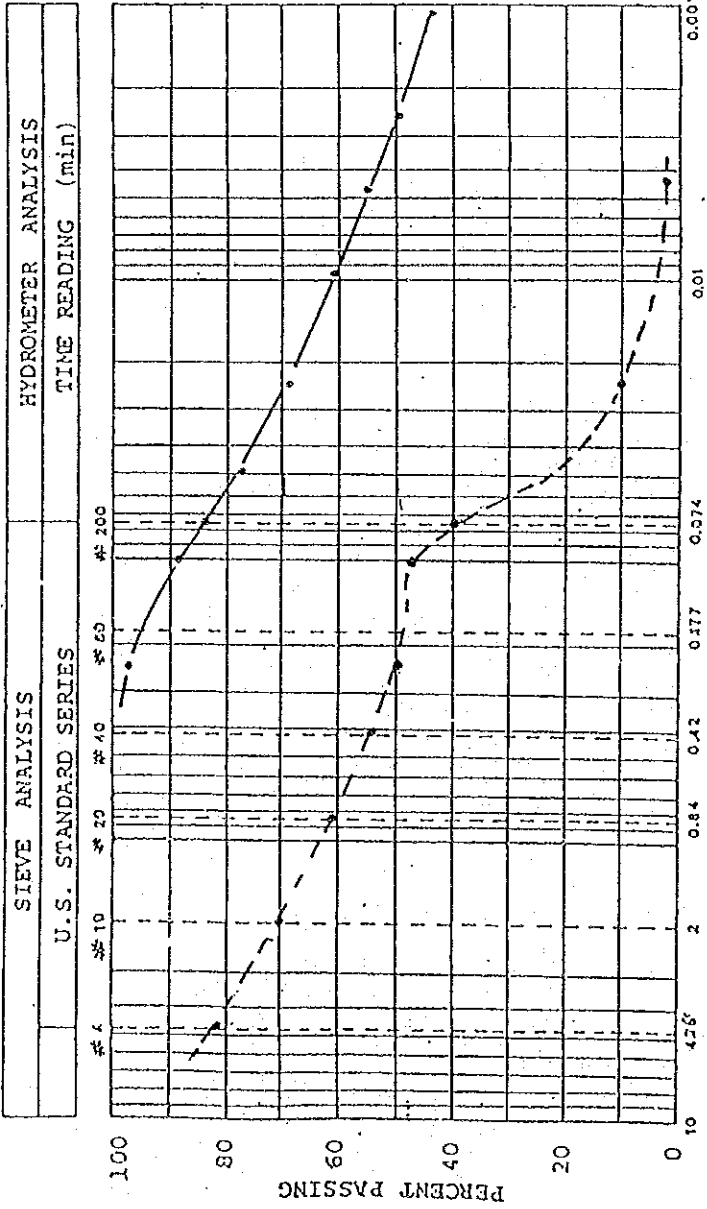
PROJECT : FLOOD CONTROL AND URBAN DRAINAGE

LOCATION : SEMARANG; CENTRAL JAVA

HOLE No. : B-10

DEPTH (m) : 1.30-1.70 ; 6.00-6.35

REMARKS : (-----) (-----) (-----)



815:2.5:ddy

SIEVE No.	PERCENT RETAINED		
	A	B	C
4 - 10	0.00	29.60	
10 - 40	1.50	15.60	
40 - 200	17.70	14.40	
< 200	80.80	59.60	
$Cu = \frac{D_{60}}{D_{10}}$			
$Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$			



BOORACE INC

GRAIN SIZE DISTRIBUTION

UNIFIED SOIL CLASSIFICATION

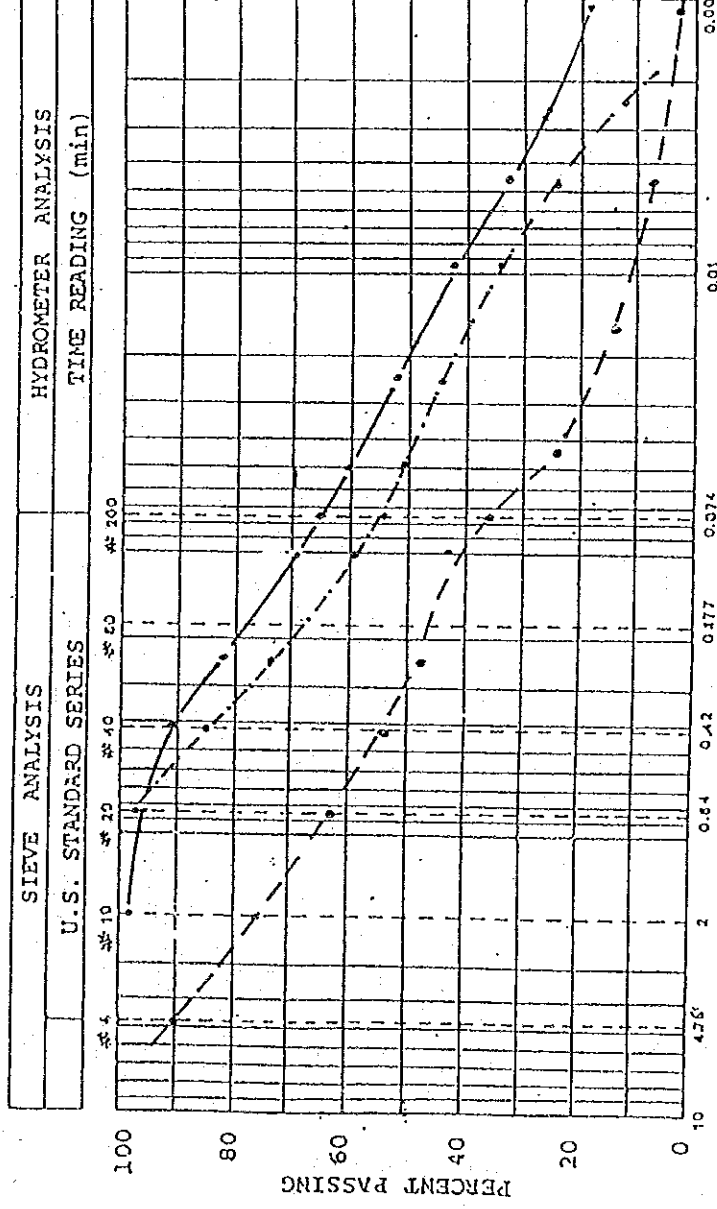
PROJECT : FLOOD CONTROL AND URBAN DRAINAGE

