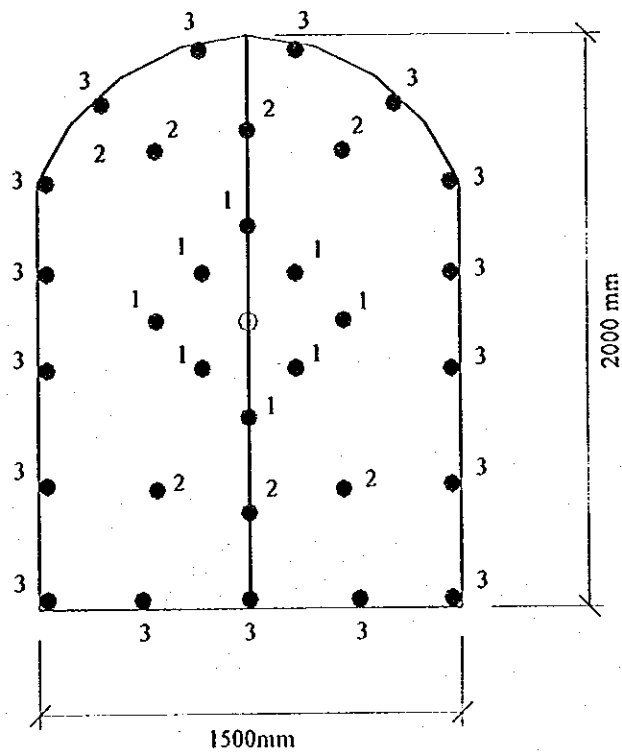
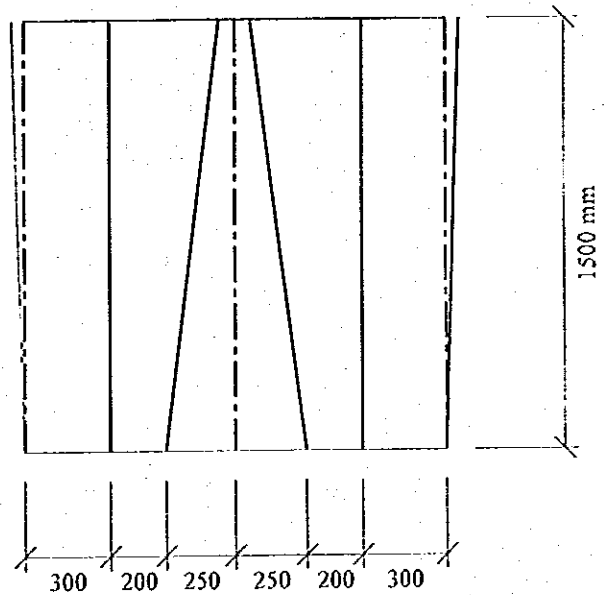


Figures



A. Front View

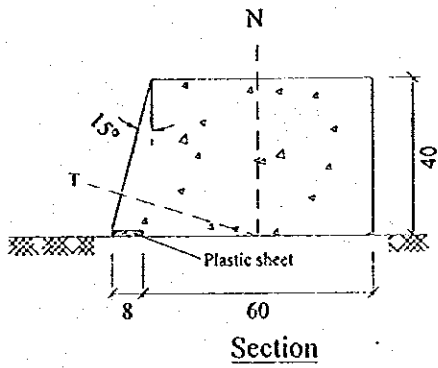


B. Upper View

- Drill hole (open)
- Drill hole (tiled explosive)

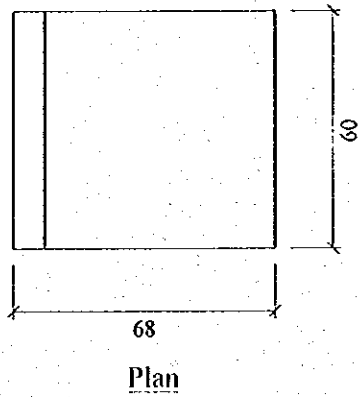
Fig. 2.1.1 Drilling Pattern For Blasting (Adit Test)

