

**JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)**

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

**THE DETAILED DESIGN STUDY  
ON MEDAN FLOOD CONTROL PROJECT**

**FINAL REPORT**

**VOL. VI**

**DATA BOOK**

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**OCTOBER 1996**

**CTI ENGINEERING CO., LTD.**

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**LIST OF REPORTS**

<b>VOLUME I</b>	<b>SUMMARY</b>
<b>VOLUME II</b>	<b>MAIN REPORT</b>
<b>VOLUME III</b>	<b>DESIGN NOTES</b>
<b>VOLUME IV</b>	<b>WORK QUANTITIES</b>
<b>VOLUME V</b>	<b>COST ESTIMATE</b>
<b>VOLUME VI</b>	<b>DATA BOOK</b>

**COST ESTIMATE**  
**IS BASED ON THE PRICE LEVEL OF NOVEMBER 1995**  
**AND EXPRESSED IN INDONESIAN RUPIAH (RP.)**  
**ACCORDING TO THE FOLLOWING EXCHANGE RATES:**

**US\$1.00 = ¥103.6 = RP. 2,285**  
**(AS OF NOVEMBER 1995)**

**THE DETAILED DESIGN STUDY  
ON MEDAN FLOOD CONTROL PROJECT**

**FINAL REPORT**

**VOL. VI**

**DATA BOOK**

**TABLE OF CONTENTS**

- 1. GEOLOGICAL SURVEY**
- 2. METEOROLOGY AND HYDROLOGY**
  - 2.1 DAILY RAINFALL**
  - 2.2 DAILY DISCHARGE**
- 3. TIDE**
- 4. WATER QUALITY**

**1. GEOLOGICAL SURVEY**

**VOL. IX**

**DATA BOOK**

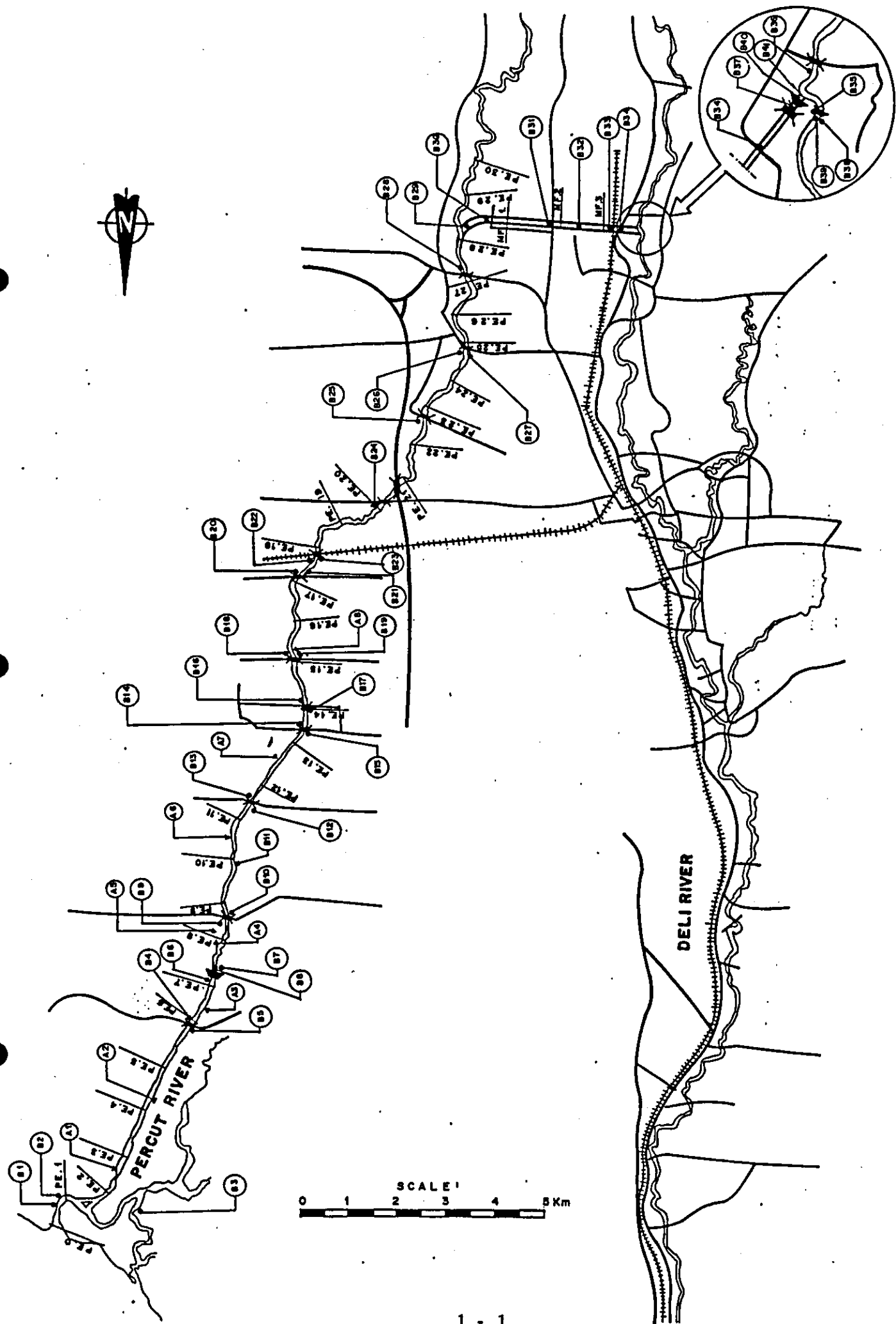
## **1. Geological Survey**

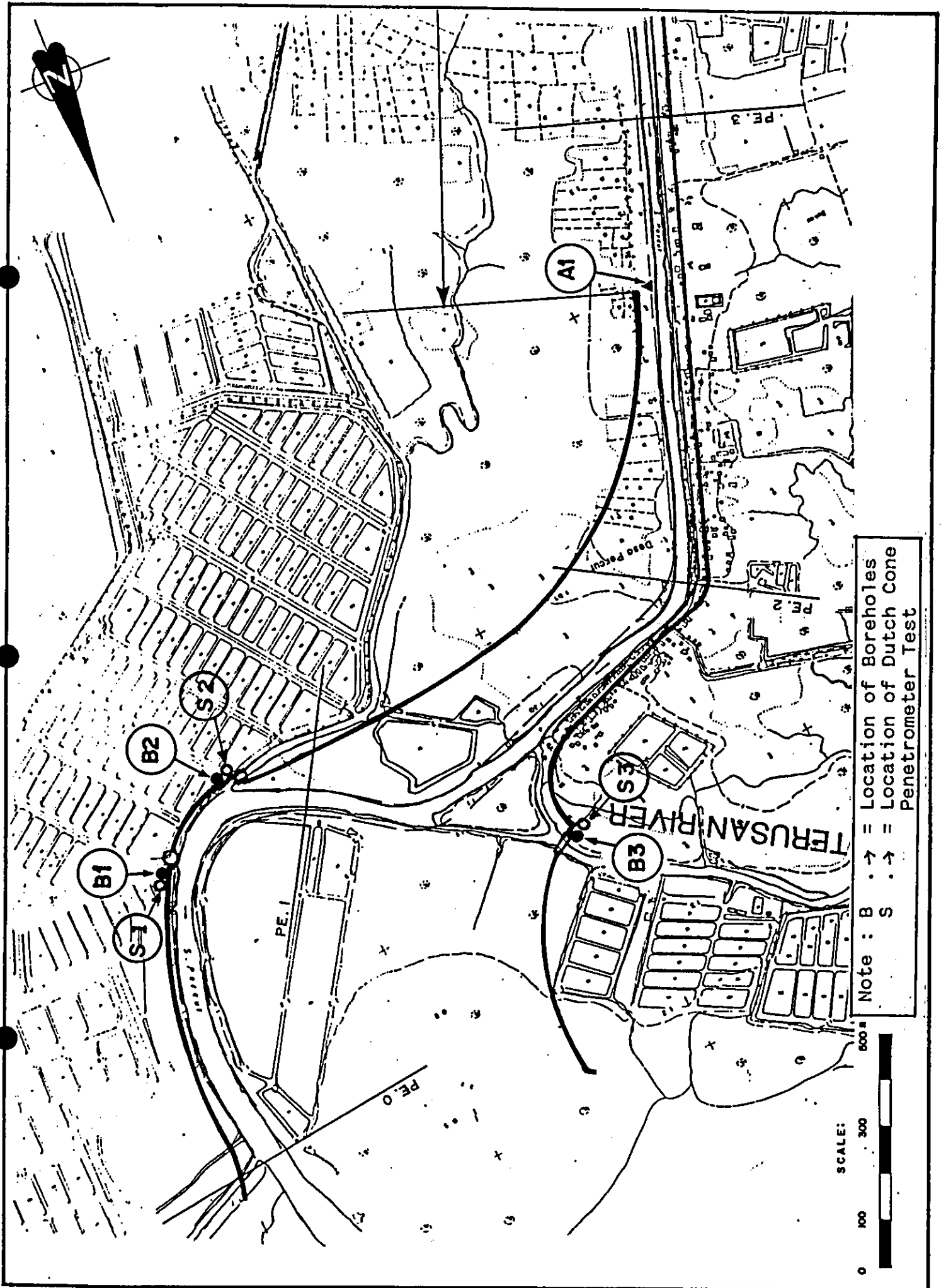
The drilling sites were determined accordingly:

- River improvement works including excavation and dredging of river channel and dike embankment (investigation for soft soil area in upper, middle and lower stream of the Percut River).
- Road, railway and pedestrian bridges.
- Intake weir and sluices.
- Floodway (to be excavated).
- Diversion works such as weirs on Deli River and Floodway.

## TABLE OF CONTENT

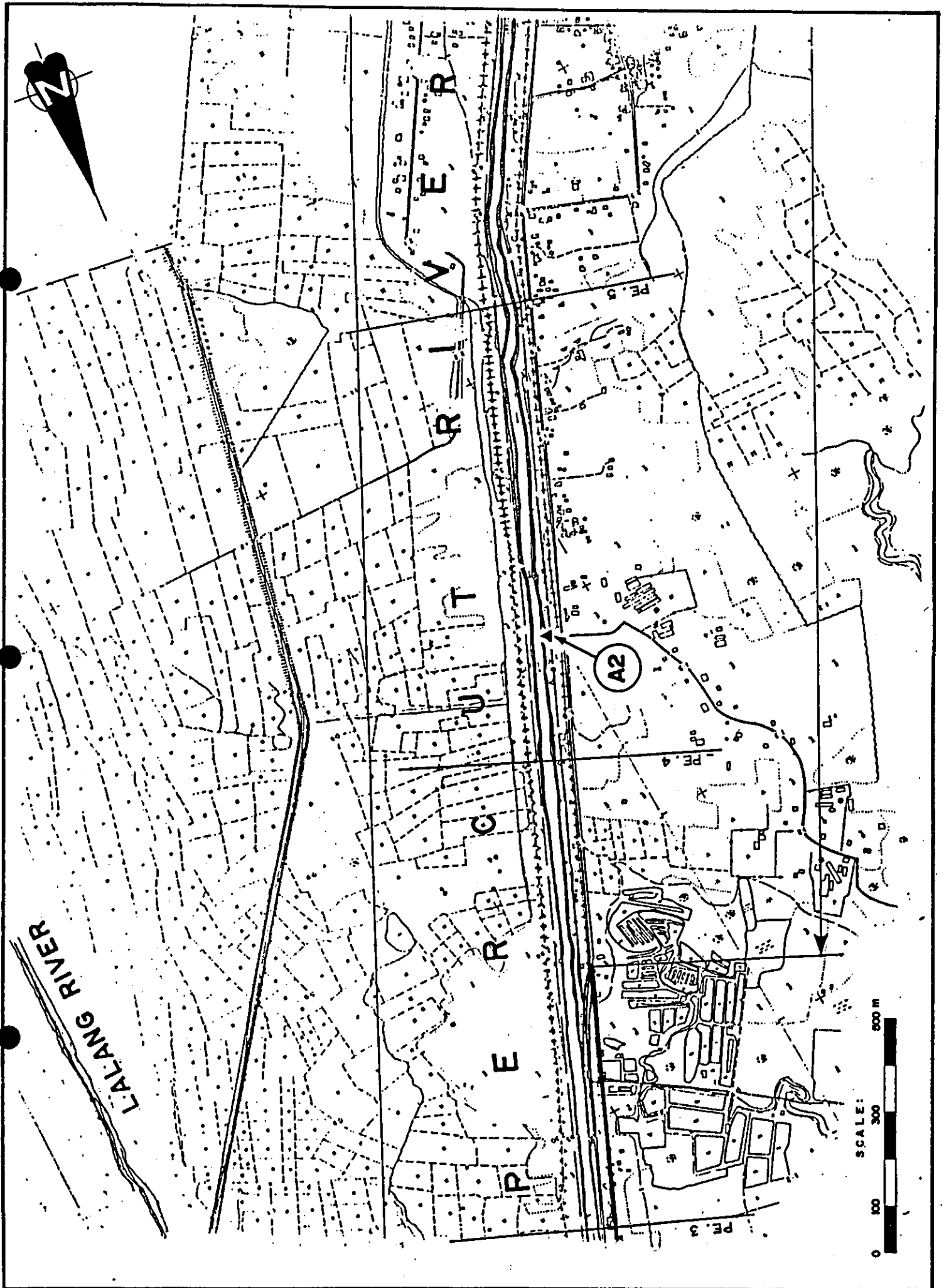
1 . BORE HOLE, DUTCH CONE PENETRATION TEST, HAND AUGER MAP .....	1 - 1
2 . DRILLING LOG BORE MACHINE (B.01) .....	1 - 12
3 . DRILLING LOG BORE MACHINE (B.02) .....	1 - 13
4 . DRILLING LOG BORE MACHINE (B.03) .....	1 - 14
5 . DRILLING LOG BORE MACHINE (B.04) .....	1 - 15
6 . DRILLING LOG BORE MACHINE (B.05) .....	1 - 16
7 . DRILLING LOG BORE MACHINE (B.06) .....	1 - 17
8 . DRILLING LOG BORE MACHINE (B.07) .....	1 - 18
9 . DRILLING LOG BORE MACHINE (B.08) .....	1 - 19
10 . DRILLING LOG BORE MACHINE (B.09) .....	1 - 20
11 . DRILLING LOG BORE MACHINE (B.10) .....	1 - 21
12 . DRILLING LOG BORE MACHINE (B.11) .....	1 - 22
13 . DRILLING LOG BORE MACHINE (B.12) .....	1 - 23
14 . DRILLING LOG BORE MACHINE (B.13) .....	1 - 24
15 . DRILLING LOG BORE MACHINE (B.14) .....	1 - 25
16 . DRILLING LOG BORE MACHINE (B.15) .....	1 - 26
17 . DRILLING LOG BORE MACHINE (B.16) .....	1 - 27
18 . DRILLING LOG BORE MACHINE (B.17) .....	1 - 28
19 . DRILLING LOG BORE MACHINE (B.18) .....	1 - 29
20 . DRILLING LOG BORE MACHINE (B.19) .....	1 - 30
21 . DRILLING LOG BORE MACHINE (B.20) .....	1 - 31
22 . DRILLING LOG BORE MACHINE (B.21) .....	1 - 32
23 . DRILLING LOG BORE MACHINE (B.22) .....	1 - 33
24 . DRILLING LOG BORE MACHINE (B.23) .....	1 - 34
25 . DRILLING LOG BORE MACHINE (B.24) .....	1 - 35
26 . DRILLING LOG BORE MACHINE (B.25) .....	1 - 36
27 . DRILLING LOG BORE MACHINE (B.26) .....	1 - 37
28 . DRILLING LOG BORE MACHINE (B.27) .....	1 - 38
29 . DRILLING LOG BORE MACHINE (B.28) .....	1 - 39
30 . DRILLING LOG BORE MACHINE (B.29) .....	1 - 40
31 . DRILLING LOG BORE MACHINE (B.30) .....	1 - 41
32 . DRILLING LOG BORE MACHINE (B.31) .....	1 - 42
33 . DRILLING LOG BORE MACHINE (B.32) .....	1 - 43
34 . DRILLING LOG BORE MACHINE (B.33) .....	1 - 44
35 . DRILLING LOG BORE MACHINE (B.34) .....	1 - 45
36 . DRILLING LOG BORE MACHINE (B.35) .....	1 - 46
37 . DRILLING LOG BORE MACHINE (B.36) .....	1 - 47
38 . DRILLING LOG BORE MACHINE (B.37) .....	1 - 48
39 . DRILLING LOG BORE MACHINE (B.38) .....	1 - 49
40 . DRILLING LOG BORE MACHINE (B.39) .....	1 - 50
41 . DRILLING LOG BORE MACHINE (B.40) .....	1 - 51
42 . DRILLING LOG BORE MACHINE (B.41) .....	1 - 52
43 . DRILLING LOG HAND AUGER (A.01) .....	1 - 53
44 . DRILLING LOG HAND AUGER (A.02) .....	1 - 54
45 . DRILLING LOG HAND AUGER (A.03) .....	1 - 55
46 . DRILLING LOG HAND AUGER (A.04) .....	1 - 56
47 . DRILLING LOG HAND AUGER (A.05) .....	1 - 57
48 . DRILLING LOG HAND AUGER (A.06) .....	1 - 58
49 . DRILLING LOG HAND AUGER (A.07) .....	1 - 59
50 . DRILLING LOG HAND AUGER (A.08) .....	1 - 60

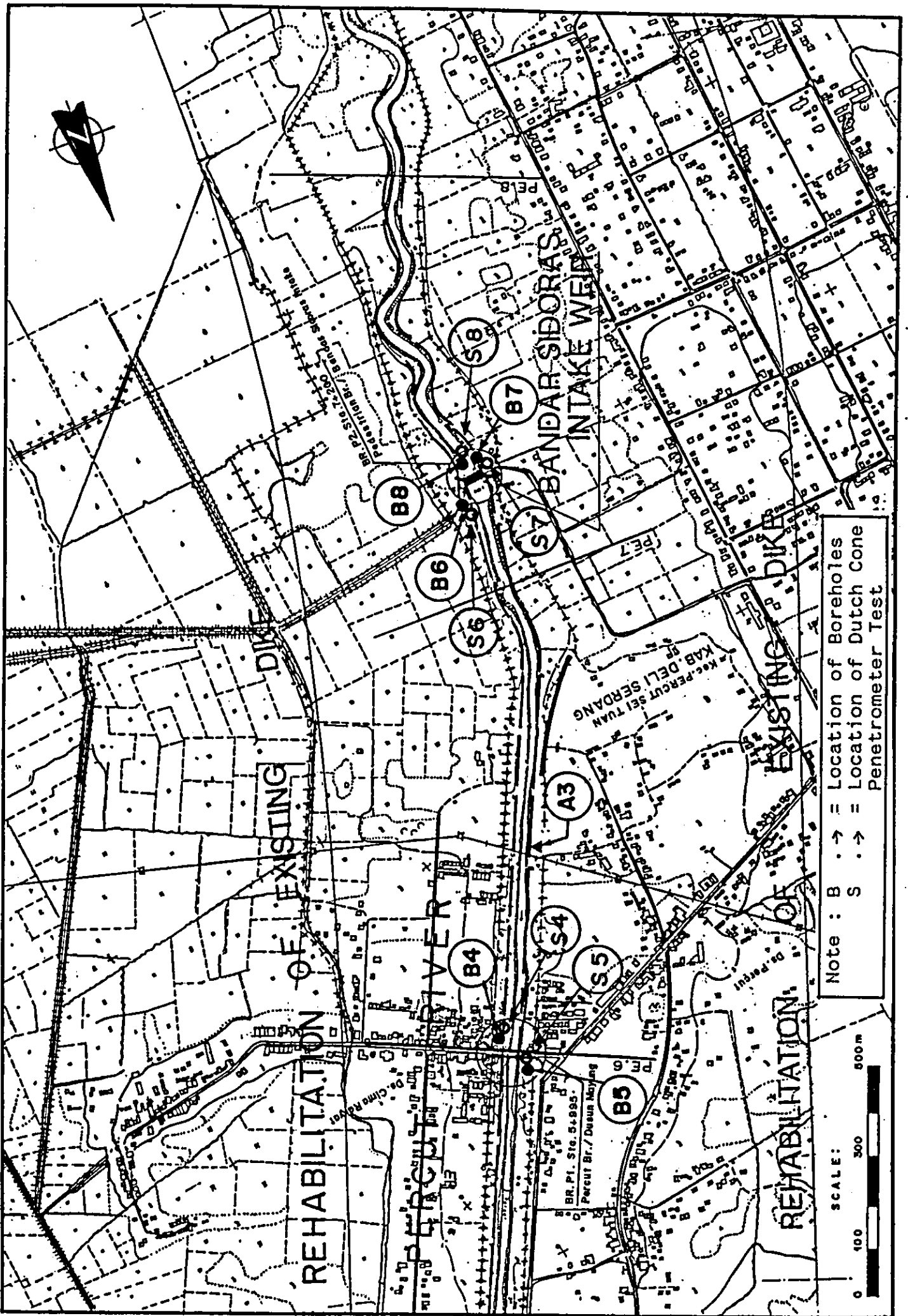




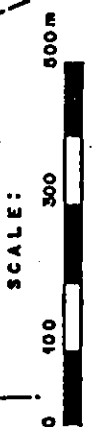
Note : B . → = Location of Boreholes  
 S . ← = Location of Dutch Cone  
 ○ . = Penetrometer Test

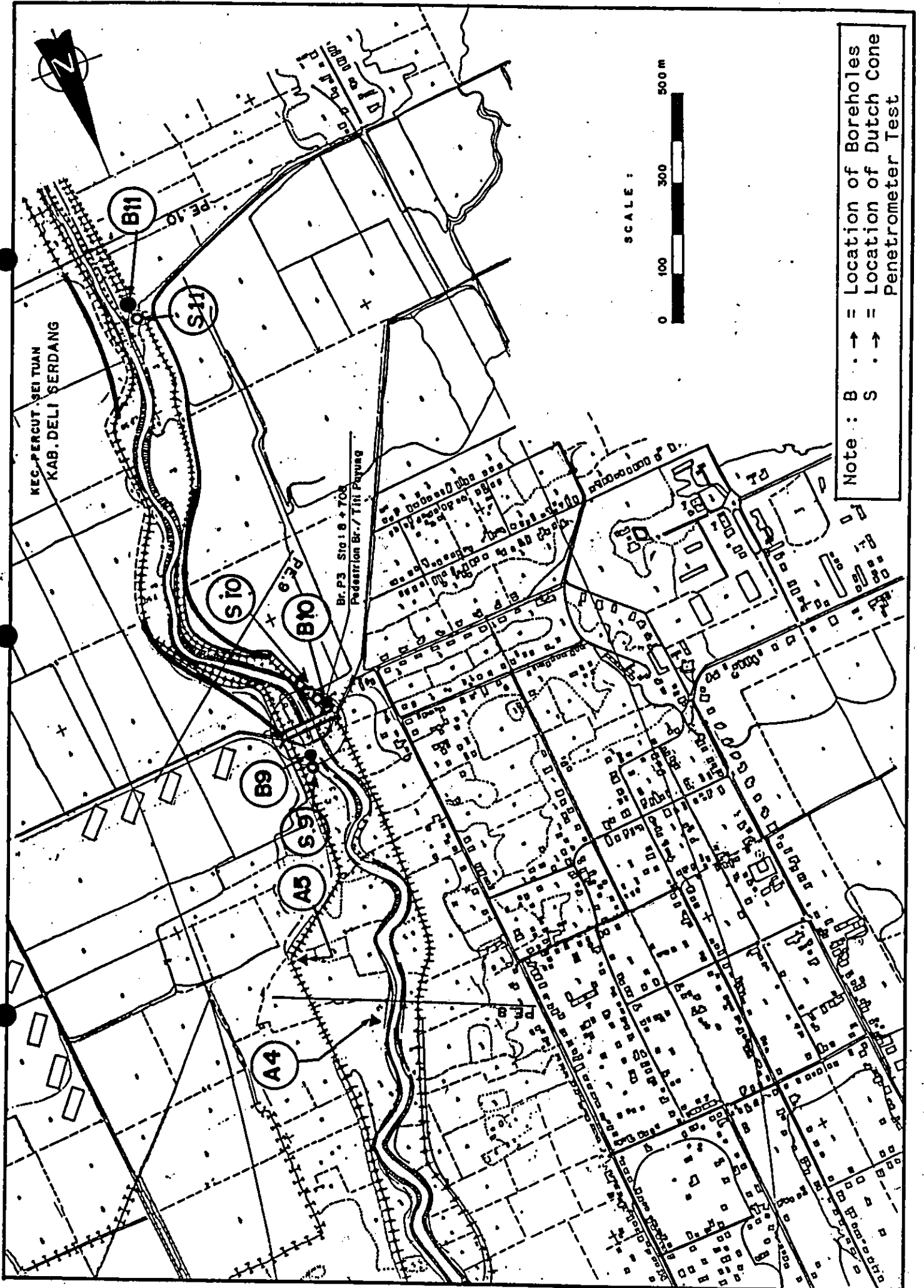






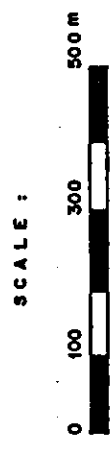
Note : B → = Location of Boreholes  
 S → = Location of Dutch Cone Penetrometer Test



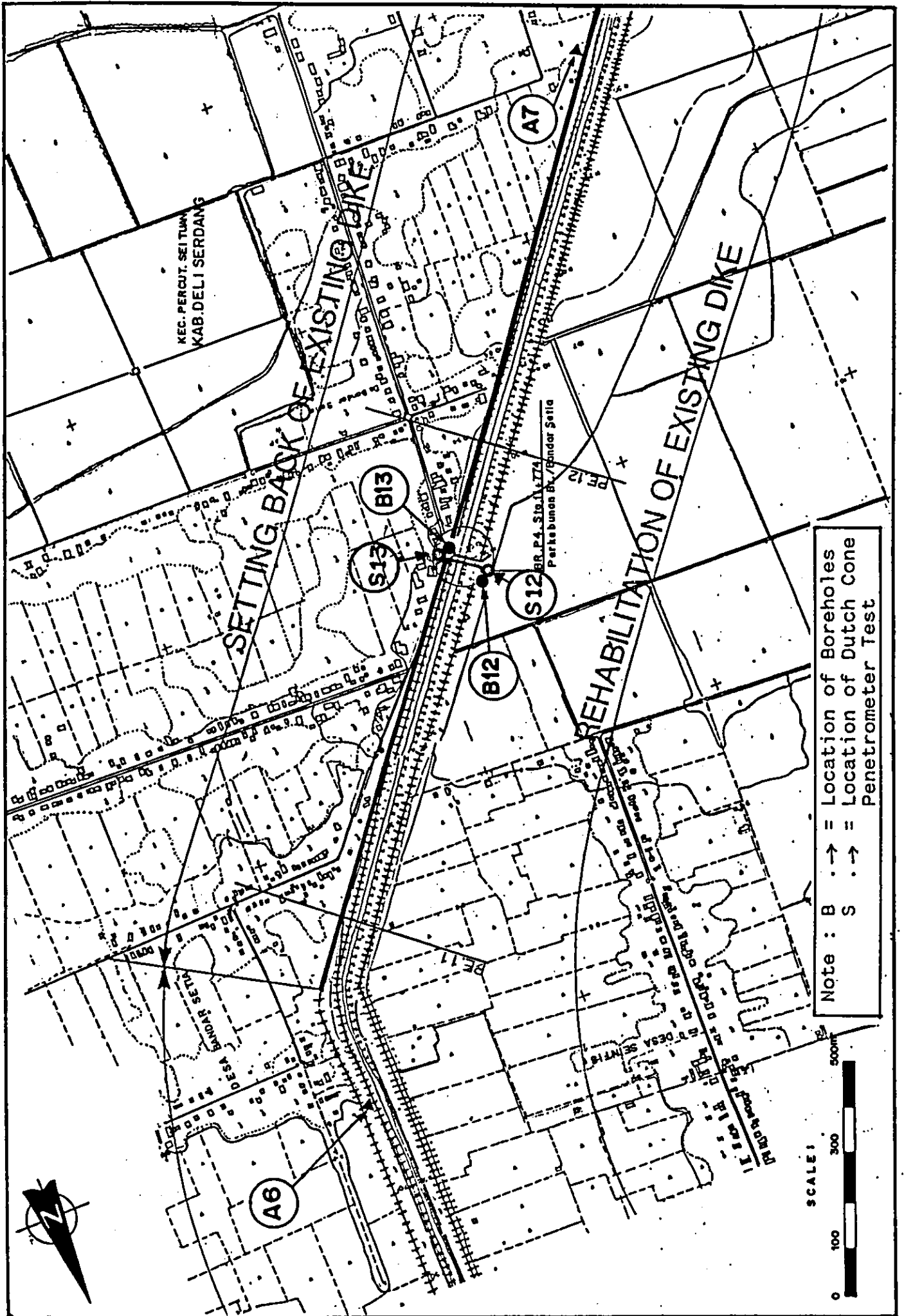


KEC. PERCUT SEITUAN  
KAB. DELI SERDANG

Br. P3. St. 1.8 + 704  
Pedestrian Br. / Titi Payung



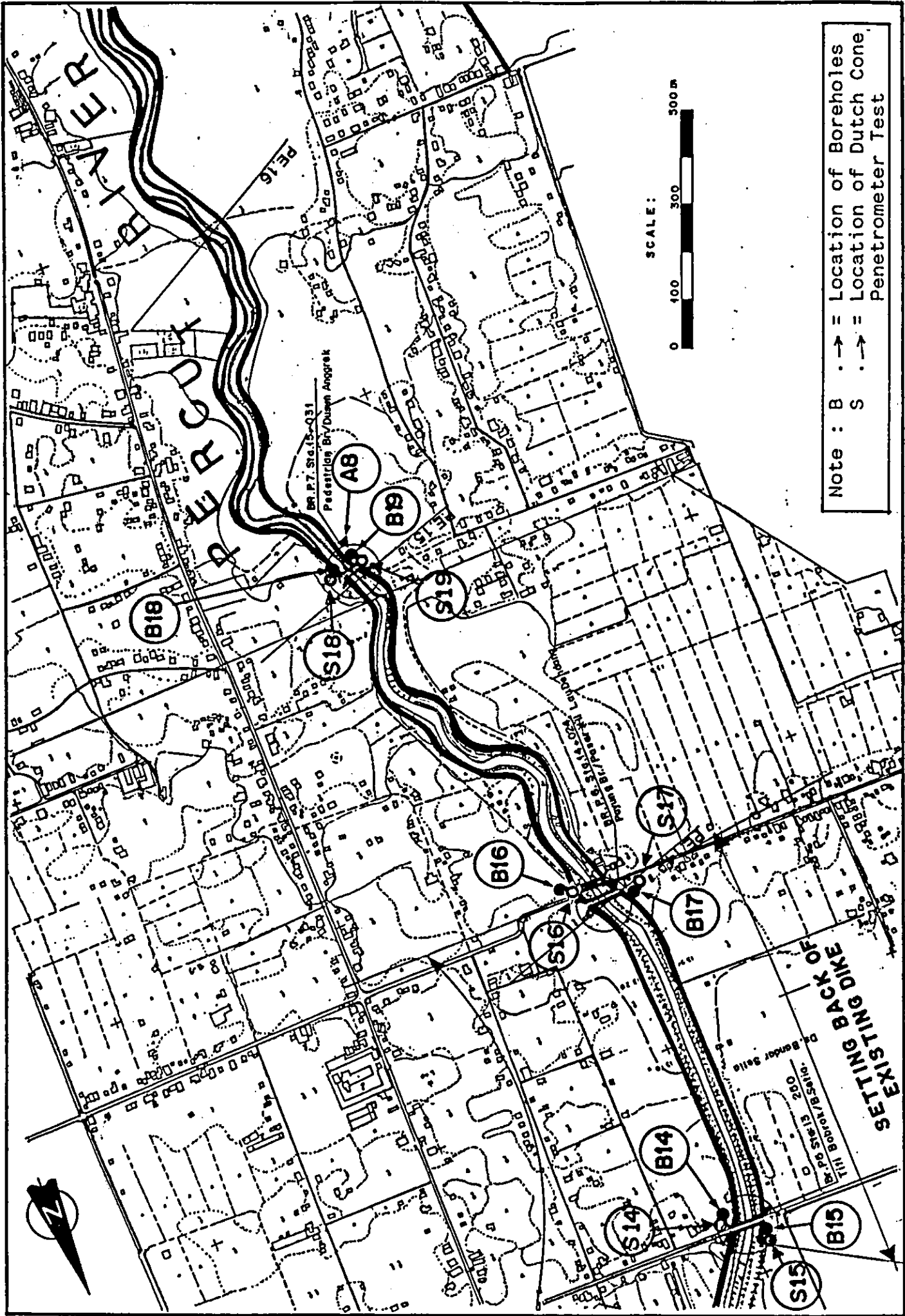
Note : B . . . = Location of Boreholes  
 S . . . = Location of Dutch Cone Penetrometer Test  
 ↑ = Location of Dutch Cone Penetrometer Test  
 - - - - - = Location of Dutch Cone Penetrometer Test



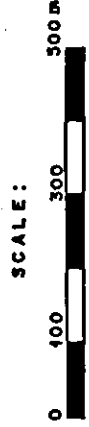
Note : B . . = Location of Boreholes  
 S . . = Location of Dutch Cone  
 ↑ = Penrometer Test



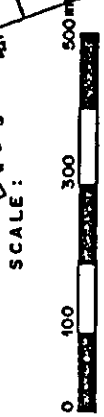
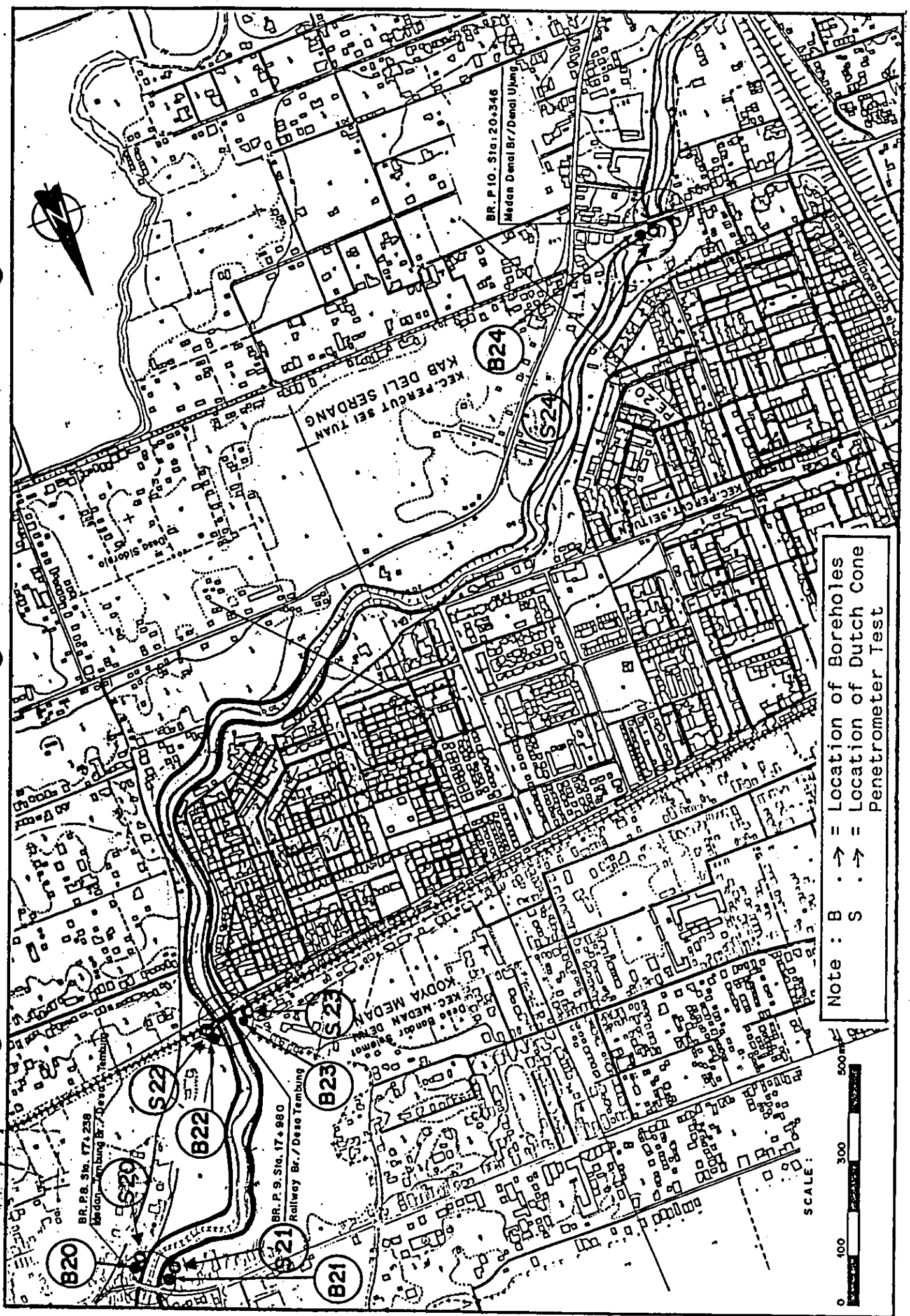
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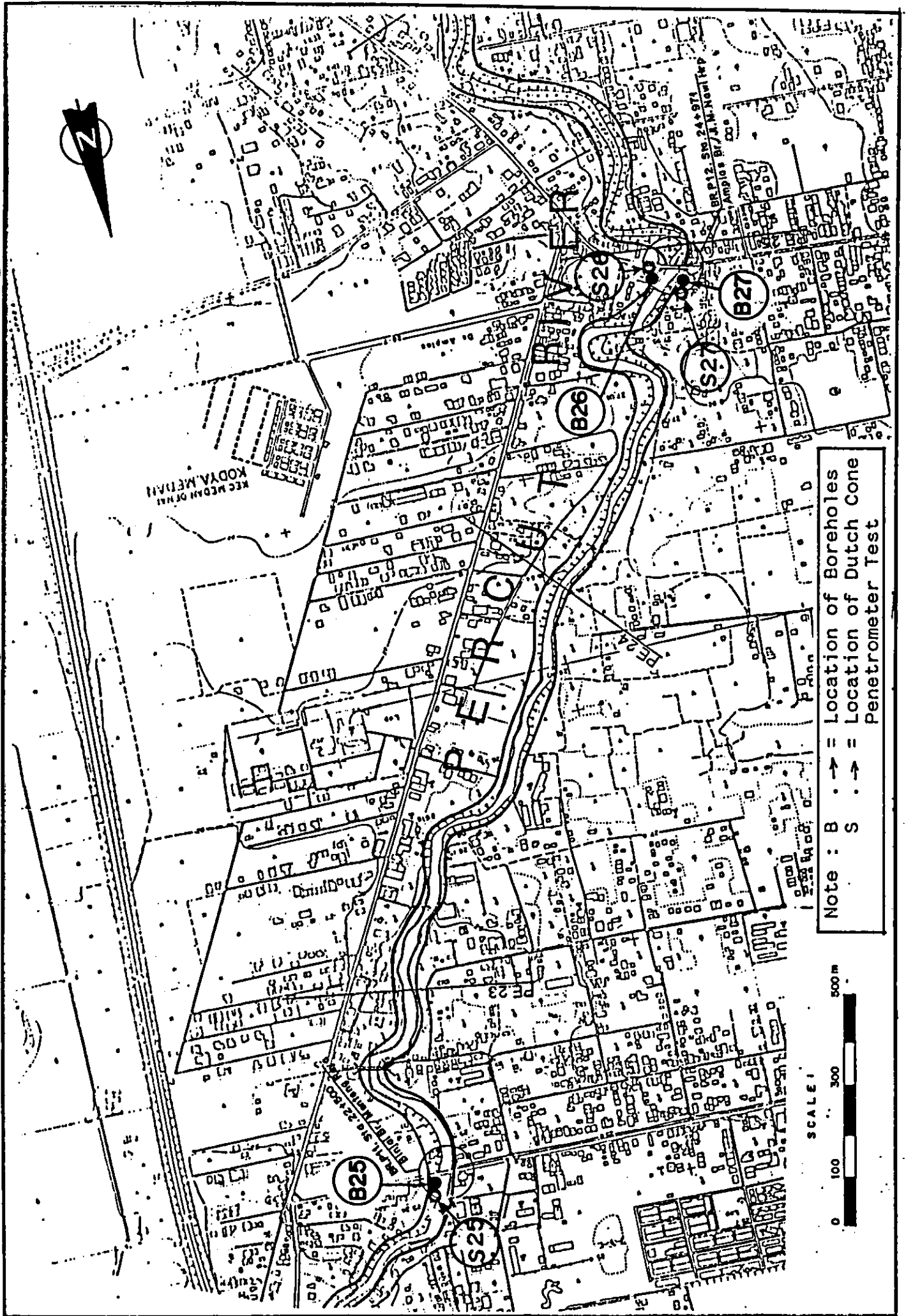


Note : B → = Location of Boreholes  
 S → = Location of Dutch Cone Penetrometer Test



EXISTING BACK OF  
 SETTING BACK





KODYA MEDANI

Note : B • Location of Boreholes  
 S • Location of Dutch Cone  
 ↑ Penetrometer Test

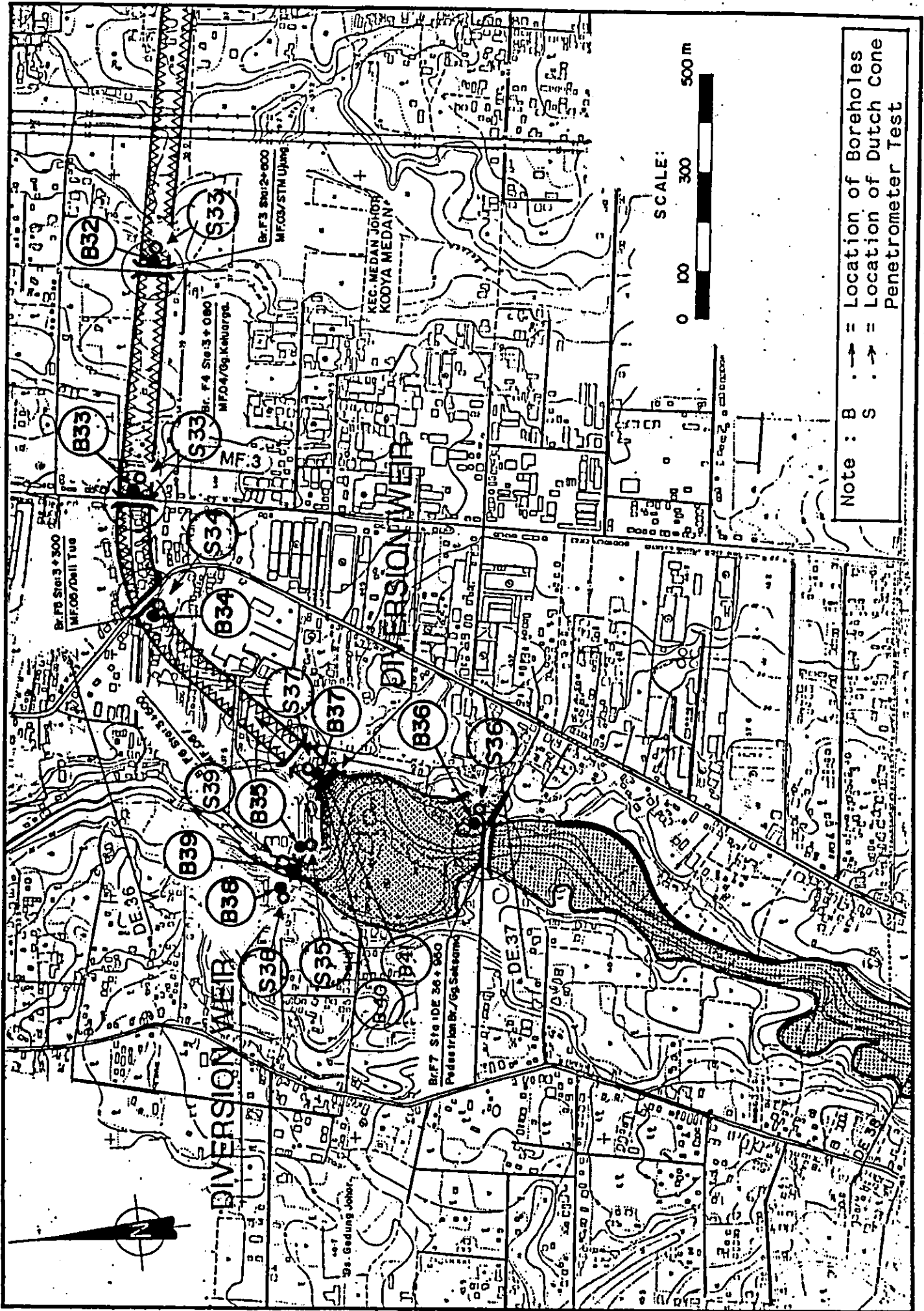
SCALE  
 0 100 300 500 m



Note : B → = Location of Boreholes  
 S → = Location of Dutch Cone Penetrometer Test

FLOODWAY





Note : B → = Location of Boreholes  
 S → = Location of Dutch Cone Penetrometer Test