LOCATION : SEMARANG; CENTRAL JAVA

HOLE No. : B-11

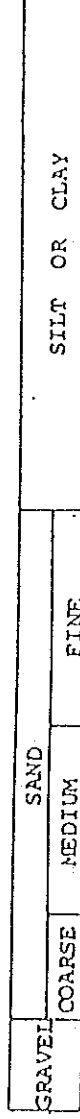
DEPTH (m) : 3.40-3.70 ; 9.20-9.40 ; 17.00-17.20

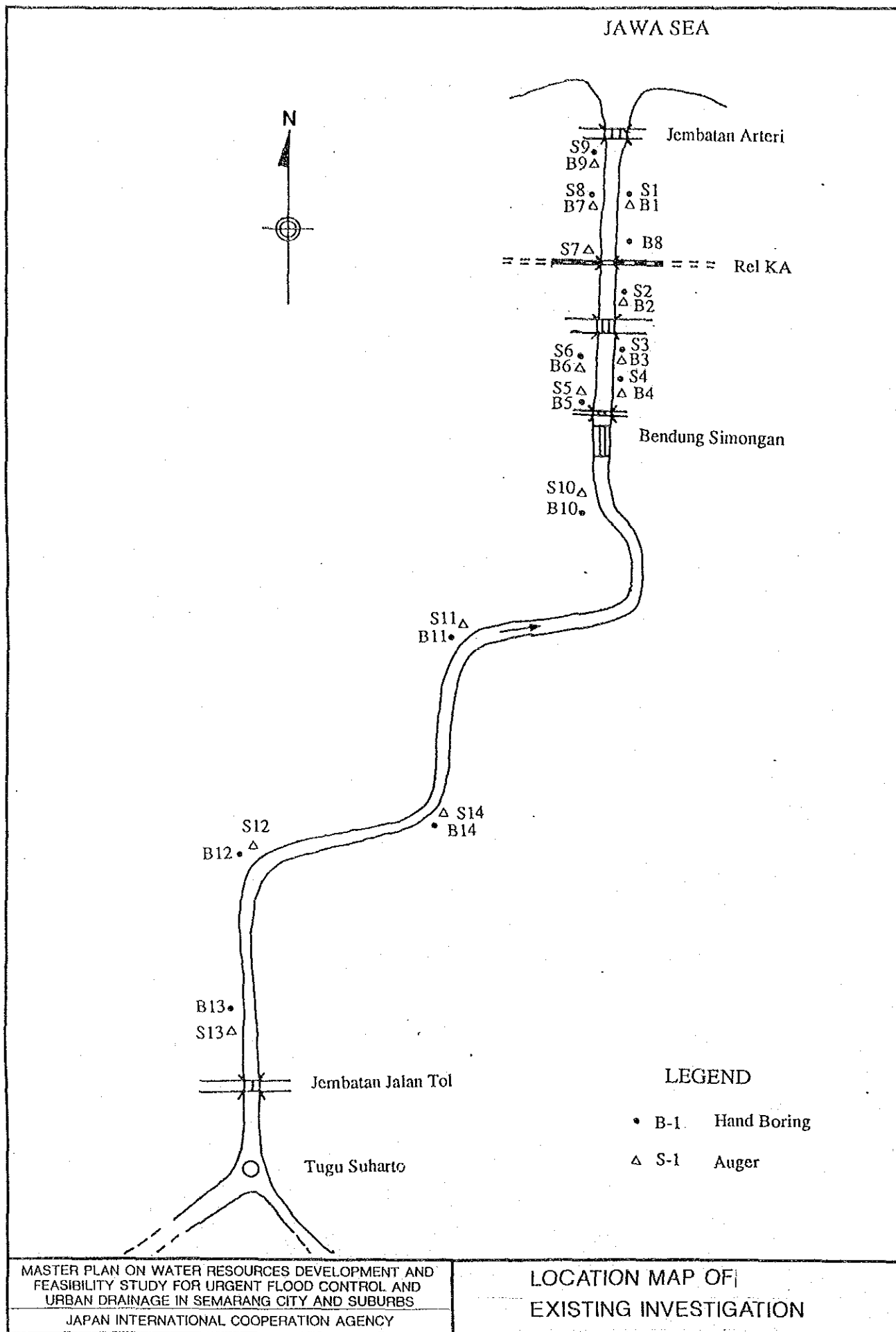
REMARKS : (-----) (-----) (-----)



615:2.5:ddy

SIEVE No.	PERCENT RETAINED		
	A	B	C
4 - 10	1.90	3.18	25
10 - 40	24.30	14.93	20.40
40 - 200	19.20	16.62	17.20
< 200	54.60	34.73	37.40
$Cu = \frac{D_{60}}{D_{10}}$			
$Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$			