Concrete Test Block



Unit : cm
 N : Vertical Load
 T : Shearing Load

Section



Plan

Installation of Apparatus

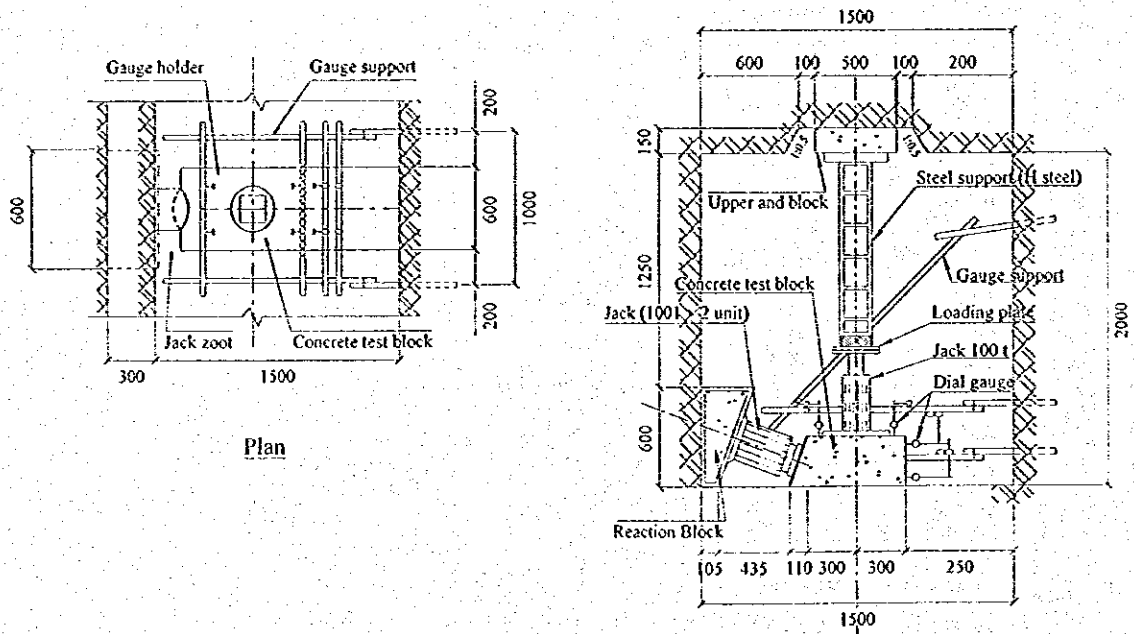
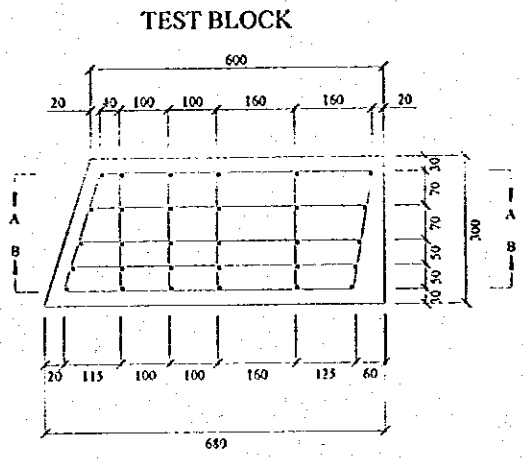
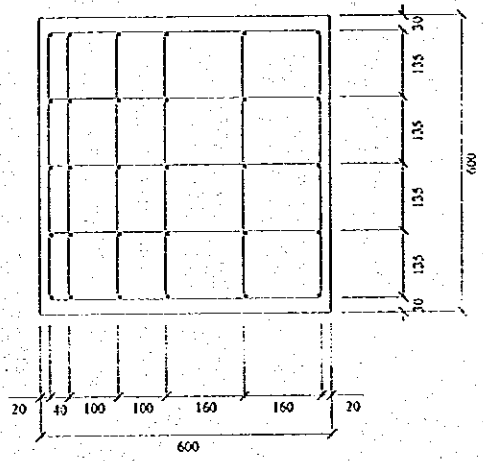
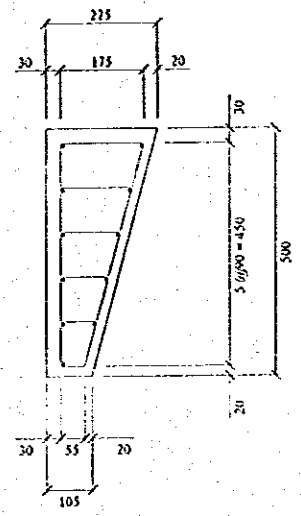