SCALE:  
 0 100 300 500 m

# DRILLING LOG

PROJECT : MEDAN FLOOD CONTROL

Boring No		B01		Location		PERCUT RIVER									
Client :		CTI Engineering Co., Ltd		Implementation Period		17/05/1995 21/05/1995		Boring Log Prepared By		Sibar TB		North Latitude		East Latitude	
Company's Name		PT. MELIAS KESUMA		Chief Engineer		Sanusi Lbs		Hammer Drop Implement		SPT Tools		Chief Operator		Survanto	
Ground Elevation		180°		Direction		90°		Ground Slope		0°					
Boring depth		36.0 M		Boring Machine		TOHO		Pump		Yanmar		Ground Water Level (GWL)		2.13 m	
Elevation (m)	Thickness (m)	Depth (m)	Symbol	DISCRIPTION	Ground Water Level (M)	Geological Condition	Depth of SPT (M)	Standard Penetration Test			In-Situ Test		Sampling Depth (M)	Method of sampling	D s t e
								Blow Penetration Each 15 Cm	N BLOWS N2 + N3 30 Cm	N - VALUE	Elevation of SPT (M)	Test Name and Result			
1.285				Top Soil											
				Light brown, Silty clay, Very soft, Medium plasticity, Medium to high moisture content	-0.845		1.00								
-1.165	2.45	2.45		Light grey, Silty clay, Very soft, Medium plasticity, Medium to high moisture content			1.45	1	1	1	2		-0.165		
							2.00								
							2.45	1	1	2	3		-1.165		
							3.00								
							3.45	1	1	1	2		-2.165		
							4.00								
							4.45	1	2	2	4		-3.165	4.00	UDS
							5.00								
-4.315	3.15	5.60		Dark grey, Silty clay, Soft, Medium plasticity, Medium to high moisture content			5.45	1	3	2	5		-4.165	4.80	UDS
							6.00								
							6.45	1	2	2	4		-5.165		
							7.00								
							7.45	2	2	4	6		-6.165		
							8.00								
							8.45	1	3	2	5		-7.165	8.00	UDS
							9.00								
							9.45	2	3	3	6		-8.165	8.80	UDS
							10.00								
							10.45	1	3	1	4		-9.165		
							11.00								
							11.45	2	3	4	7		-10.165		
							12.00								
-11.715	7.40	13.00		Dark grey, Soft clay containing silt and peat material, Low to medium plasticity, Medium moisture content			12.45	2	2	3	5		-11.165		
							13.00								
							13.45	1	1	3	4		-12.165		
							14.00								
							14.45	1	2	2	4		-13.165		
							15.00								
							15.45	2	2	4	6		-14.165	15.00	UDS
							16.00								
							16.45	4	3	5	8		-15.165	15.80	DS
							17.00								
							17.45	3	4	7	11		-16.165	17.00	DS
							18.00								
							18.45	4	6	6	12		-17.165	17.45	DS
							19.00								
							19.45	2	4	7	11		-18.165		
							20.00								
							20.45	4	6	5	11		-19.165		
							21.00								
							21.45	2	3	5	8		-20.165	21.00	DS
							22.00								
							22.45	7	4	4	8		-21.165	21.45	DS
							23.00								
							23.45	6	7	9	16		-22.165		
							24.00								
							24.45	5	3	6	9		-23.165		
							25.00								
							25.45	4	6	9	15		-24.165		
							26.00								
							26.45	4	5	8	13		-25.165		
							27.00								
							27.45	6	8	12	20		-26.165		
							28.00								
							28.45	8	14	16	30		-27.165		
							29.00								
							29.45	11	15	21	36		-28.165		
							30.00								
							30.45	13	18	26	44		-29.165		
							31.00								
							31.45	14	17	29	46		-30.165		
							32.00								
							32.45	11	17	25	42		-31.165		
							33.00								
							33.45	17	25	32	>50		-32.165		
							34.00								
							34.45	15	23	27	50		-33.165		
							35.00								
							35.45	13	18	22	40		-34.165		
							36.00								
-35.165	8.60	36.45					36.45	15	25	28	>50		-35.165		

**LEGEND:**

	Undisturbed Sample (UDS)		Sand		Tuff		Ground Water Level (GWL)
	Disturbed Sample (DS)		Silt		Organic		Pre Testing
	Standard Penetration Test (SPT)		Clay		Gravel		

# DRILLING LOG

PROJECT : MEDAN FLOOD CONTROL

Boring No		B.02		Location		PERCUT RIVER													
Client :		CTI Engineering Co., Ltd		Implementation		Boring Log		North Latitude											
Company's Name		PT. MELIAS KESUMA		Periode		Prepared By		East Latitude											
Ground Elevation		180°		180°		Hammer Drop		Chief Operator		Suryanto									
Angle		90°		Direction		Implement		SPT Tools											
Boring depth		34.0 M		Ground Slope		SGZ-1A		Robis		Drilling Method: Rotary Drilling									
				90°		Lushan		Ground Water Level (GWL)		2.21 m									
No	Elevation (m)	Thiessen (m)	Depth (m)	Symbol	DISCRPTION	Ground Water Level (M)	Geological Condition	Depth of SPT (M)	Standard Penetration Test					In-Situ Test		Sampling Depth (M)	Methods of sampling	Date	
									Blows Penetration Each 15 Cms			N - VALUE		Elevation of SPT (M)					Test Name and Result
								N1	N2	N3	N2 + N3	10	20	30	40	50			
0	0.710				Top Soil														
1	-0.790	1.50	1.50		Light brown, Silty clay, Medium stiffness, Medium plasticity, Medium moisture content			1.00	2	2	3	5							
2								1.45	2	2	3	5							
3								2.00	1	1	2	3							
4								2.45	1	2	2	4							
5								3.00	1	1	3	4							
6								3.45	1	2	2	4							
7								4.00	1	1	3	4							
8								4.45	1	2	1	3							
9								5.00	1	2	3	5							
10								5.45	1	2	3	5							
11								6.00	1	2	3	5							
12								6.45	1	2	3	5							
13								7.00	1	2	2	4							
14								7.45	2	3	4	7							
15								8.00	1	2	3	5							
16								8.45	1	2	3	5							
17								9.00	1	1	3	4							
18								9.45	1	1	3	4							
19								10.00	1	1	3	4							
20	-19.090	18.30	19.80					10.45	2	3	3	6							
21								11.00	2	3	3	6							
22								11.45	1	1	2	3							
23								12.00	1	1	2	3							
24								12.45	1	2	3	5							
25								13.00	1	1	2	3							
26								13.45	1	2	3	5							
27								14.00	1	1	2	3							
28								14.45	1	2	4	6							
29								15.00	1	2	3	5							
30								15.45	1	2	3	5							
31								16.00	1	2	3	5							
32								16.45	1	2	2	4							
33								17.00	1	3	4	7							
34								17.45	1	2	2	4							
35								18.00	1	3	4	7							
36								18.45	2	4	5	9							
37								19.00	4	7	7	14							
38								19.45	5	7	10	17							
39								20.00	4	6	7	13							
40								20.45	3	4	7	11							
41								21.00	5	7	8	15							
42								21.45	4	6	7	13							
43								22.00	3	4	7	11							
44								22.45	5	7	8	15							
45								23.00	4	6	7	13							
46								23.45	7	11	20	31							
47								24.00	11	16	22	38							
48								24.45	14	18	24	42							
49								25.00	9	14	18	32							
50								25.45	16	19	25	44							
51								26.00	15	18	30	48							
52								26.45	14	19	26	45							
53								27.00	16	22	29	>50							
54								27.45	18	20	36	>50							
55								28.00											
56								28.45											
57								29.00											
58								29.45											
59								30.00											
60								30.45											
61								31.00											
62								31.45											
63								32.00											
64								32.45											
65								33.00											
66								33.45											
67								34.00											
68								34.45											

LEGEND:

	Undisturbed Sample (UDS)		Sand		Tuff		Ground Water Level (GWL)
	Disturbed Sample (DS)		Silt		Organic		N1 Pre Testing
	Standard Penetration Test (SPT)		Clay		Gravel		

# DRILLING LOG

PROJECT : MEDAN FLOOD CONTROL

Boring No		Client		Location		PERCUT RIVER	
Company's Name		Implementation Periods		Boring Log Prepared By		North Latitude	
Elevation		Direction		Chief Engineer		East Latitude	
Boring depth		Ground Slope		Boring Machine		Chief Operator	
30.0 M		90°		TOHO		Suryanto	
				Engine		Drilling Methode	
				Yanmar		Rotary Drilling	
						Ground Water Level (GWL)	
						2.65 m	

Elevation (m)	Thickness (m)	Depth (m)	Symbol	DISCRIPTION	Ground Water Level (M)	Geological Condition	Depth of SPT (M)	Standard Penetration Test					In-Situ Test			
								Blows Penetration Each 15 Cm			N VALUE	Elevation of SPT (M)	Test Name and Result	Sampling Depth (M)	Methods of sampling	D
								N1	N2	N3						
0.775				Top Soil												
-0.025	0.80	0.80		Yellowish light brown, Silty clay, Soft, Medium plasticity, High moisture content			1.00									
				Dark grey, Fine to medium size sand Medium density, Non plasticity, Low moisture content.	-1.875	A	1.45	2	2	3	5		-0.675			
				Dark brown some black Fine sand, Medium density, Non plasticity, Low moisture content.			2.00									
							2.45	4	7	7	14		-1.675			
-3.225	3.20	4.00					3.00									
							3.45	4	7	12	19		-2.675			
							4.00									
							4.45	5	7	9	16		-3.675			
							5.00									
							5.45	9	9	9	18		-4.675			
							6.00									
							6.45	3	2	2	4		-5.675			
							7.00									
-6.875	3.65	7.65		Dark grey, Sandy clay, Soft, Medium plasticity, High moisture content			7.45	3	7	16	23		-6.675			
							8.00									
							8.45	1	1	2	3		-7.675			
							9.00									
							9.45	3	3	5	8		-8.675			
-9.025	2.15	9.80					10.00									
							10.45	3	4	7	11		-9.675			
							11.00									
							11.45	3	4	9	13		-10.675			
							12.00									
							12.45	3	3	10	13		-11.675			
							13.00									
							13.45	2	3	7	10		-12.675			
							14.00									
							14.45	6	11	14	25		-13.675			
							15.00									
							15.45	2	2	4	6		-14.675			
							16.00									
							16.45	2	5	7	12		-15.675			
							17.00									
							17.45	4	9	13	22		-16.675			
							18.00									
							18.45	6	11	17	28		-17.675			
-17.725	8.70	18.50					19.00									
							19.45	6	13	19	32		-18.675			
							20.00									
							20.45	9	14	21	35		-19.675			
							21.00									
							21.45	11	16	27	43		-20.675			
-21.725	4.00	22.50					22.00									
							22.45	13	17	29	46		-21.675			
							23.00									
							23.45	17	25	34	>50		-22.675			
							24.00									
							24.45	14	21	36	>50		-23.675			
							25.00									
							25.45	12	18	27	45		-24.675			
							26.00									
							26.45	21	29	42	>50		-25.675			
							27.00									
							27.45	26	33	46	>50		-26.675			
							28.00									
							28.45	24	38	45	>50		-27.675			
							29.00									
							29.45	31	40	51/6	>50		-28.675			
-29.675	7.95	30.45					30.00									
							30.45	36	43	40/3	>50		-29.675			

LEGEND:

	Undisturbed Sample (UDS)		Sand		Tuff		Ground Water Level (GWL)
	Disturbed Sample (DS)		Silt		Organic		N1 Pre Testing
	Standard Penetration Test (SPT)		Clay		Gravel		

# DRILLING LOG

PROJECT : MEDAN FLOOD CONTROL

Boring No		B.04				Location		PERCUT RIVER											
Client :		CTI Engineering Co.,Ltd				Implementation		Boring Log		North Latitude									
Company's Name		PT. MELIAS KESUMA				Periode		Prepared By		Sihar TB		East Latitude							
Ground Elevation		180°		180°		Chief		Hammer Drop		Chief Operator		Suryanto							
Boring depth		24.0 M		Angle 90°		Direction 270°		Ground Slope 90°		Engineer		SPT Tools							
										Saasul Lbs		Implement							
										TOHO		Pump							
										TOHO		Drilling Methode							
										Yanmar		Rotary Drilling							
										Ground Water Table (GWL)		3.81 m							
Elevation (M)	Thickness (M)	Depth (M)	Symbol	DESCRIPTION	Ground Water Level (M)	Geological Condition	Depth of SPT (M)	Standard Penetration Test				In-Site Test				Sampling Depth (M)	Methods of sampling	D	
								Blows Penetration Each 15 Cm			N	N - VALUE							Elevation of SPT (M)
								N1	N2	N3	N	10	20	30	40	50			
3.797				Top Soil			1.00												
				Light brown Silty clay, Soil			1.45	1	2	4	6								
				Medium plasticity, Medium to high moisture content.			2.00												
							2.45	3	4	6	10								
0.017	3.78	3.78			-0.012		3.00												
							3.45	3	5	7	12								
							4.00												
-1.203	1.22	5.00		Dark grey, Silty clay, Soil, Medium plasticity, High moisture content.			4.45	2	3	5	8								
							5.00												
							5.45	4	6	10	16								270595
							6.00												
							6.45	4	7	12	19								
							7.00												
							7.45	5	6	10	16								
							8.00												
							8.45	6	8	2	10								
-5.203	4.00	9.00					9.00												
							9.45	1	1	2	3								
							10.00												
							10.45	2	2	3	5								
							11.00												
							11.45	1	1	2	3								11.00 UDS
							12.00												
							12.45	1	1	3	4								11.80 UDS
-9.053	3.85	12.85					13.00												
							13.45	8	15	16	29								280595
							14.00												
							14.45	8	15	19	34								
							15.00												
							15.45	11	15	21	36								
							16.00												
							16.45	13	17	24	41								16.00 UDS
-13.853	4.80	17.65					17.00												
							17.45	15	21	28	49								16.80 UDS
							18.00												
							18.45	17	24	29	>50								
							19.00												
							19.45	19	36	50	>50								290595
							20.00												
							20.45	17	26	31	>50								
							21.00												
							21.45	19	26	34	>50								
							22.00												
							22.45	16	22	36	>50								
							23.00												
							23.45	20	26	39	>50								21.00 DS
							24.00												
-20.653	6.80	24.45					24.45	22	27	41	>50								23.45 DS

LEGEND:

	Undisturbed Sample (UDS)		Sand		Tuff		Ground Water Level (GWL)
	Disturbed Sample (DS)		Silt		Organic		N1 Pre Testing
	Standard Penetration Test (SPT)		Clay		Gravel		

# DRILLING LOG

PROJECT : MEDAN FLOOD CONTROL

Boring No Client : Company's Name		B.05 CTI Engineering Co., Ltd PT. MELIAS KESUMA		Location PERCUT RIVER		Implementation Periods		Boring Log Prepared By		North Latitude East Latitude	
Ground Elevation		180° Angle		180° Direction		Ground Slope		Chief Engineer		Sitar TB	
Boring depth		25.0 M		0°		0°		Saiful Lba		Suryanto	
								Hammer Drop Implement		SPT Tools	
								TOHO		TOHO	
								Yaamar		Ground Water Table (GWL) 3.32 m	

No	Elevation (M)	Thickness (M)	Depth (M)	SYMBOL	DESCRIPTION	Ground Water Level (M)	Geological Condition	Depth of SPT (M)	Standard Penetration Test					In-Situ Test					Sampling Depth (M)	Methods of sampling	D a t e					
									Blows Penetration Each 15 Cm			N BLOWS N1 + N3 30 cm	Elevation of SPT (M)	Test Name and Result	N1	N2	N3	N - VALUE				10	20	30	40	50
									N1	N2	N3															
0	4.390				Top Soil																					
1					Light Yellow, Silty clay, Soil			1.00																		
2					Medium plasticity, Medium to high moisture content.			1.45	2	2	2	4														
3	1.590	2.80	2.80		Light grey, Silty clay, soft, Medium plasticity, High moisture content.	-1.070		2.45	2	2	3	5														
4								3.00	1	2	2	4														
5	-0.610	2.20	5.00					3.45	1	2	2	4														
6								4.00	2	3	3	6														
7					Dark grey, Fine sand containing clay Low density, Low plasticity, Low moisture content.			4.45	2	3	3	6														
8								5.00	1	2	3	5														
9								6.00	2	2	1	3														
10	-5.610	5.00	10.00					6.45	2	3	4	7														
11					Dark grey, Clay Medium stiffness High plasticity, Medium moisture content.			7.00	2	3	4	7														
12	-8.060	2.45	12.45					7.45	2	3	4	7														
13								8.00	3	3	2	5														
14								8.45	1	1	2	3														
15					Light grey Sandy clay Medium stiffness, High plasticity, Medium moisture content.			9.00	4	7	11	18														
16								9.45	3	7	10	17														
17	-12.480	4.42	16.87					10.00	5	9	12	21														
18								10.45	6	9	13	22														
19					Light grey Fine to medium size sand, High density Non plasticity, Low moisture content.			11.00	3	7	10	17														
20								11.45	5	9	12	21														
21								12.00	7	11	14	25														
22								12.45	5	8	12	20														
23	-18.610	6.13	23.00					13.00	7	11	14	25														
24					Dark grey Fine to medium size sand, High density Non plasticity, Low moisture content.			13.45	7	9	28	37														
25	-21.060	2.45	25.45					14.00	13	26	37	>50														
26								14.45	10	32	41	>50														
27								15.00	18	36	49	>50														
28								15.45	16	32	43	>50														
29								16.00	21	38	42	>50														
30								16.45	25	40	51	>50														
31								17.00	45	63/15	--	>50														
32								17.45	50	40/10	--	>50														

LEGEND:

- Undisturbed Sample (UDS)
- Disturbed Sample (DS)
- Standard Penetration Test (SPT)
- Sand
- Silt
- Clay
- Tuff
- Organic
- Gravel
- Ground Water Level (GWL)
- N1 Pre Testing

# DRILLING LOG

PROJECT : MEDAN FLOOD CONTROL

Boring No Client :		B.06 CTI Engineering Co.,Ltd Company's Name PT. MELIAS KESUMA				Location PERCUT RIVER		Implementation Periode 04/06/95		Boring Log Prepared By Sibar TB		North Latitude		East Latitude															
Ground Elevation		180° Angle		180° Deviation		Ground Slope		Chief Engineer		Hammer Drop Implement		SPT Tools		Chief Operator Suryanto															
Boring depth		25.0 M				90°		Boring Machine TOHO		Engine		Yanmar		Ground Water Table (GWL) 2.09 m															
S * 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 * 31 * 32 * 33 * 34 * 35	Elevation	Thickness	Depth	Symbol	DESCRIPTION	Ground Water Level	Geological Condition	Depth of SPT	Standard Penetration Test Blows Penetration Each 15 Cm			N - VALUE					Elevation of SPT	Test Name and Result	Sampling Depth	Methods of sampling	D e t a i l								
	(M)	(M)	(M)			(M)		(M)	N1	N2	N3	N2 + N3 30 cm					(M)		(M)										
0	6.947				Top Soil																								
1	5.447	1.50	1.50	✓✓✓	Light Yellow, Silty clay, Soft, Medium plasticity, Medium to high moisture content.	4.857	A l l u v i u m	1.00	2	3	4	7						5.497											
2	4.497	0.95	2.45	✓✓✓	Dark brown, Silty clay, Soft, Medium plasticity, High Moisture content.			2.00	2	4	7	11						4.497											
3				✓✓✓	Light grey, Sandy clay, Medium stiffness Medium plasticity, Medium moisture content.			3.00	9	13	18	31						3.497											
4				✓✓✓	Dark grey, Fine sand containing clay, Medium density, Low plasticity, Low to medium moisture content.			4.00	7	7	10	17						2.497											
5				✓✓✓	Light grey Fine sand containing clay, Medium to high density, Low plasticity, Low to medium moisture content.			5.00	4	9	12	21						1.497											
6	0.947	3.55	6.00	✓✓✓	Dark grey, Fine sand containing clay, Medium density, Low plasticity, Low to medium moisture content.			6.00	3	7	11	18						0.497											
7				✓✓✓	Light grey Fine sand containing clay, Medium to high density, Low plasticity, Low to medium moisture content.			7.00	7	9	13	22						-0.503											
8				✓✓✓	Light grey Fine sand containing clay, Medium to high density, Low plasticity, Low to medium moisture content.			8.00	5	11	16	27						-1.503											
9				✓✓✓	Light grey Fine sand containing clay, Medium to high density, Low plasticity, Low to medium moisture content.			9.00	7	10	13	23						-2.503											
10				✓✓✓	Light grey Fine sand containing clay, Medium to high density, Low plasticity, Low to medium moisture content.			10.00	4	7	12	19						-3.503											
11				✓✓✓	Light grey Fine sand containing clay, Medium to high density, Low plasticity, Low to medium moisture content.			11.00	7	9	11	20						-4.503											
12	-5.053	6.00	12.00	✓✓✓	Light grey Fine sand containing clay, Medium to high density, Low plasticity, Low to medium moisture content.			12.00	6	7	10	17						-5.503											
13				✓✓✓	Light grey Fine sand containing clay, Medium to high density, Low plasticity, Low to medium moisture content.			13.00	6	9	12	21						-6.503											
14				✓✓✓	Light grey Fine sand containing clay, Medium to high density, Low plasticity, Low to medium moisture content.			14.00	6	7	7	14						-7.503											
15				✓✓✓	Light grey Fine sand containing clay, Medium to high density, Low plasticity, Low to medium moisture content.			15.00	6	13	17	30						-8.503											
16				✓✓✓	Light grey Fine sand containing clay, Medium to high density, Low plasticity, Low to medium moisture content.			16.00	8	16	28	44						-9.503											
17				✓✓✓	Light grey Fine sand containing clay, Medium to high density, Low plasticity, Low to medium moisture content.			17.00	7	16	32	48						-10.503											
18				✓✓✓	Light grey Fine sand containing clay, Medium to high density, Low plasticity, Low to medium moisture content.			18.00	8	14	30	44						-11.503											
19	-12.053	7.00	19.00	✓✓✓	Light grey Fine sand containing clay, Medium to high density, Low plasticity, Low to medium moisture content.			19.00	12	18	37	>50						-12.503											
20				✓✓✓	Light grey Fine sand containing clay, Medium to high density, Low plasticity, Low to medium moisture content.			20.00	14	21	40	>50						-13.503											
21				✓✓✓	Light grey Fine to medium size sand, High density Non plasticity, Low moisture content.			21.00	17	28	42	>50						-14.503											
22				✓✓✓	Light grey Fine to medium size sand, High density Non plasticity, Low moisture content.			22.00	25	51	-	>50						-15.503											
23				✓✓✓	Light grey Fine to medium size sand, High density Non plasticity, Low moisture content.			23.00	27	56	-	>50						-16.503											
24				✓✓✓	Light grey Fine to medium size sand, High density Non plasticity, Low moisture content.			24.00	23	41	51	>50						-17.503											
25	-18.503	6.45	25.45	✓✓✓	Light grey Fine to medium size sand, High density Non plasticity, Low moisture content.			25.00	25	49	51	>50						-18.503											

LEGEND:

	Undisturbed Sample (UDS)		Sand		Tuff		Ground Water Level (GWL)
	Disturbed Sample (DS)		Silt		Organic		N1 Pre Testing
	Standard Penetration Test (SPT)		Clay		Gravel		

# DRILLING LOG

PROJECT : MEDAN FLOOD CONTROL

Boring No Client: Company's Name		B.07 CTI Engineering Co., Ltd PT. MELIAS KESUMA		Location PERCUT RIVER		Implementation 08/06/95 11/06/95		Boring Log Prepared By Sihar TB		North Latitude East Latitude	
Ground Elevation		180° Angle		180° Direction		Ground Slope		Chief Engineer Samsul Lbs		Chief Operator Suryanto	
Boring depth 25.0 M		90°		270°		90°		Hammer Drop Implement TOHO		SPT Tools TOHO	
								Drilling Method Rotary Drilling		Ground Water Table (GWL) 1.21 m	

No	Elevation (M)	Thickness (M)	Depth (M)	Symbol	DESCRIPTION	Ground Water Level (M)	Geological Condition	Depth of SPT (M)	Standard Penetration Test					In-Situ Test					Sampling Depth (M)	Methods of sampling	D o i e		
									Blows Penetration Each 15 Cm			N - VALUE	Elevation of SPT (M)	Test Name and Result	N1	N2	N3						
									N1	N2	N3							10				20	30
0	7.202				Top Soil																		
1	5.702	1.50	1.50	∩ ∩ ∩ ∩	Light brown, Silty clay, Medium stiff, Medium plasticity, Medium to high moisture content.	5.992	A	1.00															
2	4.202	1.50	3.00	∩ ∩ ∩ ∩	Dark grey, Sandy clay, Soft, Medium plasticity, Medium to high moisture content.		A	1.45	1	1	1	2											
3	2.202	2.00	5.00	∩ ∩ ∩ ∩	Dark grey, Sandy clay, Medium stiffness, Medium plasticity, Medium to high moisture content.		A	2.00	1	2	2	4											
4				∩ ∩ ∩ ∩	Dark grey, Sandy clay, Medium stiffness, Medium plasticity, Medium to high moisture content.		A	3.45	6	9	14	23											
5				∩ ∩ ∩ ∩	Dark grey, Fine sand, Low to medium density, Non plasticity, Low moisture content.		A	4.00	4	8	11	19											
6				∩ ∩ ∩ ∩	Dark grey, Fine sand, Low to medium density, Non plasticity, Low moisture content.		A	4.45	4	8	11	19											
7				∩ ∩ ∩ ∩	Dark grey, Fine sand, Low to medium density, Non plasticity, Low moisture content.		A	6.00	6	7	15	22											
8				∩ ∩ ∩ ∩	Dark grey, Fine sand, Low to medium density, Non plasticity, Low moisture content.		A	6.45	2	6	8	14											
9				∩ ∩ ∩ ∩	Dark grey, Fine sand, Low to medium density, Non plasticity, Low moisture content.		A	7.00	4	7	10	17											
10				∩ ∩ ∩ ∩	Dark grey, Fine sand, Low to medium density, Non plasticity, Low moisture content.		A	7.45	4	7	10	17											
11				∩ ∩ ∩ ∩	Dark grey, Fine sand, Low to medium density, Non plasticity, Low moisture content.		A	8.00	4	6	8	14											
12				∩ ∩ ∩ ∩	Dark grey, Fine sand, Low to medium density, Non plasticity, Low moisture content.		A	8.45	4	6	8	14											
13				∩ ∩ ∩ ∩	Dark grey, Fine sand, Low to medium density, Non plasticity, Low moisture content.		A	9.00	5	7	10	17											
14				∩ ∩ ∩ ∩	Dark grey, Fine sand, Low to medium density, Non plasticity, Low moisture content.		A	9.45	5	7	10	17											
15				∩ ∩ ∩ ∩	Dark grey, Fine sand, Low to medium density, Non plasticity, Low moisture content.		A	10.00	3	7	16	23											
16				∩ ∩ ∩ ∩	Dark grey, Fine sand, Low to medium density, Non plasticity, Low moisture content.		A	10.45	3	7	16	23											
17				∩ ∩ ∩ ∩	Dark grey, Fine sand, Low to medium density, Non plasticity, Low moisture content.		A	11.00	5	9	13	22											
18				∩ ∩ ∩ ∩	Dark grey, Fine sand, Low to medium density, Non plasticity, Low moisture content.		A	11.45	5	9	13	22											
19				∩ ∩ ∩ ∩	Dark grey, Fine sand, Low to medium density, Non plasticity, Low moisture content.		A	12.00	2	3	1	4											
20				∩ ∩ ∩ ∩	Dark grey, Fine sand, Low to medium density, Non plasticity, Low moisture content.		A	12.45	2	3	1	4											
21				∩ ∩ ∩ ∩	Dark grey, Fine sand, Low to medium density, Non plasticity, Low moisture content.		A	13.00	2	2	6	8											
22				∩ ∩ ∩ ∩	Dark grey, Fine sand, Low to medium density, Non plasticity, Low moisture content.		A	13.45	2	2	6	8											
23				∩ ∩ ∩ ∩	Dark grey, Fine sand, Low to medium density, Non plasticity, Low moisture content.		A	14.00	2	3	5	8											
24				∩ ∩ ∩ ∩	Dark grey, Fine sand, Low to medium density, Non plasticity, Low moisture content.		A	14.45	2	3	5	8											
25				∩ ∩ ∩ ∩	Dark grey, Fine sand, Low to medium density, Non plasticity, Low moisture content.		A	15.00	5	9	12	21											
26				∩ ∩ ∩ ∩	Dark grey, Fine sand, Low to medium density, Non plasticity, Low moisture content.		A	15.45	5	9	12	21											
27				∩ ∩ ∩ ∩	Dark grey, Fine sand, Low to medium density, Non plasticity, Low moisture content.		A	16.00	7	11	15	26											
28				∩ ∩ ∩ ∩	Dark grey, Fine sand, Low to medium density, Non plasticity, Low moisture content.		A	16.45	7	11	15	26											
29				∩ ∩ ∩ ∩	Dark grey, Fine sand, Low to medium density, Non plasticity, Low moisture content.		A	17.00	11	16	19	35											
30				∩ ∩ ∩ ∩	Dark grey, Fine sand, Low to medium density, Non plasticity, Low moisture content.		A	17.45	11	16	19	35											
31				∩ ∩ ∩ ∩	Dark grey, Fine sand, Low to medium density, Non plasticity, Low moisture content.		A	18.00	19	31	41	>50											
32				∩ ∩ ∩ ∩	Dark grey, Fine sand, Low to medium density, Non plasticity, Low moisture content.		A	18.45	19	31	41	>50											
33				∩ ∩ ∩ ∩	Dark grey, Fine sand, Low to medium density, Non plasticity, Low moisture content.		A	19.00	23	36	43	>50											
34				∩ ∩ ∩ ∩	Dark grey, Fine sand, Low to medium density, Non plasticity, Low moisture content.		A	19.45	23	36	43	>50											
35				∩ ∩ ∩ ∩	Dark grey, Fine sand, Low to medium density, Non plasticity, Low moisture content.		A	20.00	43	60/6	-	>50											
36				∩ ∩ ∩ ∩	Dark grey, Fine sand, Low to medium density, Non plasticity, Low moisture content.		A	20.45	43	60/6	-	>50											
37				∩ ∩ ∩ ∩	Dark grey, Fine sand, Low to medium density, Non plasticity, Low moisture content.		A	21.00	41	52	58/7	>50											
38				∩ ∩ ∩ ∩	Dark grey, Fine sand, Low to medium density, Non plasticity, Low moisture content.		A	21.45	45	51	60/9	>50											
39				∩ ∩ ∩ ∩	Dark grey, Fine sand, Low to medium density, Non plasticity, Low moisture content.		A	22.00	45	51	60/9	>50											
40				∩ ∩ ∩ ∩	Dark grey, Fine sand, Low to medium density, Non plasticity, Low moisture content.		A	22.45	43	58/9	-	>50											
41				∩ ∩ ∩ ∩	Dark grey, Fine sand, Low to medium density, Non plasticity, Low moisture content.		A	23.00	40	54	60/8	>50											
42				∩ ∩ ∩ ∩	Dark grey, Fine sand, Low to medium density, Non plasticity, Low moisture content.		A	23.45	45	51/8	60/6	>50											

LEGEND:

	Undisturbed Sample (UDS)		Sand		Tuff		Ground Water Level (GWL)
	Disturbed Sample (DS)		Silt		Organic		N1 Pre Testing
	Standard Penetration Test (SPT)		Clay		Gravel		

# DRILLING LOG

PROJECT : MEDAN FLOOD CONTROL

Boring No		B.08		Location		PERCUT RIVER											
Client :		CTI Engineering Co., Ltd		Implementation		29/06/95		Boring Log		North Latitude							
Company's Name		PT. MELIAS KESUMA		Periods		03/07/95		Prepared By		Sihar TB							
Ground Elevation		180°		Direction		180°		Chief Engineer		Samsul Uls							
Boring depth		26.0 M		Ground Slope		0°		Boring Machine		TOHO							
		Angle		90°		90°		Engineer		Yasmar							
		Diagram		Diagram		Diagram		Implement		SPT Tools							
		Diagram		Diagram		Diagram		Pump		TOHO							
		Diagram		Diagram		Diagram		Ground Water Table (GWL)		Chief Operator							
		Diagram		Diagram		Diagram				Suryanto							
		Diagram		Diagram		Diagram				Drilling Method							
		Diagram		Diagram		Diagram				Rotary Drilling							
Elevation (M)	Thickness (M)	Depth (M)	Symbol	DESCRIPTION	Ground Water Level (M)	Geological Condition	Depth of SPT (M)	Standard Penetration Test			In-Situ Test				Sampling Depth (M)	Methods of sampling	Date
								Blow Penetration Each 15 Cm	N	N - VALUE	Elevation of SPT (M)	Test Name and Result					
5.106				Top Soil													
3.256	1.85	1.85		Light brown, Silty Clay, Very soft, Low to Medium plasticity, High moisture content.			1.00										
							1.45										
							2.00										
							2.45	3	5	8	13						
							3.00										
							3.45	3	6	10	16						
							4.00										
							4.45	5	5	7	12						
							5.00										
							5.45	3	5	10	15			5.00	DS		
							6.00							5.45			
							6.45	5	4	7	11						
							7.00										
							7.45	5	5	8	13						
							8.00										
							8.45	3	6	9	15						
							9.00										
							9.45	5	8	11	19						
							10.00										
							10.45	2	2	3	5						
							11.00										
							11.45	2	7	10	17			11.00	UDS	01/07/95	
							12.00										
							12.45	7	11	16	27			11.80			
							13.00										
							13.45	4	7	9	16						
							14.00										
							14.45	6	6	11	17			14.00	UDS		
							15.00										
							15.45	11	19	26	45			14.80			
							16.00										
							16.45	16	28	37	>50						
							17.00										
							17.45	14	26	38	>50						
							18.00										
							18.45	21	33	46	>50						
							19.00										
							19.45	30	53	64	>50						
							20.00										
							20.45	27	46	57	>50						
							21.00										
							21.45	23	41	52	>50						
							22.00										
							22.45	27	45	56	>50						
							23.00										
							23.45	21	37	54	>50						
							24.00										
							24.45	29	40	14	>50						
							25.00										
							25.45	32	45	54	>50						
							26.00										
							26.45	36	54	6	>50						

LEGEND:

	Undisturbed Sample (UDS)		Sand		Tuff		Ground Water Level (GWL)
	Disturbed Sample (DS)		Silt		Organic		N1 Pre Testing
	Standard Penetration Test (SPT)		Clay		Gravel		

# DRILLING LOG

PROJECT : MEDAN FLOOD CONTROL

Boring No Client : Company's Name		B.09 CTI Engineering Co.,Ltd PT. MELIAS KESUMA			Location PERCUT RIVER		Implementation Periode		16/06/95 19/06/95		Boring Log Prepared By		Sibar TB		North Latitude East Latitude		
Ground Elevation		180° Angle		180° Direction		0° Ground Slope		Chief Engineer		Sanusi Iba		Hammer Drop Implement		SPT Tools		Chief Operator Suryanto	
Boring depth		19.0 M		270° 180°		90°		Boring Machine Engineer		TOHO Yannar		Pump Ground Water Table (GWL)		TOHO		Drilling Methods Rotary Drilling	

Elevation (M)	Thickness (M)	Depth (M)	Symbol	DESCRIPTION	Ground Water Level (M)	Geological Condition	Depth of SPT (M)	Standard Penetration Test					In-Situ Test					Sampling Depth (M)	Methods of sampling	Date
								Blow Penetration Each 15 Cm			N	N - VALUE				Elevation of SPT (M)	Test Name and Result			
								N1	N2	N3	N2 + N3	10	20	30	40	50				
7.284				Top Soil																
				Light brown, Sandy clay, Soil, Medium plasticity, Medium to high moisture content.			1.00													
							1.45	2	2	4	6									
							2.00													
							2.45	4	5	8	13									
4.284	3.00	3.00					3.00													
					4.092		3.45	2	3	5	8									
							4.00													
				Light grey, Sandy clay, Soil to medium stiffness, Medium to high plasticity, Medium moisture content.			4.45	5	11	18	29							4.00	DS	17/06/95
							5.00											4.45		
							5.45	4	7	11	18							6.00	UDS	
							6.00											6.80		
							6.45	5	5	7	12							6.80	UDS	
							7.00													
							7.45	3	7	7	14									
-0.496	4.78	7.78		Dark grey, Sandy clay, Soil, Medium plasticity, Medium to high moisture content.			8.00													
							8.45	1	1	2	3									
							9.00													
							9.45	1	1	1	2									
							10.00													
							10.45	2	2	7	9									
							11.00													
							11.45	1	3	3	6									
							12.00													
							12.45	3	3	7	10									
-5.566	3.07	12.85					13.00													
							13.45	4	6	8	14									
				Dark grey, Sand, Medium density, Non plasticity, Low moisture content.			14.00													
							14.45	4	8	11	19									
							15.00													
							15.45	4	7	15	22									
-8.496	2.93	15.78					16.00													
							16.45	17	36	45	>50									
				Light grey Fine sand and Tuff High density, Non plasticity, Low moisture content.			17.00													
							17.45	21	44	63	>50									
							18.00													
							18.45	25	51	70	>50									
							19.00													
-12.166	3.67	19.45					19.45	26	43	60	>50									

LEGEND:

	Undisturbed Sample (UDS)		Sand		Tuff		Ground Water Level (GWL)
	Disturbed Sample (DS)		Silt		Organic		N1 Pre Testing
	Standard Penetration Test (SPT)		Clay		Gravel		

# DRILLING LOG

PROJECT : MEDAN FLOOD CONTROL

Boring No		B.10				Location		PERCUT RIVER											
Client :		CTI Engineering Co., Ltd				Implementation		Boring Log		North Latitude									
Company's Name		PT. MELLIAS KESUMA				Periode		Prepared By		East Latitude									
Ground Elevation		180°		180°		Chief Engineer		Hammer Drop Implement		Chief Operator									
Boring depth		Angle		Direction		Sanusi Lbs		SPT Tools		Suryanto									
20.0 M		90°		180°		Boring Machine		TOHO		Drilling Method									
		Slope		90°		Engine		Yaumar		Rotary Drilling									
								Ground Water Table (GWL)		1.66 m									
No	Elevation (M)	Thickness (M)	Depth (M)	Symbol	DESCRIPTION	Ground Water Level (M)	Geological Condition	Depth of SPT (M)	Standard Penetration Test					In-Situ Test		Sampling Depth (M)	Methods of sampling	Date	
									Blows Penetration Each 15 Cm			N - VALUE	Elevation of SPT (M)	Test Name and Result					
								N1	N2	N3	N2 + N3				10	20	30	40	50
0	6.315				Top Soil														
1					Light brown, Silty clay, Soil, Medium plasticity, Medium to high moisture content.	4.675	A	1.00											
2	4.315	2.00	2.00		Light brown, Silty clay, Soil, Medium plasticity, Medium to high moisture content.		I	1.45	4	2	3	5							
3	3.315	1.00	3.00		Light brown, Silty clay, Soil, Medium plasticity, High moisture content.		U	2.00											
4					Light grey, Silty clay, Soil to medium stiffness, Medium to high plasticity, Medium moisture content.		V	2.45	3	1	1	2							
5					Light grey, Silty clay, Soil to medium stiffness, Medium to high plasticity, Medium moisture content.		M	3.00	7	11	11	22							
6	0.425	2.89	5.89		Light grey, Silty clay, Soil to medium stiffness, Medium to high plasticity, Medium moisture content.		D	4.00	4	4	7	11							
7					Light grey, Fine sand containing clay, Low density, Low plasticity, Low moisture content.		F	4.45	4	4	7	11							
8					Light grey, Fine sand containing clay, Low density, Low plasticity, Low moisture content.		R	5.00	5	7	10	17							
9					Light grey, Fine sand containing clay, Low density, Low plasticity, Low moisture content.		M	6.00	4	7	12	19							
10					Light grey, Fine sand containing clay, Low density, Low plasticity, Low moisture content.		S	6.45	4	7	12	19							
11	-5.335	5.76	11.65		Light grey, Fine sand containing clay, Low density, Low plasticity, Low moisture content.		I	7.00	3	5	7	12							
12					Dark grey, Sand, Medium density, Non plasticity, Low moisture content.		U	7.45	3	5	7	12							
13					Dark grey, Sand, Medium density, Non plasticity, Low moisture content.		V	8.00	4	7	11	18							
14					Dark grey, Sand, Medium density, Non plasticity, Low moisture content.		M	8.45	4	7	11	18							
15					Dark grey, Sand, Medium density, Non plasticity, Low moisture content.		D	9.00	4	6	6	12							
16	-9.685	4.35	16.00		Dark grey, Sand, Medium density, Non plasticity, Low moisture content.		F	9.45	4	6	6	12							
17					Light grey, Fine sand and Tuff, High density, Non plasticity, Low moisture content.		R	10.00	4	7	10	17							
18					Light grey, Fine sand and Tuff, High density, Non plasticity, Low moisture content.		S	10.45	4	7	10	17							
19					Light grey, Fine sand and Tuff, High density, Non plasticity, Low moisture content.		I	11.00	5	5	8	13							
20	-14.135	4.45	20.45		Light grey, Fine sand and Tuff, High density, Non plasticity, Low moisture content.		V	11.45	5	5	8	13							
21					Light grey, Fine sand and Tuff, High density, Non plasticity, Low moisture content.		M	12.00	8	12	12	24							
22					Light grey, Fine sand and Tuff, High density, Non plasticity, Low moisture content.		U	12.45	8	12	12	24							
23					Light grey, Fine sand and Tuff, High density, Non plasticity, Low moisture content.		V	13.00	7	11	14	25							
24					Light grey, Fine sand and Tuff, High density, Non plasticity, Low moisture content.		M	13.45	7	11	14	25							
25					Light grey, Fine sand and Tuff, High density, Non plasticity, Low moisture content.		D	14.00	8	12	14	26							
26					Light grey, Fine sand and Tuff, High density, Non plasticity, Low moisture content.		F	14.45	8	12	14	26							
27					Light grey, Fine sand and Tuff, High density, Non plasticity, Low moisture content.		R	15.00	7	10	16	26							
28					Light grey, Fine sand and Tuff, High density, Non plasticity, Low moisture content.		S	15.45	7	10	16	26							
29					Light grey, Fine sand and Tuff, High density, Non plasticity, Low moisture content.		I	16.00	10	16	22	38							
30					Light grey, Fine sand and Tuff, High density, Non plasticity, Low moisture content.		V	16.45	10	16	22	38							
31					Light grey, Fine sand and Tuff, High density, Non plasticity, Low moisture content.		M	17.00	14	20	26	46							
32					Light grey, Fine sand and Tuff, High density, Non plasticity, Low moisture content.		U	17.45	14	20	26	46							
33					Light grey, Fine sand and Tuff, High density, Non plasticity, Low moisture content.		V	18.00	14	19	26	45							
34					Light grey, Fine sand and Tuff, High density, Non plasticity, Low moisture content.		M	18.45	14	19	26	45							
35					Light grey, Fine sand and Tuff, High density, Non plasticity, Low moisture content.		D	19.00	17	20	32	>50							
					Light grey, Fine sand and Tuff, High density, Non plasticity, Low moisture content.		F	19.45	17	20	32	>50							
					Light grey, Fine sand and Tuff, High density, Non plasticity, Low moisture content.		R	20.00	19	26	34	>50							

LEGEND:

	Undisturbed Sample (UDS)		Sand		Tuff		Ground Water Level (GWL)
	Disturbed Sample (DS)		Silt		Organic		N1 Pre Testing
	Standard Penetration Test (SPT)		Clay		Gravel		

# DRILLING LOG

PROJECT : MEDAN FLOOD CONTROL

Boring No Client :		8.11 CTI Engineering Co., Ltd		Location		PERCUT RIVER															
Company's Name		PT. MELIAS KESUMA		Implementation Periode	20/06/95	Boring Log Prepared By	Sihar TB	North Latitude		East Latitude											
Ground Elevation		180° Angle	90°	180° Direction	90°	Ground Slope	0°	Chief Engineer	Sausil Lbs	Hammer Drop Implement	SPT Tools	Chief Operator	Suryanto								
Boring depth	24.0 M					Boring Machine	TOHO	Pump	TOHO	Drilling Method	Rotary Drilling										
						Engine	Yanmar	Ground Water Table (GWL)	2.276 m												
2.276																					
Elevation (M)	Thickness (M)	Depth (M)	Symbol	DESCRIPTION	Ground Water Level (M)	Geological Condition	Depth of SPT (M)	Standard Penetration Test					In-Situ Test		Sampling Depth (M)	Methods of sampling	D ata e				
								Blow Penetration Each 15 Cm			N BLOWS		Elevation of SPT (M)	Test Name and Result							
								N1	N2	N3	N2 + N3 30 cm	10			20	30	40	50			
7.672				Top Soil																	
				Light brown, Sandy clay, Soil, Medium plasticity, Medium to high moisture content.	5.396	A I l i m e n t	1.00		4	5	7	12									
	2.45	2.45					1.45														
				Light grey, Silty clay, Soil Medium plasticity, High moisture content.			2.00		1	2	3	5								2.00	UDS
							2.45														
							3.00		2	3	5	8									
							3.45														
							4.00		2	4	7	11									
							4.45														
							5.00		2	3	7	10									
							5.45														
	1.172	4.05	6.50				6.00		3	5	2	7									
							6.45														
							7.00		3	3	5	8									
				Dark grey, Sandy clay, Soil, Medium plasticity, Medium to high moisture content.			7.45														
							8.00		2	2	5	7									
							8.45														
							9.00		3	3	7	10									
							9.45														
	-2.108	-3.28	9.78	Dark grey, Silty clay containing peat material. Very soft, Low to medium plasticity, Medium to high moisture content.		M e d i a n	10.00		2	1	3	4									
							10.45														
							11.00		2	2	1	3									
							11.45														
							12.00		1	1	1	2									
							12.45														
	-5.178	-3.07	12.85	Light brown, Clay, Silty High plasticity, Low moisture content.		D i l l u v i u m	13.00		3	7	11	18									
							13.45														
							14.00		3	5	10	15									
							14.45														
							15.00		18	23	26	49									
							15.45														
							16.00		21	26	35	>50									
							16.45														
							17.00		17	24	33	>50									
							17.45														
							18.00		16	26	37	>50									
				Light brown, Fine sand, High density, Non plasticity, Low moisture content.			18.45														
							19.00		14	19	28	47									
							19.45														
							20.00		14	21	30	>50									
							20.45														
							21.00		17	26	34	>50									
							21.45														
							22.00		19	23	39	>50									
							22.45														
							23.00		21	35	43	>50									
							23.45														
							24.00		37	41	30	>50									
	16.778	9.63	24.45				24.45														

LEGEND:

	Undisturbed Sample (UDS)		Sand		Tuff		Ground Water Level (GWL)
	Disturbed Sample (DS)		Silt		Organic		N1 Pre Testing
	Standard Penetration Test (SPT)		Clay		Gravel		

# DRILLING LOG

PROJECT : MEDAN FLOOD CONTROL

Boring No		B.12			Location		PERCUT RIVER			
Client :		CTI Engineering Co., Ltd			Implementation		Boring Log		North Latitude	
Company's Name		PT. MELIAS KESUMA			Periode		Prepared By		East Latitude	
Ground Elevation		Angle		Direction		Ground Slope		Chief Engineer		
		180°		180°		0°		Snuai Lhs		
		90°		270°		90°		Hammer Drop Implement		
Boring depth		33.0 M				ZT-100		SPT Tools		
						Engine		Robis		
						Lushas		Chief Operator		
								Aturea		
								Drilling Methode		
								Rotary Drilling		
								Ground Water Table (GWL)		
								3.26 m		