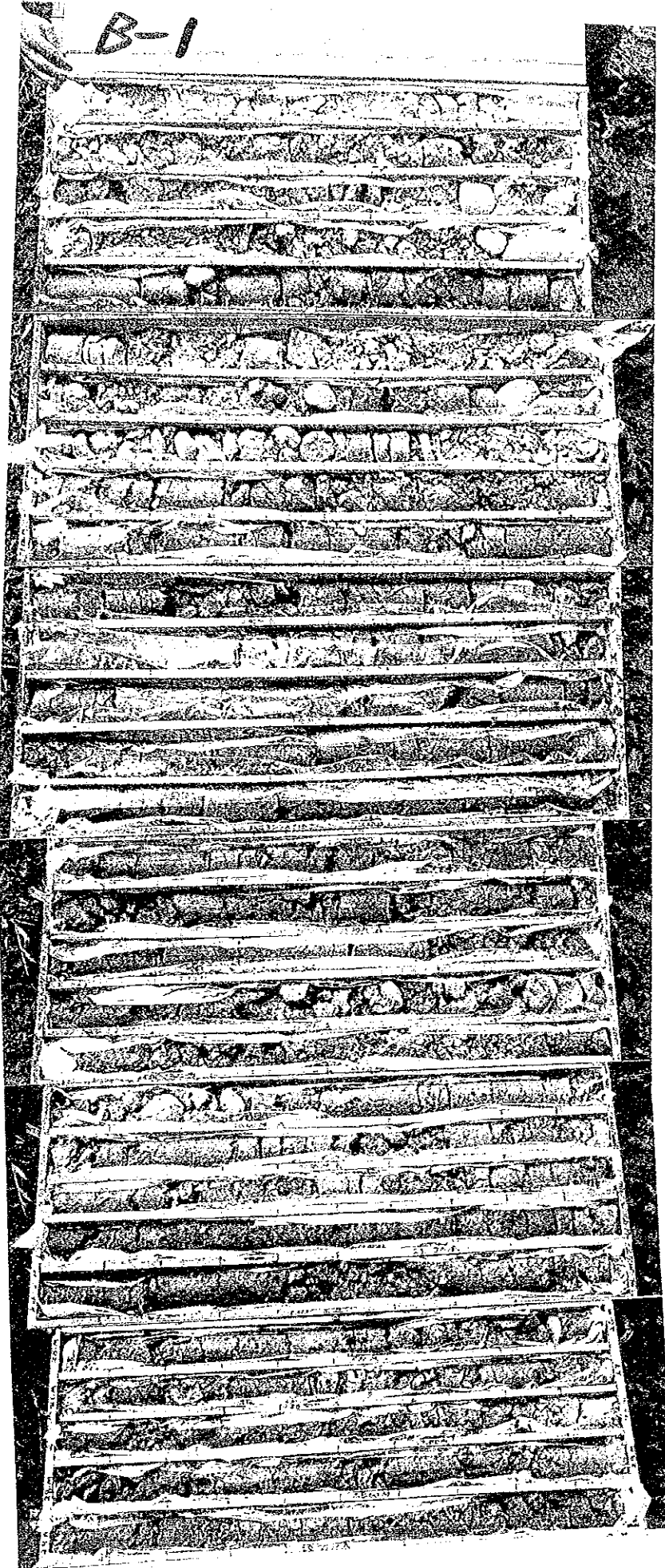




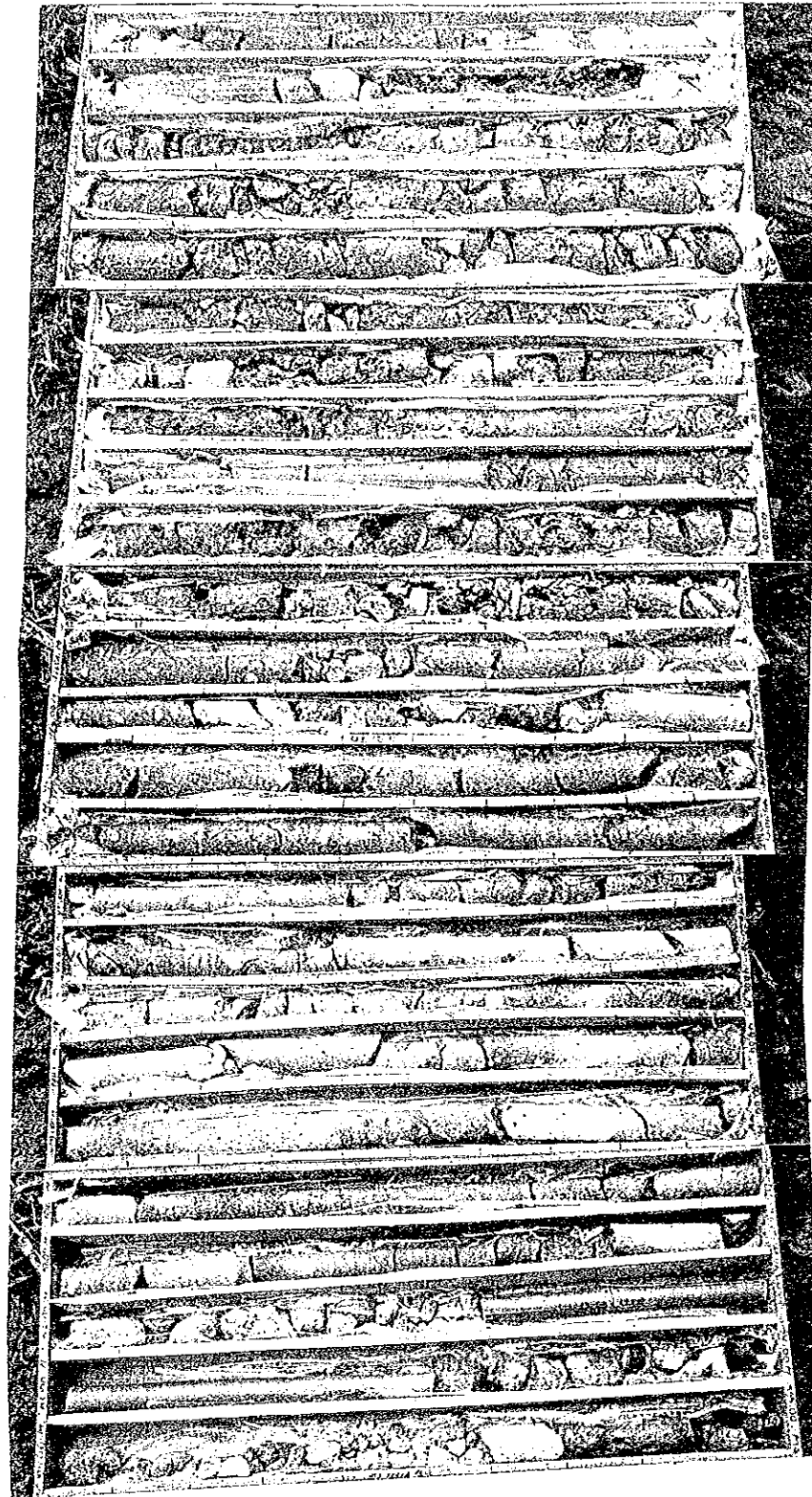
Available Data List of Existing Boring in West Floodway/Garang River

Machine Boring		Hand Boring		Auger Boring	
Boring No.	Depth (m)	Boring No.	Depth (m)	Boring No.	Depth (m)
BM-6	10	B-1	10.00	S-1	
BM-7	10	B-2	10.00	S-2	
BM-8	20	B-3	5.50	S-3	
BM-9	20	B-4	4.50	S-4	
BM-10	21	B-5	5.50	S-5	
BM-11	21	B-6	6.80	S-6	
		B-7	10.00	S-7	
		B-8	7.75	S-8	
		B-9	11.00	S-9	
		B-10	5.50	S-10	
		B-11	5.10	S-11	
		B-12	4.00	S-12	
		B-13	4.80	S-13	
		B-14	6.50	S-14	