Fig. 2.1.2 Preparation of Rock Shear Test

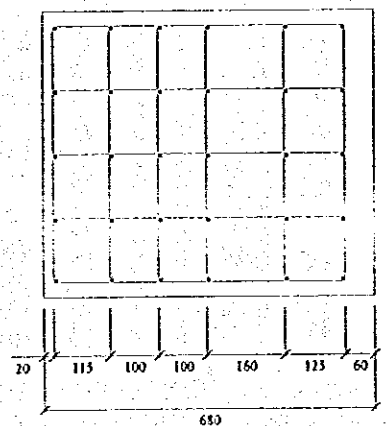


NOTE : Diameter of reinforcing bars shall be 1 mm.

REACTION BLOCK



A - A



B - B

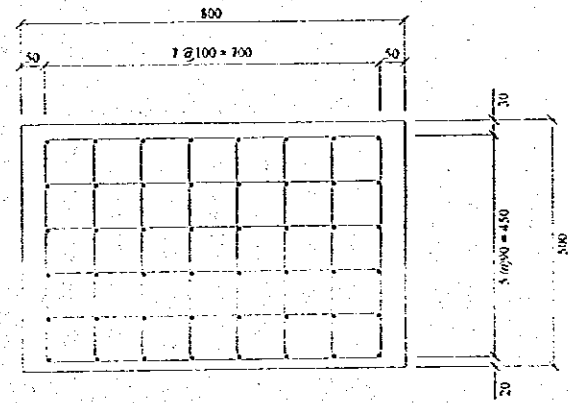