Elevation (M)	Thickness (M)	Depth (M)	Symbol	DESCRIPTION	Ground Water Level (M)	Geological Condition	Depth of SPT (M)	Standard Penetration Test					In-Situ Test					Sampling Depth (M)	Methods of sampling	Date	
								Blow Penetration Each 15 Cm			N - VALUE	Elevation of SPT (M)	Test Name and Result	Sampling	Methods	Date					
								N1	N2	N3							N2 + N3				10
7.877				Top Soil			1.00														
				Grey Silty clay, Sandy clay, SoB, Medium plasticity, Medium to high moisture content.	4.617	Aluvium	1.45	2	3	3	6										
							2.00														
							2.45	3	3	4	7										
							3.00														
							3.45	3	4	4	8										
							4.00														
							4.45	1	2	4	6										
3.077	4.80	4.80		Dark grey, Fine sand containing clay Medium density, Low plasticity, Low moisture content.		Medium	3.45	7	11	12	23										
							6.00														
2.027	1.05	5.85		Grey Silty clay, SoB, Medium plasticity, Medium to high moisture content.		Medium	4.45	2	3	3	6										
							7.00														
							7.45	1	1	2	3										
							8.00														
							8.45	1	2	2	4										
-0.823	2.85	8.70					9.00														
							9.45	2	3	4	7										
							10.00														
							10.45	2	3	3	6										
							11.00														
							11.45	2	3	5	8										
							12.00														
				Light grey, Fine sandy clay, SoB to medium stiffness, medium to high plasticity, Medium to high moisture content.		Medium	12.45	2	2	5	7										
							13.00														
							13.45	2	3	5	8										
							14.00														
							14.45	2	3	3	6										
							15.00														
							15.45	3	4	5	9										
							16.00														
							16.45	3	3	5	8										
							17.00														
							17.45	4	8	11	19										
							18.00														
							18.45	7	13	15	28										
							19.00														
-10.293	10.17	18.87					19.45	11	20	25	43										
							20.00														
							20.45	10	25	30	>50										
							21.00														
							21.45	11	14	20	34										
							22.00														
				Grey, Fine sand, High density, Non plasticity, Low moisture content.		Medium	22.45	13	17	18	35										
							23.00														
							23.45	10	11	17	28										
							24.00														
							24.45	7	10	14	24										
							25.00														
							25.45	12	17	25	42										
							26.00														
							26.45	10	15	22	37										
							27.00														
-12.623	8.63	27.50					27.45	12	16	20	36										
							28.00														
							28.45	18	20	23	43										
							29.00														
				Grey Fine to medium size sand containing small gravel High density, Non plasticity, Low moisture content.		Medium	29.45	17	21	23	44										
							30.00														
							30.45	16	21	26	47										
							31.00														
							31.45	18	26	27	>50										
							32.00														
							32.45	19	26	29	>50										
							33.00														
-25.573	5.95	33.45					33.45	20	26	31	>50										

**LEGEND:**

	Undisturbed Sample (UDS)		Sand		Tuff		Ground Water Level (GWL)
	Disturbed Sample (DS)		Silt		Organic		N1 Pre Testing
	Standard Penetration Test (SPT)		Clay		Gravel		

# DRILLING LOG

PROJECT : MEDAN FLOOD CONTROL

Boring No Client :		B.13 CTI Engineering Co.,Ltd PT. MELIAS KESUMA				Location PERCUT RIVER		Implementation Period		Boring Log Prepared By		North Latitude East Latitude									
Ground Elevation		180° Angle		180° Direction		Ground Slope		Chief Engineer		Hammer Drop Implement		Chief Operator									
Boring depth		90°		270°		0°		Saastu Lbr		SPT Tools		Alrean									
31.0 M		90°		180°		90°		ZT-100		Robia		Rotary Drilling									
						Lushan		Ground Water Level (GWL)		2.778 m											
No	Elevation (M)	Thickness (M)	Depth (M)	Symbol	DESCRIPTION	Ground Water Level (M)	Geological Condition	Depth of SPT (M)	Standard Penetration Test					In-Situ Test		Sampling Depth (M)	Methods of sampling	D a t a			
									Blows Penetration Each 15 Cm			N BLOWS		N - VALUE					Elevation of SPT (M)	Test Name and Result	
									N1	N2	N3	N1 + N2 30 cm	10	20	30	40	50				
0	8.793				Top Soil																
1								1.00													
2					Light gray Clay containing fine sand Soil, Medium plasticity, Medium to high moisture content.	6.023	A l l u v i u m	1.45	2	1	3	4									
3								2.00													
4								3.00	3	3	3	6									
5								4.00	2	3	4	7									
6	3.013	5.78	5.78					4.45	3	4	6	10									
7					Dark gray, fine sand containing clay Low density, Low to medium plasticity, Low moisture content.			5.00													
8								6.00	3	4	5	9									
9								6.45	1	2	2	4									
10	-1.007	4.02	9.80		Dark gray, Organic clay, Soft, Low plasticity, High moisture content.			7.00													
11								7.45	2	3	3	6									
12								8.00	2	2	3	5									
13								8.45	2	2	3	5									
14								9.00	3	4	5	9									
15								9.45													
16								10.00	1	2	2	4									
17	-2.747	1.74	11.54					10.45	1	2	2	4									
18								11.00													
19								11.45	2	2	3	5									
20								12.00													
21								12.45	2	4	6	10									
22								13.00													
23								13.45	2	3	4	7									
24								14.00													
25								14.45	3	4	6	10									
26								15.00													
27								15.45	3	4	5	9									
28								16.00													
29								16.45	2	4	4	8									
30								17.00													
31								17.45	8	31	38	>50									
32								18.00													
33								18.45	10	14	26	40									
34								19.00													
35								19.45	8	13	20	33									
36								20.00													
37								20.45	8	11	16	27									
38								21.00													
39								21.45	10	13	15	28									
40								22.00													
41								22.45	9	15	20	35									
42								23.00													
43								23.45	11	20	22	42									
44								24.00													
45								24.45	12	14	17	31									
46								25.00													
47								25.45	10	16	17	33									
48								26.00													
49								26.45	16	13	23	36									
50								27.00													
51								27.45	10	26	29	>50									
52								28.00													
53								28.45	14	20	27	47									
54								29.00													
55								29.45	16	19	32	>50									
56								30.00													
57								30.45	17	21	34	>50									
58								31.00													
59								31.45	15	19	30	49									

LEGEND:

	Undisturbed Sample (UDS)		Sand		Tuff		Ground Water Level (GWL)
	Disturbed Sample (DS)		Silt		Organic		N1 Pre Testing
	Standard Penetration Test (SPT)		Clay		Gravel		

# DRILLING LOG

PROJECT : MEDAN FLOOD CONTROL

Boring No Client : Company's Name		B.14 CTI Engineering Co.,Ltd PT. MELLAS KESUMA				Location PERCUT RIVER		Implementation Periods 04/06/95 07/06/95		Boring Log Prepared By Sihar TB		North Latitude East Latitude							
Ground Elevation	180° Angle	180° Direction	Ground Slope	Chief Engineer	Sanusi Lba	Hammer Drop Implement	SPT Tools	Chief Operator	Aturen		Drilling Methods								
Boring depth	27.0 M	90°	270°	90°	Boring Machine Enggine	SGZ-1A Lushaa	Pump	Robie	Rotary Drilling		Ground Water Table (GWL) : 2.28 m								
Elevation (M)	Thickness (M)	Depth (M)	Symbol	DESCRIPTION	Ground Water Level (M)	Geological Condition	Depth of SPT (M)	Standard Penetration Test					In-Situ Test		Sampling Depth (M)	Methods of sampling	Date		
								Blow Penetration Each 15 Cm			N - VALUE		Elevation of SPT (M)	Test Name and Result					
								N1	N2	N3	N2 + N3 30 cm	10	20	30	40	50			
0	11.941			Top Soil															
1				Light grey, Clay, stiffness, High plasticity, Medium to high moisture content.		Al	1.00												
2	10.141	1.80	1.80			Al	1.45	6	11	14	25								
3				Light grey, Clay Soft	9.461	Al	2.00												
4				Medium plasticity, High moisture content.		Al	2.45	2	3	3	6								
5	7.341	2.80	4.60			Al	3.00												
6				Light grey, Clay Medium stiffness		Al	3.45	1	2	2	4								
7				High plasticity, Medium to high moisture content.		Al	4.00												
8	4.941	2.40	7.00			Al	4.45	3	4	4	8								
9				Dark grey, Sand, Medium density, Non plasticity, Low moisture content.		Al	5.45	3	6	9	15								
10						Al	6.00												
11				Light grey, Silty clay, Sandy clay, Soft, Medium to high plasticity, High moisture content.		Al	6.45	4	8	12	20								
12						Al	7.00												
13						Al	7.45	3	5	8	13								
14						Al	8.00												
15						Al	8.45	4	6	8	14								
16						Al	9.00												
17						Al	9.45	3	3	4	7								
18						Al	10.00												
19						Al	10.45	2	3	3	6								
20						Al	11.00												
21						Al	11.45	2	3	6	9								
22						Al	12.00												
23						Al	12.45	2	3	5	8								
24						Al	13.00												
25						Al	13.45	4	4	6	10								
26						Al	14.00												
27						Al	14.45	5	5	8	13								
28						Al	15.00												
29						Al	15.45	3	7	15	22								
30						Al	16.00												
31						Al	16.45	7	8	8	16								
32						Al	17.00												
33						Al	17.45	4	7	8	15								
34						Al	18.00												
35						Al	18.45	4	6	9	15								
36						Al	19.00												
37						Al	19.45	4	6	7	13								
38						Al	20.00												
39						Al	20.45	2	2	3	5								
40						Al	21.00												
41						Al	21.45	7	10	14	24								
42						Al	22.00												
43						Al	22.45	10	15	17	32								
44						Al	23.00												
45						Al	23.45	8	14	25	39								
46						Al	24.00												
47						Al	24.45	9	17	27	44								
48						Al	25.00												
49						Al	25.45	7	18	20	38								
50						Al	26.00												
51						Al	26.45	10	16	26	42								
52						Al	27.00												
53						Al	27.45	13	25	39	>50								

LEGEND:

	Undisturbed Sample (UDS)		Sand		Tuff		Ground Water Level (GWL)
	Disturbed Sample (DS)		Silt		Organic		N1 Pre Testing
	Standard Penetration Test (SPT)		Clay		Gravel		

# DRILLING LOG

PROJECT : MEDAN FLOOD CONTROL

Boring No Client :		B.15 CTI Engineering Co., Ltd PT. MELIAS KESUMA			Location PERCUT RIVER		Implementation Periods		Boring Log Prepared By		North Latitude		East Latitude								
Company's Name					Chief Engineer		Sanni Lbs		Hammer Drop Implement		Sihar TB										
Ground Elevation		180° Angle		180° Direction		Ground Slope		Boring Machine		SPT Tools		Chief Operator									
Boring depth		35.0 M				90°		SGZ-1A		Robin		Atures									
								Lushan		Ground Water Table (GWL)		4.10 m									
No	Elevation (M)	Thickness (M)	Depth (M)	Symbol	DESCRIPTION	Ground Water Level (M)	Ecological Condition	Depth of SPT (M)	Standard Penetration Test				In-Situ Test				Sampling Depth (M)	Methods of sampling	D		
									Blows Penetration Each 15 Cm			N	N -- VALUE							Elevation of SPT (M)	Test Name and Result
									N1	N2	N3	N2 + N3	10	20	30	40	50				
0	13.976				Top Soil																
1	12.326	1.65	1.65		Light grey, Soft clay, Medium stiff, High plasticity, Medium to high moisture content.			1.00													
2					Brownish dark grey, Clay, Soft, Medium plasticity, High moisture content.			1.45	1	1	1	2									
3								2.00													
4	9.476	2.85	4.50			9.876		2.45	1	2	2	4								3.00 UDS	
5								3.00													3.80
6								3.45	3	4	4	8									7.00 DS
7								4.00													7.45
8	6.116	3.36	7.86					4.45	3	4	5	9									
9	-5.076	1.04	8.90		Dark grey, Medium size sand, Medium density, Non plasticity, Low moisture content.			5.00													
10								5.45	3	4	7	11									
11								6.00													
12					Light grey, Sandy clay, Soft, Medium to high plasticity, High moisture content.			6.45	3	5	7	12									
13								7.00													
14								7.45	3	4	6	10									
15								8.00													
16	-2.474	7.55	16.45		Dark grey, Medium size sand, Medium density, Non plasticity, Low moisture content.			8.45	3	7	9	16									
17								9.00													
18								9.45	4	4	7	11									
19								10.00													
20	-5.824	3.35	19.80		Light grey, Sandy clay, Soft, Medium to high plasticity, High moisture content.			10.45	4	5	5	10									
21								11.00													
22	-7.424	1.60	21.40		Dark grey, Medium size sand, Low density, Non plasticity, Low moisture content.			11.45	2	2	5	7									
23								12.00													
24	-9.924	2.50	23.90		Dark grey, Fine sand, Medium density, Non plasticity, Low moisture content.			12.45	2	5	7	12									
25								13.00													
26	-12.624	2.70	26.60		Dark grey, Fine sand, Medium density, Non plasticity, Low moisture content.			13.45	4	5	5	10									
27								14.00													
28								14.45	3	4	4	8									
29								15.00													
30								15.45	3	3	4	7									
31								16.00													
32								16.45	4	4	5	9									
33								17.00													
34								17.45	4	6	10	16									
35								18.00													
36								18.45	10	13	16	29									
37								19.00													
38								19.45	4	7	9	16									
39								20.00													
40								20.45	3	5	9	14									
41								21.00													
42								21.45	4	5	6	11									
43								22.00													
44								22.45	5	7	10	17									
45								23.00													
46								23.45	8	9	9	18									
47								24.00													
48								24.45	7	10	14	24									
49								25.00													
50								25.45	11	13	15	28									
51								26.00													
52								26.45	13	18	20	38									
53								27.00													
54								27.45	13	16	25	41									
55								28.00													
56								28.45	14	19	28	47									
57								29.00													
58								29.45	16	23	32	>50									
59								30.00													
60								30.45	16	29	35	>50									
61								31.00													
62								31.45	19	31	26/5	>50									
63								32.00													
64								32.45	21	38	12/6	>50									
65								33.00													
66								33.45	24	36	30	>50									
67								34.00													
68								34.45	26	38	10/3	>50									
69								35.00													
70	-21.474	8.85	35.45					35.45	26	46	15/5	>50									

**LEGEND:**

	Undisturbed Sample (UDS)		Sand		Tuff		Ground Water Level (GWL)
	Disturbed Sample (DS)		Silt		Organic		N1 Pre Testing
	Standard Penetration Test (SPT)		Clay		Gravel		

# DRILLING LOG

PROJECT : MEDAN FLOOD CONTROL

Boring No Client : Company's Name		B.16 CTI Engineering Co.,Ltd PT. MELIAS KESUMA			Location PERCUT RIVER		Implementation Periods 26/05/95 30/05/95		Boring Log Prepared By Sihar TB		North Latitude East Latitude									
Ground Elevation		180° Angle		180° Direction		Ground Slope		Chief Engineer Sanul Lbs		Hammer Drop Implement SPT Tools		Chief Operator Aturea								
Boring depth		30.0 M				90°		Boring Machine Eggline		SGZ-LA Lushan		Pump Robin		Ground Water Table (GWL) 3.36 m		Drilling Method Rotary Drilling				
No	Elevation (M)	Thickness (M)	Depth (M)	Symbol	DESCRIPTION	Ground Water Level (M)	Geological Condition	Depth of SPT (M)	Standard Penetration Test					In-Situ Test		Sampling Depth (M)	Methods of sampling	D e t a i l		
									Blow Penetration Each 15 Cms			N - VALUE		Elevation of SPT (M)					Test Name and Result	
									N1	N2	N3	N2 + N3 30 cms	10	20	30	40	50			
0	13.793				Top Soil															
1					Brown, Soft dry containing sand, Medium plasticity, Medium to high moisture content.			1.00												
2	12.193	1.60	1.60					1.45	2	2	4	6								
3					Dark grey, Clay, Soil, Medium plasticity, High moisture content.			2.00												
4								2.45	3	3	4	7								
5								3.00												
6								3.45	2	3	3	6								
7								4.00												
8	8.993	3.20	4.80					4.45	3	4	4	8								
9								5.00												
10								5.45	4	5	5	10								
11								6.00												
12								6.45	5	6	7	13								
13								7.00												
14	5.343	3.65	8.45					7.45	4	6	8	14								
15								8.00												
16								8.45	3	3	8	13								
17								9.00												
18								9.45	3	4	4	8								
19	3.993	1.35	9.80					10.00												
20								10.45	3	4	6	10								
21								11.00												
22								11.45	2	3	3	6								
23	1.193	2.80	12.60					12.00												
24								12.45	2	3	4	7								
25								13.00												
26								13.45	5	7	8	15								
27								14.00												
28								14.45	3	4	5	9								
29	-1.707	2.90	15.50					15.00												
30								15.45	3	5	8	13								
31								16.00												
32								16.45	5	11	7	18								
33								17.00												
34								17.45	8	10	13	23								
35								18.00												
36								18.45	11	15	15	30								
37	-6.007	4.30	19.80					19.00												
38								19.45	8	10	13	23								
39								20.00												
40								20.45	6	6	7	13								
41								21.00												
42								21.45	6	8	13	21								
43								22.00												
44								22.45	5	6	47	> 50								
45								23.00												
46								23.45	7	11	14	25								
47	-10.707	4.70	24.50					24.00												
48								24.45	8	13	15	28								
49								25.00												
50								25.45	10	15	19	34								
51								26.00												
52								26.45	16	21	30	> 50								
53	-12.907	2.20	26.70					27.00												
54								27.45	14	15	31	46								
55								28.00												
56								28.45	13	19	30	49								
57								29.00												
58								29.45	10	20	36	> 50								
59	-16.657	3.75	30.45					30.00												
60								30.45	13	21	38	> 50								

LEGEND:

	Undisturbed Sample (UDS)		Sand		Tuff		Ground Water Level (GWL)
	Disturbed Sample (DS)		Silt		Organic		N1 Pre Testing
	Standard Penetration Test (SPT)		Clay		Gravel		

# DRILLING LOG

PROJECT : MEDAN FLOOD CONTROL

Boring No		B.17				Location		PERCUT RIVER										
Client :		CTI Engineering Co.,Ltd				Implementation	22/05/95	Boring Log	Prepared By		North Latitude							
Company's Name		PT. MELIAS KESUMA				Periods	25/05/95	Hammer Drop	Sihar TB		East Latitude							
Ground Elevation	180°	90°	Direction	180°	90°	Chief Engineer	Sanul Lbr	Implement	SPT Tools	Chief Operator	Atares							
Boring depth	31.0 M	90°	270°	180°	90°	Boring Machine	SGZ-1A	Pump	Robla	Drilling Methods	Rotary Drilling							
						Ground Slope		Ground Water Table (GWL)		3.30 m								
Elevation (M)	Thickness (M)	Depth (M)	Symbol	DESCRIPTION	Ground Water Level (M)	Geological Condition	Depth of SPT (M)	Standard Penetration Test				In-Situ Test				Sampling Depth (M)	Methods of sampling	Date
								Blow Penetration Each 15 Cm			N - VALUE	Elevation of SPT (M)		Test Name and Result				
N1	N2	N3	N2 + N3	10	20	30	40	20										
0	13.792			Top Soil			1.00											
1				Dark brown, Soft clay containing sand, Medium plasticity, Medium to high moisture content.			1.45	1	2	3	5							
2	12.012	1.78	1.78				2.00											
3				Light grey, Clay, Soil, Medium plasticity, High moisture content.	10.492		2.45	2	3	3	6							
4							3.00											
5							3.45	3	6	7	13							
6							4.00											
7	7.192	4.82	6.60	Dark grey, Sandy silt, soil, Low plasticity, Low moisture content.			4.45	2	3	7	10				4.00	UDS		
8							5.00											
9	6.292	0.90	7.50	Dark grey, Clayey fine sand, Low to medium density, Low plasticity, Low moisture content.			5.45	3	4	6	10				4.80		25/05/95	
10							6.00											
11							6.45	3	4	7	11							
12							7.00											
13	0.992	5.30	12.80	Dark grey, Clay, Medium stiff, High plasticity, High moisture content.			7.45	2	3	3	6							
14	-0.108	1.10	13.90	Light grey, Fine sand, Medium density, Non plasticity, Low moisture content.			8.00											
15							8.45	6	11	16	27							
16	-2.758	2.65	16.55	Dark grey, Medium size sand, Medium density, Non plasticity, Low moisture content.			9.00											
17							9.45	5	5	7	12							
18							10.00											
19	-4.988	2.23	18.78	Dark grey, Medium size sand, Medium density, Non plasticity, Low moisture content.			10.45	1	2	2	4				10.00	UDS		
20							11.00											
21							11.45	3	6	8	14				10.80			
22							12.00											
23							12.45	5	7	10	17							
24							13.00											
25	-11.808	6.82	25.60	Dark grey, Clay, Medium stiff, High plasticity, High moisture content.			13.45	5	5	7	12				13.00	DS		
26							14.00											
27							14.45	4	6	9	15				13.45			
28							15.00											
29							15.45	5	4	12	16							
30							16.00											
31	-17.658	5.85	31.45	Light grey, Fine sand, Medium to high density, Non plasticity, Low moisture content.			16.45	7	11	14	25							
32							17.00											
33							17.45	5	7	10	17							
34							18.00											
35							18.45	4	4	8	12							
							19.00											
							19.45	7	9	10	19							
							20.00											
							20.45	4	7	9	16							
							21.00											
							21.45	6	7	10	17							
							22.00											
							22.45	8	9	9	18							
							23.00											
							23.45	7	8	11	19							
							24.00											
							24.45	8	9	12	21							
							25.00											
							25.45	7	13	19	32							
							26.00											
							26.45	9	20	31	>50							
							27.00											
							27.45	10	18	22	40							
							28.00											
							28.45	9	13	19	32							
							29.00											
							29.45	12	18	25	43							
							30.00											
							30.45	16	21	24	45							
							31.00											
							31.45	16	22	24	46							

LEGEND:

	Undisturbed Sample (UDS)		Sand		Tuff		Ground Water Level (GWL)
	Disturbed Sample (DS)		Silt		Organic		N1 Pre Testing
	Standard Penetration Test (SPT)		Clay		Gravel		

# DRILLING LOG

PROJECT : MEDAN FLOOD CONTROL

Boring No		B.18		Location		PERCUT RIVER														
Client :		CTI Engineering Co., Ltd		Implementation		29/06/95		Boring Log		North Latitude										
Company's Name		PT. MELIAS KESUMA		Periode		04/07/95		Prepared By		Sihar TB										
Ground Elevation		180°		Direction		180°		Chief Engineer		Suberme										
Boring depth		26.0 M		Ground Slope		0°		Sausal Lbs		SPT Tools										
		Angle 90°		Direction 270°		180°		Hammer Drop Implement		Chief Operator										
								Pump		Drilling Methode										
								Robin		Rotary Drilling										
								Ground Water Table (GWL)		3.26 m										
S	Elevation (M)	Thickness (M)	Depth (M)	Symbol	DESCRIPTION	Ground Water Level (M)	Geological Condition	Depth of SPT (M)	Standard Penetration Test					In-Situ Test		Sampling Depth (M)	Methods of sampling	D		
									Blows Penetration Each 15 Cm			N - VALUE		Elevation of SPT (M)	Test Name and Result					
0	11.326				Top Soil				N1	N2	N3	N2 + N3	10	20	30	40	50			
1					Light brown, Silty Clay, Soil			1.00				5								
2	9.326	2.00	2.00		Medium plasticity, High moisture content.			1.45	2	3	2	5								3006/95
3					Dark grey, Clayey Sand, Low density, Low plasticity, Low moisture content.	8.066		2.00												
4								2.45	2	3	3	6								
5								3.00												
6	5.486	3.84	5.84					3.45	1	3	2	5								
7								4.00												
8								4.45	3	3	4	7								
9					Grey Fine sand, Low to Medium plasticity, Non plasticity, Medium to high moisture content.			5.00												
10								5.45	4	8	10	18								
11								6.00												
12								6.45	9	13	13	26								
13								7.00												
14								7.45	8	12	16	28								
15								8.00												
16								8.45	9	11	8	19								
17								9.00												
18								9.45	7	6	6	12								9.00 DS
19								10.00												
20								10.45	8	12	7	19								
21								11.00												
22								11.45	11	11	14	25								
23	-1.124	7.01	12.85					12.00												
24								12.45	10	12	13	25								
25								13.00												
26								13.45	4	4	3	7								
27								14.00												
28								14.45	4	6	7	13								
29	-4.124	2.60	15.45					15.00												
30								15.45	9	7	11	18								
31								16.00												
32								16.45	12	12	12	24								
33								17.00												
34								17.45	9	9	13	22								
35								18.00												
36								18.45	11	14	16	30								
37								19.00												
38								19.45	13	17	19	36								
39								20.00												
40								20.45	16	14	21	35								
41								21.00												
42								21.45	14	12	26	38								
43								22.00												
44								22.45	16	23	21	44								
45								23.00												
46								23.45	21	24	24	48								
47								24.00												
48								24.45	26	31	31	>50								
49								25.00												
50								25.45	21	23	24	47								
51	-15.124	11.00	26.45					26.00												
52								26.45	26	38	31/6	>50								

LEGEND:

- Undisturbed Sample (UDS)
- Disturbed Sample (DS)
- Standard Penetration Test (SPT)
- Sand
- Silt
- Clay
- Tuff
- Organic
- Gravel
- Ground Water Level (GWL)
- N1 Pre Testing

# DRILLING LOG

PROJECT : MEDAN FLOOD CONTROL

Boring No Client : Company's Name		B.19 CTI Engineering Co., Ltd PT. MELIAS KESUMA		Location PERCUT RIVER		Implementation Periods		Boring Log Prepared By		North Latitude East Latitude	
Ground Elevation		180° Angle 90° Direction		180° Direction 90°		Chief Engineer		Hammer Drop Implement		SPT Tools	
Boring depth		25.0 M		Ground Slope 60°		Boring Machine		Pump		Drilling Methode	
						SGZ-1A		Lushan		Rotary Drilling	
						Enggine		Ground Water Table (GWL)		2.85 m	

No	Elevation (m)	Thicknes (m)	Depth (m)	Symbol	DISCRIPTION	Ground Water Level (M)	Geological Condition	Depth of SPT (M)	Standard Penetration Test								In-Site Test		Sampling Depth (M)	Methods of sampling	Date
									Blow Penetration Back 15 Cm			N BLOW	N - VALUE				Elevation of SPT (M)	Test Name and Result			
									N1	N2	N3		N2 + N3	10	30	40					
0	10.835				Top Soil																
1	9.335	1.50	1.50		Dark brown, Silty clay, S&B, Medium plasticity, Medium moisture content.		1.00														
2					Light gray, Clay containing sand, Low density, Low plasticity, Low moisture content.	7.985	2.00	2	3	5	8										
3					Light gray, Clay containing sand, Low density, Low plasticity, Low moisture content.		3.00	4	4	5	9										
4	7.035	2.30	3.80		Light gray, Soft clay containing sand, Medium stiff, Medium plasticity, Medium to high plasticity.		3.43	4	5	7	12										
5					Light gray, Soft clay containing sand, Medium stiff, Medium plasticity, Medium to high plasticity.		4.00	6	6	7	13										
6					Light gray, Soft clay containing sand, Medium stiff, Medium plasticity, Medium to high plasticity.		4.43	6	6	7	13										
7					Light gray, Soft clay containing sand, Medium stiff, Medium plasticity, Medium to high plasticity.		5.00	5	6	9	15										
8	2.835	4.20	8.00		Dark gray, Sand, Medium dense, Non plasticity, Low moisture content.		5.43	6	6	8	14										
9					Dark gray, Sand, Medium dense, Non plasticity, Low moisture content.		6.00	6	6	8	14										
10					Dark gray, Sand, Medium dense, Non plasticity, Low moisture content.		7.00	6	9	13	22										
11					Dark gray, Sand, Medium dense, Non plasticity, Low moisture content.		7.43	6	9	13	22										
12	-1.665	4.50	12.50		Light gray, Sandy clay, Medium stiff, Low to medium moisture content.		8.00	6	10	16	26										
13					Light gray, Sandy clay, Medium stiff, Low to medium moisture content.		8.43	6	10	16	26										
14					Light gray, Sandy clay, Medium stiff, Low to medium moisture content.		9.00	5	11	14	25										
15	-3.965	2.30	14.80		Light gray, Sandy clay, Medium stiff, Low to medium moisture content.		9.43	5	11	14	25										
16					Light brown, Clay, Medium stiff, High plasticity, Medium moisture content.		10.00	6	9	11	20										
17	-5.965	2.00	16.80		Light brown, Clay, Medium stiff, High plasticity, Medium moisture content.		10.43	6	9	11	20										
18					Light brown, Clay, Medium stiff, High plasticity, Medium moisture content.		11.00	7	11	13	24										
19					Light brown, Clay, Medium stiff, High plasticity, Medium moisture content.		11.43	7	11	13	24										
20					Light brown, Clay, Medium stiff, High plasticity, Medium moisture content.		12.00	7	12	16	28										
21	-14.615	8.65	25.45		Light gray, Sand, High density, Non plasticity, Low moisture content.		12.43	7	12	16	28										
22					Light gray, Sand, High density, Non plasticity, Low moisture content.		13.00	7	10	16	26										
23					Light gray, Sand, High density, Non plasticity, Low moisture content.		13.43	7	10	16	26										
24					Light gray, Sand, High density, Non plasticity, Low moisture content.		14.00	6	9	11	20										
25					Light gray, Sand, High density, Non plasticity, Low moisture content.		14.43	6	9	11	20										
26					Light gray, Sand, High density, Non plasticity, Low moisture content.		15.00	4	7	10	17										
27					Light gray, Sand, High density, Non plasticity, Low moisture content.		15.43	4	7	10	17										
28					Light gray, Sand, High density, Non plasticity, Low moisture content.		16.00	8	12	10	22										
29					Light gray, Sand, High density, Non plasticity, Low moisture content.		16.43	8	12	10	22										
30					Light gray, Sand, High density, Non plasticity, Low moisture content.		17.00	7	10	15	25										
31					Light gray, Sand, High density, Non plasticity, Low moisture content.		17.43	7	10	15	25										
32					Light gray, Sand, High density, Non plasticity, Low moisture content.		18.00	6	9	13	22										
33					Light gray, Sand, High density, Non plasticity, Low moisture content.		18.43	6	9	13	22										
34					Light gray, Sand, High density, Non plasticity, Low moisture content.		19.00	8	15	15	30										
35					Light gray, Sand, High density, Non plasticity, Low moisture content.		19.43	8	15	15	30										
36					Light gray, Sand, High density, Non plasticity, Low moisture content.		20.00	19	23	33	>50										
37					Light gray, Sand, High density, Non plasticity, Low moisture content.		20.43	19	23	33	>50										
38					Light gray, Sand, High density, Non plasticity, Low moisture content.		21.00	16	23	31	>50										
39					Light gray, Sand, High density, Non plasticity, Low moisture content.		21.43	16	23	31	>50										
40					Light gray, Sand, High density, Non plasticity, Low moisture content.		22.00	13	18	27	45										
41					Light gray, Sand, High density, Non plasticity, Low moisture content.		22.43	13	18	27	45										
42					Light gray, Sand, High density, Non plasticity, Low moisture content.		23.00	10	16	25	41										
43					Light gray, Sand, High density, Non plasticity, Low moisture content.		23.43	10	16	25	41										
44					Light gray, Sand, High density, Non plasticity, Low moisture content.		24.00	15	24	27	>50										
45					Light gray, Sand, High density, Non plasticity, Low moisture content.		24.43	15	24	27	>50										
46					Light gray, Sand, High density, Non plasticity, Low moisture content.		25.00	17	23	35	>50										
47					Light gray, Sand, High density, Non plasticity, Low moisture content.		25.43	17	23	35	>50										

LEGEND:

	Undisturbed Sample (UDS)		Sand		Tuff		Ground Water Level (GWL)
	Disturbed Sample (DS)		Silt		Organic		N1 Pre Testing
	Standard Penetration Test (SPT)		Clay		Gravel		

# DRILLING LOG

PROJECT : MEDAN FLOOD CONTROL

Boring No Clear :		B.20 CTI Engineering Co.,Ltd PT. MELLAS KESUMA		Location PERCUT RIVER		Implementation 02/05/95		Boring Log Prepared By Sihar TB		North Latitude										
Company's Name		180° Angle		180° Direction		Chief Engineer		Hammer Drop Implement		East Latitude										
Ground Elevation		180° Angle		180° Direction		Sanusi Lbs		SPT Tools		Chief Operator										
Boring depth		30.0 M		270° 180°		SGZ-LA		Robis		Suryanto										
				90°		Lushan		Ground Water Table (GWL)		3.44 m										
No	Elevation (M)	Thickness (M)	Depth (M)	Symbol	DESCRIPTION	Ground Water Level (M)	Geological Condition	Depth of SPT (M)	Standard Penetration Test				In-Situ Test				Sampling Depth (M)	Methods of sampling	Date	
									Blows Penetration Each 13 Cm			N	N - VALUE							Elevation of SPT (M)
									N1	N2	N3	N2 + N3 30 sec	10	20	30	40	50			
0	17.864				Top Soil															
1					Light yellow, Clayey sand, Low density, Low plasticity, Low moisture content.			1.00												
2	15.864	2.00	2.00					1.45	7	7	12	19								
3								2.00												
4					Light grey Clayey sand Medium stiff Medium plasticity, High moisture content.	▽ 14.424		2.45	6	12	21	33								
5								3.00												
6								3.45	7	10	13	23								
7								4.00												
8	10.414	5.45	7.45					4.45	8	11	13	24								
9								5.00												
10					Dark grey, Clay Soft			5.45	6	9	14	23								
11								6.00												
12					Medium plasticity, High moisture content			6.45	6	12	17	29								
13								7.00												
14								7.45	11	18	20	38								
15								8.00												
16								8.45	3	2	4	6								
17					Dark grey, Sand			9.00												
18					Low to medium density, Non plasticity, Low moisture content			9.45	2	4	7	11								
19	-1.136	4.20	19.00					10.00												
20								10.45	3	5	7	12								
21								11.00												
22								11.45	5	6	8	14								
23								12.00												
24								12.45	6	4	4	8								
25								13.00												
26								13.45	5	7	7	14								
27								14.00												
28								14.45	6	7	9	16								
29								15.00												
30								15.45	8	11	16	27								
31								16.00												
32								16.45	11	10	20	30								
33								17.00												
34								17.45	3	6	6	12								
35								18.00												
36								18.45	9	11	16	27								
37								19.00												
38								19.45	12	15	24	39								
39								20.00												
40								20.45	12	17	27	44								
41								21.00												
42								21.45	10	16	21	37								
43								22.00												
44								22.45	13	21	23	44								
45								23.00												
46					Light grey, Fine sand containing gravel Medium density, Non plasticity, Low moisture content.			23.45	12	17	25	42								
47								24.00												
48								24.45	13	15	28	43								
49								25.00												
50								25.45	10	16	31	47								
51								26.00												
52								26.45	11	16	34	50								
53								27.00												
54								27.45	13	19	37	>50								
55								28.00												
56								28.45	19	24	30	>50								
57								29.00												
58								29.45	16	21	32	>50								
59								30.00												
60	-12.586	11.45	30.45					30.45	18	26	31	>50								

LEGEND:

	Undisturbed Sample (UDS)		Sand		Tuff		Ground Water Level (GWL)
	Disturbed Sample (DS)		Silt		Organic		N1. Pre Testing
	Standard Penetration Test (SPT)		Clay		Gravel		

# DRILLING LOG

PROJECT : MEDAN FLOOD CONTROL

Boring No		B.21		Location		PERCUT RIVER													
Client :		B.21		Implementation		Boring Log		North Latitude											
Company's Name		FT. MELLAS KESUMA		Periods		Prepared By		East Latitude											
Ground Elevation		187°		187°		Chief Engineer		Hammer Drop		SPT Tools									
Boring depth		30.0 M		270°		Saasul Lbs		Implement		Chief Operator									
		90°		180°		ZT-100		Pump		Robis									
		90°		90°		Lashan		Ground Water Table (GWL)		4.70 m									
Elevation (M)	Thickness (M)	Depth (M)	Symbol	DESCRIPTION	Ground Water Level (M)	Geological Condition	Depth of SPT (M)	Standard Penetration Test				In-Situ Test				Sampling Depth (M)	Methods of sampling	Date	
								Blow Penetration Each 15 Cm			N	Elevation of SPT (M)							Test Name and Result
(M)	(M)	(M)			(M)		N1	N2	N3	N1 + N2 + N3	10	20	30	40	50	(M)			
17.534				Top Soil			1.00												
				Light yellow, Clayey sand, Low density, Low plasticity, Low moisture content.			1.45	3	5	6	11					16.084			
							2.00												
14.534	3.00	3.00					2.45	5	7	7	14					15.084			
							3.00												
							3.45	10	15	14	29					14.084			
							4.00												
							4.45	8	13	14	27					13.084			
							5.00												
				Light grey, Clayey sand, Low to medium density, Low plasticity, Low moisture content.	12.834		5.45	10	15	12	27					12.084			
							6.00												
							6.45	4	6	8	14					11.084			
							7.00												
							7.45	5	7	7	14					10.084			
							8.00												
							8.45	6	13	12	25					9.084			
							9.00												
							9.45	5	9	13	22					8.084			
7.754	6.78	9.78					10.00												
							10.45	4	6	6	12					7.084			
				Light grey, Clay Soil, Medium plasticity, High moisture content.			11.00												
							11.45	7	7	8	15					6.084			
							12.00												
							12.45	5	4	5	9					5.084			
4.034	3.72	13.50					13.00												
							13.45	3	5	7	12					4.084			
							14.00												
				Dark grey Sand, Medium density, Non plasticity, Low moisture content.			14.45	6	9	12	21					3.084			
							15.00												
							15.45	6	10	14	24					2.084			
							16.00												
							16.45	8	11	15	26					1.084			
							17.00												
							17.45	10	14	17	31					0.084			
							18.00												
							18.45	11	13	16	29					-0.916			
							19.00												
				Light grey, Fine sand containing gravel, Medium density, Non plasticity, Low moisture content.			19.45	14	14	19	33					-1.916			
							20.00												
							20.45	13	15	21	36					-2.916			
							21.00												
				Light grey Unconsolidated silt, High density, Non plasticity, Low moisture content.			21.45	17	25	37	>50					-3.916			
							22.00												
							22.45	15	26	47	>50					-4.916			
							23.00												
							23.45	7	10	14	24					-5.916			
							24.00												
							24.45	9	13	13	26					-6.916			
							25.00												
				Light grey, Fine to medium size sand, Medium to high density, Non plasticity, Low moisture content.			25.45	14	21	26	47					-7.916			
							26.00												
							26.45	18	24	27	>50					-8.916			
							27.00												
							27.45	18	29	35	>50					-9.916			
							28.00												
							28.45	20	26	31	>50					-10.916			
							29.00												
							29.45	21	21	27	48					-11.916			
							30.00												
							30.45	23	27	33	>50					-12.916			

LEGEND:

	Undisturbed Sample (UDS)		Sand		Tuff		Ground Water Level (GWL)
	Disturbed Sample (DS)		Silt		Organic		N1 Pre Testing
	Standard Penetration Test (SPT)		Clay		Gravel		

# DRILLING LOG

PROJECT : MEDAN FLOOD CONTROL

Boring No Client : Company's Name		B.22 CTI Engineering Co., Ltd PT. MELIAS KESUMA		Location PERCUT RIVER		Implementation 18/05/95 21/05/95		Boring Log Prepared By Sibar TB		North Latitude East Latitude	
Ground Elevation		180° Angle 90° Direction 180° 370° 90°		Ground Slope 0° 90°		Chief Engineer Sasuni Lbs		Hammer Drop Implement SPT Tools TOHO		Chief Operator Suryanto	
Boring depth 30.0 M				Boring Machine Esqisse Lashan		Pump Ground Water Table (GWL) 3.78 m				Drilling Method Rotary Drilling	

No	Elevation (M)	Thickness (M)	Depth (M)	Symbol	DESCRIPTION	Ground Water Level (M)	Soil Condition	Depth of SPT (M)	Standard Penetration Test				In-Site Test				Sampling Depth (M)	Methods of sampling	Date
									Blows Penetration Each 15 Cm			N - VALUE	Elevation of SPT (M)	Test Name and Result	Sampling	Methods			
									N1	N2	N3								
0	19.205				Top Soil														
1	18.005	1.20	1.20		Light brown, Clay, silt, High plasticity, Medium moisture content.			1.00											
2	16.405	1.60	2.80		Brown, Fine sand including gravel, Low density, Non plasticity, Medium moisture content.			2.00											
3	15.205	1.20	4.00		Grey, Clay, Silt, High plasticity, Medium to high moisture content.	15.425		3.45											
4	13.455	1.75	5.75		Grey Sandy clay, Silt, High plasticity, Medium to high moisture content.			4.00											
5					Dark grey, Silty clay, Silt, High plasticity, High moisture content.			4.45											
6	9.655	3.80	9.55		Grey soft clay containing sand, High plasticity, Medium moisture content.			5.00											
7	7.605	2.05	11.60		Light grey, Silty clay, Silt, High plasticity, High moisture content.			6.45											
8	5.405	2.20	13.80		Dark grey Silty sand containing tuff, Low density, Non plasticity, Low moisture content.			8.45											
9					Brown, Medium size sand, Medium density, Non plasticity, Low moisture content.			9.00											
10					Grey fine sand containing tuff, High density, Non plasticity, Low moisture content.			9.45											
11					Grey fine sand containing tuff, High density, Non plasticity, Low moisture content.			10.00											
12					Grey fine sand containing tuff, High density, Non plasticity, Low moisture content.			10.45											
13					Grey fine sand containing tuff, High density, Non plasticity, Low moisture content.			11.00											
14					Grey fine sand containing tuff, High density, Non plasticity, Low moisture content.			11.45											
15					Grey fine sand containing tuff, High density, Non plasticity, Low moisture content.			12.00											
16					Grey fine sand containing tuff, High density, Non plasticity, Low moisture content.			12.45											
17					Grey fine sand containing tuff, High density, Non plasticity, Low moisture content.			13.00											
18					Grey fine sand containing tuff, High density, Non plasticity, Low moisture content.			13.45											
19					Grey fine sand containing tuff, High density, Non plasticity, Low moisture content.			14.00											
20					Grey fine sand containing tuff, High density, Non plasticity, Low moisture content.			14.45											
21					Grey fine sand containing tuff, High density, Non plasticity, Low moisture content.			15.00											
22					Grey fine sand containing tuff, High density, Non plasticity, Low moisture content.			15.45											
23					Grey fine sand containing tuff, High density, Non plasticity, Low moisture content.			16.00											
24					Grey fine sand containing tuff, High density, Non plasticity, Low moisture content.			16.45											
25					Grey fine sand containing tuff, High density, Non plasticity, Low moisture content.			17.00											
26					Grey fine sand containing tuff, High density, Non plasticity, Low moisture content.			17.45											
27					Grey fine sand containing tuff, High density, Non plasticity, Low moisture content.			18.00											
28					Grey fine sand containing tuff, High density, Non plasticity, Low moisture content.			18.45											
29					Grey fine sand containing tuff, High density, Non plasticity, Low moisture content.			19.00											
30					Grey fine sand containing tuff, High density, Non plasticity, Low moisture content.			19.45											
31					Grey fine sand containing tuff, High density, Non plasticity, Low moisture content.			20.00											
32					Grey fine sand containing tuff, High density, Non plasticity, Low moisture content.			20.45											
33					Grey fine sand containing tuff, High density, Non plasticity, Low moisture content.			21.00											
34					Grey fine sand containing tuff, High density, Non plasticity, Low moisture content.			21.45											
35					Grey fine sand containing tuff, High density, Non plasticity, Low moisture content.			22.00											

LEGEND:

	Undisturbed Sample (UDS)		Sand		Tuff		Ground Water Level (GWL)
	Disturbed Sample (DS)		Silt		Organic		N1 Pre Testing
	Standard Penetration Test (SPT)		Clay		Gravel		

# DRILLING LOG

PROJECT : MEDAN FLOOD CONTROL

Boring No Client : Company's Name		B.23 CII Engineering Co.,Ltd PT. MELIAS KESUMA		Location Implementation Period		PERCUT RIVER 14/05/95 17/05/95		Boring Log Prepared By Sihar TB		North Latitude East Latitude	
Ground Elevation		180° 90° Direction		Ground Slope		Chief Engineer		Hammer Drop Implement		Chief Operator Aturea	
Boring depth		32.0 M		770° 180°		SGZ-LA Enggine		SPT Tools Robin		Drilling Method Rotary Drilling	
				90°		Lusban		Ground Water Table (GWL)		3.33 m	

No	Elevation (M)	Thimmas (M)	Depth (M)	Symbol	DESCRIPTION	Ground Water Level (M)	Geologi Condition	Depth of SPT (M)	Standard Penetration Test					In-Situ Test		Sampling Depth (M)	Methods of sampling	Date
									Blows Penetration Each 15 Cm			N - VALUE	Elevation of SPT (M)	Test Name and Result				
									N1	N2	N3				BLOWS N1 + N2 + N3			
0	19.477				Top Soil													
1					Light brown Soft clay, Medium stiffness, High plasticity, Medium to high moisture content			1.00										
2								1.45	4	5	7	12	18.027					
3								2.00										
4	15.677	3.80	3.80			▽ 16.147		2.45	4	4	5	9	17.027					
5								3.00										
6					Dark grey Silty clay, Medium plasticity, Medium to high moisture content			3.45	3	4	5	9	16.027					
7								4.00										
8								4.45	3	5	6	11	15.027					
9								5.00										
10								5.45	3	3	5	8	14.027					
11	8.777	2.20	10.70		Grey Silty clay, Soft, Medium plasticity, High moisture content			6.00										
12								6.45	5	8	9	17	13.027					
13					Light grey Silty clay, Soft, High plasticity, High moisture content			7.00										
14	6.027	2.75	13.45					7.45	3	4	6	10	12.027					
15								8.00										
16	3.977	2.05	15.50		Grey Silty clay, Soft, Medium plasticity, High moisture content			8.45	3	4	5	9	11.027					
17								9.00										
18					Light grey Silty sand, Low density, Non plasticity, Low moisture content			9.45	4	5	6	11	10.027					
19								10.00										
20	-0.323	4.30	19.80					10.45	2	3	3	6	9.027					
21					Light grey Silty sand, Low density, Non plasticity, Low moisture content			11.00										
22								11.45	2	3	3	6	8.027					
23					Grey Silty sand and Tuff, Low density, Non plasticity, Low moisture content			12.00										
24								12.45	3	4	5	9	7.027					
25	-3.973	3.65	23.45					13.00										
26					Dark grey Sand, Medium to high density, Non plasticity, Low moisture content			13.45	1	2	2	4	6.027					
27								14.00										
28								14.45	1	1	2	3	5.027					
29								15.00										
30								15.45	1	2	3	5	4.027					
31								16.00										
32								16.45	5	7	8	15	3.027					
33								17.00										
34								17.45	1	2	2	4	2.027					
35								18.00										
36								18.45	2	3	3	6	1.027					
37								19.00										
38								19.45	4	4	12	16	0.027					
39								20.00										
40								20.45	10	10	18	28	-0.973					
41								21.00										
42								21.45	8	13	18	31	-1.973					
43								22.00										
44								22.45	9	12	19	31	-2.973					
45								23.00										
46								23.45	8	9	17	26	-3.973					
47								24.00										
48								24.45	9	17	24	41	-4.973					
49								25.00										
50								25.45	13	23	28	>50	-5.973					
51								26.00										
52								26.45	12	17	30	47	-6.973					
53								27.00										
54								27.45	12	14	17	31	-7.973					
55								28.00										
56								28.45	15	20	28	48	-8.973					
57								29.00										
58								29.45	20	25	30	>50	-9.973					
59								30.00										
60								30.45	21	28	32	>50	-10.973					
61								31.00										
62								31.45	19	24	29	>50	-11.973					
63								32.00										
64								32.45	16	23	28	>50	-12.973					