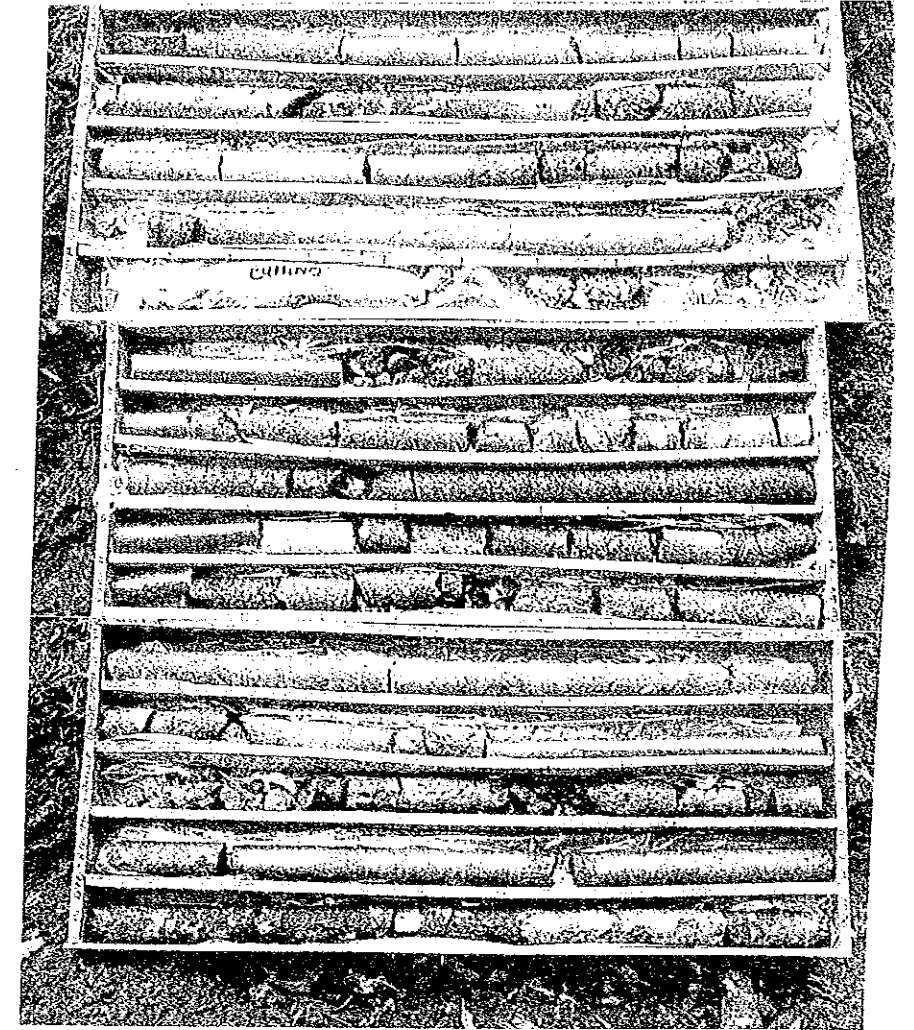
0 ~ 30m



B-1 Core Samples
30 ~ 55m



55 ~ 70m

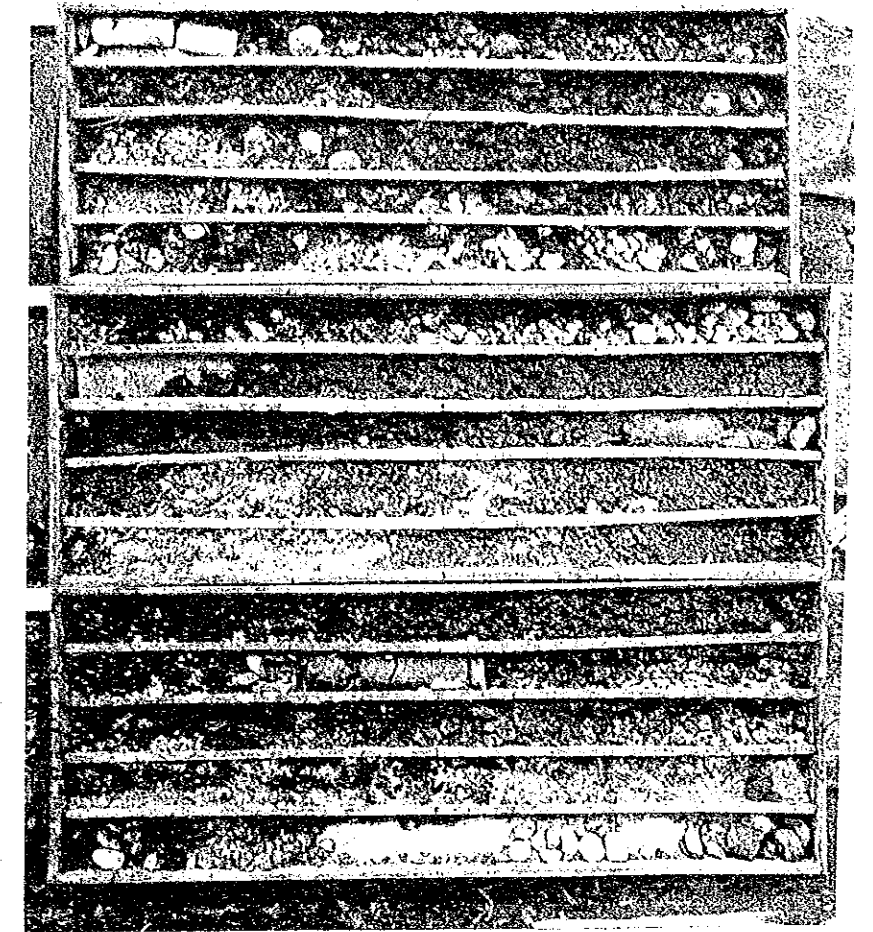
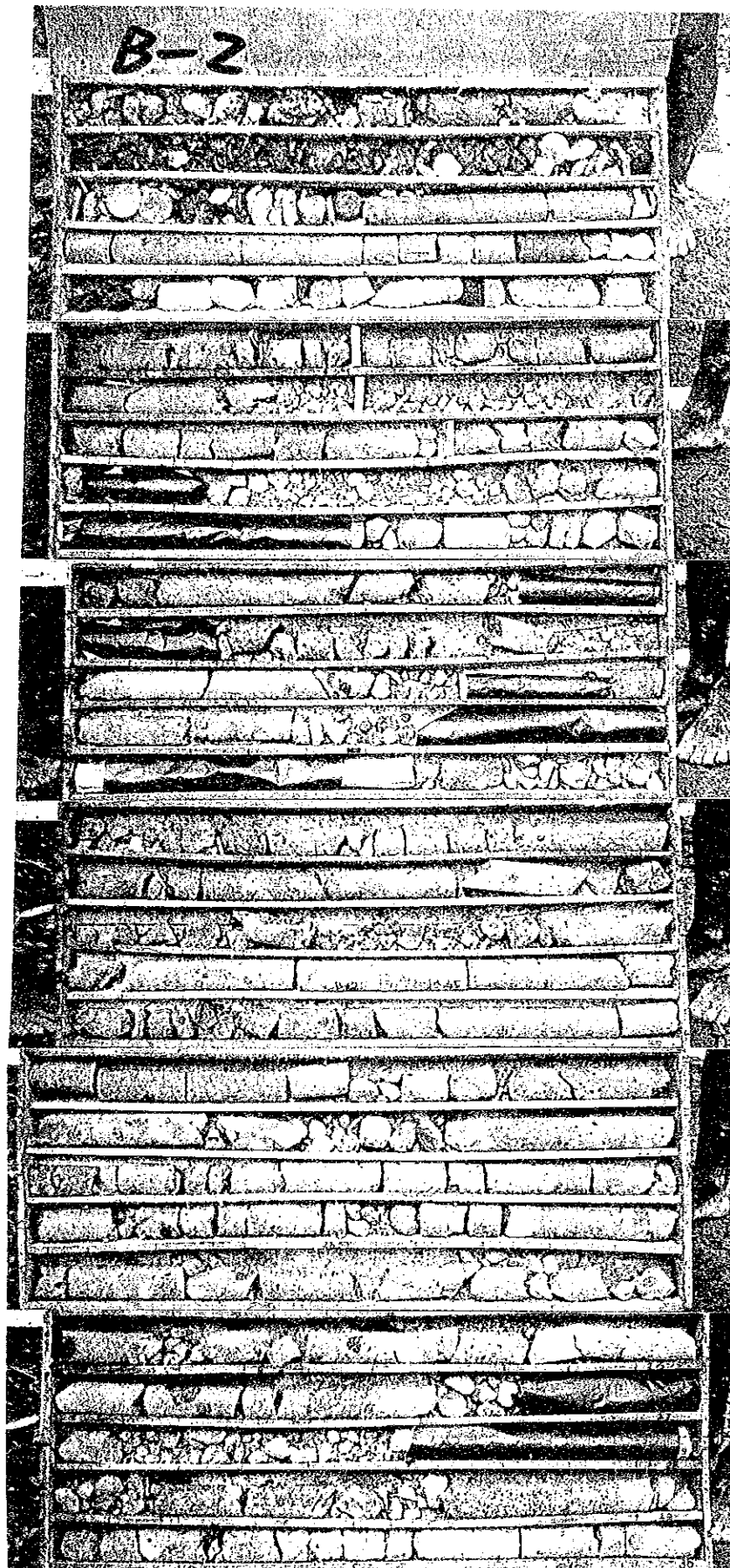


B-2 Core Samples

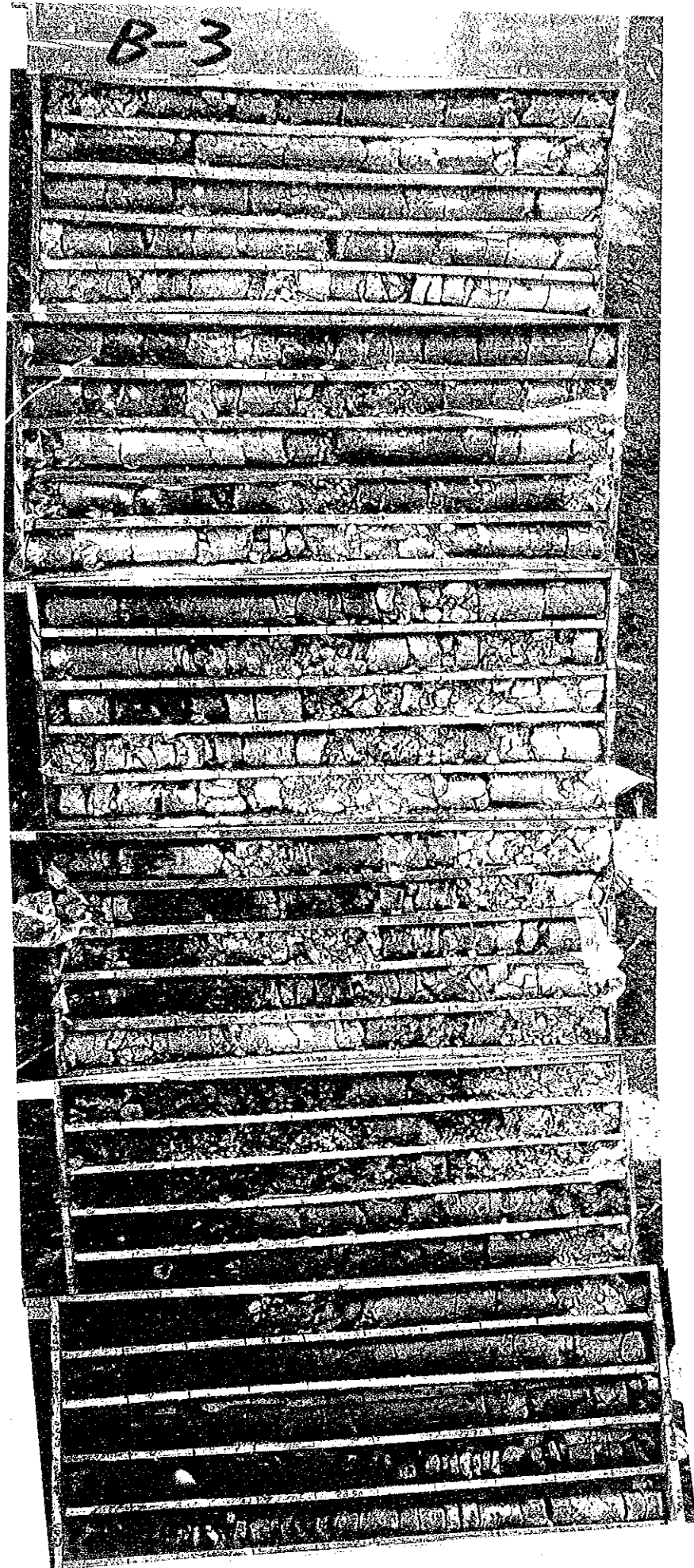
0 ~ 30m

30 ~ 55m

55 ~ 70m



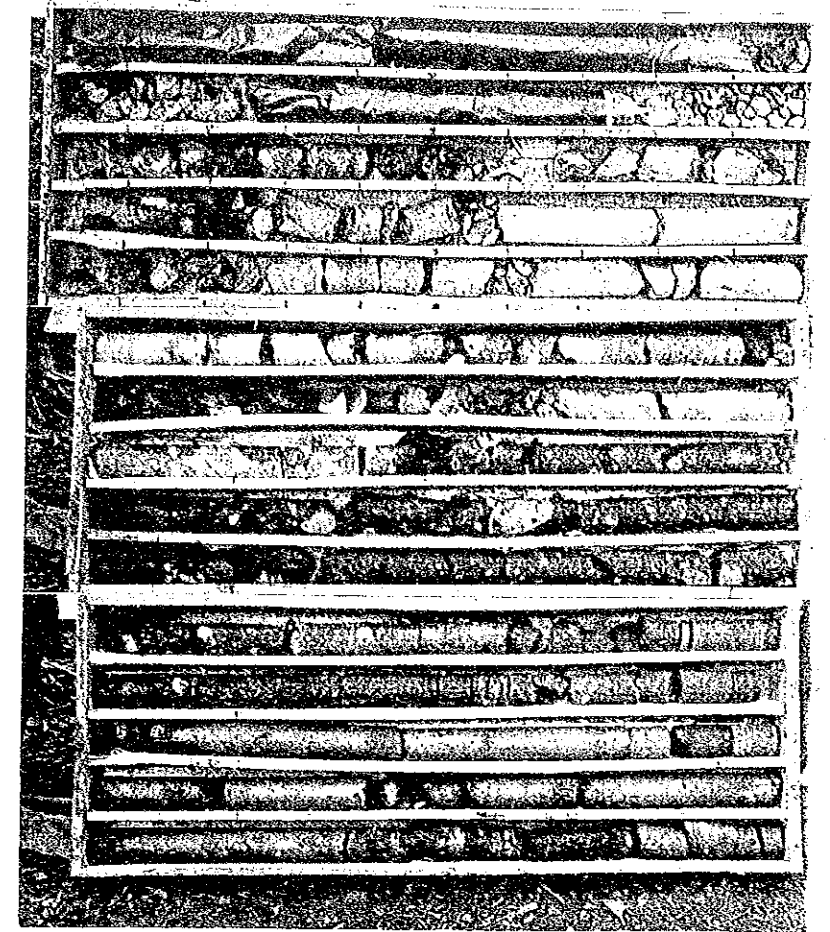
0 ~ 30m



B-3 Core Samples
30 ~ 55m



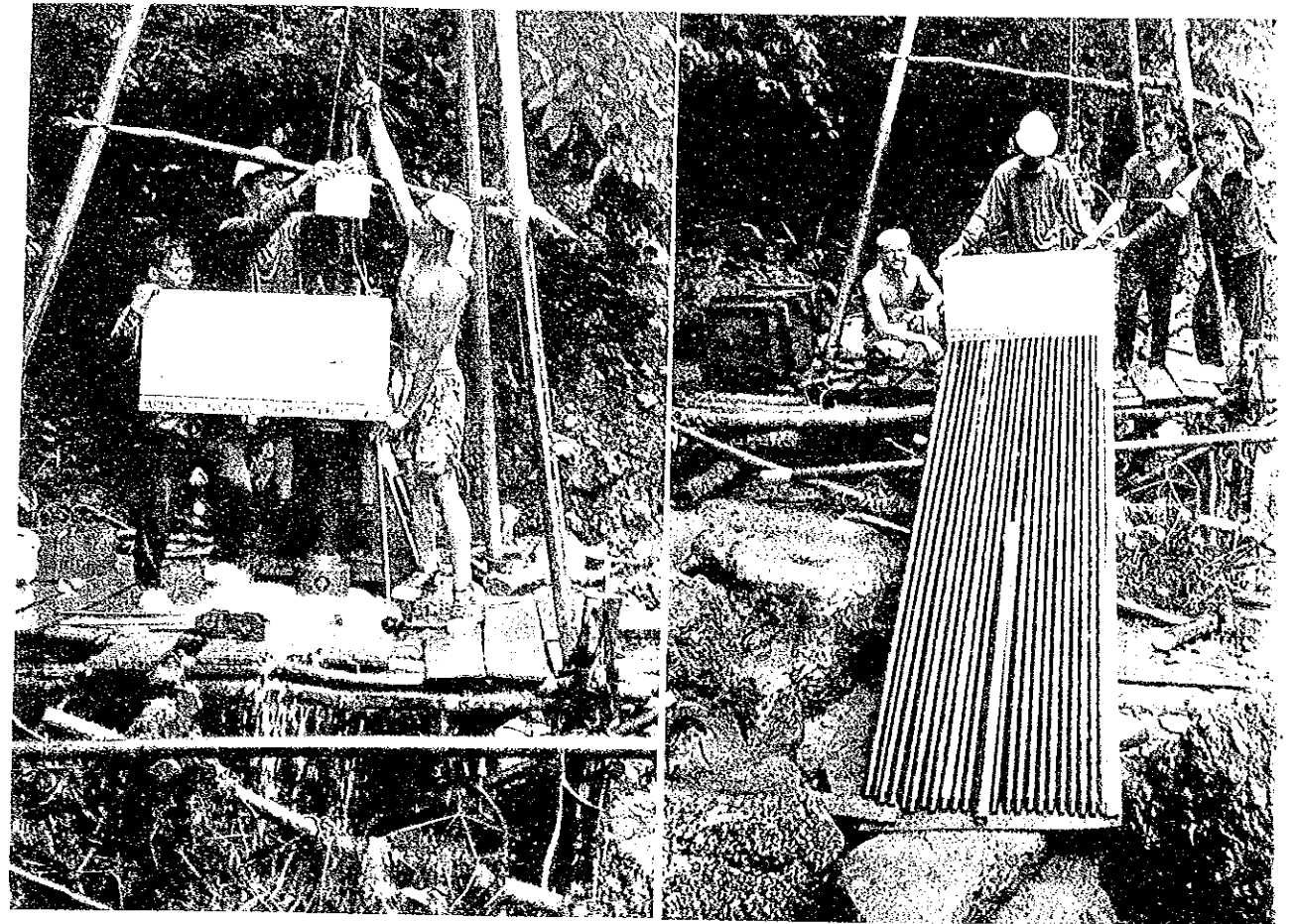
55 ~ 70m



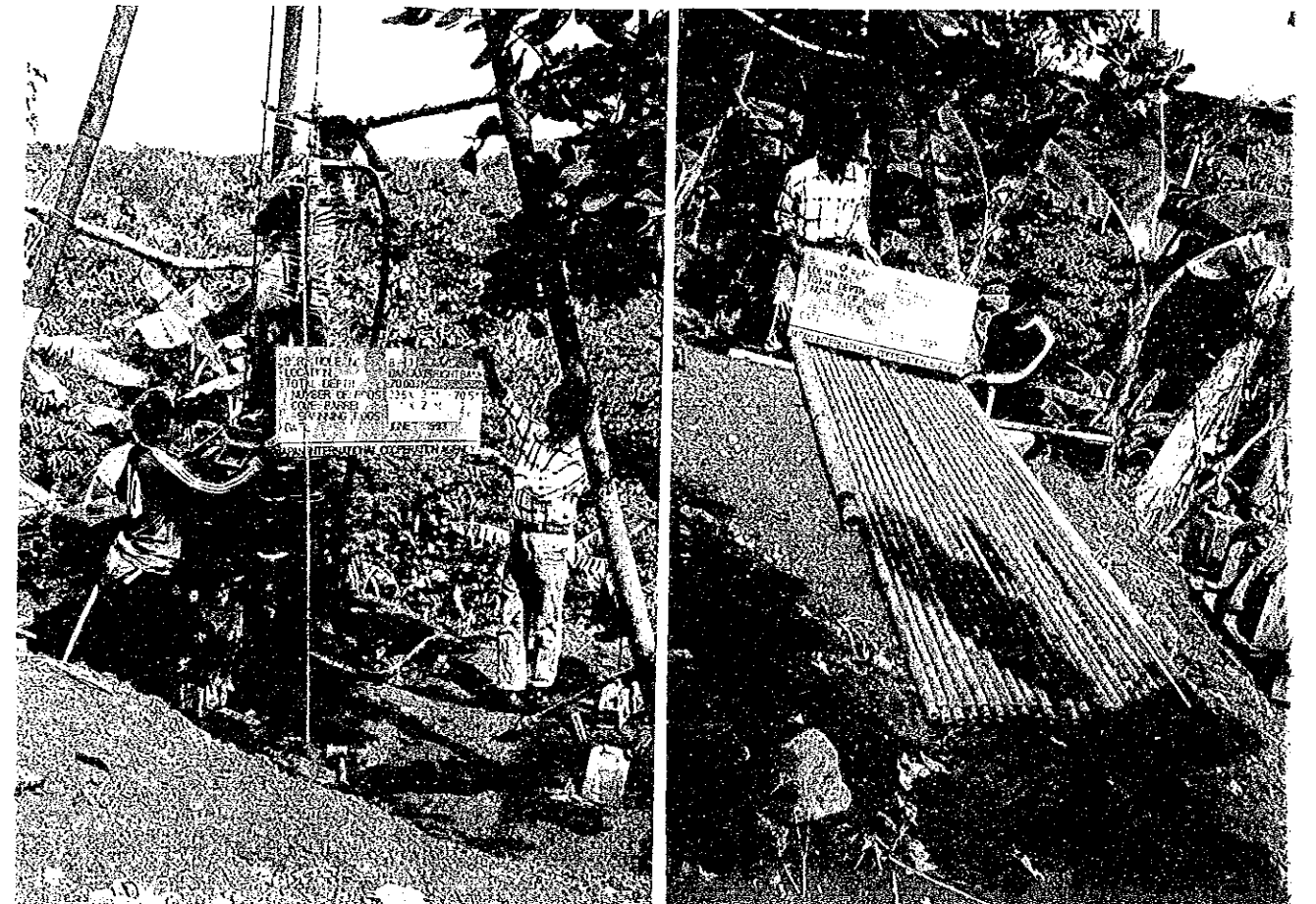