LEGEND:

	Undisturbed Sample (UDS)		Sand		Tuff		Ground Water Level (GWL)
	Disturbed Sample (DS)		Silt		Organic		N1 Pre Testing
	Standard Penetration Test (SPT)		Clay		Gravel		

# DRILLING LOG

PROJECT : MEDAN FLOOD CONTROL

Boring No		B.24		Location		PERCUT RIVER											
Client :		CTI Engineering Co., Ltd		Implementation	07/05/1995	Boring Log	Prepared By	Sibar TB	North Latitude								
Company's Name		PT. MELIAS KESUMA		Periods	12/05/1995	Hammer Drop	Implement	SPT Tools	East Latitude								
Ground	180°	Direction	180°	Chief	Samsi Lba	Implement	Robia	Chief Operator	Aturen								
Elevation	38.0 M	Angle	90°	Boring Machine	ZT-100	Pump :		Drilling Methods	Rotary Drilling								
depth	38.0 M	Slope	90°	Engine	Lusba	Ground Water Level (GWL)			4.14 m								
Elevation (m)	Thickness (m)	Depth (m)	Symbol	DISCRIPTION	Ground Water Level (M)	Core Recovery	Standard Penetration Test					In-Site Test					
							Depth of Depth (M)	Blows Penetration Each 15 Cms			N BLOWS N2 + N3	N - VALUE	Elevation of Depth (M)	Test Name and Result	Sampling Depth (M)	Methods of sampling	Date
21.448				Top Soil			1.00										
21.948	0.50	0.50		Light brown, Clay, Medium stiff, High plasticity, Medium moisture content			1.45	1	1	2	3						
19.898	2.05	2.55		Dark grey, Fine sand containing clay, Low density, Low plasticity, Medium moisture content.			2.00										
							2.45	1	2	4	6						
							3.00										
							3.45	5	5	6	11						08/05/95
							4.00										
							4.45	2	4	7	11						
							5.00										
							5.45	3	3	6	9						
							6.00										
							6.45	3	3	4	7						
							7.00										
							7.45	3	7	11	18						
							8.00										
							8.45	2	4	6	10						
							9.00										
							9.45	3	7	8	15						
							10.00										
							10.45	3	4	5	9						10.00
							11.00										
							11.45	3	4	6	10						10.80
							12.00										
							12.45	8	10	11	21						
							13.00										
							13.45	10	12	14	26						
							14.00										
							14.45	10	12	13	25						
							15.00										
							15.45	8	12	12	24						14.00
							16.00										
							16.45	2	3	3	6						DS
							17.00										
							17.45	3	3	5	8						17.00
							18.00										
							18.45	2	4	6	10						17.80
							19.00										
							19.45	6	9	11	20						
							20.00										
							20.45	13	29	30	> 50						
							21.00										
							21.45	8	15	19	34						
							22.00										
							22.45	4	5	7	12						
							23.00										
							23.45	6	10	13	23						
							24.00										
							24.45	6	9	12	21						
							25.00										
							25.45	6	8	14	22						
							26.00										
							26.45	7	11	19	30						
							27.00										
							27.45	8	15	22	37						
							28.00										
							28.45	8	10	17	22						
							29.00										
							29.45	9	10	12	22						
							30.00										
							30.45	8	11	13	24						
							31.00										
							31.45	8	9	12	21						
							32.00										
							32.45	8	17	19	36						
							33.00										
							33.45	7	16	41	> 50						
							34.00										
							34.45	6	15	36	> 50						
							35.00										
							35.45	8	13	27	40						
							36.00										
							36.45	9	19	27	46						
							37.00										
							37.45	9	21	25	46						
							38.00										
							38.45	12	21	29	50						

**LEGEND:**

- ⊠ Undisturbed Sample (UDS)
- ⊡ Disturbed Sample (DS)
- ▨ Standard Penetration Test (SPT)
- ⊞ Sand
- ⊞ Silt
- ⊞ Clay
- ⊞ Tuff
- ⊞ Organic
- ⊞ Gravel
- ⊞ Ground Water Level (GWL)
- ⊞ N1 Pre Testing

# DRILLING LOG

PROJECT : MEDAN FLOOD CONTROL

Boring No		B.25			Location		PERCUT RIVER														
Client		CITY Engineering Co., Ltd			Implementation Period		12/06/1995		Boring Log Prepared By		Sihar TB		North Latitude								
Company's Name		PT. MELIAS KESUMA			Chief Engineer		Senui Lba		Hammer Drop Implement		SPT Tools		Chief Operator								
Ground Elevation		180°		180°		Ground Slope		0°		Boring Machine		ZT-100		Pump							
Boring depth		36.0 M		270°		180°		90°		Engine		Lumba		Ground Water Level (GWL)							
		Angle		Direction								Robia		Drilling Method							
		50°		180°								Rotary Drilling		3.65 m							
Elevation (m)	Thickness (m)	Depth (m)	Symbol	DISCRIPTION	Ground Water Level (M)	Geological Condition	Depth of SPT (M)	Standard Penetration Test					In-Situ Test		Sampling Depth (M)	Method of sampling	Date				
								Blows Penetration Each 15 Cm			N - VALUE		Elevation of SPT (M)	Test Name and Result							
								N1	N2	N3	30 Cn	10			20	30	40	50			
24.231				Top Soil			1.00														
				Dark brown, Clay, Medium silty fines, Medium plasticity, Medium moisture content.			1.45	2	2	3	5										
22.431	1.80	1.80					2.45	2	2	4	6									2.00	
				Brown, Silty clay, Medium silty fines, Medium plasticity, Medium moisture content.	20.381		3.45	2	3	5	8										2.80
							4.45	4	4	4	8										
							5.45	4	5	7	12										
17.431	5.00	6.80					6.45	5	5	8	13										
							7.45	5	7	9	16										
				Grey, Fine to medium sand, Non plasticity, Low moisture content.			8.45	6	9	14	23										
							9.45	14	16	21	37										
							10.45	12	16	20	36										
							11.45	12	17	22	39										
							12.45	14	19	21	40										
10.231	7.20	14.00		Dark grey, Silty clay, Medium plasticity, High moisture content.			13.45	10	14	19	33										
							14.45	6	7	7	14										
7.731	7.50	16.50					15.45	4	5	5	10										15.00
							16.45	6	6	6	12										
							17.45	7	8	9	17										
				Dark grey, Silty sand, Low density, Non plasticity, Low moisture content.			18.45	7	9	9	18										
							19.45	8	11	13	24										
							20.45	6	10	10	20										20.00
							21.45	9	11	16	27										20.45
1.731	6.00	22.30		Light grey, Fine sand, Low density, Non plasticity, Low moisture content.			22.45	9	9	13	22										
							23.45	14	21	20	23										
							24.45	14	16	19	21										
-1.769	3.50	26.00					25.45	16	18	21	22										
							26.45	11	18	26	44										
							27.45	13	21	26	47										
							28.45	21	26	34	>30										
							29.45	28	36	42	>30										
				Grey, Unacid Tuff, Low hard, Non plasticity, Low moisture content.			30.45	20	18	19	37										
							31.45	21	21	20	41										
							32.45	26	35	15	>30										
							33.45	21	38	12	>30										
							34.45	26	45	15	>30										
							35.45	23	29	36	>30										
-12.219	10.43	36.43					36.45	28	36	39	>30										

LEGEND:

- Undisturbed Sample (UDS)
- Disturbed Sample (DS)
- Standard Penetration Test (SPT)
- Sand
- Silty Sand (SS)
- Clay
- Tuff
- Organic
- Gravel
- Ground Water Level (GWL)
- N1 Pre Testing



# DRILLING LOG

PROJECT : MEDAN FLOOD CONTROL

Boring No		B.27		Location		PERCUT RIVER													
Client:		CTI Engineering Co., Ltd		Implementation		01/05/1995		Boring Log		North Latitude									
Company's Name		PT. MELIAS KESUMA		Periode		06/05/1995		Prepared By		Sihar TB									
Ground Elevation		187°		Direction		187°		Ground Slope		0°									
Boring depth		32.0 M		Chief Engineer		Samuel Lbe		Hammer Drop Implement		SPT Tools									
				Boring Machine		SGZ-1A		Pump		Robin									
				Engine		Lushan		Ground water level (GWL)		2.81 m									
No	Elevation (M)	Thicknes (M)	Depth (M)	Symbol	DESCRIPTION	Ground Water Level (M)	Geological Condition	Depth of SPT (M)	Standard Penetration Test					Elevation of SPT (M)	Test Name and Result	Sampling Depth (M)	Methods of sampling	Date	
									Blows Each 15 Cm			N - VALUE							
								N1	N2	N3	N2 + N3	10	20	30	40	50			
0	27.718				Top Soil														
1	27.218	0.50	0.50		Dark grey, Clay, Medium to fine sand, Medium plasticity, Medium moisture content.		1.00												
2	26.218	1.00	1.50		Light brown, Clay, Medium stiffness, Medium plasticity, Medium moisture content.	24.910	1.45	2	2	3	5								
3					Light brown, Sandy clay, Soft to medium stiffness, Medium plasticity, Medium moisture content.		2.00												
4					Dark grey, Fine to medium size sand, High density, Non plasticity, low moisture content.		2.45	2	3	3	6								
5					Dark grey, Fine to medium size sand, High density, Non plasticity, low moisture content.		3.00	2	3	5	8								
6	20.268	5.25	6.75		Dark grey, Silty sand, Low to medium density, Non plasticity, low moisture content.		3.45	2	3	5	8								
7					Dark grey, Silty sand, Low to medium density, Non plasticity, low moisture content.		4.00	3	5	5	10								
8	19.418	1.55	8.30		Dark grey, Silty sand, Low to medium density, Non plasticity, low moisture content.		4.45	3	5	5	10								
9					Dark grey, Silty sand, Low to medium density, Non plasticity, low moisture content.		5.00	4	6	7	13								
10					Dark grey, Silty sand, Low to medium density, Non plasticity, low moisture content.		5.45	4	6	7	13								
11	16.918	2.30	10.80		Dark grey, Silty sand, Low to medium density, Non plasticity, low moisture content.		6.00	3	4	12	16								
12					Dark grey, Silty sand, Low to medium density, Non plasticity, low moisture content.		6.45	3	4	12	16								
13					Dark grey, Silty sand, Low to medium density, Non plasticity, low moisture content.		7.00	12	17	20	37								
14					Dark grey, Silty sand, Low to medium density, Non plasticity, low moisture content.		7.45	12	17	20	37								
15	12.918	4.00	14.80		Dark grey, Silty sand, Low to medium density, Non plasticity, low moisture content.		8.00	12	23	30	> 50								
16					Dark grey, Silty sand, Low to medium density, Non plasticity, low moisture content.		8.45	12	23	30	> 50								
17					Dark grey, Silty sand, Low to medium density, Non plasticity, low moisture content.		9.00	22	24	29	> 50								
18					Dark grey, Silty sand, Low to medium density, Non plasticity, low moisture content.		9.45	22	24	29	> 50								
19					Dark grey, Silty sand, Low to medium density, Non plasticity, low moisture content.		10.00	11	19	26	45								
20					Dark grey, Silty sand, Low to medium density, Non plasticity, low moisture content.		10.45	11	19	26	45								
21					Dark grey, Silty sand, Low to medium density, Non plasticity, low moisture content.		11.00	5	5	10	15								
22					Dark grey, Silty sand, Low to medium density, Non plasticity, low moisture content.		11.45	5	7	11	18								
23					Dark grey, Silty sand, Low to medium density, Non plasticity, low moisture content.		12.00	5	7	11	18								
24					Dark grey, Silty sand, Low to medium density, Non plasticity, low moisture content.		12.45	5	9	12	21								
25					Dark grey, Silty sand, Low to medium density, Non plasticity, low moisture content.		13.00	8	11	12	23								
26					Dark grey, Silty sand, Low to medium density, Non plasticity, low moisture content.		13.45	8	11	12	23								
27					Dark grey, Silty sand, Low to medium density, Non plasticity, low moisture content.		14.00	5	7	11	18								
28					Dark grey, Silty sand, Low to medium density, Non plasticity, low moisture content.		14.45	5	7	11	18								
29					Dark grey, Silty sand, Low to medium density, Non plasticity, low moisture content.		15.00	4	6	6	12								
30					Dark grey, Silty sand, Low to medium density, Non plasticity, low moisture content.		15.45	4	6	6	12								
31					Dark grey, Silty sand, Low to medium density, Non plasticity, low moisture content.		16.00	4	4	5	9								
32					Dark grey, Silty sand, Low to medium density, Non plasticity, low moisture content.		16.45	6	8	9	17								
33					Dark grey, Silty sand, Low to medium density, Non plasticity, low moisture content.		17.00	5	7	8	15								
34					Dark grey, Silty sand, Low to medium density, Non plasticity, low moisture content.		17.45	6	10	11	21								
35					Dark grey, Silty sand, Low to medium density, Non plasticity, low moisture content.		18.00	2	3	5	8								
36					Dark grey, Silty sand, Low to medium density, Non plasticity, low moisture content.		18.45	3	5	5	10								
37					Dark grey, Silty sand, Low to medium density, Non plasticity, low moisture content.		19.00	5	6	6	12								
38					Dark grey, Silty sand, Low to medium density, Non plasticity, low moisture content.		19.45	5	6	8	14								
39					Dark grey, Silty sand, Low to medium density, Non plasticity, low moisture content.		20.00	4	5	11	16								
40					Dark grey, Silty sand, Low to medium density, Non plasticity, low moisture content.		20.45	7	9	17	26								
41					Dark grey, Silty sand, Low to medium density, Non plasticity, low moisture content.		21.00	13	13	27	40								
42	0.218	12.70	27.50		Dark grey, Fine sand containing gravel, High density, Non plasticity, Low moisture content.		21.45	10	15	29	44								
43					Dark grey, Fine sand containing gravel, High density, Non plasticity, Low moisture content.		22.00	11	20	39	> 50								
44					Dark grey, Fine sand containing gravel, High density, Non plasticity, Low moisture content.		22.45	12	21	32	> 50								
45					Dark grey, Fine sand containing gravel, High density, Non plasticity, Low moisture content.		23.00	14	25	38	> 50								
46					Dark grey, Fine sand containing gravel, High density, Non plasticity, Low moisture content.		23.45	14	27	35	> 50								
47	-4.732	4.95	32.45		Dark grey, Fine sand containing gravel, High density, Non plasticity, Low moisture content.		24.00	14	27	35	> 50								

LEGEND: Undisturbed Sample (UDS)    Disturbed Sample (DS)    Standard Penetration Test (SPT)    Sand    Silt    Clay    Tuff    Organic    Gravel    Ground Water Level (GWL)    N1 Pre Testing

# DRILLING LOG

PROJECT : MEDAN FLOOD CONTROL

Boring No		B.28				Location		PERCUT RIVER									
Client :		CTI Engineering Co., Ltd				Implementation Periods		Boring Log Prepared By		North Latitude							
Company's Name		PT. MELIAS KESUMA				21/06/1995		Sihar TB		East Latitude							
Ground Elevation		180°		180°		Chief Engineer		Hammer Drop Implement		Chief Operator							
Boring depth		28.0 M		370°		Saouji Lba		SPT Tools		Aturea							
		Angle		Direction		Boring Machine		TOHO		Drilling Method							
				180°		Engine		Yanmar		Rotary Drilling							
				Ground Slope				Ground water level (GWL)		4.13 M							
Elevation (M)	Thiessen (M)	Depth (M)	Symbol	DESCRIPTION	Ground Water Level (M)	Geological Condition	Depth of SPT (M)	Standard Penetration Test					In-Situ Test		Sampling Depth (M)	Methods of sampling	Date
								Blow Penetration Each 15 Cm			N - VALUE		Elevation of SPT (M)	Test Name and Result			
31.075				Top Soil				N1	N2	N3	N						
				Dark grey, Clay Soil			1.00	2	2	3	5	29.625					
				Medium plasticity, High moisture content.			2.00	2	3	3	6	28.625			2.00	UDS	
							3.00	2	2	3	5	27.625			2.80		
26.375	4.50	4.50			▽ 26.945		4.00	1	3	4	7	26.625					
				Greyish brown Silty clay containing peat material soil			5.00	1	1	1	2	25.625					190696
				Low to medium plasticity, Medium moisture content.			6.00	1	1	2	3	24.625					
							7.00	1	0	1	1	23.625					
							8.00	1	1	2	3	22.625			8.00	UDS	
							9.00	2	2	3	5	21.625			8.80		
							10.00	1	2	2	4	20.625					
							11.00	1	2	4	6	19.625					
19.325	7.25	11.75		Grey, Soft clay containing silt, Medium plasticity, High moisture content.			12.00	3	4	5	9	18.625					
18.075	1.25	13.00					13.00	10	13	14	27	17.625					
				Dark grey, Silty sand, Low to medium density			14.00	6	8	14	22	16.625					
				Non plasticity, Low moisture content.			15.00	4	7	10	17	15.625			15.00	DS	
							16.00	6	8	12	20	14.625			15.45		200698
							17.00	4	7	12	19	13.625					
							18.00	9	12	15	27	12.625					
12.205	5.87	18.87		Dark grey, Medium size sand containing gravel			19.00	12	25	32	> 50	11.625					
				High density, Non plasticity, Low moisture content			20.00	16	35	40	> 50	10.625					
							21.00	20	26	32	> 50	9.625					
							22.00	15	30	35	> 50	8.625					
							23.00	10	24	26	50	7.625					
7.625	4.58	23.45		Dark grey, Tuff			24.00	10	24	26	50	6.625					
				High density, Non plasticity, Low moisture content			25.00	17	15	19	34	5.625					
							26.00	15	20	26	46	4.625					210696
							27.00	18	22	29	> 50	3.625					
2.625	5.00	28.45					28.00	20	27	32	> 50	2.625					

LEGEND:

	Undisturbed Sample (UDS)		Sand		Tuff		Ground Water Level (GWL)
	Disturbed Sample (DS)		Silt		Organic		N1 Pre Testing
	Standard Penetration Test (SPT)		Clay		Gravel		

# DRILLING LOG

PROJECT : MEDAN FLOOD CONTROL

Boring No		Client				Location		FLOODWAY											
B.29		CTI Engineering Co., Ltd PT. MELLAS KESUMA				Implementation Period		31/06/1995 03/06/1995		Boring Log Prepared By		Sihar TB		North Latitude					
Company's Name		180° Angle		180° Direction		Ground Slope		0°		Chief Engineer		Sanusi Lbs		Hammer Drop Implement					
Ground Elevation		90°		270°		90°		180°		Boring Machine		ZT-100		Pump					
Boring depth		20.0 M								Engine		Lushan		Ground Water Table (GWL)					
										SPT Tools		Robin		Chief Operator					
														OLO TB					
														Drilling Method					
														Rotary Drilling					
Elevation (M)	Thickness (M)	Depth (M)	Symbol	DESCRIPTION	Ground Water Level (M)	Geological Condition	Depth of SPT (M)	Standard Penetration Test					In-Situ Test		Sampling Depth (M)	Methods of sampling	D		
								Blows Penetration Each 15 Cm			N - VALUE		Elevation of SPT (M)	Test Name and Result					
31.254				Top soil				N1	N2	N3	N2 + N3	10	20	30	40	50			
				Dark grey, Clay Soil			1.00												
				Dark grey, Clay Soil			1.45	2	2	4	6								
				Dark grey, Clay Soil			2.00												
				Dark grey, Clay Soil			2.45	3	3	3	6								
				Dark grey, Clay Soil			3.00												
				Dark grey, Clay Soil			3.45	5	5	6	11								
				Dark grey, Clay Soil			4.00												
				Dark grey, Clay Soil			4.45	4	5	5	10								
26.384	4.87	4.87		Dark grey, Clay Soil			5.00												
				Dark grey, Clay Soil			5.45	6	7	10	17								
				Dark grey, Clay Soil			6.00												
				Dark grey, Clay Soil			6.45	6	9	12	21								
24.354	2.03	6.90		Dark grey, Clay Soil			7.00												
				Dark grey, Clay Soil			7.45	3	1	1	2								
				Dark grey, Clay Soil			8.00												
				Dark grey, Clay Soil			8.45	1	1	1	2								
				Dark grey, Clay Soil			9.00												
21.754	2.60	9.30		Dark grey, Clay Soil			9.45	2	2	1	3								
				Dark grey, Clay Soil			10.00												
				Dark grey, Clay Soil			10.45	2	2	3	5								
				Dark grey, Clay Soil			11.00												
19.754	2.00	11.50		Dark grey, Clay Soil			11.45	1	2	4	6								
				Dark grey, Clay Soil			12.00												
				Dark grey, Clay Soil			12.45	3	3	5	8								
				Dark grey, Clay Soil			13.00												
				Dark grey, Clay Soil			13.45	4	3	6	9								
17.404	2.35	13.85		Dark grey, Clay Soil			14.00												
				Dark grey, Clay Soil			14.45	7	13	22	35								
				Dark grey, Clay Soil			15.00												
				Dark grey, Clay Soil			15.45	5	11	23	34								
				Dark grey, Clay Soil			16.00												
				Dark grey, Clay Soil			16.45	9	12	24	36								
				Dark grey, Clay Soil			17.00												
				Dark grey, Clay Soil			17.45	7	13	26	39								
13.354	4.05	17.90		Dark grey, Clay Soil			18.00												
				Dark grey, Clay Soil			18.45	16	19	28	47								
				Dark grey, Clay Soil			19.00												
				Dark grey, Clay Soil			19.45	13	22	27	49								
10.804	2.55	20.45		Dark grey, Clay Soil			20.00												
				Dark grey, Clay Soil			20.45	10	21	32	>50								

LEGEND:

- Undisturbed Sample (UDS)
- Sand
- Tuff
- Ground Water Level (GWL)
- Disturbed Sample (DS)
- Silt
- Organic
- N1 Pre Testing
- Standard Penetration Test (SPT)
- Clay
- Gravel

# DRILLING LOG

PROJECT : MEDAN FLOOD CONTROL

Boring No		B.30		Location		FLOODWAY													
Client :		CTI Engineering Co., Ltd		Implementation		Boring Log		North Latitude											
Company's Name		PT. MELIAS KESUMA		Period		Prepared By		East Latitude											
Ground Elevation		180°		180°		Hammer Drop		Sihar TB											
Boring depth		25.0 M		270°		Implement		SPT Tools											
		90°		180°		TOHO		Chief Operator											
		90°		90°		Pump		Subman											
						TOHO		Drilling Method											
						Ground Water Table (GWL)		Rotary Drilling											
								2.96 m											
No	Elevation (M)	Thickness (M)	Depth (M)	Symbol	DESCRIPTION	Ground Water Level (M)	Geological Condition	Standard Penetration Test				In-Situ Test				Sampling Depth (M)	Methods of sampling	D o i e	
								Blows Penetration Each 15 Cm			N	N - VALUE			Elevation of SPT (M)				Test Name and Result
								N1	N2	N3	N1 + N2 + N3	10	20	30	40	50			
0	35.081				Top soil														
1					Dark yellow, Clay Soil														
2					Medium plasticity, High moisture content.	32.101													
3																			
4	30.781	4.30	4.30		Yellowish light grey, Silty fine sand, Low density, Non plasticity, Low moisture content.														270395
5																			
6																			
7	28.211	2.37	6.67		Dark grey, Medium size sand, Medium density, Non plasticity, Low moisture content.														
8																			
9																			
10	24.981	3.68	10.30		Dark grey, Fine sand clay, Medium stiffness, Medium to high plasticity, Medium moisture content.														
11																			
12																			
13	22.281	2.30	12.80		Grey, Fine sand, Medium density, Low plasticity, Low moisture content.														
14																			
15																			
16																			
17	18.081	4.20	17.00		Dark grey, Fine sand, Low density, Non plasticity, Low moisture content.														
18																			
19																			
20	14.51	3.35	20.35		Dark grey, Light grey, Medium size sand, Medium density, Non plasticity, Low moisture content.														
21																			
22	13.281	1.25	21.81		Yellowish dark grey, Medium size sand, containing gravel, High density, Non plasticity, Low moisture content.														
23																			
24																			
25	9.01	3.63	25.45																
26																			
27																			
28																			
29																			
30																			
31																			
32																			
33																			
34																			
35																			

LEGEND:

	Undisturbed Sample (UDS)		Sand		Tuff		Ground Water Level (GWL)
	Disturbed Sample (DS)		Silt		Organic		N1 Pre Testing
	Standard Penetration Test (SPT)		Clay		Gravel		

# DRILLING LOG

PROJECT : MEDAN FLOOD CONTROL

Boring No		B.31		Location		FLOODWAY												
Client :		CTI Engineering Co., Ltd		Implementation		Boring Log												
Company's Name		PT. MELLAS KESUMA		Periods		Prepared By												
Ground Elevation		180°		Chief Engineer		Hammer Drop Implement												
Boring depth		31.0 M		Boring Machine		SPT Tools												
		180°		Enggine		Chief Operator												
		90°		Yaumar		Suberman												
		180°		Ground Water Table (GWL)		Drilling Methode												
		90°		2.47 m		Rotary Drilling												
No	Elevation (M)	Thickness (M)	Depth (M)	SYMBOL	DESCRIPTION	Ground Water Level (M)	Geological Condition	Depth of SPT (M)	Standard Penetration Test				In-Situ Test		Sampling Depth (M)	Methods of sampling	D	
									Blow Penetration Each 15 Cm			N - VALUE	Elevation of SPT (M)	Test Name and Result				
									N1	N2	N3	N2 + N3	10	20	30	40	50	
0	38.280				Top soil													
1	36.830	1.45	1.45		Dark brown, Clay, Richness, High plasticity, Low moisture content.			1.00										
2					Dark yellow Clay containing fine sand, Soil, Medium plasticity, High moisture content.	35.810		1.45	1	2	2	4						
3								2.00										
4	34.280	2.55	4.00					2.45	1	1	2	3						
5								3.00										
6								3.45	1	1	2	3						
7					Yellowish light grey, Silty fine sand, Low to medium density, Non plasticity, Low moisture content.			4.00										
8								4.45	1	1	1	2						
9								5.00										
10	28.480	5.80	9.80		Yellowish light grey, Medium to coarse size sand, Medium to high density, Non plasticity, Low moisture content.			5.45	2	2	7	9						5.00 DS
11								6.00										
12	26.480	2.00	11.80		Light Yellow, Clayey medium size sand, Low density, Non plasticity, Low moisture content.			6.45	8	5	6	11						5.45 DS
13								7.00										
14								7.45	2	1	2	3						8.00 UDS
15								8.00										
16	22.980	3.50	15.30					8.45	1	2	2	4						8.00 UDS
17								9.00										
18								9.45	1	2	4	6						8.80 UDS
19								10.00										
20								10.45	7	10	15	25						8.80 UDS
21								11.00										
22								11.45	8	16	18	34						14.00 UDS
23								12.00										
24								12.45	7	12	21	33						14.00 UDS
25								13.00										
26								13.45	7	8	8	16						
27								14.00										
28								14.45	5	4	11	15						
29								15.00										
30								15.45	4	6	6	12						14.80 UDS
31								16.00										
32								16.45	4	6	8	14						20.00 UDS
33								17.00										
34								17.45	4	4	6	10						
35								18.00										
36								18.45	6	12	15	27						
37								19.00										
38								19.45	8	16	19	35						
39								20.00										
40								20.45	10	15	19	34						
41								21.00										
42								21.45	14	16	16	32						
43								22.00										
44								22.45	16	14	16	30						
45								23.00										
46								23.45	10	12	18	30						
47								24.00										
48								24.45	9	10	15	25						
49								25.00										
50								25.45	10	15	18	33						
51								26.00										
52								26.45	10	15	18	33						
53								27.00										
54								27.45	10	15	33	48						
55								28.00										
56								28.45	12	17	20	37						
57								29.00										
58								29.45	15	20	22	42						
59								30.00										
60								30.45	20	23	23	46						
61	6.830	8.67	31.45					31.00										
62								31.45	33	45	10/3	>50						

LEGEND:

	Undisturbed Sample (UDS)		Sand		Tuff		Ground Water Level (GWL)
	Disturbed Sample (DS)		Silt		Organic		N1 Pre Testing
	Standard Penetration Test (SPT)		Clay		Gravel		

# DRILLING LOG

PROJECT : MEDAN FLOOD CONTROL

Boring No Client : Company's Name		B.32 CTI Engineering Co.,Ltd PT. MELLAS KESUMA		Location Implementation Period		FLOODWAY 25/06/1995 28/06/1995		Boring Log Prepared By		Sibar TB		North Latitude East Latitude	
Ground Elevation		180° Angle 90° Direction 180°		Ground Slope 0°		Chief Engineer		Hammer Drop Implement		SPT Tools		Chief Operator	
Boring depth		20.0 M				Boring Machine		Pump		Drilling Method		Rotary Drilling	
						Engine		Lusban		Ground Water Table (GWL)		3.76 m	

S e c t i o n	Elevation (M)	Thickness (M)	Depth (M)	Symbol	DESCRIPTION	Ground Water Level (M)	Geological Condition	Depth of SPT (M)	Standard Penetration Test					In-Situ Test				Sampling Depth (M)	Methods of sampling	D e t a i l
									Blow Penetration Each 15 Cm			N - VALUE	Elevation of SPT (M)	Test Name and Result	Sampling	Methods	D			
									N1	N2	N3									
0	35.843				Top soil															
1	35.943	0.90	0.90		Dark grey, Clay, Soil, Medium plasticity, High moisture content.			1.00												
2					Light grey, Silty clay Soil, Medium plasticity, High moisture content.			1.45	4	4	12	16			35.393					
3								2.00												
4								2.45	5	7	16	23			34.393					
5								3.00												
6								3.45	8	12	16	28			33.393					
7								4.00												
8								4.45	9	13	14	27			32.393					
9	32.043	3.90	4.80			33.083		5.00												
10								5.45	7	13	14	27			31.393					
11								6.00												
12								6.45	11	15	16	31			30.393					
13								7.00												
14								7.45	9	11	16	27			29.393					
15								8.00												
16								8.45	11	19	18	37			28.393					
17								9.00												
18								9.45	7	11	20	31			27.393					
19								10.00												
20								10.45	9	16	24	40			26.393					
21								11.00												
22								11.45	13	21	27	48			25.393					
23								12.00												
24								12.45	10	18	21	39			24.393					
25	25.063	6.98	11.78		Dark grey, Fine sand containing gravel, Medium density, Non plasticity, Low moisture content.			13.00												
26								13.45	15	24	27	>50			23.393					
27								14.00												
28								14.45	13	18	26	44			22.393					
29								15.00												
30								15.45	11	17	27	44			21.393					
31								16.00												
32								16.45	15	15	21	36			20.393					
33								17.00												
34								17.45	17	21	24	45			19.393					
35								18.00												
36								18.45	17	30	32	>50			18.393					
37								19.00												
38								19.45	11	28	33	>50			17.393					
39								20.00												
40	16.393	6.95	20.45					20.45	21	32	29/6	>50			16.393					

LEGEND:

Undisturbed Sample (UDS)	Sand	Tuff	Ground Water Level (GWL)
Disturbed Sample (DS)	Silt	Organic	N1 Pre Testing
Standard Penetration Test (SPT)	Clay	Gravel	

# DRILLING LOG

PROJECT : MEDAN FLOOD CONTROL

Boring No Client : Company's Name		B.33 CTI Engineering Co.,Ltd PT. MELIAS KESUMA			Location Implementation Period		FLOODWAY 16/05/95 20/05/95				Boring Log Prepared By		North Latitude East Latitude	
Ground Elevation		180° Angle		180° Direction		Ground Slope		Chief Engineer		Sausal Lbs Implement		SPT Tools Chief Operator		
Boring depth		26.0 M		270° 180°		90°		SGZ-1A Engine		Lushan Ground Water Level (GWL)		Robis 251 m		

No	Elevation (M)	Thickness (M)	Depth (M)	Symbol	DESCRIPTION	Ground Water Level (M)	Geological Condition	Depth of SPT (M)	Standard Penetration Test										In-Site Test			Date	
									Blow Penetration Each 15 Cm			N BLOWS	N - VALUE					Elevation of SPT (M)	Test Name and Result	Sampling Depth (M)	Methods of sampling		
									N1	N2	N3		N2 + N3	10	30	40	50						
0	38.842				Top Soil																		
1					Dark brown Soft clay, Medium stiffness			1.00															
2	36.042	2.80	2.80		Medium plasticity, High moisture content	36.332		1.43	2	2	2	4											
3					Light brown Sandy clay, SoR,			2.00															
4	34.942	1.10	3.90		Medium plasticity, High moisture content			3.43	2	3	2	5											17/03/93
5					Light grey Fine sandy clay, SoR,			4.00															
6					Medium plasticity, High moisture content			4.43	2	3	3	6											
7	31.842	3.10	7.00		Grey, Fine sand containing clay Low density, Low plasticity, Low moisture content			5.00	1	2	3	5											
8	30.842	1.00	8.00		Grey, Fine sand containing Gravel Medium density, Non plasticity, Low moisture content			6.43	1	1	1	1											
9	30.042	0.80	8.80		Grey, Fine sand containing Gravel Medium density, Non plasticity, Low moisture content			7.43	1	2	4	6											
10					Brown Silty fine to medium size sand, Low to medium density, Non plasticity, Low moisture content			8.00	10	11	12	23											
11					Brown Silty fine to medium size sand, Low to medium density, Non plasticity, Low moisture content			8.43	4	5	11	16											
12					Light grey, Fine to medium size sand, Medium density, Non plasticity, Low moisture content			9.00	8	6	3	9											
13					Light grey, Fine to medium size sand, Medium density, Non plasticity, Low moisture content			10.43	8	6	3	9											
14	24.242	5.80	14.60		Light grey, Fine to medium size sand, Medium density, Non plasticity, Low moisture content			11.00	5	5	7	12											
15					Light grey, Fine to medium size sand, Medium density, Non plasticity, Low moisture content			11.43	12	8	8	16											
16					Light grey, Medium size sand containing clay Medium density, Non plasticity, Low moisture content			12.00	12	8	8	16											
17					Light grey, Medium size sand containing clay Medium density, Non plasticity, Low moisture content			12.43	8	7	9	16											
18					Light grey, Medium size sand containing clay Medium density, Non plasticity, Low moisture content			13.00	5	7	7	14											
19	19.942	4.30	18.90		Light grey, Medium size sand containing clay Medium density, Non plasticity, Low moisture content			13.43	14	14	20	34											
20					Light grey, Medium size sand containing clay Medium density, Non plasticity, Low moisture content			14.00	16	18	29	47											
21					Light grey, Medium size sand containing clay Medium density, Non plasticity, Low moisture content			14.43	26	29	21/7	50											
22	16.942	3.00	21.90		Light grey, Medium size sand containing clay Medium density, Non plasticity, Low moisture content			15.00	17	18	20	38											
23					Grey Unconsolidated silt High density, Non plasticity, Low moisture content			15.43	9	9	10	19											
24					Grey Unconsolidated silt High density, Non plasticity, Low moisture content			16.00	8	8	10	18											
25					Grey Unconsolidated silt High density, Non plasticity, Low moisture content			16.43	7	9	13	22											
26	12.392	4.55	26.45		Grey Unconsolidated silt High density, Non plasticity, Low moisture content			17.00	16	21	31	52											
27					Grey Unconsolidated silt High density, Non plasticity, Low moisture content			17.43	18	27	30	57											
28					Grey Unconsolidated silt High density, Non plasticity, Low moisture content			18.00	21	40	10/4	50											
29					Grey Unconsolidated silt High density, Non plasticity, Low moisture content			18.43	25	45	10/5	55											
30					Grey Unconsolidated silt High density, Non plasticity, Low moisture content			19.00	18	20	22	42											
31								19.43															
32								20.00															
33								20.43															
34								21.00															
35								21.43															

LBOBND:

- ☒ Undisturbed Sample (UDS)
- ☐ Disturbed Sample (DS)
- ▨ Standard Penetration Test (SPT)
- ☐ Sand
- ☐ Silt
- ☐ Clay
- ☐ Tuff
- ☐ Organic
- ☐ Gravel
- ☐ Ground Water Level (GWL)
- ☐ N1 Pre Testing

# DRILLING LOG

PROJECT : MEDAN FLOOD CONTROL

Boring No		B.34		Location		FLOODWAY			
Client :		CTI Engineering Co., Ltd		Implementation		11/05/1995		Boring Log	
Company's Name		PT. MELIAS KESUMA		Period		15/05/1995		Prepared By	
Ground Elevation		180°		Direction		180°		Ground Slope	
Boring depth		23.0 M		Chief Engineer		Sanusi Ibs		Hammer Drop Implement	
		Angle		270°		180°		SPT Tools	
		90°		0°		90°		Chief Operator	
		90°		90°		90°		Suberman	
				Boring Machine		SGZ-1A		Drilling Method	
				Engine		Lushan		Rotary Drilling	
						Ground Water Level (GWL)		3.40 m	

Elevation (M)	Thickness (M)	Depth (M)	Symbol	DESCRIPTION	Ground Water Level (M)	Geological Condition	Depth of SPT (M)	Standard Penetration Test					In-Situ Test		Sampling Depth (M)	Method of sampling	Date		
								Blow Penetration Each 15 Cms			N - VALUE		Elevation of SPT (M)	Test Name and Result					
								N1	N2	N3	N2 + N3	10	20	30	40	50			
40.136				Top soil			1.00												
39.636	0.50	0.50		Peat material			1.45	1	-	1	1								
				Dark brown, Soft clay, Medium plasticity, High moisture content	36.736		2.00	1	1	-	1								
							2.45	1	1	-	1								
							3.00	1	-	-	0								
							3.45	1	-	-	0								
							4.00	1	-	-	0								
35.136	4.50	5.00		Grey, Silty fine sand, Low density, Non plasticity, Low moisture content.			4.45	1	-	-	0								
							5.00	1	3	6	9								
							5.45	1	5	9	14								
33.636	1.50	6.50		Grey, Fine sand containing small gravel Medium density, Non plasticity, Low moisture content.			6.00	5	5	9	14								
							6.45	5	5	9	14								
							7.00	7	9	11	20								
							7.45	7	9	11	20								
							8.00	9	11	11	22								
							8.45	9	11	11	22								
							9.00	8	11	13	24								
30.336	3.30	9.80		Grey, Fine sand containing small gravel and silt Medium to light density, Non plasticity, low moisture content.			9.45	8	11	13	24								
							10.00	14	26	26	>50								
							10.45	10	15	23	38								
28.536	1.80	11.60		Grey, Sandy clay, silt Medium plasticity, Medium to high moisture content			11.00	10	15	23	38								
							11.45	10	15	23	38								
							12.00	5	7	12	19								
							12.45	5	7	12	19								
							13.00	9	23	28	51								
							13.45	9	23	28	51								
							14.00	12	16	21	37								
25.536	2.10	14.60		Light brown, Unsolid tuff, Medium to high density, Non plasticity, High moisture content.			14.45	12	16	21	37								
							15.00	5	7	9	16								
							15.45	5	7	9	16								
							16.00	6	7	6	13								
							16.45	6	7	6	13								
							17.00	8	6	9	15								
							17.45	8	6	9	15								
							18.00	5	7	20	27								
							18.45	5	7	20	27								
							19.00	20	22	25	47								
							19.45	20	22	25	47								
20.336	5.20	19.80		Dark grey Fine to medium size sand containing Small to medium size gravel High density, Non plasticity, Low moisture content			20.00	37	48	10/2	>50								
							20.45	37	48	10/2	>50								
							21.00	28	55	-	>50								
							21.45	28	55	-	>50								
							22.00	25	21	15	36								
							22.45	25	21	15	36								
							23.00	20	20	22	42								
							23.45	20	20	22	42								
16.686	3.65	23.45																	

**LEGEND**

- Undisturbed Sample (UDS)
- Disturbed Sample (DS)
- Standard Penetration Test (SPT)
- Sand
- Silt
- Clay
- Tuff
- Organic
- Gravel
- Ground Water Level (GWL)
- N1 Pre Testing

# DRILLING LOG

PROJECT : MEDAN FLOOD CONTROL

Boring No		B.35		Location		DIVERSION WEIR					
Client		CTI Engineering Co.,Ltd		Implementation		04/06/95		Boring Log		North Latitude	
Company's Name		PT. MELJAS KESUMA		Period		11/06/95		Prepared By		Sihar TB	
Ground Elevation		180°		Direction		180°		Ground Slope		0°	
Boring depth		35.0 M		Chief Engineer		Sausi Lbs		Implement		SPT Tools	
				Boring Machine		SGZ-1A		Pump		Robin	
				Engine		Lushan		Ground Water Table (GWL)		2.90 m	
										Chief Operator	
										Suberman	
										Drilling Method	
										Rotary Drilling	

Elevation (M)	Thickness (M)	Depth (M)	Symbol	DESCRIPTION	Ground Water Level (M)	Geological Condition	Depth of SPT (M)	Standard Penetration Test				In-Situ Test				Sampling Depth (M)	Method of sampling	Date	
								Blow Penetration Each 15 Cm			N - VALUE	Elevation of SPT (M)	Test Name and Result	Sampling	Method				Date
								N1	N2	N3									
31.265				Top Soil															
				Dark brown, Fine sandy clay, Soft		M	1.00												
				Medium to high plasticity, High moisture content.			1.45	5	9	14	23		29.815						
							2.00												
							2.45	6	11	13	24		28.815				06/06/95		
28.465	2.80	2.80		Dark Grey	26.365	F	3.00												
				Fine sand containing small gravel and clay low to medium density, Non plasticity, Low moisture content.			3.45	4	28	24	>50		27.815						
							4.00												
							4.45	7	14	16	30		26.815						
							5.00												
25.265	3.20	6.00		Light grey, Clay, Soft, Medium plasticity, High moisture content.			5.45	8	7	13	20		25.815						
							6.00												
							6.45	5	4	6	10		24.815						
							7.00												
24.465	0.80	6.80		Light grey, Unconsolidated silt and fine to medium size sand, Non plasticity, Very low moisture content.			7.45	21	24	33	>50		23.815	7.00	7.00	UDS			
							8.00												
							8.45	26	27	35	>50		22.815		7.80				
							9.00												
							9.45	22	24	30	>50		21.815		10.00		06/06/95		
							10.00												
							10.45	14	19	27	46		20.815		10.00		UDS		
							11.00												
20.485	3.96	10.78		Light grey, Unconsolidated silt and fine to medium size sand, Non plasticity, Very low moisture content.			11.45	21	25	31	>50		19.815		10.80				
							12.00												
							12.45	23	28	33	>50		18.815						
							13.00												
							13.45	29	20	26	46		17.815						
							14.00												
				Light grey, Unconsolidated silt Low hard Non plasticity, Very low moisture content.			14.45	9	15	25	40		16.815						
							15.00												
							15.45	12	17	23	40		15.815		15.00		UDS		
							16.00												
							16.45	30	46	14/3	>50		14.815		15.80		UDS		
							17.00												
							17.45	36	62	-	>50		13.815				07/06/95		
							18.00												
							18.45	40	66	-	>50		12.815						
							19.00												
							19.45	38	51	17/3	>50		11.815						
							20.00												
							20.45	39	59	21/4	>50		10.815		20.00		UDS		
							21.00												
							21.45	17	25	28	>50		9.815		20.80		UDS		
							22.00												
				Dark grey, Fine sand containing clay, Medium density, Low plasticity, Low moisture content.			22.45	6	11	14	25		8.815		22.00		UDS		
							23.00												
							23.45	4	6	8	14		7.815		22.80		UDS		
							24.00												
				Light brown, Clay, Soft to medium stiff, High plasticity, Medium to moisture content			24.45	3	5	4	9		6.815		24.00		UDS		
							25.00												
							25.45	5	7	6	13		5.815		24.80		UDS		
							26.00												
							26.45	10	11	19	30		4.815		26.00		UDS		
							27.00												
							27.45	9	13	25	38		3.815		26.80		UDS		
							28.00												
							28.45	12	17	29	46		2.815						
							29.00												
							29.45	15	21	28	49		1.815						
							30.00												
				Dark grey, Clay High stiffness High plasticity, Medium moisture content			30.45	14	24	32	>50		0.815						
							31.00												
							31.45	16	22	28	50		-0.185						
							32.00												
							32.45	15	20	27	47		-1.185						
							33.00												
							33.45	12	22	24	46		-2.185						
							34.00												
2.515	5.78	33.78		Dark grey, fine sand containing gravel High density, Non plasticity, Low moisture content.			34.45	17	24	31	>50		-3.185						
							35.00												
-4.185	1.67	35.45					35.45	15	27	29	>50		-4.185						

LEGEND:

	Undisturbed Sample (UDS)		Sand		Tuff		Ground Water Level (GWL)
	Disturbed Sample (DS)		Silt		Organic		Pre Testing
	Standard Penetration Test (SPT)		Clay		Gravel		