B-1 Inspection of Drillhole Depth

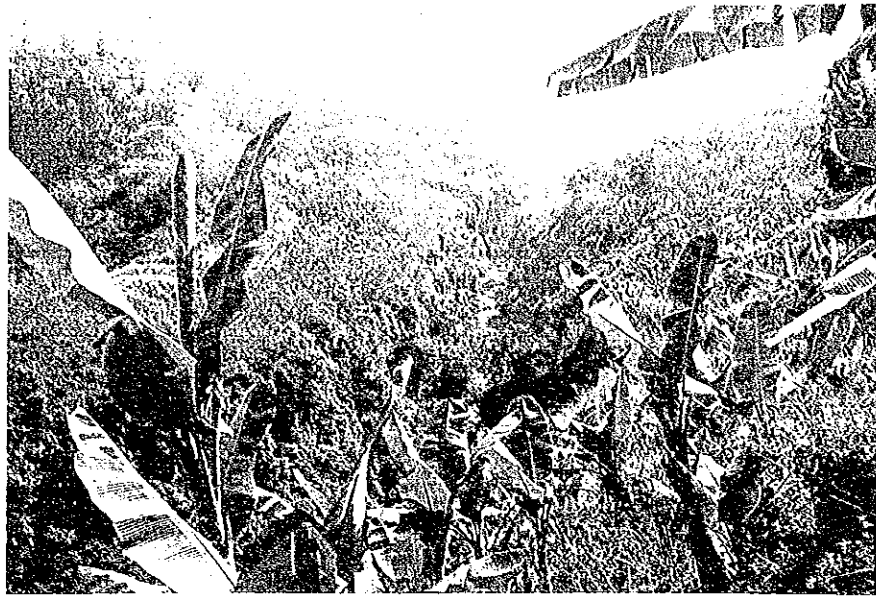


B-2 Inspection of Drillhole Depth



B-3 Inspection of Drillhole Depth

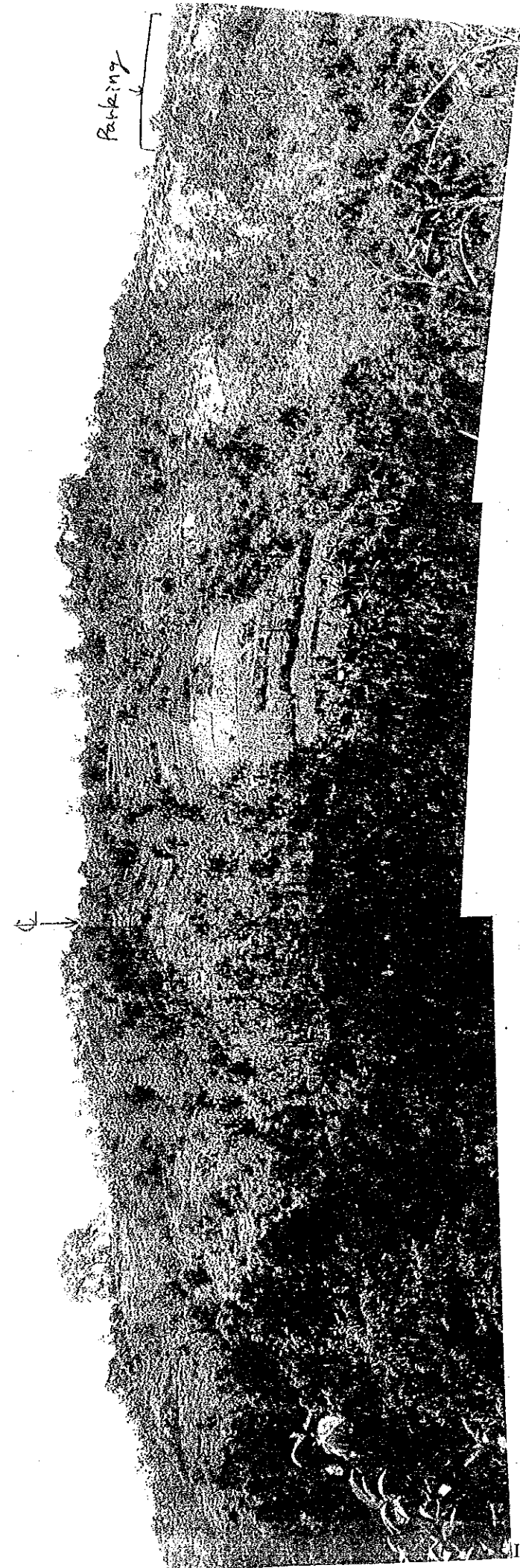




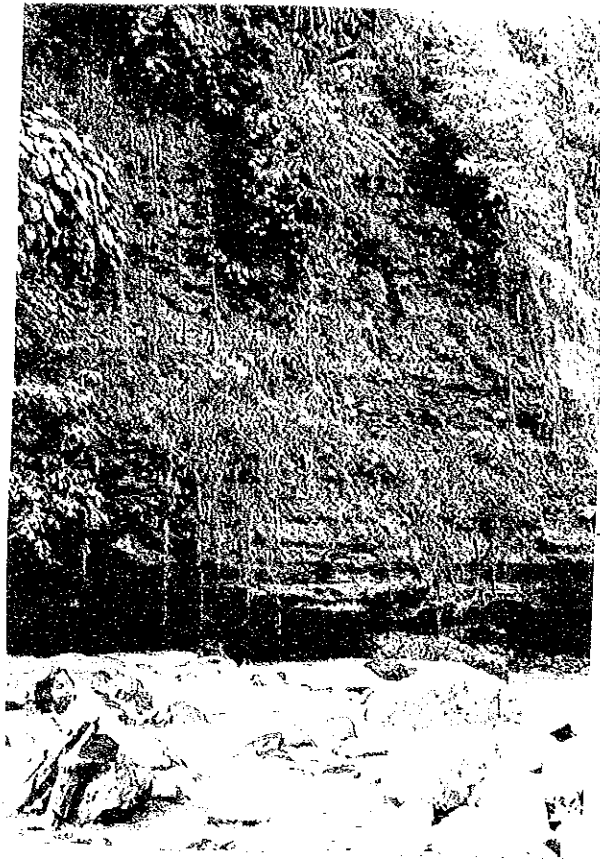
JATIBARANG Dam Site Upstream View



River Bed Condition of Dam Axis

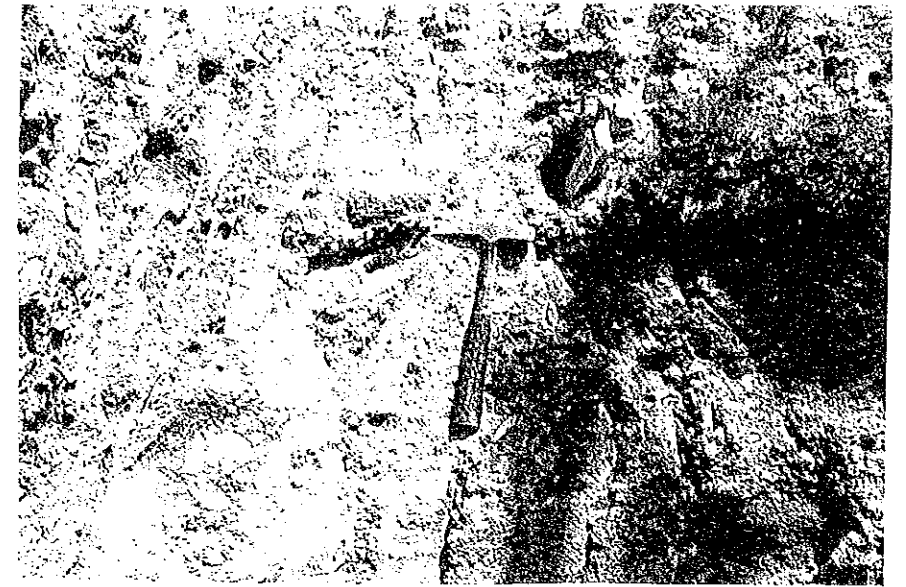


JATIBARANG DAM SITE RIGHT BANK



Volcanic Breccia

Tuffaceous Sandstone



Weathered Volcanic Breccia near B-1 site



Volcanic Breccia

Lava (right side)