# DRILLING LOG

PROJECT ; MEDAN FLOOD CONTROL

Boring No		B.36				Location		FLOODWAY															
Client :		CTI Engineering Co.,Ltd				Implementation		Boring Log		North Latitude													
Company's Name		PT. MELIAS KESUMA				Period		Prepared By		East Latitude													
Ground Elevation	Boring depth	180° Angle	90° Direction	180° 270° 180°	Ground Slope	0° 90°	Chief Engineer		Hammer Drop Implement		SPT Tools		Chief Operator										
							Sasul Lbs		SPT Tools		Robis		Suberna										
Boring depth		26.0 M		Boring Machine		ZT-100		Pump		Robis		Drilling Method		Rotary Drilling									
Ground Elevation		31.601		Ground Water Level		30.301		Engine		Lushan		Ground Water Table (GWL)		1.30 m									
Elevation (M)	Thickness (M)	Depth (M)	Symbol	DESCRIPTION	Ground Water Level (M)	Geological Condition	Depth of SPT (M)	Standard Penetration Test					In-Situ Test		Sampling Depth (M)	Method of sampling	D						
								Blow Penetration Each 15 Cm		N - VALUE		Elevation of SPT (M)		Test Name and Result									
(M)	(M)	(M)			(M)		(M)	N1	N2	N3	N2 + N3	10	20	30	40	50	(M)						
31.601				Top Soil			1.00																
				Grey, Fine sandy clay containing gravel, Soil Medium to high plasticity, High moisture content.	30.301	Med	1.45	2	2	2	4												
							2.00																
							2.45				2	2	3	5									
							3.00																
							3.45				3	4	6	10									
							4.00																
				4.45				2	3	5	8												
				5.00																			
				5.45				2	3	3	6												
				6.00																			
				6.45				2	2	4	6												
24.711	6.89	6.89		Dark grey, Fine sand, Low density, Non plasticity, Very low moisture content.			7.00																
					7.45				2	4	6	10											
					8.00																		
					8.45				4	7	7	14											
				9.00																			
				9.45				5	8	11	19												
21.601	3.11	10.00		Dark grey Coarse sand containing gravel Medium to high density, Non plasticity, Low moisture content.			10.00																
					10.45				14	18	23	41											
					11.00																		
					11.45				16	19	24	43											
					12.00																		
					12.45				17	17	26	43											
				13.00																			
				13.45				18	19	24	43												
				14.00																			
				14.45				15	14	20	34												
				15.00																			
				15.45				15	17	22	39												
				16.00																			
				16.45				17	20	25	45												
				17.00																			
				17.45				13	16	17	33												
13.711	7.89	17.89		Light grey Fine sand and Unconsolidated buff Medium to high density, Non plasticity, Low moisture content.			18.00																
					18.45				10	11	11	22											
					19.00																		
					19.45				12	14	21	35											
11.801	1.91	19.80		Dark grey, Unconsolidated buff High density, Non plasticity, Low moisture content.			20.00																
					20.45				14	16	25	41											
					21.00																		
					21.45				17	20	29	49											
					22.00																		
					22.45				21	22	27	49											
				23.00																			
				23.45				19	24	31	>50												
				24.00																			
				24.45				16	25	33	>50												
				25.00																			
				25.45				14	21	29	50												
				26.00																			
5.151	6.65	26.45		26.45				14	23	27	50												

**LEGEND:**

	Undisturbed Sample (UDS)		Sand		Tuff		Ground Water Level (GWL)
	Disturbed Sample (DS)		Silt		Organic		N1 Pre Testing
	Standard Penetration Test (SPT)		Clay		Gravel		

# DRILLING LOG

PROJECT : MEDAN FLOOD CONTROL

Boring No Chest :		B.37 CTI Engineering Co.,Ltd PT. MELIAS KESUMA				Location DIVERSION WEIR		Implementation 05/05/1995 08/05/1995		Boring Log Prepared By Sihar TB		North Latitude								
Company's Name						Chief Engineer Saaul Uls		Hammer Drop Implement TOHO		SPT Tools TOHO		Chief Operator Suberna								
Ground Elevation		180° Angle		180° Direction		Ground Slope														
Boring depth		20.0 M				90°		Enggine Yanzur		Ground Water Table (GWL) 2.81 m		Drilling Method Drilling Method								
Elevation (M)	Thickness (M)	Depth (M)	Symbol	DESCRIPTION	Ground Water Level (M)	Geological Condition	Depth of SPT (M)	Standard Penetration Test					In-Situ Test		Sampling Depth (M)	Methods of sampling	D e t a i l			
								Blow Penetration Each 15 Cm			N BLOWS		N - VALUE	Elevation of SPT (M)				Test Name and Result		
34.786				Top soil				N1	N2	N3	N2 + N3 30 cm	10			20	30	40		30	
				Light brown, Clay Medium stiffness High plasticity, High moisture content.			1.00													
							1.45	2	2	2	4									
							2.00													
32.336	2.45	2.45					2.45	2	3	4	7							2.00	UDS	06/03/95
				Dark grey, Fine sand containing small gravel Medium density, Non plasticity, Low moisture content.	31.976		3.00													
							3.45	4	10	15	25									
							4.00													
							4.45	10	8	6	14									
29.986	2.35	4.80					5.00													
				Light brown, Clay Soft, High plasticity, High moisture content.			5.45	2	2	3	5									
							6.00													
							6.45	1	2	2	4									
27.786	2.20	7.00					7.00													
				Light brown, Soft clay containing sand, Medium to high plasticity, High moisture content.			7.45	1	1	2	3									
							8.00													
							8.45	2	1	3	4									
							9.00													
				Light grey Medium size sand and uncemented tuff Medium density, Non plasticity, Low moisture content.			9.45	3	3	3	6									
							10.00													
							10.45	7	7	15	22									
23.286	3.50	11.50					11.00													
							11.45	7	10	14	24									
							12.00													
							12.45	8	13	17	30									
							13.00													
							13.45	10	14	19	33									
							14.00													
				Grey, Uncemented Tuff Medium hard Non plasticity, Very low moisture content.			14.45	12	14	21	35									
							15.00													
							15.45	17	20	28	48									
							16.00													
							16.45	20	33	17/4	>50									
							17.00													
							17.45	18	35	15/3	>50									
							18.00													
							18.45	23	33	17/3	>50									
							19.00													
							19.45	18	24	28	>50									
							20.00													
14.336	8.95	20.45					20.45	21	25	29	>50									

LEGEND:

- Undisturbed Sample (UDS)      Sand      Tuff      Ground Water Level (GWL)
- Disturbed Sample (DS)      Silt      Organic      N1 Pre Testing
- Standard Penetration Test (SPT)      Clay      Gravel

# DRILLING LOG

PROJECT : MEDAN FLOOD CONTROL

Boring No		Client		Location		Implementation		Boring Log		North Latitude									
B.38		CTI Engineering Co., Ltd		DIVERSION WEIR		01/5/1995		Prepared By		Sihar TB									
Company's Name		PT. MELIAS KESUMA		Chief Engineer		Sausal Lbs		Hammer Drop Implement		SPT Tools									
Ground Elevation		180°		Direction		Ground Slope		Boring Machine		Chief Operator									
35.0 M		180°		270°		90°		SGZ-1A		Suberna									
Boring depth		Angle		Direction		Slope		Engine		Drilling Method									
35.0 M		90°		180°		90°		Lushan		Rotary Drilling									
								Pump		7.66 m									
								Robin											
								Groud Water Level (GWL)											
No	Elevation (M)	Thickness (M)	Depth (M)	Symbol	DESCRIPTION	Ground Water Level (M)	Geoligal Condition	Depth of SPT (M)	Standard Penetration Test					Elevation of SPT (M)	In-Situ Test	Sampling Depth (M)	Method of Sampling	Date	
									Blows Penetration Each 15 Cm			N - VALUE							Test Name and Result
								N1	N2	N3	N2 + N3	10	20	30	40	50			
0	34.374				Top Soil														
1	33.174	1.20	1.20		Brown, clay, Medium stiffness, High plasticity, High moisture content.			1.00											
2	32.574	0.60	1.80		Light brown, Fine sandy clay, Soft Medium to high plasticity, High moisture content			1.45	2	2	3	5							
3	31.574	1.00	2.80		Light grey, Fine sand, Low density, Non plasticity, Low moisture content			2.00											
4	30.874	0.70	3.50		Brownish light grey, Fine sand containing clay, Medium density, Low plasticity, Low moisture content.			2.45	3	4	4	8							
5	30.374	0.50	4.00		Brown, Clay, Soft to Medium stiffness, High plasticity, High moisture content			3.00											
6					Dark grey, Clay containing small gravel, Medium stiffness, Medium to high plasticity, Medium moisture content.			3.45	5	8	8	16							01/05/95
7	27.374	3.00	7.00		Grey, Unconsolidated tuff Medium density, Non plasticity, Low moisture content	26.714		4.00											
8					Grey, Unconsolidated tuff Medium density, Non plasticity, Very low moisture content.			4.45	5	7	10	17							
9								5.00	6	8	8	16							
10	23.724	3.65	10.65					5.45	6	8	8	16							
11								6.00	6	9	11	20							
12								6.45	6	9	11	20							
13								7.00	6	9	11	20							
14								7.45	5	7	9	16							
15								8.00	4	7	12	19							
16								8.45	4	7	12	19							
17								9.00	7	12	17	29							
18								9.45	7	12	17	29							
19								10.00	9	14	20	34							
20								10.45	9	14	20	34							
21								11.00	10	12	16	28							
22								11.45	10	12	16	28							
23								12.00	10	12	23	35							
24	10.674	13.05	23.70					12.45	10	12	23	35							
25	10.374	0.30	24.00		Dark grey, fine to medium size sand, Low density, Non plasticity, Low moisture content.			13.00	13	21	26	47							
26	9.374	1.00	25.00		Light brown, Soft clay medium stiffness, High plasticity, Low moisture content.			13.45	13	21	26	47							
27								14.00	18	26	34	>50							
28								14.45	18	26	34	>50							
29								15.00	13	23	26	49							
30								15.45	13	23	26	49							
31								16.00	8	11	22	33							
32								16.45	8	11	22	33							
33								17.00	8	11	22	33							
34								17.45	14	23	25	48							
35								18.00	17	21	35	>50							
36								18.45	17	21	35	>50							
37								19.00	15	26	30	>50							
38								19.45	15	26	30	>50							
39								20.00	19	24	26	50							
40								20.45	19	24	26	50							
41								21.00	17	23	24	47							
42								21.45	17	23	24	47							
43								22.00	19	21	24	45							
44								22.45	19	21	24	45							
45	10.674	13.05	23.70					23.00	18	24	24	48							
46	10.374	0.30	24.00		Dark grey, fine to medium size sand, Low density, Non plasticity, Low moisture content.			23.45	18	24	24	48							
47	9.374	1.00	25.00		Light brown, Soft clay medium stiffness, High plasticity, Low moisture content.			24.00	5	11	10	21							
48								24.45	5	11	10	21							
49								25.00	7	7	8	15							
50								25.45	7	7	8	15							
51								26.00	8	10	11	21							
52								26.45	8	10	11	21							
53								27.00	5	7	7	14							
54								27.45	5	7	7	14							
55								28.00	4	5	7	12							
56								28.45	4	5	7	12							
57								29.00	5	8	13	21							
58								29.45	5	8	13	21							
59								30.00	6	18	21	39							
60	3.374	6.00	31.00					30.45	6	18	21	39							
61	2.374	1.00	32.00		Brownish grey, Sandy clay containing small gravel, Medium stiffness, Medium plasticity, Low to medium moisture content.			31.00	7	12	17	29							
62								31.45	7	12	17	29							
63								32.00	8	12	14	26							
64								32.45	8	12	14	26							
65								33.00	6	8	19	27							
66								33.45	6	8	19	27							
67								34.00	10	24	27	>50							
68								34.45	10	24	27	>50							
69	-1.076	3.45	35.45		Brown, Medium to coarse size sand containing gravel and silt, High density, Non plasticity, Low moisture content.			34.95	12	22	34	>50							
70																			

**LEGEND:**

- Undisturbed Sample (UDS)
- Disturbed Sample (DS)
- Standard Penetration Test (SPT)
- Sand
- Silt
- Clay
- Tuff
- Organic
- Gravel
- Ground Water Level (GWL)
- N1 Pre Testing

# DRILLING LOG

PROJECT : MEDAN FLOOD CONTROL

Boring No ( B.39 )				Location		DIVERSION WEIR			
Client : CTI Engineering Co.,Ltd				Implementation Periods		Boring Log Prepared By		North Latitude	
Company's Name PT. MELIAS KESUMA				20/06/95 25/06/95		Sihar TB		East Latitude	
Ground Elevation		180° Angle		180° Direction		Chief Engineer		Hammer Drop Implement	
Boring depth		27.0 M		Ground Slope		SGZ-LA		SPT Tools	
		90°		90°		Saual Lbs		Robis	
		370°		180°		Pump		Chief Operator	
		0°		90°		Enggine		Subernan	
						Lasbas		Drilling Methode	
						Ground Water Table (GWL)		Rotary Drilling	

Elevation (M)	Thickness (M)	Depth (M)	Symbol	DESCRIPTION	Ground Water Level (M)	Geological Condition	Standard Penetration Test										In-Site Test		Sampling Depth (M)	Methods of sampling	D u s t e
							Blows Penetration Each 15 Cm			N - VALUE	Elevation of SPT (M)	Test Name and Result									
							N1	N2	N3				N2 + N3	30 cm	10	20	30	40			
24.316				Top Soil																	
1.45				Grey Fine to medium size sand and Uncemented tuff, High density, Non plasticity, Low moisture content.																	
2.00																					
2.45																					
3.00																					
3.45																					
4.00																					
4.45																					
5.00	19.446	4.87	4.87																		
5.45																					
6.00																					
6.45																					
7.00																					
7.45																					
8.00																					
8.45																					
9.00																					
9.45																					
10.00																					
10.45																					
11.00																					
11.45																					
12.00																					
12.45																					
13.00	10.416	9.03	13.90																		
13.45																					
14.00																					
14.45																					
15.00																					
15.45																					
16.00																					
16.45																					
17.00																					
17.45	6.666	3.75	17.65																		
18.00																					
18.45																					
19.00																					
19.45																					
20.00																					
20.45																					
21.00																					
21.45	2.866	3.80	21.45																		
22.00																					
22.45																					
23.00																					
23.45																					
24.00																					
24.45																					
25.00																					
25.45																					
26.00																					
26.45																					
27.00																					
27.45	-3.134	6.00	27.45																		
28.00																					
29.00																					
30.00																					
31.00																					
32.00																					
33.00																					
34.00																					
35.00																					

LEGEND:

	Undisturbed Sample (UDS)		Sand		Tuff		Ground Water Level (GWL)
	Disturbed Sample (DS)		Silt		Organic		N1 Pre Testing
	Standard Penetration Test (SPT)		Clay		Gravel		

# DRILLING LOG

PROJECT : MEDAN FLOOD CONTROL

Boring No B.40		Location FLOOD WAY	
Client : CTI Engineering Co.,Ltd		Implementation 26/12/1995	Boring Log 29/12/1995
Company's Name PT. MELIAS KESUMA		Prepared By Sihar TB	North Latitude
Ground Elevation 180° Angle 90° Direction 180° 90°		Chief Engineer Sanusi Lbs	Hammer Drop Implement SPT Tools
Boring Depth		Chief Operator Suherman	East Latitude
Ground Slope 0°		Boring Machine TOHO	Ground Water Level (GWL) 7.20 m
		Engine	TOHO

S c a l e	Elevation (m)	Thickness (m)	Depth (m)	Symbol	DISCRIPTION	Ground Water Level (M)	Geological Condition	Depth of SPT (M)	Standard Penetration Test					In-Situ Test					
									Blows Penetration Each 15 Cm			N BLOWS N1 + N3 30 Cm	N - VALUE	Elevation of SPT (M)	Test Name and Result	Sampling Depth (M)	Methods of sampling	D a t e	
									N1	N2	N3								
0	38.241	0.00	0.00		Top Soil														
1					Dark Grey, Clay, Medium stiffness to stiffness High plasticity, Low to medium moisture content.			1.00											
2	36.391	1.85	1.85					1.45	4	6	7	13			36.791				
3								2.00											
4					Light brown, Clay, Medium stiffness High plasticity, Low to medium moisture content.			2.45	4	8	9	17			35.791				
5								3.00											
6	32.441	3.95	5.80					3.45	6	7	7	14			34.791				
7								4.00											
8								4.45	4	5	8	13			33.791				
9	29.541	2.90	8.70		Dark grey, Fine to medium sand containing clay and small gravel. Low to medium density Low plasticity, Medium moisture content.	31.841		5.00	7	9	12	21			32.791				26/12/95
10								5.45	7	9	12	21							
11								6.00	9	15	17	32			31.791				
12								6.45	9	15	17	32							
13					Light grey, Medium size sand and uncemented tuff containing clay, Medium density, Low plasticity, Low moisture content			7.00	8	12	13	25			30.791				
14								7.45	8	12	13	25							
15	23.241	6.30	15.00					8.00	7	9	8	17			29.791				
16								8.45	7	9	8	17							
17								9.00	6	6	7	13			28.791				
18								9.45	6	6	7	13							
19								10.00	7	8	9	17			27.791				
20								10.45	7	8	9	17							
21								11.00	7	9	11	20			26.791				
22								11.45	7	9	11	20							
23								12.00	9	11	13	24			25.791				
24								12.45	9	11	13	24							
25								13.00	11	13	15	28			24.791				
26								13.45	11	13	15	28							
27								14.00	13	15	19	34			23.791				27/12/95
28								14.45	13	15	19	34							
29								15.00	15	18	20	38			22.791				
30								15.45	15	18	20	38							
31								16.00	16	19	22	41			21.791				
32								16.45	16	19	22	41							
33								17.00	20	23	23	46			20.791				
34					Grey, Uncemented Tuff Medium hard, Non plasticity, Low moisture content			17.45	20	23	23	46							
35								18.00	22	24	26	>50			19.791				
36								18.45	22	24	26	>50							
37								19.00	24	25	26	>50			18.791				
38								19.45	24	25	26	>50							
39								20.00	23	24	28	>50			17.791				
40								20.45	23	24	28	>50							
41								21.00	21	35	12/9	>50			16.791				
42								21.45	21	35	12/9	>50							
43								22.00	23	39	15/6	>50			15.791				28/12/95
44								22.45	23	39	15/6	>50							
45								23.00	25	42	18/9	>50			14.791				
46								23.45	25	42	18/9	>50							
47								24.00	26	49	11/2	>50			13.791				
48								24.45	26	49	11/2	>50							
49								25.00	29	51	-	>50			12.791				
50	12.791	10.45	25.45					25.45	29	51	-	>50							
51								26.00											

**LEGEND:**

	Undisturbed Sample (UDS)		Sand		Uncemented stone		Ground Water Level (GWL)
	Disturbed Sample (DS)		Silt		Organic		Tuff
	Standard Penetration Test (SPT)		Clay		Gravel		N1 Pre Testing

# DRILLING LOG

PROJECT : MEDAN FLOOD CONTROL

Boring No B.41		Location FLOOD WAY	
Client : CTI Engineering Co.,Ltd		Implementation Periode	20/12/1995
Company's Name PT. MELIAS KESUMA		Boring Log Prepared By	Sihar TB
Ground Elevation		Chief Engineer	Sanusi Lhs
Boring depth		Boring Machine Engine	TOHO
Ground Slope		Hammer Drop Implement	Pump
Direction		SPT Tools	Robin
Angle		Chief Operator	Suherman
Ground Slope		Ground Water Level (GWL) m	

Elevation (m)	Thickness (m)	Depth (m)	Symbol	DISCRIPTION	Ground Water Level (M)	Geological Condition	Depth of SPT (M)	Standard Penetration Test				In-Situ Test				Test Name and Result	Sampling Depth (M)	Method of sampling	Date	
								Blows Penetration Each 15 Cm			N	N - VALUE								Elevation of SPT (M)
								N1	N2	N3	N2 + N3 30 Cm	10	20	30	40					50
38.918	0.00	0.00		Top Soil Dark Grey, Clay. Medium stiffness to stiffnes High plasticity. Low to medium moisture content.			1.00													
36.918	2.00	2.00		Light brown, Clay. Medium stiffness to stiffnes High plasticity. Low to medium moisture content.			1.45	5	7	7	14			37.468				20/12/95		
							2.00													
							2.45	7	8	10	18			36.468						
							3.00													
							3.45	6	8	9	17			35.468						
							4.00													
							4.45	4	5	8	13			34.468						
							5.00													
							5.45	8	13	17	30			33.468						
32.918	4.00	6.00		Dark grey, Fine to medium sand containing clay and small gravel. Low to medium density, Low plasticity. Medium moisture content.			6.00													
							6.45	11	20	32	52			32.468						
							7.00													
							7.45	6	8	10	18			31.468						
							8.00													
							8.45	3	4	5	9			30.468				22/12/95		
							9.00													
							9.45	8	9	9	18			29.468						
29.018	3.90	9.90		Light grey, Medium size sand and uncemented tuff containing clay, Medium density, Low plasticity, Low moisture content			10.00													
							10.45	14	14	15	29			28.468						
							11.00													
							11.45	6	9	10	19			27.468						
							12.00													
							12.45	4	7	8	15			26.468						
							13.00													
							13.45	5	7	7	14			25.468						
							14.00													
							14.45	13	20	22	42			24.468						
							15.00													
							15.45	15	25	37/10	>50			23.468						
							16.00													
							16.45	20	36	24/6	>50			22.468						
							17.00													
							17.45	22	46	15/4	>50			21.468				23/12/95		
							18.00													
							18.45	25	42	18/4	>50			20.468						
							19.00													
							19.45	21	46	20/5	>50			19.468						
							20.00													
							20.45	20	57	10/8	>50			18.468						
							21.00													
							21.45	20	44	16/4	>50			17.468						
							22.00													
							22.45	22	47	13/3	>50			16.468						
							23.00													
							23.45	24	45	13/3	>50			15.468				24/12/95		
							24.00													
							24.45	20	50	10/2	>50			14.468						
							25.00													
13.468	11.70	25.45		Grey, Uncemented Tuff Medium hard, Non plasticity, Low moisture content			25.45	22	48	12/3	>50			13.468						
							26.00													

**LEGEND:**

	Undisturbed Sample (UDS)		Sand		Uncemented stone		Ground Water Level (GWL)
	Disturbed Sample (DS)		Silt		Organic		Tuff
	Standard Penetration Test (SPT)		Clay		Gravel	N1	Pre Testing

PT. MELIAS KESUMA				DRILLING LOG			Bore No : A1	
SOIL & ROCK INVESTIGATION							Depth : 6.00 m	
							Tested by : Rizal	
							Date : 21/06/1995	
Depth (m)	Depth of sampling test Compaction / Physical		GWL (m)	Elevation (m)	Thickness (m)	Depth (m)	Symbol	DESCRIPTION
0.00				1.386				Top Soil
1.00	CT	PS	0.536	0.236	1.15	1.15		Brown Clay containing fine sand, Medium stiffness Medium plasticity, Medium to high moisture content.
2.00	CT	PS						Dark grey, Clay, Soft, Medium plasticity, High moisture content.
3.00	CT							
4.00				-2.184	2.42	3.57		Grey, Fine sand containing silt Low density, Non plasticity, Low moisture content.
5.00		PS						
6.00				-4.614	2.43	6.00		
Total Length of Bore			: 6.00 m			Machine Type : IWAN BORE		
Elevation			: 1.386 m			Beginning : 21/06/1995		
Ground Water Level			: 0.85 m			Ending : 21/06/1995		
Analist			: Solihin			Supervisor : Irivanto		
Legend :								
	Clay			Undisturbed Sample				
	Silt			Disturbed Sample / Physical				
	Sand			Compaction Test				
	Peat Material			Ground Water Level (GWL)				
Project: Medan Flood Control				Location : Embankment Material				

PT. MELIAS KESUMA

## DRILLING LOG






Bore No : A.2

Depth : 6.00 m

Tested by : Rizal

Date : 21/06/1995

## SOIL &amp; ROCK INVESTIGATION

Depth (m)	Depth of sampling test		GWL (m)	Elevation (m)	Thickness (m)	Depth (m)	Symbol	DESCRIPTION
	Compaction / Physical							
0.00				1.693				Top Soil
-				0.943	0.75	0.75		Dark brown, Fine sandy clay Medium stiffness, Medium plasticity, Medium to high moisture content
1.00	CT	PS	0.393	0.343	0.60	1.35		Light brown, Fine sandy clay Medium stiffness, Medium plasticity, Medium to high moisture content
2.00	CT	PS		-0.857	1.20	2.55		Dark grey, Clay containing fine sand Medium stiffness, Medium plasticity, Medium moisture content.
3.00	CT	PS						Dark grey, Clay containing sand, Medium stiffness Medium plasticity, Medium to high moisture content.
4.00								
5.00								
6.00				-4.307	3.45	6.00		

Total Length of Bore : 6.00 m

Machine Type : IWAN BORE

Elevation : 1.963 m

Beginning : 21/06/1995

Ground Water Level : 1.30 m

Ending : 21/06/1995

Analist : Solihin

Supervisor : Irivanto

## Legend :



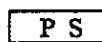
Clay



Undisturbed Sample



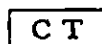
Silt



Disturbed Sample / Physical



Sand



Compaction Test



Peat Material



Ground Water Level (GWL)


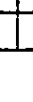

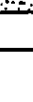
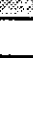







Project:

Medan Flood Control

Location :

Embankment Material

<b>PT. MELIAS KESUMA</b>				<b>DRILLING LOG</b>			Bore No : A.3	
							Depth : 6.00 m	
<b>SOIL &amp; ROCK INVESTIGATION</b>							Tested by : Rizal	
							Date : 22/06/1995	
Depth (m)	Depth of sampling test Compaction / Physical	GWL (m)	Elevation (m)	Thickness (m)	Depth (m)	Symbol	DESCRIPTION	
0.00			5.473				Top Soil	
1.00	CT					[Symbol: Clay with sand]	Dark brown, Clay containing sand, Clay including fine sand, Medium stiffness Medium to high plasticity, Medium moisture content.	
2.00	CT	PS	4.023					
3.00	CT	PS		3.223	2.25		Light grey, Clay containing Fine sand, Medium stiffness, Medium plasticity, Medium to high moisture content	
4.00						[Symbol: Sand]	Medium size sand containing clay Medium density, Low plasticity, Low moisture content.	
5.00		PS						
6.00			-0.527	2.50	6.00			
Total Length of Bore		: 6.00 m		Machine Type		: IWAN BORE		
Elevation		: 5.473 m		Beginning		: 22/06/1995		
Ground Water Level		: 1.45 m		Ending		: 22/06/1995		
Analist		: Solihin		Supervisor		: Irivanto		
<b>Legend :</b>								
[Symbol: Clay]	Clay	[Symbol: Undisturbed Sample]	Undisturbed Sample					
[Symbol: Silt]	Silt	[Symbol: Disturbed Sample]	Disturbed Sample					
[Symbol: Sand]	Sand	[Symbol: Compaction Test]	Compaction Test					
[Symbol: Peat Material]	Peat Material	[Symbol: Ground Water Level (GWL)]	Ground Water Level (GWL)					
Project: Medan Flood Control				Location : Embankment Material				

PT. MELIAS KESUMA				DRILLING LOG			Bore No : A.4	
SOIL & ROCK INVESTIGATION							Depth : 6.00 m	
							Tested by : Rizal	
							Date : 22/06/1995	
Depth (m)	Depth of sampling test Compaction / Physical		GWL (m)	Elevation (m)	Thickness (m)	Depth (m)	Symbol	DESCRIPTION
0.00				6.953				Top Soil
1.00	CT	PS						Brown Clay containing Fine sand, Soft Medium plasticity, Medium to high moisture content
2.00	CT		5.103	5.203	1.75	1.75		
3.00								
4.00	CT	PS						Dark grey, Fine to medium size sand, Low to medium density, Non plasticity, Low moisture content.
5.00								
6.00				-0.797	6.00	6.00		
Total Length of Bore : 6.00 m			Machine Type : IWAN BORE					
Elevation : 6.953 m			Beginning : 22/06/1995					
Ground Water Level : 1.85 m			Ending : 22/06/1995					
Analist : Solihin			Supervisor : Iriyanto					
Legend :								
	Clay			Undisturbed Sample				
	Silt			Disturbed Sample / Physical				
	Sand			Compaction Test				
	Peat Material			Ground Water Level (GWL)				
Project: Medan Flood Control				Location : Embankment Material				

PT. MELIAS KESUMA				DRILLING LOG			Bore No : A.5									
							Depth : 6.00 m									
SOIL & ROCK INVESTIGATION							Tested by : Rizal									
							Date : 23/06/1995									
Depth (m)	Depth of sampling test Compaction / Physical		GWL (m)	Elevation (m)	Thickness (m)	Depth (m)	Symbol	DESCRIPTION								
0.00				9.189				Top Soil								
1.00	CT	PS						Brown Clay containing Fine sand, Medium stiffness, Medium to high plasticity, Medium moisture content								
2.00	CT	PS	7.039	7.339 6.989	1.85 0.35	1.85 2.20		Brown, Coarse size sand containing clay Low density, Low plasticity, Low moisture content								
3.00	CT	PS						Dark grey, Clay containing Fine sand, Medium stiffness, Medium to high plasticity, Medium moisture content								
4.00				4.939	2.05	4.25		Dark grey, Fine sand containing clay, Low density, Non plasticity, Low moisture content								
5.00		PS														
6.00				3.189	1.75	6.00										
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Total Length of Bore : 6.00 m</td> <td style="width: 50%;">Machine Type : IWAN BORE</td> </tr> <tr> <td>Elevation : 9.189 m</td> <td>Beginning : 23/06/1995</td> </tr> <tr> <td>Ground Water Level : 2.15 m</td> <td>Ending : 23/06/1995</td> </tr> <tr> <td>Analist : Solihin</td> <td>Supervisor : Irivanto</td> </tr> </table>									Total Length of Bore : 6.00 m	Machine Type : IWAN BORE	Elevation : 9.189 m	Beginning : 23/06/1995	Ground Water Level : 2.15 m	Ending : 23/06/1995	Analist : Solihin	Supervisor : Irivanto
Total Length of Bore : 6.00 m	Machine Type : IWAN BORE															
Elevation : 9.189 m	Beginning : 23/06/1995															
Ground Water Level : 2.15 m	Ending : 23/06/1995															
Analist : Solihin	Supervisor : Irivanto															
Legend :																
	Clay		Undisturbed Sample													
	Silt		Disturbed Sample / Physical													
	Sand		Compaction Test													
	Peat Material		Ground Water Level (GWL)													
Project: Medan Flood Control				Location : Embankment Material												

<b>PT. MELIAS KESUMA</b>	<b>DRILLING LOG</b>	Bore No : A.6
		Depth : 6.00 m
		Tested by : Rizal
		Date : 23/06/1995

**SOIL & ROCK INVESTIGATION**

Depth (m)	Depth of sampling test Compaction / Physical	GWL (m)	Elevation (m)	Thickness (m)	Depth (m)	Symbol	DESCRIPTION
0.00			7.761				Top Soil
	PS		7.241	0.52	0.52		Dark grey, Clay including Fine sand, Medium stiffness, Medium plasticity, Medium moisture content
1.00	PS		6.811	0.43	0.95		Light grey, Medium size sand containing c Medium density, low plasticity, Low to medium moisture content
	CT						
2.00	PS	5.721					
	CT						
3.00							Dark grey, Medium to coarse size sand, Low to medium density, Non plasticity, Low moisture content
4.00	CT						
5.00							
6.00			1.761	5.05	6.00		

Total Length of Bore : 6.00 m	Machine Type : IWAN BORE
Elevation : 7.761 m	Beginning : 23/06/1995
Ground Water Level : 2.04 m	Ending : 23/06/1995
Analist : Solihin	Supervisor : Iriyanto

**Legend :**

Clay Silt Sand Peat Material	Undisturbed Sample Disturbed Sample / Physical Compaction Test Ground Water Level (GWL)
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Project: Medan Flood Control	Location : Embankment Material
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PT. MELIAS KESUMA

DRILLING LOG

Bore No : A.7

Depth : 6.00 m

Tested by : Rizal

Date : 24/06/1995

SOIL & ROCK INVESTIGATION

Depth (m)	Depth of sampling test		GWL (m)	Elevation (m)	Thickness (m)	Depth (m)	Symbol	DESCRIPTION
	Conpaction	Physical						
0.00				9.765				Top Soil
1.00		PS		8.585	1.18	1.18		Dark grey, Soft clay Medium stiffness Medium to high plasticity, High moisture content.
2.00		PS		7.915	0.67	1.85		Dark grey, Fine sand, Low density, Non plasticity, Low moisture content.
3.00	CT		7.465					
4.00	CT							Dark grey, Soft clay Medium stiffness Medium to high plasticity, High moisture content.
5.00		PS						
6.00				3.765	4.15	6.00		

Total Length of Bore	: 6.00 m	Machine Type	: IWAN BORE
Elevation	: 9.765 m	Beginning	: 24/06/1995
Ground Water Level	: 2.30 m	Ending	: 24/06/1995
Analist	: Solihin	Supervisor	: Iriyanto

Legend :

- Clay
- Silt
- Sand
- Peat Material
- Undisturbed Sample
- Disturbed Sample / Physical
- Compaction Test
- Ground Water Level (GWL)

Project: Medan Flood Control	Location : Embankment Material
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PT. MELIAS KESUMA

DRILLING LOG

Bore No : A.8  
 Depth : 6.00 m  
 Tested by : Rizal  
 Date : 24/06/1995

SOIL & ROCK INVESTIGATION

Depth (m)	Depth of sampling test			GWL (m)	Elevation (m)	Thickness (m)	Depth (m)	Symbol	DESCRIPTION
	Compaction / Physical								
0.00					10.635				Top Soil
1.00	PS				9.285	1.35	1.35		Light grey, Clay Low to medium stiffness High plasticity, Low moisture content.
2.00									
3.00	CT			7.985					Light grey, Clayey sand, Low to medium density, Non to slight plasticity, Low moisture content.
4.00	PS								
5.00	CT								
6.00					4.635	4.65	6.00		

Total Length of Bore	: 6.00 m	Machine Type	: IWAN BORE
Elevation	: 10.635 m	Beginning	: 24/06/1995
Ground Water Level	: 2.75 m	Ending	: 24/06/1995
Analist	: Solihin	Supervisor	: Iriyanto

Legend :

- Clay
- Undisturbed Sample
- Silt
- Disturbed Sample / Physical
- Sand
- Compaction Test
- Peat Material
- Ground Water Level (GWL)

Project:  
Medan Flood Control

Location :  
Embankment Material

**2. METEOROLOGY AND HYDROLOGY**

**VOL. IX**

**DATA BOOK**

## 2. Meteorology and Hydrology

### 2-1) Daily Rainfall Data

Station = No. 1.01 (Balai Penelitian)

Period = 1984 - 1993

### 2-2) Daily Discharge Data

Station = Simeme (Dile River)

Period = 1984 - 1993

Station = Tembung (Percut River)

Period = 1990 - 1993

Daily Rainfall(mm) of Balai Penelitian (No 1.01)													year= 1984	
day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
1	27.0	24.0	8.0	16.0	40.0	0.0	0.0	0.0	4.0	1.0	0.0	0.0	0.0	
2	0.0	73.0	23.0	0.0	0.0	8.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	
3	0.0	6.0	10.0	0.0	0.0	12.0	24.0	0.0	0.0	0.0	23.0	0.0	6.0	
4	0.0	43.0	10.0	0.0	1.0	0.0	0.0	0.0	5.0	2.0	0.0	0.0	0.0	
5	2.0	0.0	8.0	0.0	0.0	0.0	0.0	0.0	0.0	27.0	1.0	1.0	1.0	
6	0.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	8.0	0.0	1.0	1.0	14.0	
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0	52.0	0.0	0.0	
8	5.0	23.0	0.0	0.0	52.0	0.0	0.0	0.0	0.0	0.0	3.0	2.0	2.0	
9	9.0	10.0	0.0	8.0	30.0	0.0	10.0	0.0	4.0	3.0	0.0	0.0	0.0	
10	1.0	12.0	0.0	0.0	0.0	8.0	0.0	0.0	6.0	32.0	0.0	0.0	0.0	
11	0.0	0.0	0.0	2.0	0.0	0.0	21.0	0.0	10.0	0.0	0.0	0.0	0.0	
12	0.0	0.0	0.0	0.0	22.0	0.0	29.0	0.0	1.0	0.0	26.0	25.0	0.0	
13	0.0	2.0	0.0	0.0	38.0	0.0	60.0	0.0	0.0	0.0	0.0	0.0	0.0	
14	0.0	0.0	15.0	0.0	6.0	0.0	0.0	0.0	11.0	21.0	4.0	0.0	0.0	
15	0.0	0.0	12.0	0.0	10.0	7.0	3.0	0.0	0.0	0.0	0.0	0.0	3.0	
16	0.0	0.0	5.0	28.0	0.0	0.0	4.0	0.0	8.0	3.0	0.0	0.0	9.0	
17	0.0	0.0	19.0	0.0	3.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	10.0	
18	0.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
19	0.0	0.0	0.0	4.0	27.0	0.0	44.0	38.0	4.0	1.0	3.0	6.0	0.0	
20	19.0	34.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	
21	20.0	0.0	0.0	0.0	1.0	7.0	0.0	8.0	0.0	80.0	0.0	0.0	6.0	
22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.0	1.0	0.0	0.0	0.0	
23	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.0	31.0	3.0	4.0	0.0	
24	0.0	0.0	2.0	5.0	0.0	0.0	0.0	0.0	4.0	2.0	32.0	0.0	0.0	
25	0.0	0.0	0.0	0.0	0.0	11.0	0.0	0.0	0.0	8.0	2.0	0.0	0.0	
28	7.0	0.0	0.0	0.0	3.0	1.0	0.0	0.0	14.0	18.0	5.0	0.0	0.0	
27	24.0	0.0	0.0	3.0	0.0	0.0	27.0	0.0	0.0	1.0	0.0	0.0	7.0	
28	0.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.0	1.0	2.0	2.0	
29	0.0	8.0	0.0	0.0	0.0	20.0	28.0	0.0	0.0	1.0	0.0	0.0	6.0	
30	11.0	0.0	2.0	1.0	0.0	2.0	90.0	0.0	1.0	23.0	4.0	0.0	0.0	
31	0.0	0.0	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
M.Total	136.0	251.0	138.0	67.0	234.0	77.0	341.0	48.0	119.0	288.0	160.0	106.0	106.0	

Year Total = 1963.0

Year Max (1 days) = 90.0  
 Year Max (2 days) = 118.0

month= 7  
 month= 7

day= 30  
 day= 29 ~ 30

Daily Rainfall(mm) of Balai Penelitiaan (No 1.01)

year= 1985

day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.0	5.0	0.0	2.0	3.0	0.0	0.0	0.0	18.0	3.0	5.0	2.0
2	0.0	0.0	20.0	4.0	39.0	0.0	0.0	0.0	2.0	23.0	0.0	0.0
3	0.0	0.0	2.0	0.0	0.0	5.0	0.0	1.0	0.0	3.0	8.0	18.0
4	0.0	0.0	0.0	0.0	50.0	0.0	0.0	2.0	0.0	10.0	3.0	18.0
5	0.0	0.0	50.0	0.0	0.0	0.0	0.0	0.0	26.0	0.0	2.0	0.0
6	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	62.0	5.0	52.0	0.0
7	0.0	10.0	1.0	1.0	6.0	0.0	0.0	0.0	0.0	37.0	26.0	0.0
8	0.0	0.0	7.0	0.0	0.0	0.0	0.0	0.0	2.0	89.0	0.0	0.0
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.0	30.0	0.0	0.0	0.0
10	6.0	0.0	31.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0	2.0
11	1.0	4.0	0.0	53.0	0.0	0.0	0.0	0.0	0.0	13.0	0.0	0.0
12	3.0	13.0	0.0	6.0	11.0	0.0	34.0	0.0	8.0	1.0	0.0	0.0
13	0.0	0.0	0.0	1.0	14.0	0.0	11.0	0.0	0.0	21.0	0.0	6.0
14	0.0	0.0	8.0	0.0	78.0	0.0	0.0	0.0	0.0	13.0	0.0	0.0
15	0.0	1.0	0.0	0.0	9.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0
16	0.0	0.0	21.0	0.0	0.0	0.0	22.0	0.0	0.0	0.0	0.0	43.0
17	0.0	0.0	6.0	0.0	3.0	0.0	0.0	28.0	1.0	9.0	14.0	14.0
18	0.0	0.0	1.0	37.0	1.0	0.0	7.0	0.0	37.0	2.0	0.0	3.0
19	0.0	0.0	13.0	0.0	4.0	0.0	0.0	40.0	0.0	6.0	0.0	22.0
20	0.0	0.0	0.0	29.0	0.0	0.0	1.0	0.0	32.0	0.0	0.0	2.0
21	0.0	0.0	0.0	0.0	51.0	0.0	6.0	0.0	0.0	0.0	1.0	0.0
22	0.0	0.0	11.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	30.0	0.0
23	0.0	0.0	0.0	50.0	0.0	0.0	0.0	0.0	8.0	23.0	0.0	13.0
24	1.0	10.0	0.0	85.0	0.0	0.0	20.0	0.0	0.0	0.0	1.0	3.0
25	4.0	0.0	0.0	26.0	44.0	0.0	0.0	45.0	0.0	0.0	2.0	0.0
26	1.0	0.0	2.0	0.0	0.0	0.0	0.0	18.0	6.0	3.0	23.0	1.0
27	0.0	0.0	0.0	0.0	0.0	0.0	13.0	3.0	0.0	0.0	0.0	0.0
28	0.0	0.0	0.0	6.0	0.0	0.0	0.0	3.0	0.0	24.0	1.0	0.0
29	0.0	0.0	4.0	2.0	0.0	0.0	0.0	0.0	6.0	0.0	0.0	0.0
30	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	30.0	0.0
31	12.0	3.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0
M.Total	38.0	43.0	184.0	308.0	313.0	6.0	114.0	182.0	242.0	287.0	205.0	147.0

Year Total = 2067.0

Year Max (1 days)= 89.0  
 Year Max (2 days)= 135.0  
 month= 10  
 month= 4  
 day= 8  
 day= 23 ~ 24

Daily Rainfall(mm) of Bala Penelitan (No 1.01)

day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	year= 1986
1	0.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	8.0	2.0	8.0	73.0	
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	0.0	0.0	
3	0.0	107.0	20.0	2.0	0.0	0.0	40.0	0.0	8.0	0.0	0.0	0.0	
4	0.0	73.0	5.0	1.0	3.0	15.0	0.0	0.0	75.0	17.0	61.0	0.0	
5	35.0	3.0	29.0	0.0	18.0	16.0	4.0	0.0	2.0	3.0	0.0	3.0	
6	0.0	0.0	2.0	0.0	20.0	8.0	0.0	0.0	8.0	24.0	1.0	0.0	
7	9.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	11.0	0.0	13.0	
8	30.0	8.0	12.0	0.0	3.0	15.0	0.0	0.0	0.0	4.0	6.0	0.0	
9	0.0	13.0	6.0	0.0	0.0	38.0	0.0	0.0	0.0	32.0	1.0	0.0	
10	15.0	0.0	17.0	58.0	0.0	13.0	0.0	0.0	78.0	0.0	37.0	5.0	
11	0.0	0.0	0.0	0.0	0.0	25.0	11.0	0.0	0.0	0.0	2.0	0.0	
12	1.0	0.0	0.0	6.0	0.0	22.0	0.0	0.0	35.0	1.0	21.0	15.0	
13	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	14.0	3.0	14.0	2.0	
14	0.0	0.0	0.0	18.0	0.0	0.0	0.0	0.0	21.0	12.0	0.0	0.0	
15	0.0	0.0	0.0	0.0	37.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
16	10.0	0.0	22.0	0.0	3.0	92.0	0.0	0.0	46.0	11.0	7.0	0.0	
17	0.0	0.0	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.0	0.0	
18	0.0	0.0	0.0	21.0	3.0	32.0	0.0	0.0	0.0	0.0	45.0	3.0	
19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	5.0	
20	6.0	0.0	0.0	35.0	15.0	0.0	0.0	0.0	27.0	9.0	0.0	24.0	
21	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	36.0	31.0	0.0	11.0	
22	0.0	0.0	9.0	0.0	5.0	0.0	0.0	0.0	39.0	0.0	0.0	15.0	
23	0.0	5.0	0.0	0.0	31.0	0.0	0.0	4.0	0.0	2.0	0.0	4.0	
24	0.0	0.0	3.0	0.0	0.0	0.0	8.0	0.0	4.0	0.0	0.0	0.0	
25	0.0	1.0	0.0	0.0	19.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
26	0.0	0.0	0.0	0.0	42.0	0.0	0.0	4.0	18.0	0.0	0.0	0.0	
27	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	
28	0.0	0.0	0.0	5.0	0.0	40.0	0.0	10.0	3.0	0.0	5.0	1.0	
29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	0.0	4.0	0.0	0.0	
30	7.0	0.0	37.0	0.0	0.0	0.0	0.0	31.0	5.0	30.0	2.0	0.0	
31	1.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	
M.Total	114.0	215.0	153.0	159.0	200.0	314.0	68.0	55.0	422.0	201.0	240.0	177.0	Year Total = 2318.0

Year Max (1 days)= 107.0  
 Year Max (2 days)= 180.0

month= 2  
 month= 2  
 day= 3  
 day= 3 ~ 4

Daily Rainfall(mm) of Balai Penelitian (No 1.01)													year= 1987	
day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
1	0.0	0.0	0.0	0.0	6.0	0.0	5.0	0.0	0.0	0.0	0.0	3.0		
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.0	0.0	58.0	0.0	0.0		
3	0.0	0.0	0.0	0.0	12.0	0.0	10.0	9.0	0.0	4.0	0.0	2.0		
4	0.0	0.0	0.0	0.0	0.0	19.0	0.0	0.0	3.0	1.0	1.0	0.0		
5	0.0	0.0	0.0	0.0	0.0	34.0	0.0	0.0	0.0	0.0	15.0	2.0		
6	0.0	0.0	0.0	3.0	75.0	0.0	0.0	0.0	1.0	0.0	2.0	33.0		
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.0	33.0	0.0	0.0	0.0		
8	0.0	2.0	0.0	3.0	32.0	0.0	0.0	8.0	16.0	8.0	47.0	1.0		
9	27.0	0.0	16.0	3.0	0.0	0.0	15.0	27.0	0.0	0.0	3.0	33.0		
10	10.0	0.0	0.0	46.0	15.0	0.0	0.0	38.0	1.0	3.0	2.0	71.0		
11	2.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	78.0	0.0	4.0		
12	39.0	0.0	0.0	39.0	0.0	0.0	0.0	7.0	14.0	26.0	2.0	0.0		
13	1.0	0.0	47.0	0.0	0.0	0.0	0.0	1.0	0.0	5.0	0.0	0.0		
14	0.0	0.0	6.0	0.0	0.0	21.0	14.0	0.0	5.0	37.0	0.0	15.0		
15	0.0	0.0	32.0	0.0	2.0	0.0	0.0	1.0	4.0	5.0	7.0	2.0		
16	0.0	0.0	12.0	0.0	0.0	0.0	6.0	30.0	129.0	18.0	60.0	0.0		
17	0.0	0.0	0.0	0.0	0.0	5.0	3.0	44.0	2.0	0.0	0.0	0.0		
18	0.0	0.0	17.0	0.0	0.0	0.0	21.0	0.0	1.0	0.0	0.0	0.0		
19	8.0	0.0	3.0	1.0	0.0	0.0	0.0	0.0	6.0	0.0	23.0	0.0		
20	0.0	0.0	42.0	0.0	0.0	14.0	2.0	0.0	21.0	0.0	2.0	0.0		
21	0.0	0.0	0.0	1.0	0.0	1.0	0.0	2.0	28.0	0.0	0.0	0.0		
22	0.0	0.0	0.0	0.0	0.0	6.0	0.0	1.0	10.0	12.0	0.0	0.0		
23	6.0	0.0	0.0	7.0	0.0	7.0	0.0	0.0	28.0	0.0	13.0	0.0		
24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
25	0.0	0.0	0.0	17.0	0.0	0.0	0.0	0.0	0.0	0.0	90.0	6.0		
26	7.0	0.0	11.0	0.0	0.0	30.0	5.0	0.0	0.0	9.0	1.0	6.0		
27	8.0	0.0	1.0	0.0	0.0	9.0	8.0	0.0	3.0	0.0	15.0	0.0		
28	2.0	0.0	16.0	2.0	15.0	15.0	0.0	0.0	0.0	0.0	0.0	0.0		
29	12.0	0.0	0.0	0.0	41.0	0.0	19.0	1.0	0.0	28.0	3.0	0.0		
30	0.0	0.0	0.0	5.0	0.0	5.0	0.0	28.0	0.0	0.0	14.0	0.0		
31	0.0	0.0	0.0	0.0	7.0	0.0	0.0	0.0	0.0	24.0	0.0	0.0		
M.Total	122.0	2.0	203.0	127.0	205.0	166.0	108.0	238.0	305.0	315.0	300.0	178.0	Year Total = 2269.0	

Year Max (1 days) = 129.0      month= 8      day= 16  
Year Max (2 days) = 133.0      month= 9      day= 15 ~ 16

Daily Rainfall(mm) of Balai Penelitiaan (No 1.01)												year= 1988		
day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
1	0.0	0.0	0.0	11.0	5.0	0.0	49.0	3.0	7.0	11.0	0.0	28.0	0.0	
2	0.0	35.0	0.0	0.0	6.0	7.0	0.0	0.0	1.0	5.0	0.0	0.0	0.0	
3	0.0	0.0	3.0	0.0	68.0	30.0	10.0	2.0	53.0	0.0	0.0	3.0	0.0	
4	0.0	23.0	0.0	0.0	0.0	0.0	32.0	20.0	0.0	30.0	0.0	2.0	0.0	
5	0.0	2.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	8.0	63.0	0.0	
6	2.0	30.0	30.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	18.0	0.0	0.0	
7	11.0	0.0	18.0	0.0	41.0	0.0	7.0	18.0	0.0	0.0	3.0	46.0	0.0	
8	0.0	52.0	5.0	7.0	0.0	0.0	0.0	0.0	15.0	0.0	8.0	0.0	0.0	
9	0.0	0.0	12.0	8.0	3.0	0.0	1.0	0.0	9.0	0.0	29.0	16.0	0.0	
10	0.0	0.0	3.0	0.0	0.0	0.0	0.0	1.0	4.0	0.0	18.0	10.0	0.0	
11	0.0	0.0	23.0	0.0	0.0	11.0	37.0	7.0	2.0	0.0	10.0	0.0	0.0	
12	0.0	0.0	0.0	11.0	0.0	0.0	2.0	49.0	1.0	0.0	0.0	0.0	0.0	
13	4.0	0.0	0.0	0.0	0.0	0.0	49.0	5.0	0.0	5.0	4.0	0.0	0.0	
14	45.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	11.0	3.0	28.0	0.0	
15	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	58.0	2.0	0.0	1.0	0.0	
16	8.0	34.0	5.0	0.0	2.0	5.0	0.0	0.0	79.0	20.0	0.0	0.0	0.0	
17	1.0	2.0	1.0	0.0	3.0	0.0	0.0	0.0	25.0	0.0	43.0	0.0	0.0	
18	0.0	33.0	0.0	0.0	0.0	0.0	12.0	0.0	0.0	0.0	30.0	49.0	0.0	
19	8.0	7.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	7.0	0.0	0.0	
20	0.0	0.0	2.0	0.0	37.0	0.0	0.0	0.0	1.0	0.0	46.0	0.0	0.0	
21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	16.0	0.0	30.0	0.0	0.0	
22	0.0	0.0	2.0	0.0	0.0	5.0	0.0	12.0	5.0	5.0	0.0	0.0	0.0	
23	30.0	0.0	0.0	0.0	0.0	54.0	0.0	0.0	1.0	2.0	0.0	0.0	0.0	
24	0.0	0.0	0.0	0.0	0.0	20.0	8.0	0.0	6.0	0.0	0.0	0.0	0.0	
25	3.0	24.0	0.0	0.0	2.0	0.0	32.0	5.0	0.0	17.0	0.0	0.0	0.0	
26	0.0	0.0	0.0	0.0	7.0	0.0	44.0	14.0	6.0	43.0	0.0	0.0	0.0	
27	0.0	0.0	1.0	0.0	0.0	5.0	0.0	0.0	4.0	11.0	4.0	0.0	0.0	
28	4.0	5.0	0.0	0.0	0.0	0.0	2.0	8.0	0.0	1.0	2.0	32.0	0.0	
29	0.0	0.0	2.0	0.0	0.0	0.0	0.0	18.0	8.0	17.0	0.0	4.0	0.0	
30	17.0	3.0	3.0	0.0	0.0	15.0	1.0	31.0	47.0	0.0	0.0	0.0	0.0	
31	0.0	1.0	1.0	0.0	9.0	0.0	0.0	46.0	4.0	4.0	0.0	0.0	0.0	
M.Total	133.0	251.0	111.0	37.0	183.0	152.0	293.0	258.0	348.0	184.0	261.0	280.0	Year Total = 2491.0	

Year Max (1 days) = 79.0      month= 9      day= 16  
Year Max (2 days) = 137.0      month= 9      day= 15 ~ 16

Daily Rainfall(mm) of Balai Penelitian (No 1.01)													year= 1989
day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	1.0	0.0	4.0	
2	3.0	0.0	0.0	1.0	0.0	0.0	0.0	22.0	0.0	0.0	48.0	4.0	
3	3.0	0.0	0.0	0.0	0.0	3.0	0.0	58.0	65.0	22.0	1.0	0.0	
4	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	20.0	0.0	
5	3.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	8.0	20.0	23.0	0.0	
6	0.0	0.0	5.0	0.0	34.0	0.0	4.0	23.0	35.0	3.0	14.0	8.0	
7	0.0	0.0	0.0	0.0	0.0	0.0	41.0	0.0	1.0	0.0	0.0	0.0	
8	0.0	0.0	7.0	0.0	37.0	0.0	0.0	38.0	8.0	0.0	5.0	20.0	
9	0.0	0.0	12.0	0.0	18.0	48.0	0.0	22.0	68.0	0.0	6.0	0.0	
10	0.0	0.0	0.0	2.0	1.0	0.0	0.0	28.0	1.0	25.0	0.0	18.0	
11	8.0	0.0	0.0	24.0	0.0	0.0	0.0	12.0	1.0	7.0	1.0	9.0	
12	0.0	0.0	0.0	86.0	0.0	0.0	3.0	1.0	0.0	36.0	0.0	1.0	
13	21.0	2.0	0.0	0.0	9.0	0.0	0.0	19.0	78.0	0.0	2.0	28.0	
14	6.0	11.0	0.0	0.0	0.0	0.0	34.0	2.0	0.0	18.0	0.0	6.0	
15	0.0	0.0	17.0	0.0	5.0	5.0	0.0	0.0	0.0	1.0	0.0	0.0	
16	36.0	0.0	0.0	0.0	5.0	0.0	0.0	0.0	23.0	54.0	49.0	0.0	
17	15.0	0.0	0.0	2.0	0.0	0.0	0.0	16.0	1.0	0.0	0.0	0.0	
18	22.0	0.0	56.0	0.0	8.0	43.0	2.0	21.0	4.0	0.0	0.0	0.0	
19	10.0	0.0	9.0	0.0	0.0	0.0	0.0	0.0	0.0	28.0	0.0	0.0	
20	0.0	0.0	2.0	0.0	19.0	1.0	0.0	0.0	0.0	3.0	14.0	0.0	
21	10.0	0.0	7.0	0.0	14.0	0.0	0.0	0.0	23.0	41.0	0.0	8.0	
22	9.0	0.0	8.0	2.0	0.0	0.0	0.0	20.0	5.0	7.0	0.0	0.0	
23	10.0	0.0	8.0	43.0	18.0	2.0	0.0	8.0	39.0	7.0	34.0	0.0	
24	0.0	11.0	0.0	0.0	1.0	0.0	0.0	0.0	23.0	3.0	18.0	0.0	
25	0.0	0.0	0.0	0.0	0.0	7.0	0.0	10.0	7.0	0.0	10.0	0.0	
26	13.0	0.0	0.0	22.0	22.0	33.0	23.0	13.0	9.0	43.0	0.0	25.0	
27	0.0	0.0	0.0	1.0	0.0	65.0	0.0	0.0	11.0	0.0	0.0	0.0	
28	0.0	1.0	0.0	5.0	0.0	0.0	0.0	0.0	5.0	0.0	0.0	0.0	
29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	14.0	1.0	0.0	2.0	
30	0.0	0.0	4.0	0.0	0.0	0.0	1.0	0.0	38.0	0.0	7.0	0.0	
31	0.0	0.0	0.0	0.0	0.0	0.0	6.0	16.0	0.0	0.0	0.0	6.0	
M.Total	169.0	25.0	133.0	188.0	194.0	209.0	114.0	344.0	466.0	318.0	252.0	141.0	

Year Total = 2553.0

Year Max (1 days) = 86.0  
 Year Max (2 days) = 110.0  
 month= 4  
 month= 4  
 day= 12  
 day= 11 ~ 12

Daily Rainfall(mm) of Balai Penelitiaian (No 1.01)

day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	33.0	0.0	22.0	0.0
2	0.0	0.0	0.0	0.0	48.0	0.0	0.0	2.0	0.0	4.0	49.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0	23.0	51.0	2.0	5.0
4	0.0	9.0	0.0	0.0	0.0	0.0	0.0	3.0	23.0	1.0	0.0	12.0
5	0.0	12.0	0.0	0.0	0.0	11.0	0.0	0.0	3.0	56.0	0.0	0.0
8	0.0	0.0	0.0	3.0	0.0	6.0	0.0	2.0	14.0	22.0	0.0	11.0
7	0.0	0.0	0.0	0.0	0.0	0.0	58.0	0.0	0.0	0.0	15.0	3.0
8	0.0	7.0	0.0	7.0	0.0	2.0	0.0	22.0	0.0	2.0	0.0	0.0
9	7.0	4.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0
10	4.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.0	0.0
11	0.0	1.0	0.0	55.0	2.0	28.0	0.0	0.0	0.0	0.0	0.0	7.0
12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.0	2.0	0.0	39.0
13	10.0	0.0	0.0	8.0	2.0	6.0	0.0	4.0	0.0	82.0	21.0	0.0
14	0.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0	0.0
15	18.0	0.0	0.0	0.0	0.0	5.0	0.0	0.0	1.0	2.0	24.0	13.0
16	38.0	0.0	0.0	0.0	5.0	0.0	18.0	54.0	0.0	7.0	27.0	7.0
17	0.0	0.0	0.0	0.0	0.0	17.0	0.0	0.0	0.0	17.0	4.0	11.0
18	0.0	0.0	0.0	0.0	93.0	0.0	0.0	0.0	32.0	8.0	0.0	0.0
19	0.0	0.0	4.0	38.0	0.0	0.0	22.0	0.0	54.0	5.0	35.0	3.0
20	0.0	20.0	1.0	0.0	2.0	0.0	5.0	0.0	3.0	52.0	0.0	1.0
21	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	6.0	7.0	0.0	2.0
22	0.0	0.0	0.0	15.0	2.0	0.0	15.0	0.0	22.0	0.0	0.0	0.0
23	1.0	0.0	0.0	0.0	0.0	5.0	29.0	0.0	2.0	2.0	0.0	0.0
24	0.0	0.0	19.0	0.0	10.0	0.0	4.0	0.0	0.0	0.0	47.0	0.0
25	0.0	12.0	0.0	0.0	0.0	3.0	0.0	0.0	29.0	9.0	0.0	0.0
26	3.0X	0.0	0.0	0.0	9.0	1.0	0.0	0.0	89.0	3.0	60.0	0.0
27	2.0	0.0	0.0	3.0	3.0	0.0	0.0	0.0	4.0	17.0	0.0	0.0
28	0.0	0.0	0.0	0.0	1.0	0.0	28.0	0.0	44.0	0.0	3.0	0.0
29	0.0	0.0	0.0	5.0	24.0	0.0	0.0	12.0	0.0	16.0	0.0	0.0
30	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	33.0	23.0	18.0	0.0
31	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	1.0	1.0	0.0	0.0
M.Total	83.0	70.0	25.0	139.0	202.0	84.0	178.0	119.0	411.0	389.0	361.0	114.0

Year Total = 2175.0

Year Max (1 days) = 93.0  
 Year Max (2 days) = 98.0  
 month = 5  
 month = 9  
 day = 18  
 day = 25 ~ 28

Daily Rainfall(mm) of Balai Penelitiaian (No 1.01)													year= 1991	
day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
1	0.0	0.0	2.0	0.0	2.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0		
2	0.0	0.0	1.0	0.0	0.0	48.0	5.0	0.0	8.0	28.0	0.0	53.0		
3	6.0	18.0	0.0	0.0	0.0	4.0	33.0	0.0	0.0	0.0	0.0	0.0		
4	9.0	5.0	0.0	0.0	0.0	18.0	0.0	0.0	8.0	0.0	0.0	18.0		
5	0.0	1.0	0.0	0.0	0.0	41.0	0.0	0.0	8.0	0.0	0.0	0.0		
6	0.0	5.0	0.0	0.0	65.0	5.0	37.0	0.0	28.0	0.0	20.0	7.0		
7	0.0	0.0	0.0	0.0	70.0	0.0	12.0	6.0	1.0	0.0	15.0	1.0		
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	8.0		
9	0.0	0.0	0.0	2.0	0.0	0.0	0.0	21.0	0.0	0.0	0.0	0.0		
10	0.0	0.0	0.0	0.0	9.0	0.0	0.0	0.0	0.0	4.0	18.0	0.0		
11	0.0	0.0	23.0	10.0	0.0	0.0	0.0	0.0	0.0	3.0	3.0	24.0		
12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	48.0	12.0	2.0		
13	0.0	15.0	0.0	40.0	0.0	0.0	0.0	22.0	0.0	0.0	35.0	0.0		
14	0.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.0	0.0	5.0		
15	2.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	19.0		
16	0.0	0.0	0.0	0.0	2.0	0.0	0.0	3.0	0.0	0.0	0.0	2.0		
17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
18	0.0	0.0	6.0	0.0	2.0	0.0	0.0	0.0	27.0	3.0	0.0	0.0		
19	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	52.0	8.0	7.0	17.0		
20	0.0	0.0	3.0	0.0	37.0	0.0	39.0	0.0	0.0	62.0	5.0	0.0		
21	0.0	4.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	23.0	59.0	41.0		
22	0.0	0.0	41.0	2.0	1.0	0.0	1.0	0.0	0.0	0.0	0.0	3.0		
23	0.0	0.0	0.0	0.0	47.0	1.0	8.0	5.0	4.0	7.0	0.0	0.0		
24	0.0	0.0	0.0	6.0	2.0	0.0	0.0	10.0	0.0	2.0	20.0	6.0		
25	0.0	0.0	0.0	0.0	0.0	9.0	0.0	0.0	37.0	18.0	0.0	0.0		
26	0.0	0.0	0.0	1.0	0.0	0.0	0.0	4.0	0.0	3.0	0.0	0.0		
27	0.0	3.0	0.0	28.0	0.0	0.0	0.0	18.0	1.0	0.0	4.0	0.0		
28	3.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	6.0	4.0	11.0	0.0		
29	1.0	0.0	0.0	0.0	0.0	0.0	0.0	7.0	1.0	0.0	0.0	0.0		
30	1.0	0.0	11.0	0.0	12.0	13.0	0.0	15.0	24.0	3.0	0.0	0.0		
31	0.0	0.0	0.0	0.0	3.0	0.0	0.0	48.0	0.0	0.0	0.0	0.0		
M.Total	27.0	57.0	92.0	89.0	254.0	140.0	135.0	160.0	220.0	226.0	217.0	224.0	Year Total = 1841.0	

Year Max (1 days) = 70.0      month = 5      day = 7  
Year Max (2 days) = 135.0      month = 5      day = 6 ~ 7

Daily Rainfall(mm) of Balai Penelitiaian (No 1.01)												year=	1992	
day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
1	0.0	0.0	2.0	11.0	0.0	0.0	27.0	0.0	0.0	13.0	0.0	0.0	0.0	0.0
2	0.0	0.0	1.0	0.0	2.0	0.0	0.0	0.0	0.0	63.0	0.0	0.0	5.0	0.0
3	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.0	8.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	8.0	0.0	0.0	6.0	0.0
5	0.0	0.0	0.0	87.0	0.0	3.0	0.0	0.0	0.0	9.0	0.0	0.0	5.0	0.0
6	0.0	0.0	0.0	6.0	54.0	0.0	0.0	0.0	58.0	18.0	0.0	0.0	0.0	0.0
7	2.0	14.0	0.0	0.0	11.0	2.0	2.0	10.0	0.0	0.0	1.0	4.0	0.0	0.0
8	0.0	0.0	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	45.0	0.0	0.0
9	0.0	0.0	2.0	51.0	0.0	46.0	3.0	6.0	0.0	9.0	0.0	23.0	0.0	0.0
10	0.0	0.0	0.0	0.0	18.0	12.0	5.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0	0.0	7.0	0.0	4.0	40.0	4.0	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0	74.0	7.0	26.0	0.0	3.0	4.0	1.0	0.0	0.0	0.0
13	0.0	0.0	5.0	23.0	0.0	24.0	0.0	4.0	2.0	0.0	0.0	0.0	0.0	0.0
14	0.0	0.0	0.0	0.0	24.0	0.0	16.0	0.0	0.0	10.0	26.0	0.0	0.0	0.0
15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0
16	34.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	34.0	12.0	0.0	0.0
17	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0
18	0.0	2.0	0.0	1.0	3.0	0.0	0.0	0.0	34.0	0.0	21.0	0.0	0.0	0.0
19	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0	0.0	0.0	0.0	5.0	0.0	0.0
20	3.0	8.0	0.0	0.0	0.0	0.0	0.0	0.0	32.0	22.0	0.0	0.0	0.0	0.0
21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	7.0	41.0	8.0	0.0	0.0	0.0
22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	3.0	0.0	0.0	0.0
23	0.0	10.0	0.0	0.0	16.0	0.0	0.0	54.0	6.0	0.0	0.0	9.0	0.0	0.0
24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	42.0	4.0	4.0	0.0	5.0	0.0	0.0
25	0.0	0.0	0.0	0.0	18.0	0.0	0.0	0.0	7.0	0.0	0.0	0.0	0.0	0.0
26	35.0	0.0	0.0	8.0	8.0	0.0	0.0	0.0	3.0	0.0	9.0	32.0	0.0	0.0
27	0.0	0.0	12.0	4.0	0.0	35.0	44.0	0.0	39.0	0.0	20.0	2.0	0.0	0.0
28	0.0	0.0	0.0	0.0	8.0	0.0	10.0	0.0	6.0	0.0	1.0	0.0	0.0	0.0
29	0.0	0.0	0.0	2.0	0.0	0.0	9.0	0.0	5.0	0.0	6.0	36.0	0.0	0.0
30	14.0	0.0	0.0	3.0	0.0	1.0	0.0	4.0	6.0	0.0	18.0	3.0	0.0	0.0
31	0.0	0.0	3.0	0.0	0.0	0.0	0.0	2.0	0.0	4.0	0.0	0.0	0.0	0.0
M.Total	100.0	35.0	37.0	176.0	237.0	130.0	149.0	164.0	235.0	254.0	155.0	193.0		1865.0

Year Max (1 days) = 74.0      month = 5      day = 12  
Year Max (2 days) = 96.0      month = 8      day = 23 ~ 24

Daily Rainfall(mm) of Balai Penelitiaian (No 1.01)												year=	1993	
day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
1	0.0	3.0	0.0	4.0	3.0	0.0	4.0	0.0	0.0	0.0	46.0	0.0		
2	0.0	0.0	6.0	21.0	0.0	0.0	0.0	0.0	2.0	51.0	28.0	3.0		
3	0.0	0.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0		
4	0.0	0.0	0.0	2.0	0.0	22.0	0.0	0.0	30.0	0.0	42.0	6.0		
5	1.0	12.0	0.0	0.0	0.0	0.0	0.0	0.0	23.0	0.0	0.0	0.0		
6	11.0	4.0	0.0	0.0	0.0	25.0	24.0	0.0	46.0	0.0	17.0	2.0		
7	6.0	0.0	0.0	0.0	0.0	8.0	0.0	0.0	0.0	51.0	0.0	1.0		
8	1.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0	4.0	5.0	30.0		
9	9.0	0.0	0.0	0.0	0.0	0.0	13.0	39.0	0.0	3.0	4.0	37.0		
10	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	10.0	6.0	0.0		
11	0.0	0.0	0.0	0.0	14.0	0.0	0.0	44.0	8.0	17.0	0.0	46.0		
12	15.0	0.0	31.0	28.0	2.0	7.0	0.0	0.0	0.0	1.0	7.0	3.0		
13	9.0	0.0	9.0	6.0	0.0	0.0	0.0	0.0	12.0	1.0	3.0	18.0		
14	8.0	0.0	39.0	0.0	1.0	0.0	1.0	0.0	19.0	0.0	24.0	0.0		
15	0.0	10.0	8.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
16	2.0	0.0	2.0	37.0	0.0	0.0	11.0	6.0	78.0	2.0	3.0	0.0		
17	2.0	5.0	5.0	0.0	55.0	0.0	0.0	0.0	29.0	24.0	2.0	0.0		
18	2.0	1.0	12.0	22.0	0.0	10.0	0.0	0.0	0.0	0.0	0.0	9.0		
19	40.0	5.0	1.0	11.0	0.0	0.0	0.0	15.0	0.0	9.0	4.0	3.0		
20	0.0	0.0	5.0	5.0	10.0	14.0	0.0	80.0	2.0	0.0	15.0	4.0		
21	0.0	0.0	1.0	0.0	0.0	1.0	0.0	44.0	0.0	0.0	0.0	2.0		
22	1.0	9.0	0.0	0.0	0.0	6.0	15.0	0.0	0.0	0.0	0.0	53.0		
23	0.0	2.0	3.0	2.0	0.0	46.0	0.0	3.0	0.0	0.0	0.0	6.0		
24	0.0	0.0	0.0	12.0	0.0	0.0	0.0	16.0	0.0	68.0	22.0	0.0		
25	0.0	0.0	0.0	0.0	0.0	0.0	82.0	0.0	0.0	0.0	0.0	0.0		
26	0.0	0.0	3.0	0.0	0.0	0.0	0.0	12.0	0.0	8.0	57.0	4.0		
27	0.0	0.0	0.0	21.0	0.0	0.0	6.0	24.0	80.0	0.0	13.0	7.0		
28	1.0	3.0	0.0	2.0	0.0	16.0	1.0	0.0	0.0	14.0	0.0	10.0		
29	6.0	0.0	0.0	11.0	0.0	0.0	5.0	0.0	0.0	4.0	0.0	1.0		
30	8.0	0.0	0.0	32.0	0.0	0.0	0.0	3.0	6.0	2.0	0.0	5.0		
31	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.0	0.0	2.0	0.0	0.0		
M.Total	118.0	54.0	135.0	237.0	85.0	160.0	143.0	290.0	336.0	270.0	300.0	250.0		Year Total = 2378.0

Year Max (1 days) = 80.0      month= 9      day= 27  
Year Max (2 days) = 107.0      month= 9      days= 16 ~ 17

Daily Discharge(m3/s) of SIMEME (Deli River)

day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	10.40	14.80	25.30	8.80	10.70	X	X	X	X	X	X	X
2	10.40	17.20	26.80	8.30	10.40	X	X	X	X	X	X	X
3	8.80	12.20	11.90	8.55	9.80	X	X	X	X	X	X	X
4	8.55	17.60	9.80	8.80	12.20	X	X	X	X	X	X	X
5	8.88	14.20	11.30	8.05	17.80	X	X	X	X	X	X	X
6	20.40	11.90	11.60	8.05	15.50	X	X	X	X	X	X	X
7	17.90	19.00	10.70	8.05	20.40	X	X	X	X	X	X	X
8	13.10	23.80	10.70	8.05	28.00	X	X	X	X	X	X	X
9	18.30	19.70	10.70	8.05	22.30	X	X	X	X	X	X	X
10	14.80	18.30	10.70	8.05	30.60	X	X	X	X	X	X	X
11	14.50	13.50	10.70	8.08	27.20	X	X	X	X	X	X	X
12	14.50	14.20	15.90	7.08	17.60	X	X	X	X	X	X	X
13	12.80	17.90	17.60	7.10	20.80	X	X	X	X	X	X	X
14	13.80	21.80	14.80	7.10	29.10	X	X	X	X	X	X	X
15	17.20	21.90	15.20	7.10	21.20	X	X	X	X	X	X	X
16	16.50	16.20	19.30	7.10	15.20	X	X	X	X	X	X	X
17	12.20	16.20	X	8.55	14.20	X	X	X	X	X	X	X
18	15.90	15.50	X	7.55	13.80	X	X	X	X	X	X	X
19	15.50	11.90	X	7.30	13.50	X	X	X	X	X	X	X
20	14.80	11.90	X	7.80	13.50	X	X	X	X	X	X	X
21	12.80	12.80	X	7.30	12.80	X	X	X	X	X	X	X
22	12.50	11.90	X	15.90	13.10	X	X	X	X	X	X	X
23	12.50	11.90	6.70	14.50	18.60	X	X	X	X	X	X	X
24	14.20	11.90	6.70	19.00	14.20	X	X	X	X	X	X	X
25	15.20	12.20	8.80	15.50	X	X	X	X	X	X	X	X
26	15.20	10.10	10.40	15.50	X	X	X	X	X	X	X	X
27	10.10	10.10	10.70	15.20	X	X	X	X	X	X	X	X
28	8.55	10.40	8.30	15.20	X	X	X	X	X	X	X	X
29	10.40	11.00	8.30	14.50	X	X	X	X	X	X	X	X
30	10.70	8.30	8.30	11.00	X	X	X	X	X	X	X	X
31	11.30	8.30	8.30	X	X	X	X	X	X	X	X	X
Average	13.44	14.90	12.38	10.04	17.61	X	X	X	X	X	X	X

Year Average = 13.540

Daily Flow Duration (m3/s) N data = 139  
 max = 30.60 25% = 15.90 50% = 12.80 80% = 8.80  
 85% = 8.55 99% = 9.80 min = 6.70

Daily Discharge(m<sup>3</sup>/s) of SIMEME (Dell River) year= 1985

day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	5.15	5.84	5.08	5.02	9.14	5.28	3.49	4.94	7.48	11.00	7.99	10.30
2	5.35	5.41	5.01	5.05	13.60	5.07	5.44	6.24	5.67	11.20	7.41	9.87
3	5.24	5.13	4.98	5.14	9.87	4.89	4.85	6.02	5.59	16.90	6.91	9.51
4	5.40	4.85	5.22	5.17	18.10	4.70	4.42	4.93	5.64	12.30	6.84	19.20
5	5.50	9.28	15.70	5.17	14.00	4.68	4.37	4.94	5.81	9.50	14.80	12.20
6	7.31	9.91	16.20	5.16	14.00	4.64	4.34	4.93	8.85	19.50	16.10	11.10
7	17.60	6.04	7.62	6.53	7.55	4.23	4.25	4.98	10.50	26.70	9.41	9.64
8	6.44	5.98	7.18	6.39	7.17	4.20	4.20	5.72	7.43	15.10	9.00	9.67
9	6.27	5.95	9.68	5.11	7.07	4.23	4.14	6.15	10.10	17.80	10.30	10.40
10	7.95	5.92	21.70	5.45	7.07	4.25	4.04	5.02	13.10	19.70	X	14.70
11	16.10	5.88	12.50	7.89	10.40	8.53	4.31	5.02	22.40	15.90	X	11.00
12	21.80	8.00	13.30	8.39	13.60	4.81	5.36	5.00	8.60	16.10	X	8.98
13	17.10	14.50	7.94	5.01	18.00	4.88	4.42	4.94	8.96	16.50	8.95	9.00
14	7.50	11.40	6.77	5.05	17.40	4.58	3.83	4.98	12.20	17.40	8.06	9.04
15	6.68	8.20	7.55	4.77	10.70	4.51	3.83	5.04	11.90	15.60	8.03	14.00
16	6.44	8.98	7.56	4.49	10.10	4.39	3.69	5.31	8.01	13.10	8.07	16.40
17	6.31	10.70	6.52	4.98	9.62	4.26	3.51	5.85	8.03	13.30	8.50	20.90
18	6.19	6.37	6.10	4.68	12.20	4.13	3.74	6.89	8.27	10.30	8.71	17.40
19	8.07	5.37	5.79	4.34	11.10	4.09	3.56	6.24	6.14	8.57	9.52	38.40
20	5.89	5.22	5.89	5.71	19.20	4.01	3.57	5.06	6.22	8.84	7.82	17.70
21	5.70	5.88	5.66	7.17	25.60	3.93	3.58	5.02	12.20	6.69	10.80	14.00
22	5.46	5.19	5.81	8.16	11.90	3.83	8.54	5.07	9.11	9.11	26.10	12.30
23	5.30	6.94	5.87	9.81	10.50	3.76	4.96	5.18	7.44	15.10	18.30	11.70
24	5.31	6.17	5.32	11.30	10.50	3.69	5.70	7.22	9.32	7.91	13.60	11.60
25	6.59	5.12	5.13	9.80	9.33	3.56	11.50	6.18	8.72	7.20	12.70	12.30
26	2.57	4.93	4.93	7.08	8.52	3.47	5.38	5.36	6.03	10.00	14.10	11.20
27	7.14	4.95	4.91	6.71	7.57	3.52	5.16	5.39	5.97	17.60	11.30	9.88
28	6.86	5.82	4.90	6.31	6.43	3.53	5.00	5.51	6.03	20.10	12.20	9.91
29	7.28		5.17	5.96	5.99	3.51	4.87	5.54	6.12	18.00	10.80	9.87
30	6.65		5.83	5.42	5.72	3.51	4.69	5.17	11.60	10.20	11.80	9.00
31	8.80		5.32		5.54		5.64	6.84		8.21		8.23
Average	7.68	6.93	7.64	6.17	11.21	4.35	4.79	5.51	8.71	13.66	11.05	12.88

Year Average = 8.381

Daily Flow Duration (m<sup>3</sup>/s) N data = 362  
 max = 38.40 25% = 10.30 50% = 6.71 80% = 4.31  
 95% = 3.93 99% = 3.51 min = 2.57

Daily Discharge(m<sup>3</sup>/s) of SIMEME (Deli River)

day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	year= 1986
1	7.83	11.80	4.74	3.83	4.52	4.36	3.45	2.78	4.13	8.62	6.19	15.10	
2	18.50	21.30	4.75	3.82	4.52	4.44	3.37	2.69	3.41	15.20	6.76	9.52	
3	27.20	23.70	5.02	3.83	4.76	4.19	3.27	2.62	4.51	11.80	6.84	13.00	
4	14.60	20.60	6.99	3.86	4.55	4.15	3.18	2.55	4.20	9.86	7.04	7.54	
5	12.10	14.50	19.50	3.89	4.56	4.10	3.11	2.47	4.01	6.35	5.35	6.70	
6	11.20	14.40	6.79	3.89	4.59	4.10	3.09	2.40	3.80	5.80	5.30	25.60	
7	11.10	13.00	6.16	4.06	4.57	4.13	3.10	2.37	3.65	7.07	5.42	25.20	
8	9.99	8.81	6.23	4.42	4.54	4.17	3.11	2.33	3.62	10.10	6.17	14.50	
9	10.70	8.66	6.37	4.44	4.50	4.96	3.18	2.28	3.65	14.30	5.21	12.20	
10	11.20	7.20	10.80	4.33	4.45	9.28	3.14	2.23	3.66	10.30	5.08	13.60	
11	14.80	6.86	11.70	4.37	4.40	7.00	3.12	2.26	3.83	9.07	7.60	12.10	
12	9.79	7.60	15.10	5.53	4.29	4.49	3.11	2.33	3.83	6.66	10.90	14.30	
13	9.04	7.68	7.95	4.80	4.18	4.08	3.09	2.39	5.54	7.78	6.21	18.60	
14	19.20	6.74	7.68	4.79	4.49	3.91	3.10	2.45	6.20	7.98	6.08	12.90	
15	28.00	6.57	7.09	4.79	5.03	3.75	3.12	2.52	6.74	5.33	5.86	12.70	
16	13.50	6.38	6.94	4.76	4.13	4.04	3.14	2.57	4.83	5.38	5.10	12.60	
17	10.70	8.14	6.81	4.78	6.16	3.68	3.14	2.61	5.26	7.23	9.73	12.60	
18	9.08	5.84	6.56	8.38	5.38	3.69	3.15	2.67	5.55	15.80	15.30	12.50	
19	8.68	5.62	5.49	5.36	4.42	3.71	3.13	2.74	4.60	6.46	9.17	12.40	
20	8.39	5.43	5.21	6.07	4.11	3.70	3.10	2.81	4.65	6.33	10.50	11.50	
21	8.35	5.29	5.08	5.46	3.77	3.65	3.10	2.89	4.71	6.45	6.20	10.40	
22	8.35	5.18	4.95	5.22	3.81	3.61	3.12	2.97	5.88	8.51	5.54	10.50	
23	11.00	5.06	4.76	5.15	4.19	3.60	3.12	3.12	7.20	7.37	5.38	10.90	
24	9.09	4.82	4.52	5.09	7.23	3.58	3.09	3.55	4.82	6.86	5.98	11.60	
25	11.70	4.78	4.31	5.22	5.39	3.58	3.06	3.12	6.26	6.58	5.67	9.78	
26	17.00	4.80	4.25	5.01	4.06	3.57	3.51	3.13	8.16	7.60	5.54	9.47	
27	8.52	4.74	4.19	4.96	6.11	3.70	3.50	3.15	5.01	9.52	5.43	9.41	
28	8.22	4.72	4.09	4.81	4.38	3.65	3.11	3.16	4.80	6.55	9.68	9.32	
29	11.20		4.12	4.53	4.86	3.51	3.02	3.16	4.82	5.59	6.67	9.36	
30	11.30		4.10	4.53	6.58	3.45	2.93	3.15	7.59	4.88	8.53	9.35	
31	11.30		3.91	4.98	4.98	2.84	2.84	3.15	4.88	6.49	8.53	9.32	
Average	12.18	8.90	6.65	4.80	4.76	4.19	3.15	2.73	4.97	8.17	7.01	12.41	Year Average = 6.658

Daily Flow Duration (m<sup>3</sup>/s) N data = 365  
 max = 27.20 25% = 8.35 50% = 4.76 80% = 3.65  
 95% = 2.81 99% = 2.33 min = 2.23

year= 1987

Daily Discharge(m<sup>3</sup>/s) of SIMEME (Deli River)

day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	9.94	5.39	3.88	5.81	7.85	4.68	4.13	5.52	8.60	9.12	18.10	X
2	8.66	5.00	3.83	6.11	7.72	4.74	4.12	5.73	5.59	8.11	17.80	X
3	8.16	4.88	3.81	6.12	13.90	4.70	4.11	5.22	5.14	8.61	18.50	X
4	7.88	4.73	3.80	8.16	15.70	4.97	4.02	4.97	4.93	7.43	29.40	X
5	7.43	4.46	3.79	6.22	8.65	5.66	3.87	6.10	5.27	7.06	19.70	X
6	6.87	4.24	3.91	6.60	9.12	4.79	3.70	10.40	9.51	6.97	17.50	X
7	6.88	4.11	5.15	13.40	12.10	4.67	3.59	7.27	7.40	6.86	17.70	X
8	8.33	4.06	5.65	9.20	10.40	4.74	3.57	6.86	5.76	17.70	16.30	X
9	8.98	4.62	6.20	7.98	16.80	4.53	4.07	7.36	5.78	10.50	16.30	X
10	9.75	4.57	6.70	15.60	X	4.47	3.74	6.20	6.54	22.30	16.30	X
11	9.48	4.60	4.87	8.89	X	4.78	3.62	5.67	5.99	29.30	16.20	X
12	9.73	4.64	4.77	10.80	X	4.92	3.48	7.73	11.80	26.40	16.30	X
13	8.88	4.60	4.74	8.06	X	5.48	3.70	5.49	10.70	14.00	16.80	X
14	8.80	4.48	4.89	7.86	X	6.24	4.42	5.37	7.68	10.60	17.50	X
15	8.27	4.15	7.14	7.70	X	4.80	4.84	6.58	12.60	11.90	23.70	X
16	7.63	4.03	8.27	7.55	X	4.79	5.29	7.88	28.90	10.10	23.80	X
17	7.20	4.09	7.25	7.35	X	4.63	5.41	5.78	18.00	9.55	26.90	X
18	8.79	4.14	5.66	7.12	5.70	4.45	5.12	5.07	10.60	9.67	26.40	X
19	8.67	4.21	14.30	6.91	6.84	5.36	4.23	5.01	9.02	9.27	26.20	X
20	8.89	4.28	10.70	6.92	5.74	6.77	5.02	5.98	8.62	9.11	30.40	X
21	6.75	4.32	9.43	6.99	5.50	4.77	9.11	5.02	16.70	8.75	30.80	X
22	6.59	4.29	6.22	7.08	5.45	4.75	4.66	5.00	13.30	10.60	25.90	X
23	6.18	4.24	5.92	7.16	5.32	4.72	4.51	4.97	9.85	14.30	22.80	X
24	6.23	4.20	5.84	7.25	5.07	4.62	4.43	4.83	9.34	14.40	20.20	X
25	5.63	4.16	5.79	7.33	4.88	4.49	9.88	4.87	9.20	12.20	22.00	X
26	5.14	4.13	5.75	7.28	4.95	4.31	7.43	7.36	9.28	17.70	23.10	X
27	5.18	4.08	5.71	7.93	4.92	7.16	7.05	5.01	9.14	17.00	20.70	X
28	5.51	3.98	5.66	7.61	4.88	6.19	5.27	4.89	8.17	29.40	15.20	X
29	7.91		5.63	7.54	4.79	6.74	5.03	4.99	9.14	16.90	X	X
30	9.97		5.67	7.72	4.92	6.91	4.94	4.87	9.13	16.00	X	X
31	6.03		5.73	4.76	4.76	4.90	4.98	4.90	9.13	27.70	X	X
Average	7.63	4.38	6.02	7.88	7.65	5.16	4.88	5.91	9.69	13.92	21.16	X

Year Average = 8.525

Daily Flow Duration (m<sup>3</sup>/s) N data = 324  
 max = 30.90 25% = 9.28 50% = 6.59 80% = 4.94  
 95% = 4.06 99% = 3.70 min = 3.48

Daily Discharge(m<sup>3</sup>/s) of SIMEME (Deli River)

year= 1988

day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	X		9.93	14.00	8.28	7.58	5.12	8.98	9.01	18.50	11.80	7.65
2	X	X	7.76	8.72	8.41	7.65	4.94	7.58	17.60	14.80	10.50	7.66
3	X	X	7.64	8.21	9.10	8.28	4.52	7.58	22.10	14.20	10.00	7.67
4	X	X	7.41	8.22	8.88	9.61	5.77	7.21	6.68	13.70	9.72	7.68
5	X	X	7.47	8.38	8.57	9.09	6.28	7.04	5.16	13.40	9.61	7.85
6	X	X	8.14	8.89	8.50	9.97	8.95	7.80	4.79	13.20	11.50	7.59
7	X	X	11.60	9.85	9.22	9.12	12.60	7.26	4.84	12.90	18.90	14.00
8	X	15.70	9.78	9.88	9.83	8.54	8.18	7.59	4.58	12.60	21.70	11.00
9	X	10.50	9.06	11.30	9.22	7.88	7.35	7.68	4.47	12.20	17.40	9.32
10	X	9.60	9.04	10.30	9.25	7.12	16.70	6.62	4.43	11.60	17.00	9.14
11	X	9.31	8.63	10.00	10.60	8.11	11.80	6.52	4.96	11.00	15.50	9.07
12	X	9.84	8.61	9.85	9.16	7.24	8.24	6.47	8.77	10.30	18.50	8.81
13	X	9.85	8.74	9.68	8.96	6.18	6.97	6.38	6.29	9.64	15.50	8.52
14	X	9.56	9.05	9.48	8.80	5.19	6.87	6.05	6.06	9.08	15.30	8.24
15	X	11.70	8.66	9.33	8.15	4.96	6.44	5.96	7.82	8.56	15.40	8.08
16	X	9.99	8.41	9.07	8.05	4.97	5.96	5.78	23.20	7.85	15.80	7.93
17	X	10.20	8.33	8.74	8.23	4.98	5.57	5.59	25.80	7.00	19.00	7.74
18	X	10.40	8.15	8.57	8.03	4.97	5.47	5.58	13.10	6.78	20.40	7.57
19	X	8.91	7.70	8.42	7.87	4.97	5.41	5.55	20.80	6.59	17.90	7.49
20	X	8.28	7.37	8.25	7.72	5.00	5.37	5.52	24.80	6.47	20.80	7.42
21	X	7.81	7.27	8.05	7.53	5.05	5.28	5.93	11.40	6.45	X	7.33
22	X	7.89	7.21	7.85	7.38	5.08	5.16	6.16	11.10	7.07	X	7.27
23	X	9.14	7.15	7.68	7.38	5.12	5.09	5.96	10.80	6.35	X	7.27
24	X	9.17	7.11	7.96	7.35	5.13	5.04	5.81	10.60	6.13	X	7.27
25	X	9.11	7.04	8.41	7.37	5.13	5.30	5.70	10.40	6.66	X	7.25
26	X	8.55	6.80	8.19	7.45	5.13	6.75	6.83	11.80	7.10	X	7.21
27	X	8.39	6.78	8.19	7.90	5.14	6.79	9.87	13.10	6.98	X	7.17
28	X	8.07	6.78	8.19	7.90	5.15	6.73	9.34	12.90	7.85	7.96	16.40
29	X	12.00	6.83	8.20	7.73	5.14	6.65	12.40	21.10	13.20	7.76	7.77
30	X		7.71	8.23	7.66	5.13	6.98	12.70	22.50	14.00	7.69	7.69
31	X		17.50	7.62	7.62	5.13	6.98	17.30	17.40	17.40	7.59	7.59
Average	X	9.73	8.38	9.00	8.33	6.42	8.94	7.44	11.97	10.31	14.51	8.41

Year Average = 9.075

Daily Flow Duration (m<sup>3</sup>/s) N data = 321  
 max = 25.90 25% = 9.85 50% = 8.08 80% = 4.97  
 95% = 5.16 99% = 6.13 min = 4.43

year= 1989

Daily Discharge(m<sup>3</sup>/s) of SIMEME (Dell River)

day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	7.44	5.29	4.84	5.29	4.51	4.34	3.56	7.70	7.68	9.82	X	X
2	7.46	4.76	4.79	4.76	4.48	4.84	3.57	8.83	8.56	9.35	X	X
3	7.47	4.85	4.85	4.92	5.08	4.82	3.71	9.43	8.41	9.22	X	X
4	7.48	5.22	4.95	4.57	5.30	4.86	3.91	8.32	9.28	9.11	X	X
5	7.44	5.20	4.76	4.54	4.44	4.59	4.21	8.08	11.70	10.40	X	X
6	7.42	5.20	4.73	4.79	4.41	4.70	5.14	8.00	9.18	9.40	X	X
7	7.40	5.20	4.70	4.64	4.29	6.73	5.05	8.56	7.80	8.67	X	X
8	7.36	5.20	4.83	4.49	4.29	5.54	5.10	10.60	9.70	8.57	X	X
9	7.23	5.20	4.56	4.43	4.31	5.54	9.14	12.20	8.80	13.80	X	X
10	7.10	5.19	4.48	4.45	4.33	5.25	9.67	8.53	9.35	9.46	X	X
11	6.92	5.18	4.45	4.57	4.38	5.13	8.14	10.50	12.60	9.38	X	X
12	6.80	5.17	4.42	4.96	4.37	5.00	8.63	13.20	13.30	10.30	X	X
13	7.09	5.17	4.42	4.81	4.38	4.71	5.66	11.70	11.00	10.10	X	X
14	6.45	5.18	4.42	4.82	4.40	4.59	4.92	7.68	8.84	8.09	X	X
15	6.14	5.20	4.42	11.40	6.32	4.48	4.50	7.22	9.31	8.90	X	X
16	7.39	5.22	4.41	4.62	4.51	4.43	4.25	10.20	9.44	11.00	X	X
17	6.78	5.21	4.41	4.63	4.42	4.32	7.07	12.30	8.35	8.31	X	X
18	6.58	5.17	4.91	4.61	4.42	4.22	11.00	8.21	10.00	9.17	X	X
19	6.22	5.14	6.00	4.65	4.42	4.22	8.72	7.71	10.30	10.00	X	X
20	6.22	5.20	8.38	4.66	4.39	4.21	8.34	7.42	8.67	9.19	X	X
21	6.25	5.13	5.82	4.67	4.36	4.17	8.06	7.33	11.30	20.30	X	X
22	6.33	5.11	5.24	4.85	4.46	4.13	8.04	7.26	22.60	18.50	X	X
23	6.18	5.09	4.85	4.73	4.52	4.10	8.02	7.25	12.10	9.33	X	X
24	6.06	5.25	4.71	4.87	5.55	4.42	7.88	8.11	25.10	9.24	X	X
25	6.64	6.68	4.60	4.67	4.83	4.25	7.95	8.24	13.40	12.80	X	X
26	6.14	5.71	4.48	4.60	5.60	3.91	7.89	7.83	13.00	10.60	X	X
27	5.65	4.99	4.46	4.58	7.42	3.82	7.42	8.56	14.50	11.20	X	X
28	5.45	5.03	4.88	4.53	5.12	3.75	7.74	8.80	10.80	8.71	X	X
29	5.26	4.83	4.83	4.49	3.93	3.69	7.63	7.59	11.10	X	X	X
30	5.25	4.51	4.51	4.48	3.99	3.62	7.55	7.74	10.50	X	X	X
31	5.27	4.53	4.53	4.04	4.04	7.62	7.62	7.95	X	X	X	X
Average	8.61	5.25	4.85	4.90	4.69	4.55	6.73	8.81	11.22	10.49	X	X