Auto - brecciated
Lava (left side)



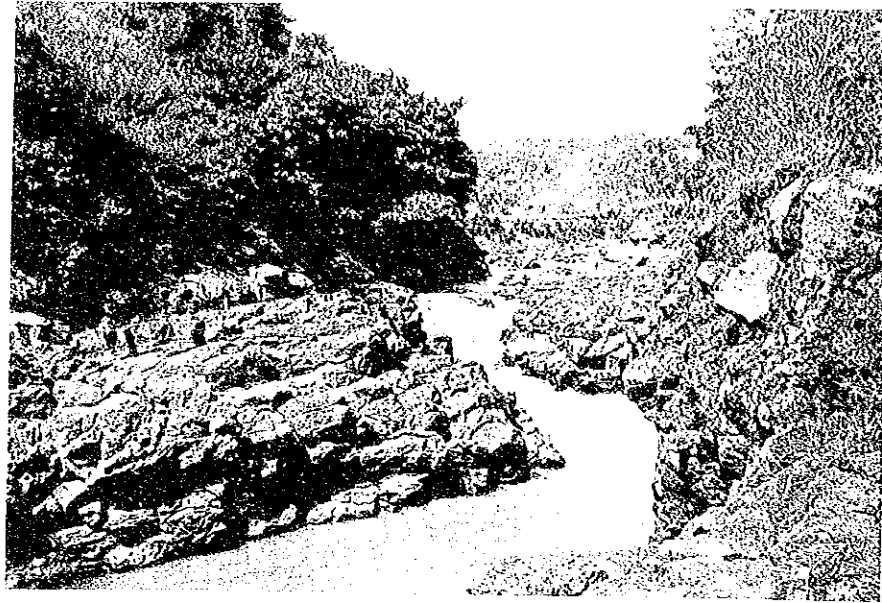
Landslide (Kalibiuk Formation - blue claystone)



Volcanic
Conglomerate



River Material included 30~40% of soft rock



Andesite Lava



Andesite (proposed quarry site of Mt. Mergi)