Year Average = 6.787

Daily Flow Duration (m<sup>3</sup>/s) N data = 301  
 max = 25.10 25% = 8.34 50% = 5.45 80% = 4.53  
 95% = 4.10 89% = 4.21 min = 4.25

Daily Discharge(m <sup>3</sup> /s) of SIMEME (Deli River)												
day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	11.90	5.50	5.90	6.70	8.30	5.70	5.90	3.80	6.10	7.55	9.80	13.50
2	11.00	5.15	5.70	4.10	13.10	5.00	5.00	3.60	8.05	13.10	17.60	11.30
3	9.30	4.85	5.70	3.95	5.70	4.85	4.85	3.50	6.10	20.40	9.05	10.40
4	11.90	4.85	5.15	4.85	5.70	4.85	4.70	3.50	9.30	14.20	7.80	9.80
5	9.05	4.85	4.40	4.25	7.55	5.30	6.10	3.60	10.10	16.20	7.55	9.80
6	10.70	5.15	4.40	3.80	5.15	6.90	7.10	3.60	7.30	20.40	9.80	9.55
7	7.80	4.85	4.55	3.80	6.30	5.00	5.50	4.10	5.15	10.40	9.80	9.55
8	7.30	5.15	4.40	3.80	5.70	7.55	4.70	5.00	4.85	9.30	11.30	10.40
9	9.05	5.15	4.85	4.40	9.30	5.30	4.70	3.80	5.30	8.80	17.60	9.30
10	15.90	4.85	5.15	5.15	6.10	4.85	4.85	3.30	7.30	11.90	12.80	9.30
11	9.05	5.00	4.25	4.85	6.10	4.70	5.70	3.30	5.30	9.30	8.30	9.05
12	7.10	5.00	3.80	5.50	10.10	4.70	6.50	3.20	5.00	11.90	9.30	12.20
13	9.05	6.50	3.60	4.55	9.30	4.70	6.10	3.20	4.85	11.30	23.80	11.00
14	6.70	14.50	4.25	3.80	11.90	4.55	5.15	4.40	6.10	9.05	23.40	13.50
15	9.30	9.55	6.10	3.70	11.00	4.55	6.50	4.55	5.90	11.00	14.20	32.60
16	7.80	7.55	5.70	3.70	12.20	4.55	10.70	6.10	8.30	6.30	12.80	15.90
17	7.55	9.80	7.80	3.70	8.05	4.70	11.00	3.60	14.20	9.55	11.00	11.80
18	9.05	8.90	8.05	3.70	9.05	4.55	12.20	3.40	8.80	9.05	11.00	11.00
19	6.30	9.05	5.50	3.70	10.10	10.10	7.30	3.40	6.90	10.40	12.50	10.70
20	6.10	7.10	5.15	3.70	16.50	7.55	7.55	3.40	7.10	8.80	9.55	11.90
21	5.15	6.90	4.85	4.70	8.55	6.70	6.70	3.40	6.90	8.05	9.05	11.00
22	5.15	7.10	5.50	11.60	7.55	7.80	5.30	3.50	8.05	7.10	9.05	11.00
23	6.70	6.90	5.90	8.00	6.10	6.30	5.50	3.50	7.10	7.80	9.30	10.70
24	9.05	7.55	6.10	4.55	6.10	6.70	4.85	3.40	6.30	7.80	11.90	10.70
25	7.10	6.10	6.50	4.55	6.10	8.05	4.55	3.30	10.10	7.30	14.80	10.40
26	5.70	6.50	5.50	4.40	6.10	7.30	4.70	2.80	15.50	6.70	34.60	10.40
27	5.15	7.30	4.85	4.40	12.20	5.30	3.70	2.80	12.50	11.30	13.50	10.40
28	5.15	6.30	4.55	4.40	6.70	4.85	3.60	2.80	10.40	8.05	15.20	10.40
29	5.00	4.40	4.40	4.40	6.50	4.85	3.60	3.20	7.55	12.50	11.00	10.40
30	5.15	4.85	4.85	4.40	5.80	4.70	3.60	5.50	6.90	12.80	10.70	10.40
31	5.15	4.85	4.85	4.40	5.15	4.70	3.60	5.15	8.30	8.30	10.40	10.40
Average	7.95	6.64	5.23	4.70	8.20	5.75	5.86	3.73	7.78	10.54	12.94	11.56

Year Average = 7.579

Daily Flow Duration (m<sup>3</sup>/s) N data = 365  
 max = 34.60 25% = 9.55 50% = 6.50 80% = 4.70  
 95% = 3.60 99% = 3.20 min = 2.80

Daily Discharge(m <sup>3</sup> /s) of SIMEME (Deli River)												year=	
day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	1991
1	10.40	8.55	4.55	3.80	4.10	8.05	4.55	4.10	7.10	9.30	13.50	14.20	
2	10.40	9.80	5.70	3.20	3.00	15.80	4.25	4.10	13.50	11.60	14.50	16.50	
3	10.40	10.10	7.55	3.20	3.00	7.10	5.50	4.10	5.70	6.70	10.10	10.10	
4	10.40	8.05	5.70	3.20	3.50	5.70	3.60	4.10	4.55	6.10	8.80	10.30	
5	9.30	8.30	5.70	5.00	8.55	4.40	3.60	4.10	5.30	5.90	8.80	10.60	
6	8.30	9.30	4.70	3.80	9.05	3.70	4.25	3.95	7.55	5.70	8.55	10.80	
7	8.30	6.50	4.40	3.30	5.50	3.60	3.70	3.95	5.70	5.50	16.20	11.00	
8	8.30	6.50	4.10	3.30	4.85	5.30	3.70	4.25	5.30	10.10	17.60	11.00	
9	8.05	6.70	4.10	3.30	6.30	3.30	3.70	5.70	4.40	16.50	20.10	9.80	
10	8.05	6.50	4.10	3.20	4.55	3.20	3.60	4.10	3.95	16.50	20.80	9.05	
11	8.05	6.30	4.10	3.10	4.40	3.20	3.40	4.10	3.80	25.30	14.50	8.05	
12	7.80	6.30	4.10	3.10	3.70	3.10	4.40	3.70	3.70	28.30	15.50	9.05	
13	7.55	6.30	4.10	3.00	3.95	3.10	3.40	4.10	3.50	15.50	12.80	10.10	
14	8.05	6.30	4.55	3.40	3.70	3.10	3.70	4.25	3.50	18.60	10.10	10.40	
15	8.30	7.10	6.10	3.00	5.50	3.00	3.50	3.70	3.95	12.50	9.55	10.10	
16	10.40	6.30	4.10	3.00	4.25	3.00	3.40	3.70	13.10	12.50	9.80	11.00	
17	9.05	5.70	3.95	2.80	3.70	3.00	3.30	3.80	11.60	16.90	9.05	9.05	
18	8.80	5.30	3.80	2.80	3.70	2.72	3.30	3.70	9.30	13.50	20.40	10.10	
19	8.55	5.30	3.95	3.00	3.60	2.48	4.40	3.80	15.90	12.20	11.30	10.70	
20	9.80	5.30	6.50	3.20	10.70	2.56	6.80	3.80	8.80	12.80	10.40	10.70	
21	10.70	8.80	6.50	3.60	12.50	3.80	5.90	3.80	8.55	19.70	9.42	10.70	
22	9.30	5.50	8.80	2.56	9.05	3.10	9.30	3.60	7.80	14.80	8.49	9.30	
23	8.05	4.25	7.10	2.67	10.10	2.80	5.70	3.50	7.55	12.80	7.55	9.30	
24	8.30	3.95	8.80	2.78	11.30	2.72	5.30	5.70	8.55	15.20	7.55	12.80	
25	8.30	3.80	6.50	2.89	5.50	5.00	4.85	3.50	7.55	14.50	9.55	24.90	
26	8.30	9.05	8.80	3.00	4.85	3.40	4.85	3.80	12.50	14.50	7.30	17.20	
27	8.55	5.00	4.40	3.00	7.10	3.40	4.85	3.80	20.80	15.50	7.55	13.80	
28	15.80	5.15	4.10	3.00	9.80	3.40	4.25	3.40	18.60	13.80	7.55	12.50	
29	9.55		3.60	3.00	6.30	3.80	4.25	4.25	17.20	24.50	7.55	12.50	
30	9.55		3.60	3.10	15.20	3.40	4.25	6.50	11.30	15.50	7.55	12.80	
31	9.55		5.70		7.10		4.25	11.60		14.20		11.00	
Average	9.17	6.68	5.25	3.18	6.43	4.14	4.45	4.34	8.72	14.10	11.45	11.59	7.472

Daily Flow Duration (m<sup>3</sup>/s) N data = 365  
 max = 28.30 25% = 9.80 50% = 6.30 80% = 3.70  
 95% = 3.00 98% = 2.72 min = 2.48

Daily Discharge(m<sup>3</sup>/s) of SIMENE (Deli River)

year= 1992

day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	8.30	8.97	16.50	8.54	9.50	17.70	3.61	4.98	2.99	12.40	8.67	15.00
2	13.50	9.01	16.00	11.90	8.73	9.70	3.39	4.92	3.01	11.70	7.44	10.10
3	14.20	9.56	12.80	7.12	7.46	7.28	3.19	4.88	3.02	7.21	8.33	9.79
4	7.10	8.81	12.00	6.69	7.15	6.72	3.19	9.15	3.04	7.09	7.38	9.91
5	6.50	9.38	11.40	7.43	6.87	7.32	4.45	5.88	3.04	7.15	7.28	9.49
6	17.20	12.10	10.40	6.54	6.60	6.92	4.49	9.36	3.05	6.82	7.15	10.00
7	20.40	12.70	9.55	6.15	6.32	6.24	3.63	9.58	3.08	6.75	7.05	9.00
8	8.55	11.70	11.30	6.29	6.03	8.24	3.59	7.01	3.07	6.80	6.95	15.50
9	7.10	8.45	15.50	7.16	5.68	7.69	3.58	6.90	3.07	7.56	6.85	8.44
10	6.90	8.12	13.50	10.20	5.34	6.29	3.57	6.03	5.46	6.71	6.82	7.71
11	6.70	7.64	10.20	10.40	5.06	5.73	3.56	5.56	7.89	9.70	6.81	8.37
12	6.70	7.02	8.89	11.40	5.16	5.63	3.56	5.14	4.31	6.45	6.81	11.90
13	7.55	14.30	7.69	9.85	7.34	5.77	3.58	4.78	4.08	4.99	7.15	12.60
14	9.05	7.54	7.20	4.95	4.99	5.42	4.49	4.45	4.76	4.72	11.40	8.06
15	7.30	7.41	6.91	9.32	5.02	5.20	4.74	4.28	6.55	4.44	8.20	6.63
16	7.10	14.50	6.91	9.19	5.19	5.01	4.44	4.15	4.06	4.49	7.82	6.34
17	7.10	9.21	6.30	7.96	6.65	4.82	3.76	4.03	6.84	5.30	15.80	6.03
18	7.10	7.83	6.72	7.46	8.02	4.63	3.64	5.10	7.59	4.20	14.10	6.11
19	6.90	12.90	6.41	7.70	5.83	4.45	5.90	5.96	4.37	4.27	10.40	7.26
20	9.30	17.50	6.78	7.64	5.64	4.33	6.74	4.47	4.03	7.19	10.40	7.07
21	9.30	13.40	6.57	7.46	5.45	4.22	4.18	4.18	4.98	5.64	10.40	5.91
22	6.67	14.80	6.50	7.56	5.32	4.11	4.04	4.18	5.08	4.94	10.30	16.00
23	6.59	12.50	6.42	7.29	5.55	4.00	3.90	3.77	4.18	9.31	10.30	43.20
24	8.37	12.30	7.29	7.12	24.80	3.89	3.79	3.99	3.64	9.60	12.70	18.50
25	12.90	10.10	8.05	7.14	15.50	3.79	3.78	3.44	8.12	11.30	10.70	20.20
26	16.10	10.50	6.49	7.85	10.60	3.72	3.79	3.01	7.27	13.10	10.90	20.60
27	11.70	10.30	6.36	11.70	11.10	3.68	3.79	2.97	9.71	8.89	11.80	17.00
28	11.20	7.74	6.28	9.78	11.60	3.67	4.94	2.84	10.90	8.65	10.40	15.20
29	11.00	15.00	6.22	11.10	10.20	3.65	10.80	2.95	11.30	8.41	10.40	14.70
30	9.75	8.16	6.16	7.95	10.40	3.63	5.73	2.96	26.20	8.18	11.10	13.80
31	9.15	6.09	6.09	17.00	17.00	3.63	5.35	2.98	7.96	7.96	11.10	13.10
Average	9.62	10.74	8.88	8.38	8.20	5.62	4.36	4.97	5.97	7.51	9.40	12.40

Year Average = 8.013

Daily Flow Duration (m<sup>3</sup>/s):  
 N data = 366  
 max = 43.20 25% = 9.85 50% = 7.12 80% = 4.74  
 95% = 3.56 89% = 2.98 min = 2.94

Daily Discharge(m <sup>3</sup> /s) of SIMEME (Deli River)													year= 1993	
day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
1	12.50	7.61	4.35	6.62	9.54	5.09	17.50	4.05	5.81	8.70	5.51	8.28		
2	13.10	8.79	4.31	5.35	5.51	4.33	15.70	3.26	6.08	7.58	3.92	8.26		
3	15.70	8.81	4.30	4.59	4.95	4.58	6.05	3.20	5.81	5.38	5.72	8.25		
4	12.40	10.60	4.28	4.53	4.55	5.11	5.25	3.04	8.94	8.45	20.60	7.95		
5	12.00	14.30	4.25	4.66	4.25	4.20	3.82	3.04	8.76	7.98	11.50	6.07		
6	10.30	15.50	4.20	4.33	4.21	4.12	4.22	5.17	10.30	4.42	5.34	6.28		
7	7.72	7.16	4.14	4.25	4.21	5.24	3.66	7.17	4.77	8.07	4.27	7.98		
8	8.08	5.88	4.20	4.18	10.80	5.27	3.65	5.41	4.94	5.63	4.13	12.20		
9	7.45	5.55	5.08	4.11	8.85	5.18	14.10	5.76	5.18	13.50	8.89	10.40		
10	6.53	5.49	4.43	4.04	7.35	5.75	5.77	4.32	6.71	10.30	9.14	7.88		
11	6.31	8.64	4.31	4.54	8.66	5.20	4.89	4.41	16.70	5.70	6.17	7.74		
12	7.75	6.01	5.27	5.73	9.30	5.05	4.64	4.51	8.63	4.48	5.86	18.00		
13	8.71	8.11	6.51	4.90	5.57	5.87	4.50	5.19	5.96	4.80	6.22	13.80		
14	6.63	5.90	18.80	4.45	4.94	6.29	4.29	3.70	7.56	4.06	17.80	9.97		
15	6.22	12.40	9.15	4.57	13.30	4.75	3.76	4.43	6.43	4.14	6.45	9.44		
16	6.21	7.27	6.49	4.86	10.20	4.70	3.89	4.16	5.61	14.60	6.02	8.55		
17	6.11	7.17	6.39	4.69	8.73	4.65	4.11	8.73	7.15	5.12	5.64	20.30		
18	6.27	8.38	5.78	5.21	7.58	5.97	7.14	5.48	9.56	3.83	5.24	9.16		
19	7.66	5.64	6.95	5.57	9.49	4.87	8.91	8.83	7.44	5.06	5.28	8.76		
20	9.78	4.86	7.46	4.94	11.30	5.87	8.20	10.80	8.15	3.70	6.28	8.36		
21	20.50	5.52	5.74	4.34	7.52	5.44	8.54	9.75	4.18	3.63	4.68	8.79		
22	11.40	9.98	5.31	4.58	6.10	4.79	10.50	12.10	3.93	5.54	4.57	9.86		
23	10.00	6.25	5.04	5.50	5.47	9.04	6.99	5.55	3.84	3.58	10.20	12.20		
24	10.20	5.24	4.82	5.44	5.16	8.53	7.22	9.71	3.80	3.68	20.50	15.40		
25	8.69	5.26	6.55	4.25	6.33	7.10	5.26	4.80	5.42	8.44	11.60	10.80		
26	7.46	4.83	5.33	6.70	7.95	4.47	7.38	7.33	7.89	10.30	15.10	11.70		
27	7.37	4.66	5.05	8.36	5.25	7.53	7.85	4.57	3.61	7.27	12.70	15.80		
28	6.69	4.50	4.80	7.17	5.06	12.40	7.22	3.60	8.13	9.48	9.64	10.10		
29	9.35		4.65	5.98	4.59	7.52	4.22	3.48	6.05	6.13	8.85	10.30		
30	10.70		4.85	7.25	4.38	6.63	3.63	3.43	6.19	4.03	8.30	9.58		
31	9.02		5.13		4.63	3.29	3.29	3.92		3.71		12.70		
Average	8.32	7.22	5.75	5.19	6.90	5.78	6.68	5.61	6.72	6.49	8.54	10.48		Year Average = 7.061

Daily Flow Duration (m<sup>3</sup>/s) N data = 365  
 max = 20.60 25% = 8.54 50% = 5.88 80% = 4.53  
 95% = 3.76 99% = 3.28 min = 3.04

year= 1990

Daily Discharge(m<sup>3</sup>/s) of TEMBUNG (Perout River)

day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	27.90	5.70	6.42	8.63	11.80	4.30	2.92	3.58	1.56	8.31	11.80	20.80
2	18.50	5.60	7.30	7.54	7.80	4.21	2.76	3.40	1.56	9.94	23.50	19.00
3	8.15	5.90	6.10	6.75	20.60	4.12	2.68	3.24	29.40	29.40	12.50	15.70
4	10.80	6.10	5.70	6.42	11.50	3.94	2.60	3.08	5.30	15.40	9.41	12.90
5	8.78	6.00	5.40	6.10	8.63	3.85	2.54	3.00	7.08	15.50	8.63	11.10
6	9.94	5.90	5.30	6.00	7.08	3.85	2.47	2.92	7.42	18.70	7.66	10.10
7	8.50	5.70	5.60	5.90	11.80	3.76	2.40	2.68	4.57	10.60	9.80	9.28
8	8.26	5.60	6.20	5.90	8.89	3.67	2.34	6.20	4.12	7.90	10.40	8.38
9	7.90	5.50	5.40	5.70	7.54	3.67	3.85	5.30	4.12	6.87	16.20	8.50
10	14.60	5.40	8.50	5.60	6.64	3.58	11.10	4.93	4.42	17.20	14.40	8.63
11	8.26	5.40	6.10	5.60	23.90	3.49	8.14	4.57	3.58	9.41	9.41	8.02
12	8.26	5.20	6.00	5.40	16.70	3.40	6.53	4.30	3.67	12.70	9.02	17.60
13	7.90	5.02	5.11	5.30	11.80	6.42	5.80	3.94	3.16	14.60	13.30	13.80
14	7.66	16.80	4.93	5.30	6.28	6.53	5.40	3.85	3.58	10.40	36.10	13.80
15	11.60	10.20	6.00	5.20	7.90	4.93	5.11	3.49	4.12	8.14	14.90	35.80
16	10.10	7.19	5.11	5.11	26.10	4.57	11.20	3.24	3.40	7.90	13.80	28.40
17	10.50	10.10	5.90	5.11	13.80	4.21	7.19	3.08	9.28	17.10	11.20	16.40
18	11.20	8.86	14.90	4.93	8.50	3.85	6.00	3.00	5.60	11.50	12.90	14.60
19	8.50	11.60	7.54	4.84	28.20	3.49	5.20	2.84	4.75	14.60	15.40	13.30
20	7.66	9.41	8.78	4.75	15.40	3.32	4.75	2.76	4.12	10.40	9.02	15.20
21	7.19	8.26	6.31	4.66	9.80	3.24	20.30	2.54	4.03	8.63	7.42	15.20
22	6.86	8.63	6.64	4.66	11.60	3.08	11.30	2.40	5.50	7.30	6.42	12.00
23	7.19	6.42	6.86	4.57	8.26	16.20	8.63	2.27	5.02	7.30	6.97	10.50
24	9.67	9.41	7.30	4.48	21.00	8.02	6.97	2.14	4.75	9.28	15.20	10.40
25	9.02	7.54	6.30	4.39	12.20	5.90	6.00	2.08	7.54	8.89	13.00	9.80
26	7.19	8.26	6.00	4.39	8.14	4.93	5.40	1.95	19.40	7.66	79.60	9.02
27	6.64	10.10	5.90	4.21	6.42	4.48	4.93	1.88	10.60	12.20	30.30	8.26
28	6.42	7.78	5.70	4.21	5.70	4.12	4.57	1.82	10.80	9.02	26.90	7.90
29	6.31		5.60	4.12	5.20	3.76	4.30	1.69	8.14	14.30	16.70	7.90
30	6.10		7.42	4.03	4.75	3.32	4.21	1.63	8.54	21.00	13.30	8.26
31	5.90		12.00	4.48	4.48		3.84	1.56		12.30		7.90
Average	8.49	7.56	6.72	5.33	11.63	4.67	5.86	3.08	5.79	12.05	16.17	13.18

Year Average = 8.473

Daily Flow Duration (m<sup>3</sup>/s) N data = 365  
 max = 79.60 25% = 10.10 50% = 6.97 80% = 4.21  
 95% = 2.68 99% = 1.69 min = 1.56

Daily Discharge(m<sup>3</sup>/s) of TEMBUNG (Percut River)

year= 1991

day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	11.20	8.38	9.15	14.10	8.28	12.90	5.80	3.32	6.20	7.05	7.18	7.70
2	8.50	9.02	9.02	10.90	8.53	27.70	5.80	4.12	12.70	14.30	11.10	26.80
3	8.80	9.15	8.50	11.80	8.20	17.40	8.86	3.76	5.90	8.00	7.57	11.00
4	10.10	8.89	8.38	10.20	8.10	16.00	5.90	3.49	5.11	6.28	6.92	12.40
5	10.20	10.50	12.20	12.70	20.60	15.70	8.00	3.58	5.40	5.68	8.52	13.20
6	8.63	10.10	9.02	12.70	19.00	12.30	8.50	3.48	11.10	5.68	6.53	10.00
7	8.14	7.90	8.63	10.40	14.30	10.20	6.64	4.39	6.97	5.09	9.36	8.15
8	8.50	8.14	7.90	10.20	9.80	14.10	5.70	3.85	7.68	14.60	16.50	11.50
9	7.66	7.90	7.66	8.28	11.80	8.28	5.70	8.38	4.10	14.80	10.50	18.60
10	7.30	9.67	7.68	8.76	9.94	8.45	5.02	4.39	3.30	17.80	17.80	11.90
11	7.08	8.89	7.42	8.50	8.14	8.07	5.02	4.75	3.38	12.90	9.12	11.40
12	7.19	8.89	7.19	8.63	7.66	7.69	5.90	4.66	3.20	41.90	11.60	10.00
13	6.75	7.70	6.75	8.02	8.02	7.45	4.75	6.10	2.80	15.50	11.80	13.80
14	6.86	7.90	7.90	10.60	7.90	7.21	4.66	5.30	2.64	21.10	7.70	10.30
15	7.54	13.30	8.89	8.26	8.89	6.89	4.66	4.48	3.20	12.20	6.66	14.50
16	8.38	8.89	7.42	8.02	8.50	6.75	3.85	4.12	12.90	8.75	6.04	13.20
17	7.90	8.50	6.86	8.02	7.42	6.18	3.76	3.76	11.80	10.80	5.56	12.10
18	7.66	7.90	6.31	7.90	7.30	5.90	4.03	3.16	6.40	20.10	10.80	12.20
19	7.42	8.78	9.41	7.80	7.30	5.50	5.02	2.92	14.10	10.20	8.75	12.60
20	8.14	8.50	11.60	8.63	12.90	5.50	6.31	2.76	6.93	11.80	9.20	13.40
21	8.76	9.67	8.41	11.10	19.40	6.86	4.30	2.68	7.57	27.90	18.60	12.60
22	7.42	8.89	8.89	8.26	13.50	6.10	8.14	2.54	5.58	14.10	13.20	12.40
23	7.08	7.78	9.94	7.19	16.40	5.60	5.20	3.58	5.32	15.90	8.45	8.12
24	6.86	7.42	27.70	7.68	23.70	5.40	4.48	6.20	5.92	10.80	7.44	8.75
25	6.75	7.08	15.70	6.97	12.50	9.02	4.03	3.94	8.60	11.90	13.40	35.70
26	6.64	16.90	32.00	7.19	10.10	5.70	3.76	4.39	7.44	10.60	8.15	10.30
27	6.64	9.15	15.40	7.08	15.20	5.40	3.49	4.30	19.90	9.12	8.45	10.00
28	14.60	8.78	12.30	6.53	20.10	5.11	3.24	3.32	11.10	10.00	8.00	9.87
29	8.89		10.80	6.31	11.10	5.50	3.16	4.75	18.60	16.10	8.00	8.73
30	8.63		9.80	6.31	19.80	5.70	3.08	6.00	12.40	8.30	6.92	8.59
31	8.50		22.50	12.20	12.20	3.40	3.40	13.20		7.18		8.54
Average	8.25	9.09	11.04	9.00	11.86	8.05	5.04	4.51	7.94	13.11	9.59	12.60

Year Average = 9.271

Daily Flow Duration (m<sup>3</sup>/s) N data = 365  
 max = 41.80 25% = 11.00 50% = 8.28 80% = 5.90  
 95% = 3.48 98% = 2.60 min = 2.54

Daily Discharge(m<sup>3</sup>/s) of TEMBUNG (Perout River)

year= 1992

day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	9.14	6.88	12.90	4.99	7.38	23.80	5.58	8.28	5.87	17.00	6.42	14.10
2	12.10	6.89	7.67	7.48	10.60	14.00	4.58	8.18	6.62	28.10	8.55	8.24
3	30.40	7.40	6.28	7.25	8.99	8.67	6.19	8.06	6.02	14.20	11.90	7.58
4	13.00	6.33	5.93	6.85	6.40	8.07	4.79	8.30	5.81	10.50	5.72	8.62
5	11.40	8.70	9.75	5.95	8.09	7.40	4.49	7.93	6.61	11.80	4.89	8.47
6	11.50	7.71	6.33	6.33	7.89	10.30	4.65	9.64	7.10	11.40	4.48	8.88
7	37.50	10.20	5.72	5.48	7.39	7.11	4.61	13.00	6.57	7.45	4.82	7.53
8	12.30	8.10	11.00	5.37	6.50	9.39	5.23	9.71	5.88	6.34	4.92	17.90
9	10.10	6.96	13.00	9.36	6.26	10.80	5.44	15.70	8.15	8.47	4.42	14.00
10	9.22	6.59	16.40	10.20	7.14	8.90	6.44	9.41	10.30	7.33	3.85	9.37
11	8.37	8.89	7.93	8.73	8.06	7.39	5.67	8.22	10.00	18.00	4.31	8.59
12	8.12	6.19	7.22	8.20	12.70	7.91	5.70	8.98	6.50	11.40	4.11	8.23
13	8.59	5.88	8.56	10.80	12.50	12.30	5.81	9.64	6.10	7.57	2.63	18.70
14	14.30	9.51	6.24	6.29	8.22	7.95	6.19	8.73	6.11	6.63	2.01	9.37
15	10.00	6.45	5.97	6.09	6.55	6.90	5.24	9.06	7.14	6.15	6.88	6.48
16	8.80	5.83	5.72	5.65	7.05	6.31	4.71	10.50	5.72	5.98	8.72	6.45
17	9.25	9.24	5.46	5.99	7.66	5.88	4.68	7.99	7.72	7.48	9.53	6.86
18	8.08	6.43	7.00	5.78	9.23	5.60	4.46	7.02	9.38	5.87	8.99	6.02
19	7.59	5.87	5.85	5.89	5.87	5.49	4.29	10.80	8.46	5.73	21.80	6.88
20	8.73	9.30	6.50	5.82	7.02	5.44	7.97	7.74	9.64	9.35	10.50	7.16
21	8.62	6.08	5.54	5.46	5.88	5.20	5.03	7.59	8.23	11.50	7.48	5.67
22	7.52	8.48	5.35	5.19	5.39	4.99	4.79	7.71	7.61	6.61	6.49	5.92
23	7.21	11.20	5.29	4.52	10.80	4.76	4.24	9.19	6.77	5.53	10.00	58.40
24	7.96	7.48	5.10	3.60	14.30	4.73	4.18	12.50	6.51	6.43	12.00	21.70
25	8.77	6.29	8.10	3.46	20.90	4.54	4.14	7.44	11.50	6.10	7.85	22.90
26	16.50	5.71	5.30	2.63	10.40	5.20	4.19	7.43	12.40	9.53	8.83	11.70
27	11.70	7.36	5.67	5.50	12.10	5.68	4.52	8.94	15.30	8.01	10.20	14.50
28	8.71	5.66	5.06	6.84	15.10	5.02	12.30	6.36	14.40	6.29	15.30	12.10
29	7.46	7.93	4.93	8.12	9.55	4.71	25.00	6.10	11.80	5.14	10.30	12.40
30	7.20	7.20	5.35	7.15	8.66	5.12	10.70	5.99	36.10	5.03	9.13	9.57
31	7.10	5.14	5.14	9.19	8.19	8.59	8.59	5.85	5.40	5.40	8.13	8.13
Average	11.20	7.40	7.11	6.33	9.09	7.66	6.27	8.74	9.20	9.04	7.90	11.95

Year Average = 8.504

Daily Flow Duration (m<sup>3</sup>/s) N data = 368  
 max = 56.40 25% = 9.39 50% = 7.40 80% = 5.72  
 95% = 4.54 99% = 3.60 min = 2.01

Daily Discharge(m<sup>3</sup>/s) of TEMBUNG (Perout River)

Year= 1993

day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	8.66	8.01	6.84	6.75	11.60	6.17	8.48	5.02	7.90	11.70	20.50	10.40
2	8.09	7.31	7.21	8.11	8.90	6.23	17.10	4.80	10.20	10.60	16.40	8.79
3	14.30	6.86	7.25	6.96	9.63	6.42	7.46	4.58	7.80	8.10	12.10	8.91
4	9.17	19.00	6.82	6.47	7.82	6.65	6.78	4.56	11.30	11.50	42.60	8.34
5	9.03	12.30	6.33	9.04	8.84	6.26	6.72	4.51	15.00	14.60	39.40	7.56
6	8.88	12.20	6.06	6.25	7.51	5.93	8.49	4.73	19.20	13.70	18.80	7.68
7	8.27	9.32	5.85	5.53	8.88	10.30	6.87	7.86	9.28	20.00	14.00	8.90
8	9.11	8.32	5.99	4.98	17.20	5.99	7.09	5.88	7.57	11.50	12.50	12.50
9	8.50	8.08	7.30	4.76	14.00	5.72	17.00	7.59	7.18	11.50	11.80	15.50
10	7.61	8.20	6.20	4.52	9.16	6.28	8.60	5.20	7.86	15.70	18.40	11.50
11	8.35	8.32	6.43	6.96	12.40	5.65	6.95	4.87	25.30	11.10	15.50	10.20
12	8.46	8.10	9.10	6.75	10.20	5.55	6.53	4.67	15.10	8.75	16.00	13.10
13	10.30	8.28	9.69	5.93	8.13	5.43	6.20	6.07	11.00	9.92	12.00	18.60
14	7.67	8.78	26.30	5.77	7.87	5.43	5.90	4.43	14.90	7.85	25.50	10.50
15	7.93	12.20	15.30	5.99	10.80	5.50	5.40	3.86	11.30	7.40	13.50	12.40
16	7.86	9.17	11.10	9.71	13.60	5.30	7.08	4.52	16.10	32.00	11.10	7.77
17	7.75	9.88	10.90	7.05	16.50	5.30	6.42	6.33	15.80	15.00	9.66	20.10
18	7.53	12.60	9.33	8.13	11.20	8.26	13.20	5.26	15.10	11.20	8.74	8.63
19	12.60	9.22	12.10	10.10	12.00	5.80	7.90	9.06	13.20	27.30	9.21	8.35
20	10.40	9.65	13.30	8.37	20.30	5.80	10.80	12.50	16.30	13.60	14.20	7.87
21	21.20	8.55	9.57	7.22	9.53	6.86	11.10	10.40	11.60	9.93	9.29	9.21
22	13.50	13.80	8.26	6.72	8.05	5.40	4.93	9.99	15.60	13.10	8.28	13.30
23	8.91	8.89	8.01	9.70	7.68	5.02	4.57	6.21	11.00	10.40	10.60	9.79
24	8.81	6.88	7.91	8.11	8.39	10.90	6.53	14.50	10.40	14.00	27.30	25.10
25	8.07	21.80	8.70	6.83	8.96	6.42	9.02	7.53	14.00	13.50	18.30	12.40
26	7.81	10.90	9.23	7.77	8.50	5.40	9.02	7.79	16.00	27.80	28.00	12.20
27	7.42	8.14	8.10	9.30	6.63	19.40	9.05	8.57	10.10	14.10	18.60	16.60
28	7.13	7.08	7.71	11.20	6.36	11.30	7.25	8.18	8.41	13.60	13.30	11.00
29	7.41		6.91	9.28	6.28	7.13	5.72	5.18	17.00	15.10	12.70	11.80
30	10.20		6.28	12.80	6.15	6.98	4.98	5.28	7.99	10.10	9.66	10.30
31	9.40		7.78		6.20		4.82	6.14		11.90		8.54
Average	9.43	10.07	8.95	7.57	9.92	6.96	8.00	6.59	12.65	13.76	16.60	11.51

Year Average = 10.159

Daily Flow Duration (m<sup>3</sup>/s)

max = 42.60  
 25% = 11.90  
 50% = 8.81  
 75% = 5.18  
 90% = 4.52  
 95% = 3.86

N data = 365

**3. TIDE**

**VOL. IX  
DATA BOOK**

### 3. Tide

The observation of tidal data was made from January 1995 to December 1995 at Belawan Deli.

BELAWAN DELI  
03°8 U - 98°7 T

Waktu : GMT + 07.00

JANUARY 1995

J T	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	J T
1	26	24	21	16	11	7	4	4	7	11	16	20	22	23	21	17	13	10	8	8	10	14	19	23	1
2	26	26	24	19	14	9	5	3	4	8	12	17	21	23	23	20	16	12	9	7	8	11	16	20	2
3	24	26	25	22	17	12	7	4	3	5	9	14	19	22	23	22	19	15	11	9	8	9	13	17	3
4	22	25	26	24	20	15	10	6	4	4	7	11	16	20	23	23	21	18	14	11	9	9	11	15	4
5	19	22	24	24	22	18	13	8	5	4	5	9	13	17	21	23	22	20	17	13	10	9	10	12	5
6	16	19	22	23	22	20	16	11	8	6	6	7	11	15	18	21	22	21	19	16	13	11	10	12	6
7	14	17	20	21	21	20	17	14	10	8	7	7	10	13	16	19	21	21	20	18	15	13	12	12	7
8	13	15	17	19	20	19	18	16	13	10	9	8	9	11	14	17	19	20	20	19	17	15	14	13	8
9	13	14	15	16	18	18	18	16	15	13	11	10	10	11	13	15	17	18	19	19	18	17	16	14	9
10	14	13	14	14	15	16	16	16	15	14	13	12	11	11	12	13	15	17	19	19	19	19	18	16	10
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03° 8 U - 98° 7 T

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BELAWAN DELI  
03°8 U - 98°7 T

Waktu : GMT + 07.00

NOVEMBER 1995

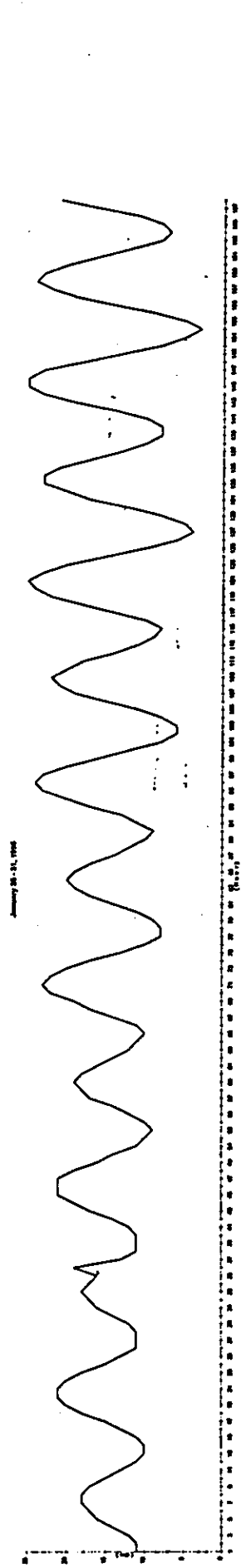
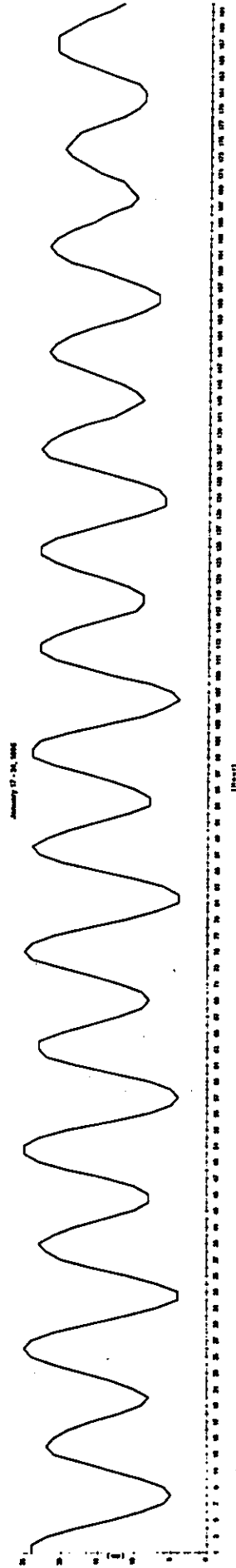
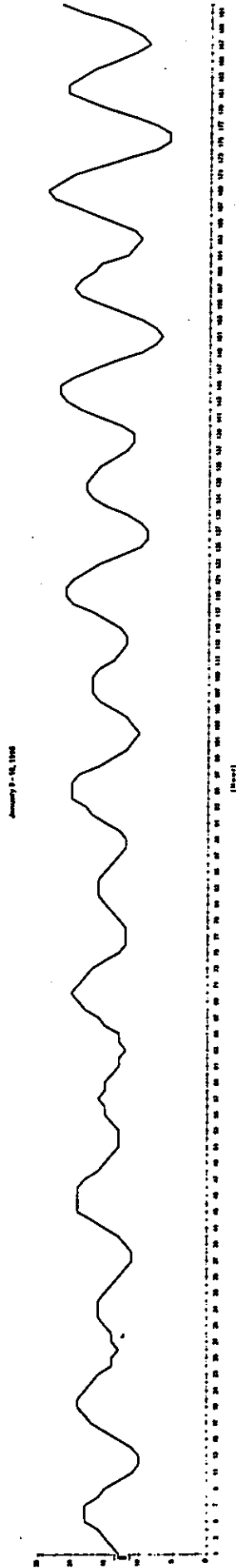
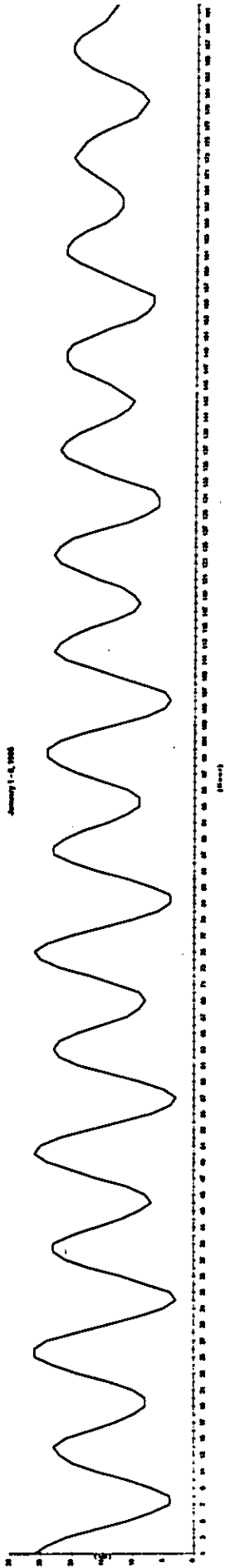
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BELAWAN DELI  
03°8 U - 98°7 T

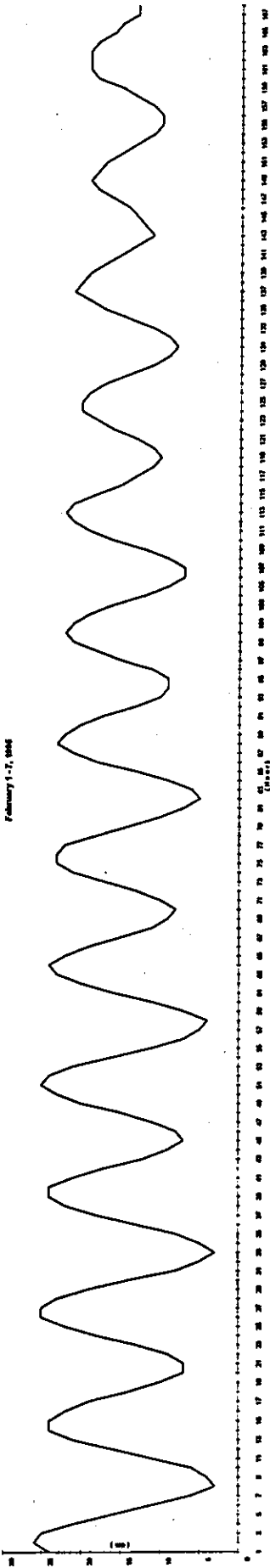
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DECEMBER 1995

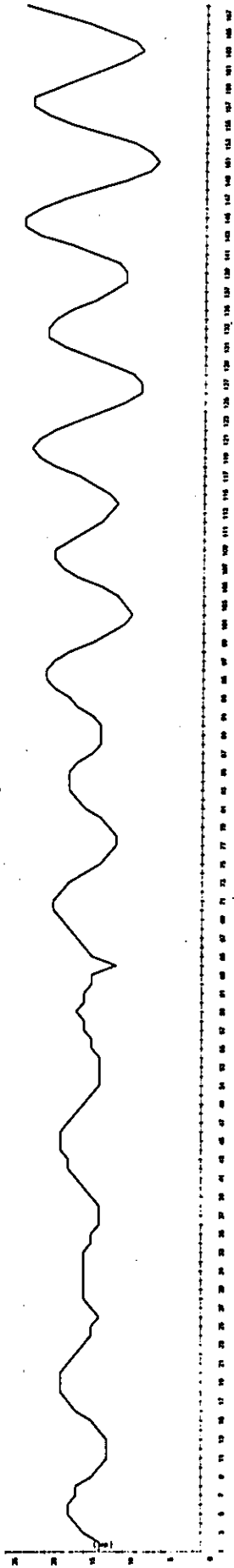
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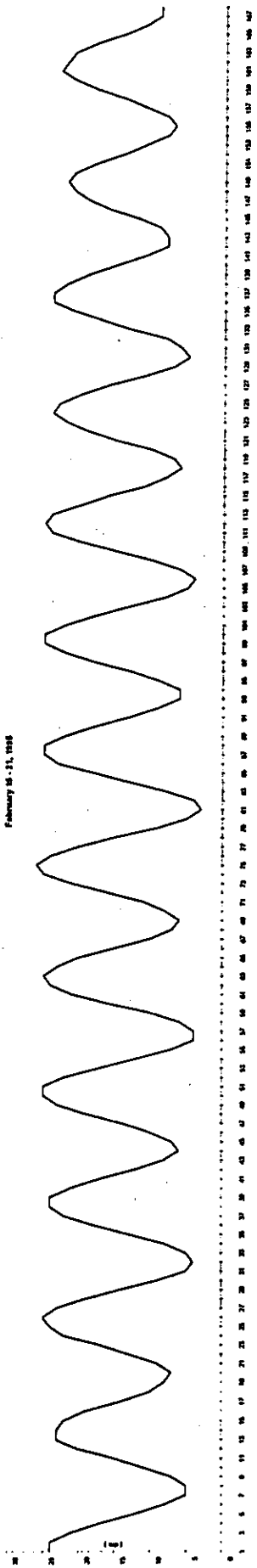
February 5-7, 1958



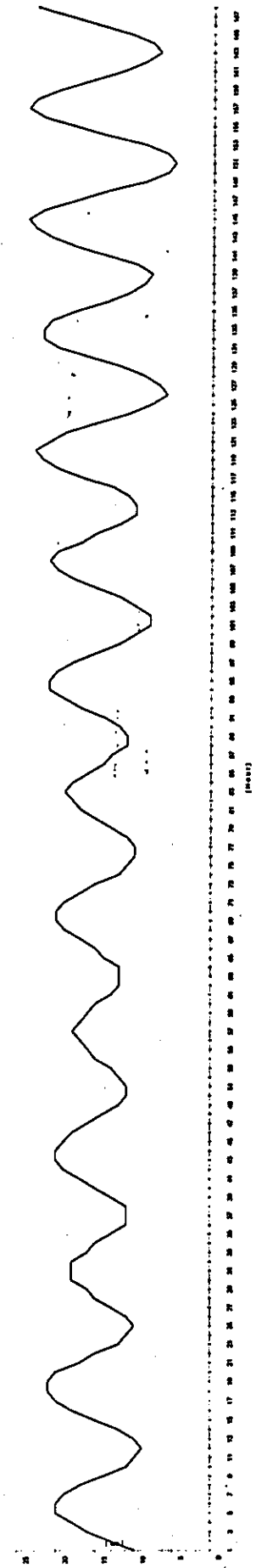
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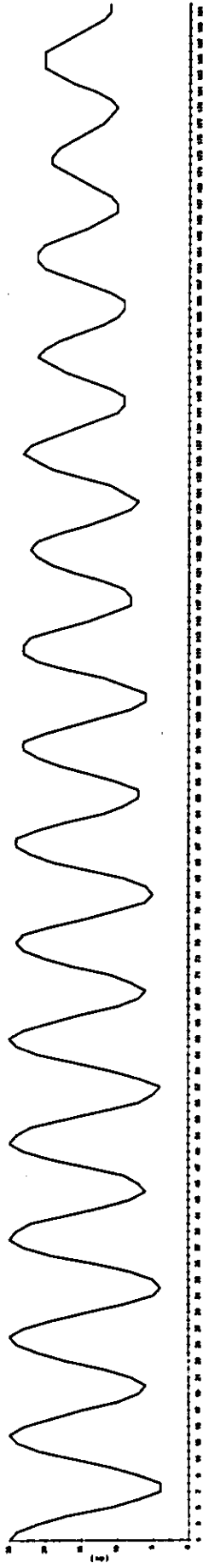
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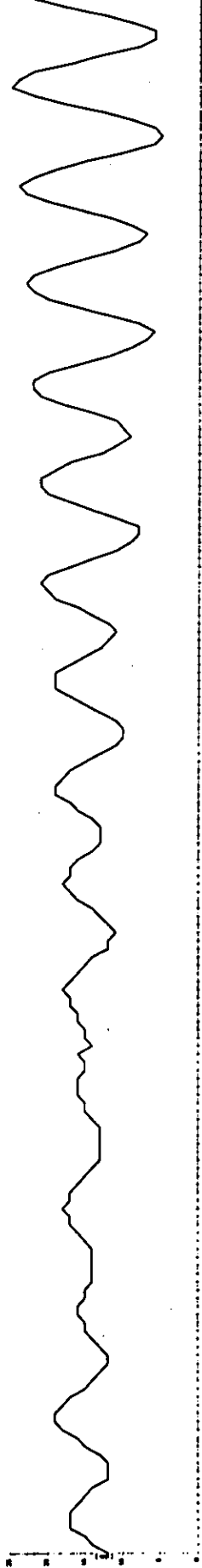
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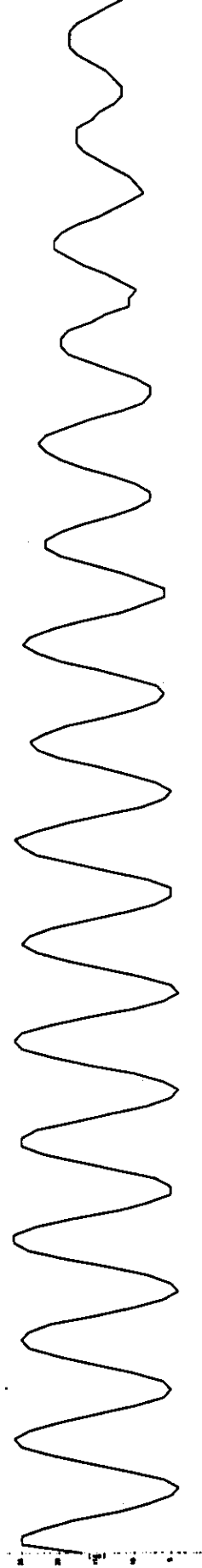
March 10, 1968



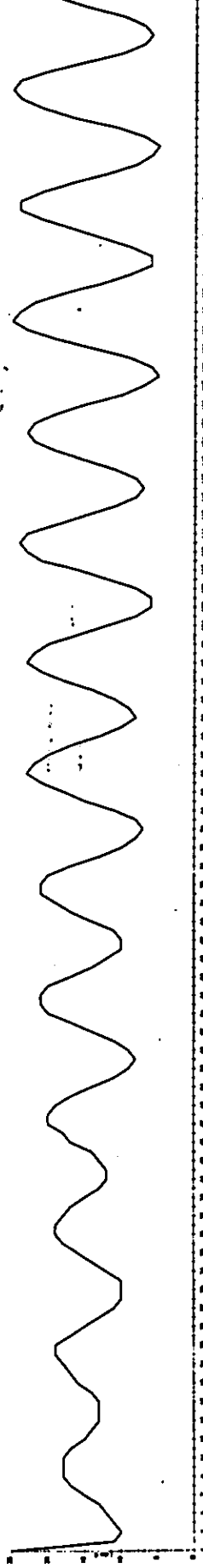
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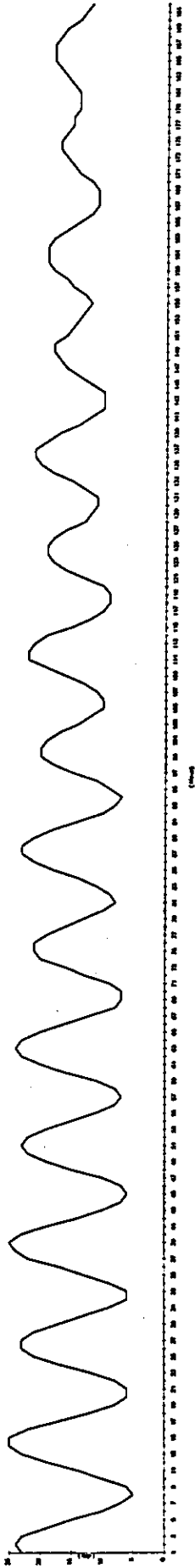
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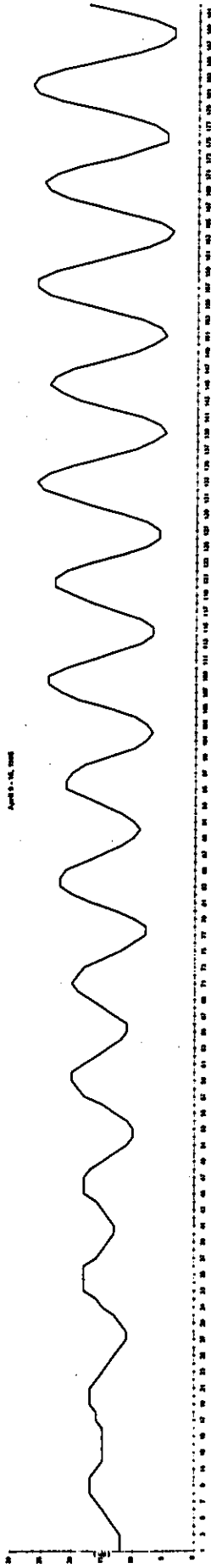
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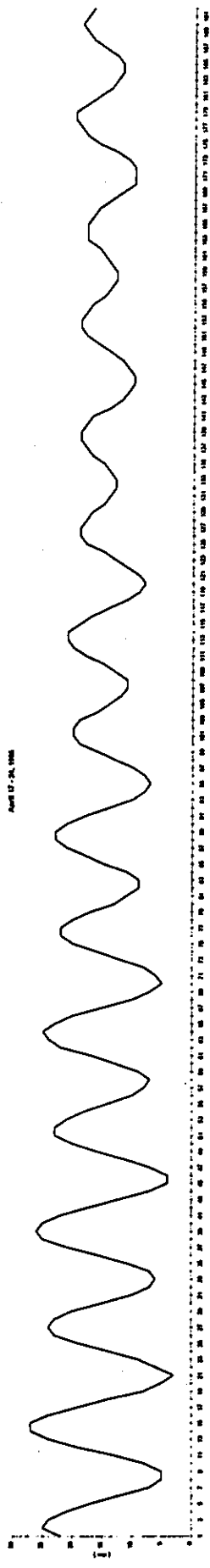
April 14, 1968



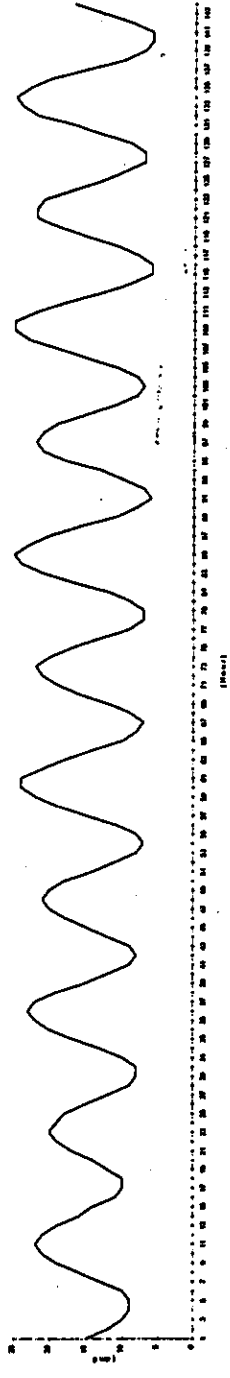
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April 17, 1968

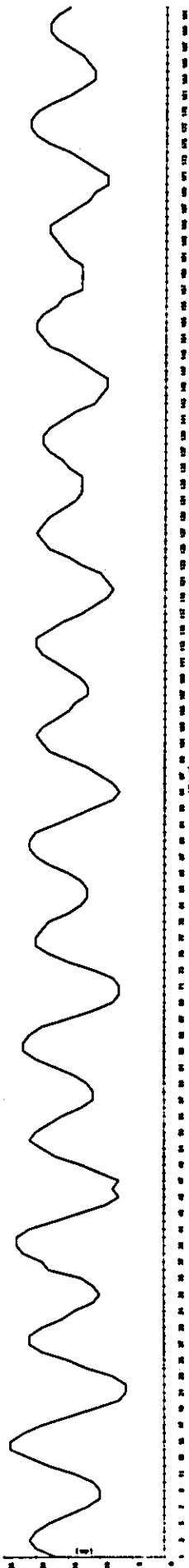


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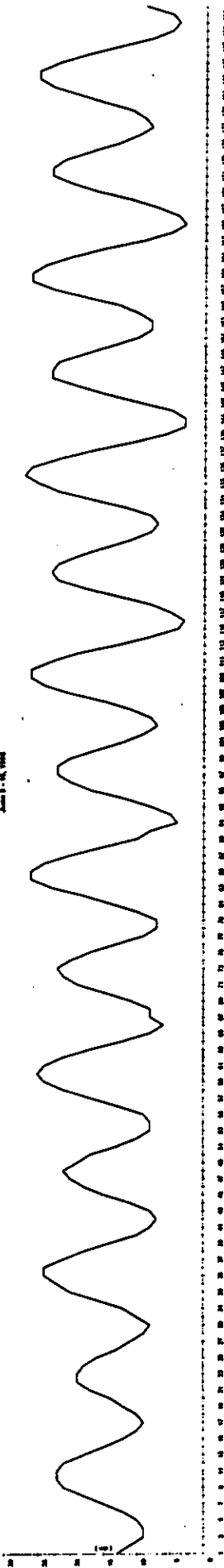




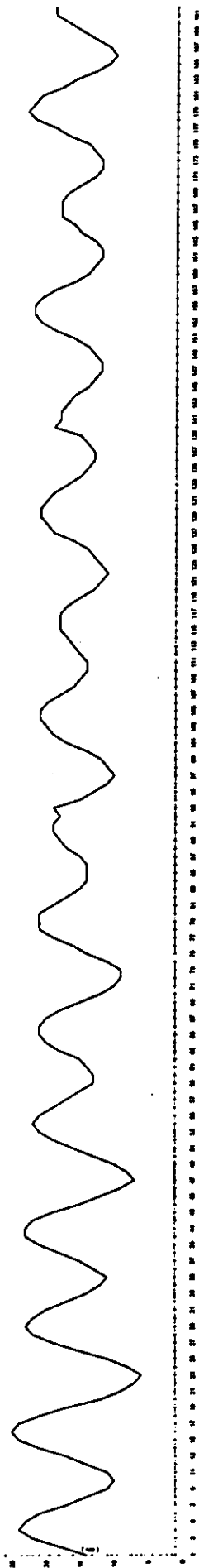
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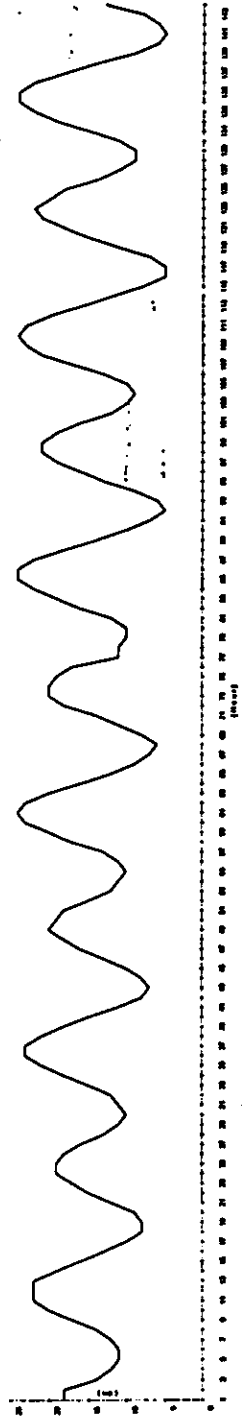
June 7-10, 1966



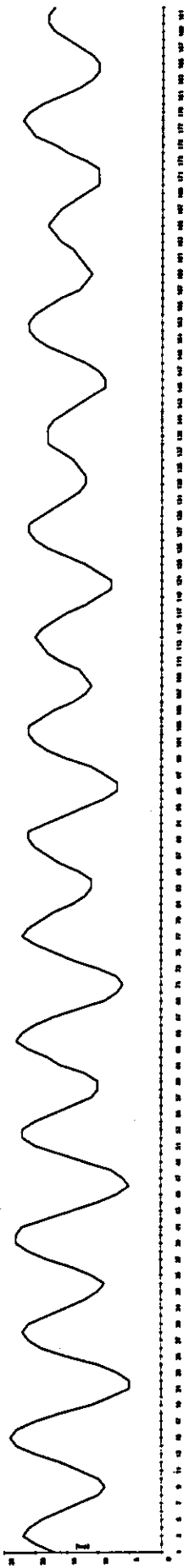
June 17, 1966



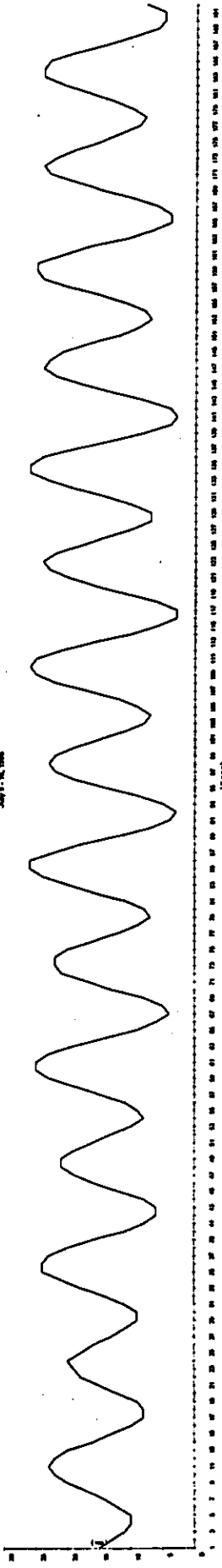
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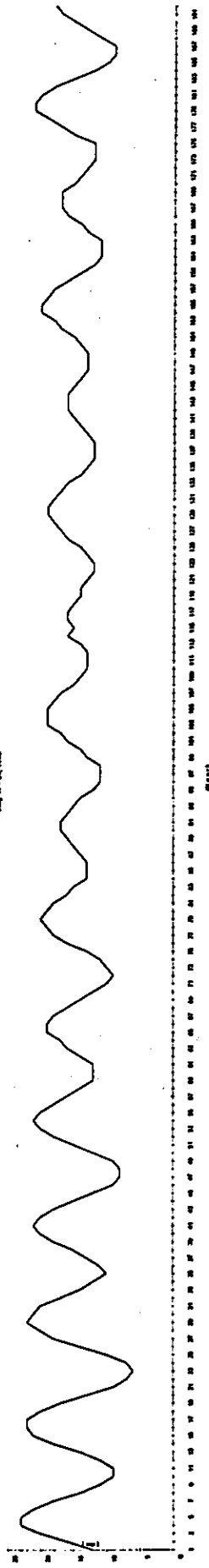
Aug 1-3, 1968



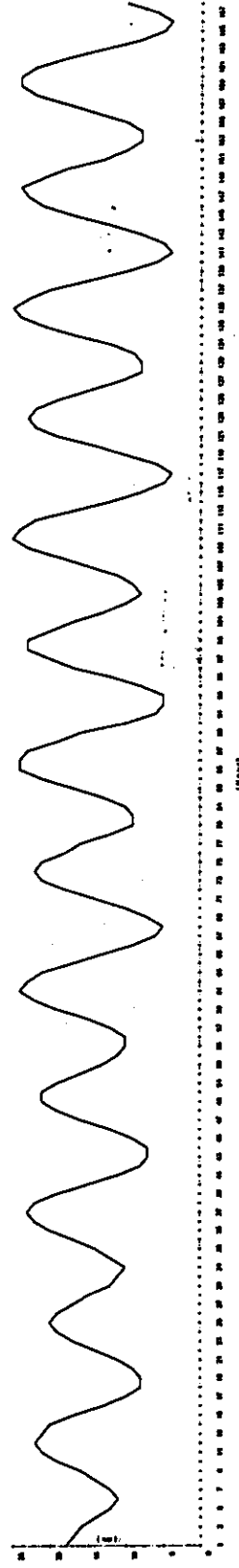
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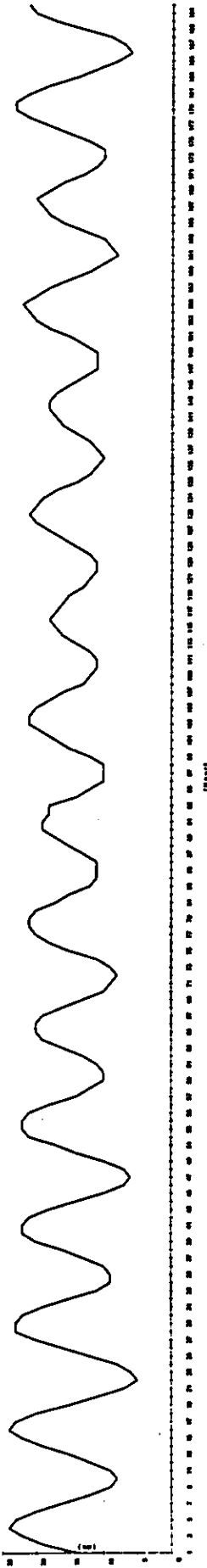
Aug 27-30, 1968



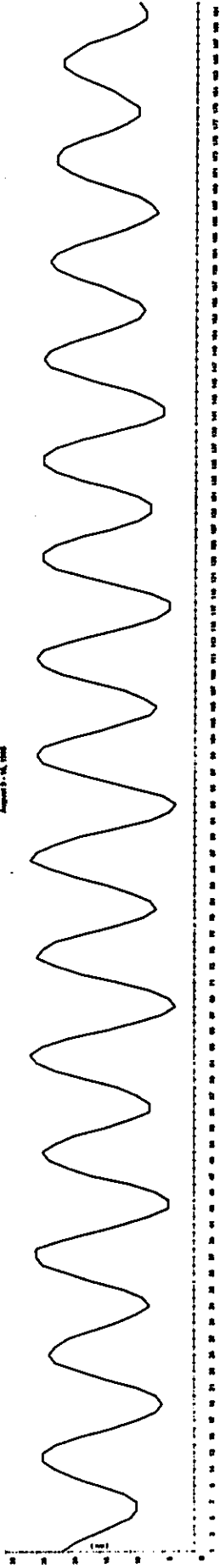
Aug 30-31, 1968



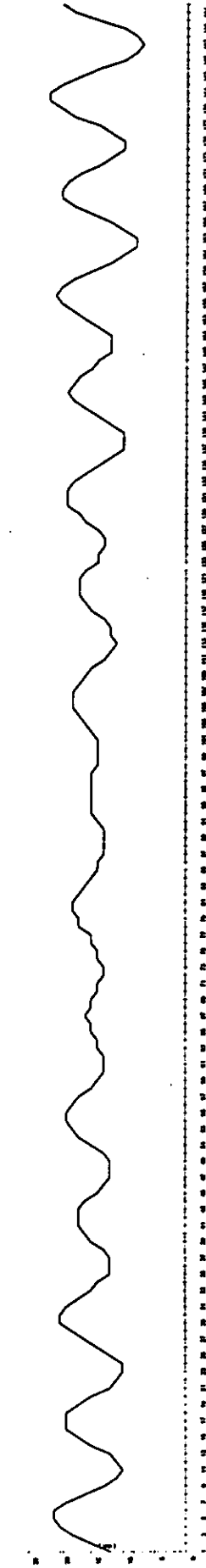
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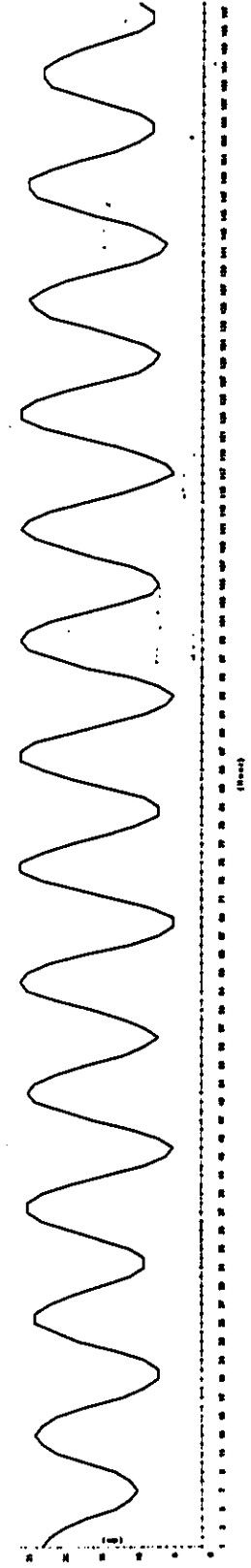
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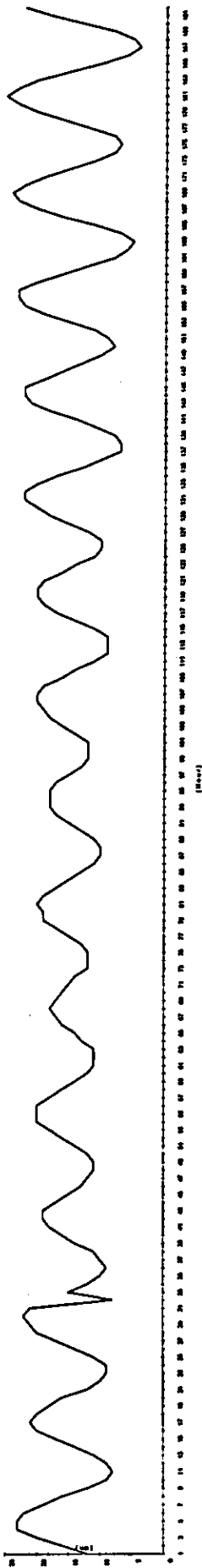
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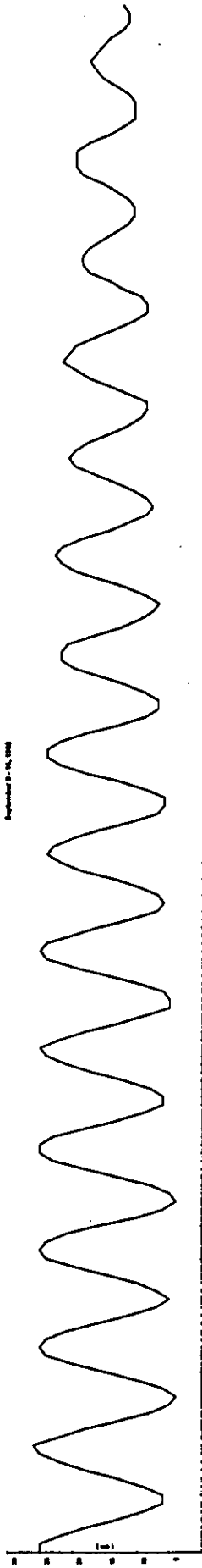
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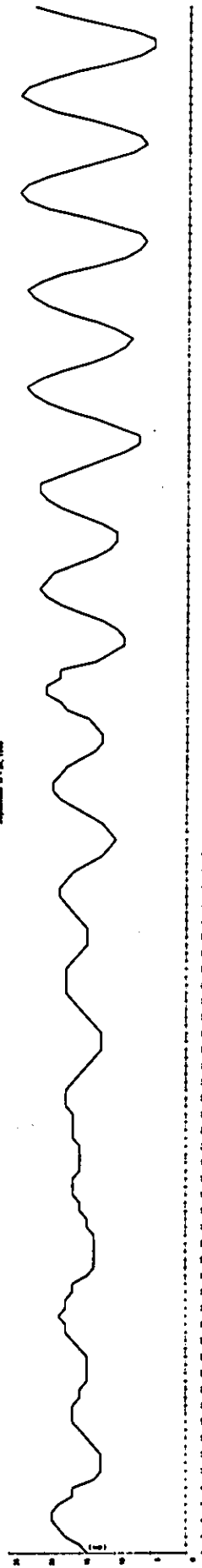
September 11, 1968



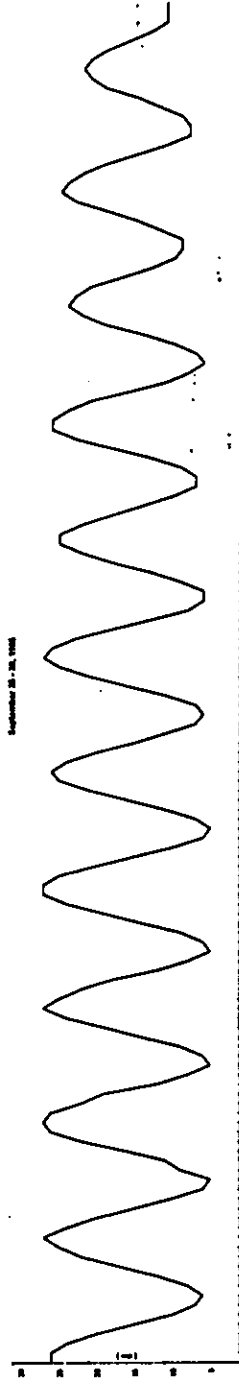
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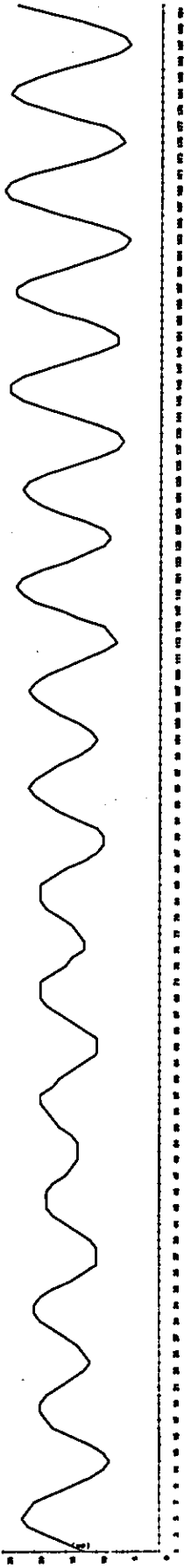
September 17, 1968



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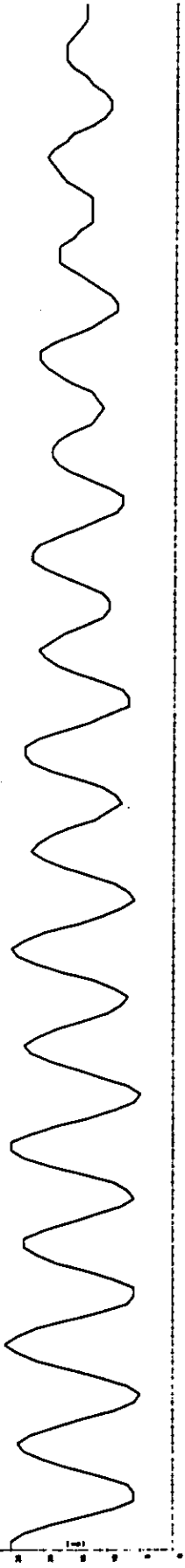


October 5-10, 1968



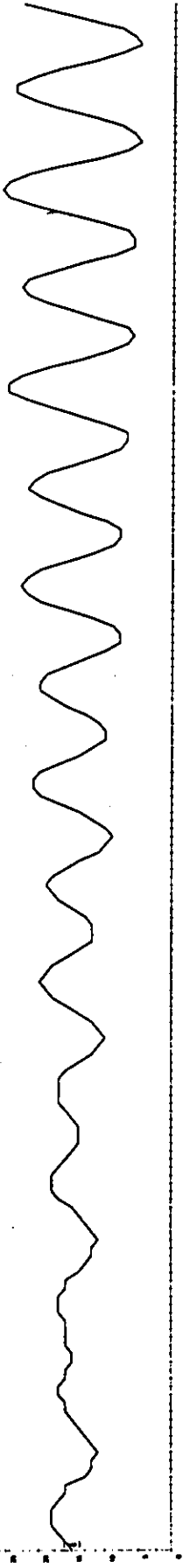
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October 6-10, 1968



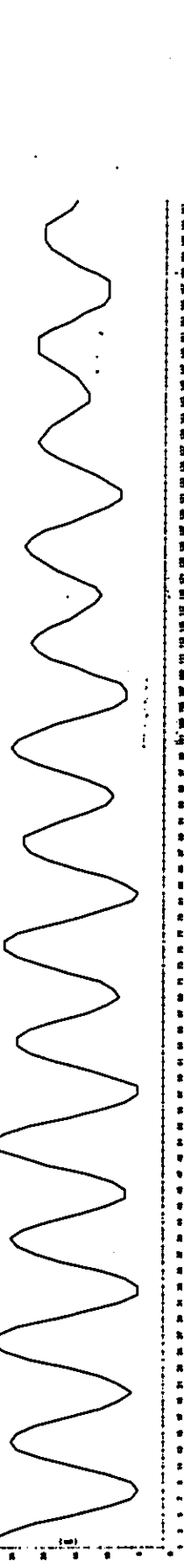
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October 17-24, 1968



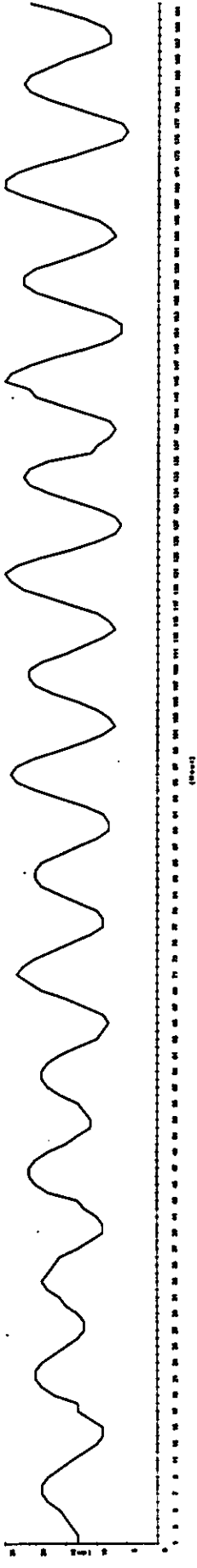
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October 26-31, 1968

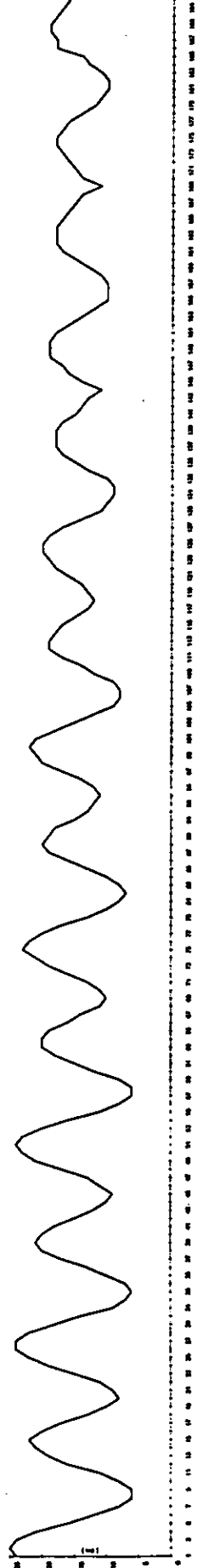


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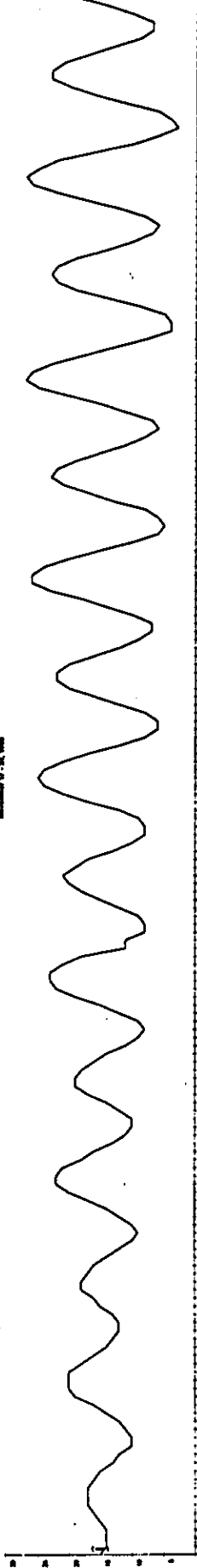
November 1-14, 1968



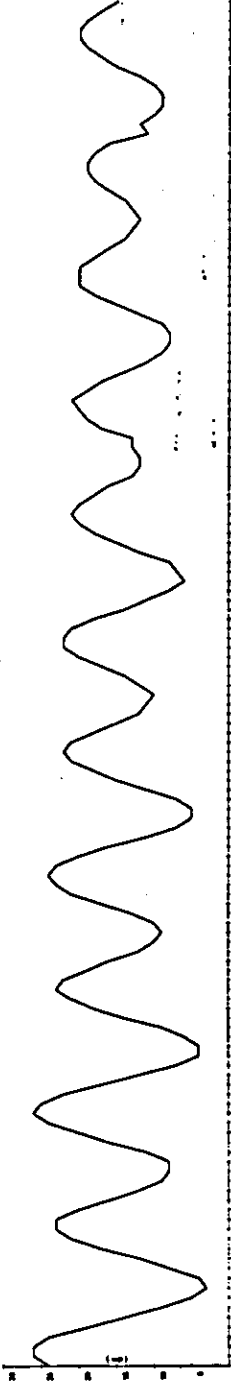
November 15-18, 1968



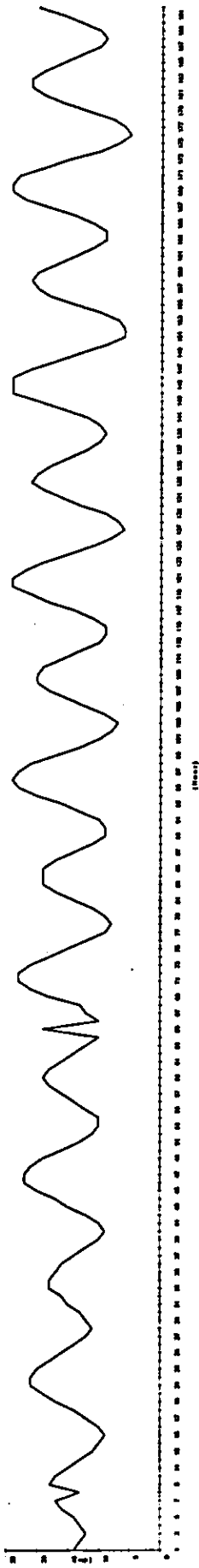
November 19-24, 1968



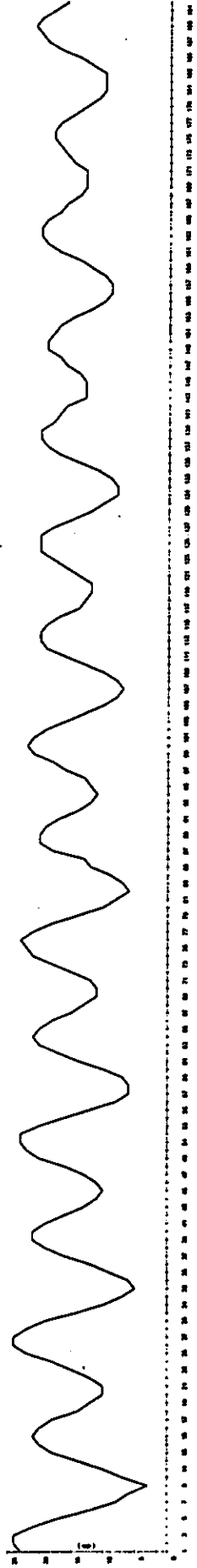
November 25-28, 1968



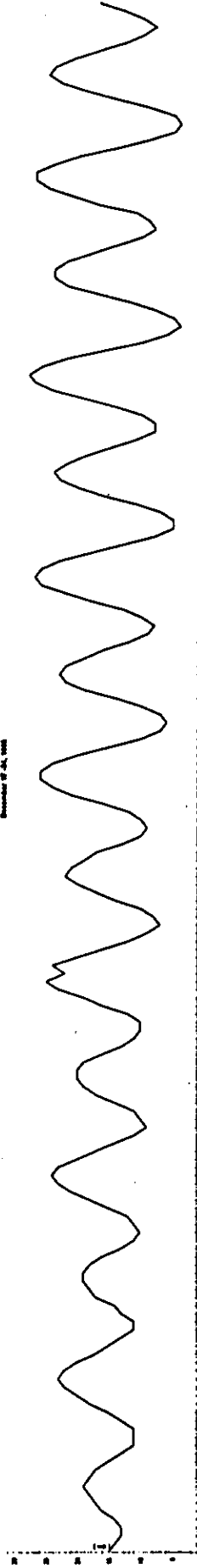
December 1-6, 1968



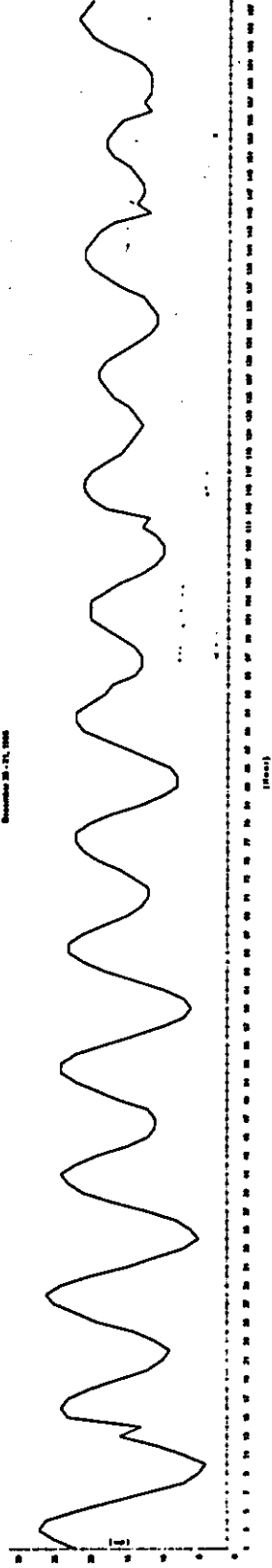
December 7-14, 1968



December 15-21, 1968



December 22-27, 1968



**4. WATER QUALITY**

**VOL. IX**

**DATA BOOK**

#### 4 Water Quality

Water samples were taken from 11 locations, 6 from Dile River and 5 from Precut River. Test items are 45 as a whole including physical, chemical and microbiological analysis.

Result of Water Analysis of Deli and Percut River (Analysed in Balai Laboratorium Kesehatan, Medan)

No.	Parameter	Unit	Code 1 Deli River	Code 2 Deli River	Code 3 Deli River	Code 4 Deli River	Code 5 Deli River	Code 6 Deli River	Code 7 Percut River	Code 8 Percut River	Code 9 Percut River	Code 10 Percut River	Code 11 Percut River	Maximum Level According Class 8
1	Colour	PtCo	10 b	15 a	15 a	10 b	10 b	10 b	15 a	15 a	15 a	15 a	10 b	15 (class A)
2	Turbidity	NTU	25 a	43 a	30 a	22 a	20 a	20 a	32 a	40 a	40 a	40 a	22 a	5 (class A)
3	Ammonium (NH4)	mg/l	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	
4	Calcium (Ca)	mg/l	14.4	15.2	15.2	12.0	13.6	10.4	16.8	14.4	34.4	34.4	17.6	
5	Copper (Cu)	mg/l	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	1,00
6	Iron (Fe)	mg/l	2.442 b	5.654 a	7.324 a	4.321 b	3.019 b	2.663 b	0.076 b	3.989 b	.556 b	3.967 b	1.766 b	5,00
7	Manganese (Mn)	mg/l	0.261 b	0.266 b	1.317 b	0.207 b	0.114 b	0.055 b	0.062 b	0.113 b	0.120 b	0.565 b	0.000 b	0,5
8	Magnesium (Mg)	mg/l	6.4	4.9	19.0	5.4	4.9	5.4	11.0	4.4	4.4	4.9	1.0	
9	Zinc (Zn)	mg/l	0.011 b	0.043 b	0.049 b	0.024 b	0.079 b	0.007 b	0.026 b	0.065 b	0.046 b	0.030 b	0.000 b	5,00
10	Chloride (Cl)	mg/l	50 b	14 b	14 b	12 b	26 b	22 b	175 b	13 b	14 b	31 b	12 b	600
11	Fluoride (F)	mg/l	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	1,55
12	Nitrate (NO3)	mg/l	0.2 b	0.4 b	0.2 b	0.6 b	0.2 b	0.2 b	0.8 b	1.6 b	1.3 b	1.0 b	0.2 b	10,0
13	Nitrite (NO2)	mg/l	0.5 b	1.2 a	0.2 b	0.2 b	0.0 b	0.0 b	0.4 b	0.6 b	0.4 b	0.4 b	0.0 b	1,0
14	Phosphate (PO4)	mg/l	0.3	0,0	0,0	0,6	0,3	0,0	0,3 b	0,6	0,9	0,4	0,3	
15	Sulphate (SO4)	mg/l	11 b	10 b	8.2 b	9.1 b	13 b	14 b	16 b	10 b	9.4 b	10 b	8.6 b	400
16	Barium (Ba)	mg/l	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	1,00
17	Cadmium (Cd)	mg/l	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0,01
18	Cyanide (CN)	mg/l	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0,01
19	Chrom Hexavalent (Cr+6)	mg/l	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0,05
20	Lead (Pb)	mg/l	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0,1
21	Mercury (Hg)	mg/l	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0,01
22	Selenium (Se)	mg/l	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0,01
23	BOD5 20 C	mg/l	24	38	48	34	26	23	26	15	28	26	14	
24	COD (by K2Cr2O7)	mg/l	40	60	80	60	40	40	40	20	40	40	20	
25	Organic Matter (KMnO4)	mg/l	21	13	26	20	17	14	69	7.8	17	19	11	
26	Surfactan Anionicas MBAS	mg/l	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
27	Dissolved Solid	mg/l	70	50	60	40	40	40	120	40	40	40	40	
28	Dissolved Oxygen	mg/l	1.8 b	2.6 b	1.8 b	2.4 b	3.5 b	3.5 b	2.8 b	3.1 b	2.5 b	2.3 b	4.7 b	> / 6,0
29	Residue on Exappcoration	mg/l	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
30	Suspended Solid	mg/l	6.7	4.9	6.0	3.8	3.8	3.8	13.6	3.7	3.9	3.4	3.1	
31	Oil and Grease	mg/l	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
32	Phenolic Compound	mg/l	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
33	Sulfide	mg/l	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0.0 b	0,1
34	M.O Alkalinity (CaCO3)	mg/l	70	60	65	50	40	20	75	55	55	55	60	
35	PP Alkalinity (CaCO3)	mg/l	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
36	Total Alkalinity (CaCO3)	mg/l	70	60	65	50	40	20	75	55	55	55	60	
37	Total Hardness (CaCO3)	mg/l	62	58	116	52	54	48	88	54	52	106	48	
38	Total P	mg/l	0.1	0.0	0.0	0.2	0.1	0.0	0.1	0.2	0.3	0.2	0.1	
39	Dissolved Oxygen	mg/l	70 b	50 b	60 b	40 b	40 b	40 b	120 b	40 b	40 b	40 b	40 b	1000
40	Free Ammonia	mg/l	0.08	0.07 b	0.07 b	0.08 b	0.08 b	0.08 b	0.18 b	0.08 b	0.08 b	0.08 b	0.08 b	0,5
41	Arsen (As)	mg/l	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0.000 b	0,05
42	Chromium (Cr)	mg/l	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
43	Conductivity	Umhos/cm	257	156	145	131	139	144	464	144	163	187	138	
44	Water Temperature	oC	28.6	28.9	2.5	29.4	28.8	29.3	28.4	2.2	29.7	29.8	28.6	Normally water temperature
45	Air Temperature	oC	30.4	30.2	31.2	31.0	31.4	33.7	30.8	32.0	27.5	31.5	34.6	
46	pH	-	7.22	7.08	6.88	6.77	8.8	8.52	6.64	6.60	8.57	8.58	8.53	5 - 9
47	Odor	-	no odor	no odor	no odor	no odor	no odor	no odor	no odor	no odor	no odor	no odor	no odor	no odor (class A)
48	Taste	-	no taste	no taste	no taste	no taste	no taste	no taste	no taste	no taste	no taste	no taste	no taste	no taste (class A)

Note of location :

1. Deli River (Belawan Bahari)
2. Deli River (Pekan Labuhan)
3. Deli River (Helvetia)
4. Deli River (Petisah)
5. Deli River (Titi Kuning)
6. Deli River (Titi Kuning)
7. Percut River (Bagan Percut)
8. Percut River (Cinta Rakyat)
9. Percut River (Bandar Setia)
10. Percut River (Tembung)
11. Percut River (Harjosari II)

a = above maximum level  
b = under maximum level

Heavy Metal Found on Mud in Percut River  
(analysed in Balai Laboratorium Kesehatan Medan)

No	Heavy Metal	Unit	Location (*)		Maximum Level According to Water Quality Class B
			1	2	
1	Arsenic (As)	mg/l	0.0 a	0.0 a	0.05
2	Berillium (Be)	mg/l	0.0 a	0.0 a	-
3	Copper (Cu)	mg/l	2.668 b	3.531 b	1.0
4	Chromium (Cr)	mg/l	0.020 a	0.101 b	0.005
5	Mercury (Hg)	mg/l	0.0a	0.0 a	0.001
6	Lead (Pb)	mg/l	4.556 b	4.641 b	0.1
7	Stannum (Sn)	mg/l	0.0 a	0.0 a	-
8	Cadmium (Cd)	mg/l	0.1 *	0.009 b	0.01
9	Barium (Ba)	mg/l	0.0 a	0.0 a	1.0

(\*) Location 1 : under rail track bridge at Tembung (residential area)  
 2 : under road bridge at Amplas  
 a : not more than maximum level  
 b : more than maximum level

DETAILED DESIGN STUDY ON  
MEDAN FLOOD CONTROL PROJECT

JAPAN INTERNATIONAL COOPERATION AGENCY

HEAVY METAL FOUND ON MUD IN PERCUT RIVER  
(ANALYSED IN BALAI LABORATORIUM

KESEHATAN, MEDAN)

2004.12.6

登録済  
(阿部)