Fig. 2.1.3 Reinforcing Bar Arrangement of Test Block

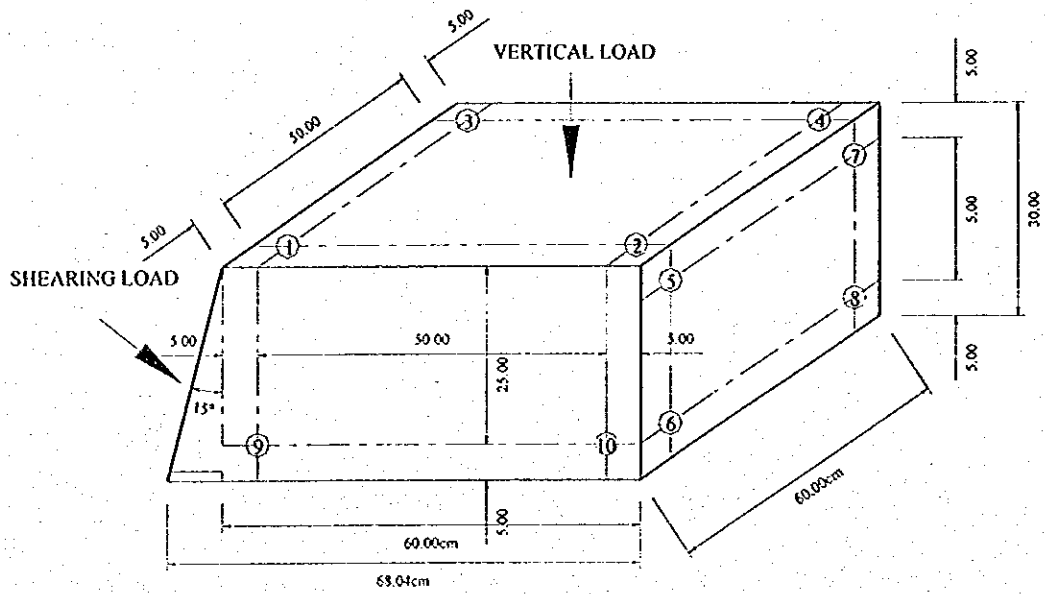


Fig. 2.1.4 Location of Dial Gauge

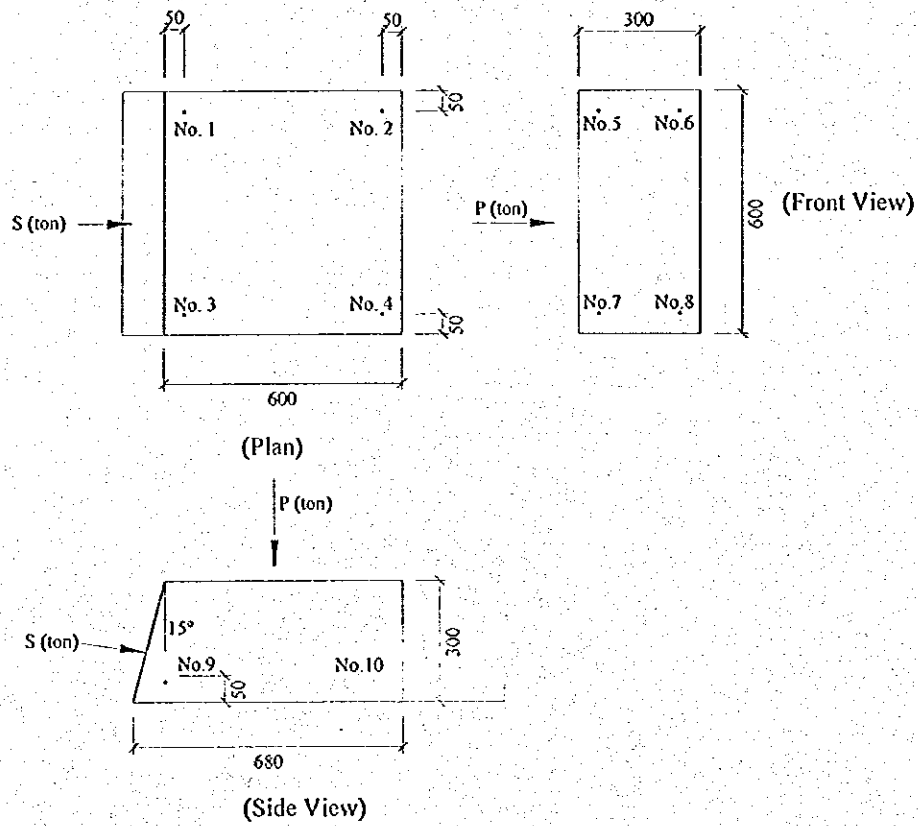
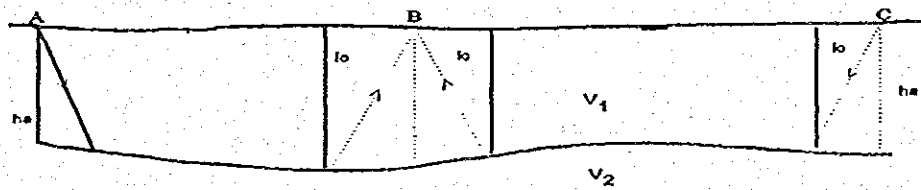
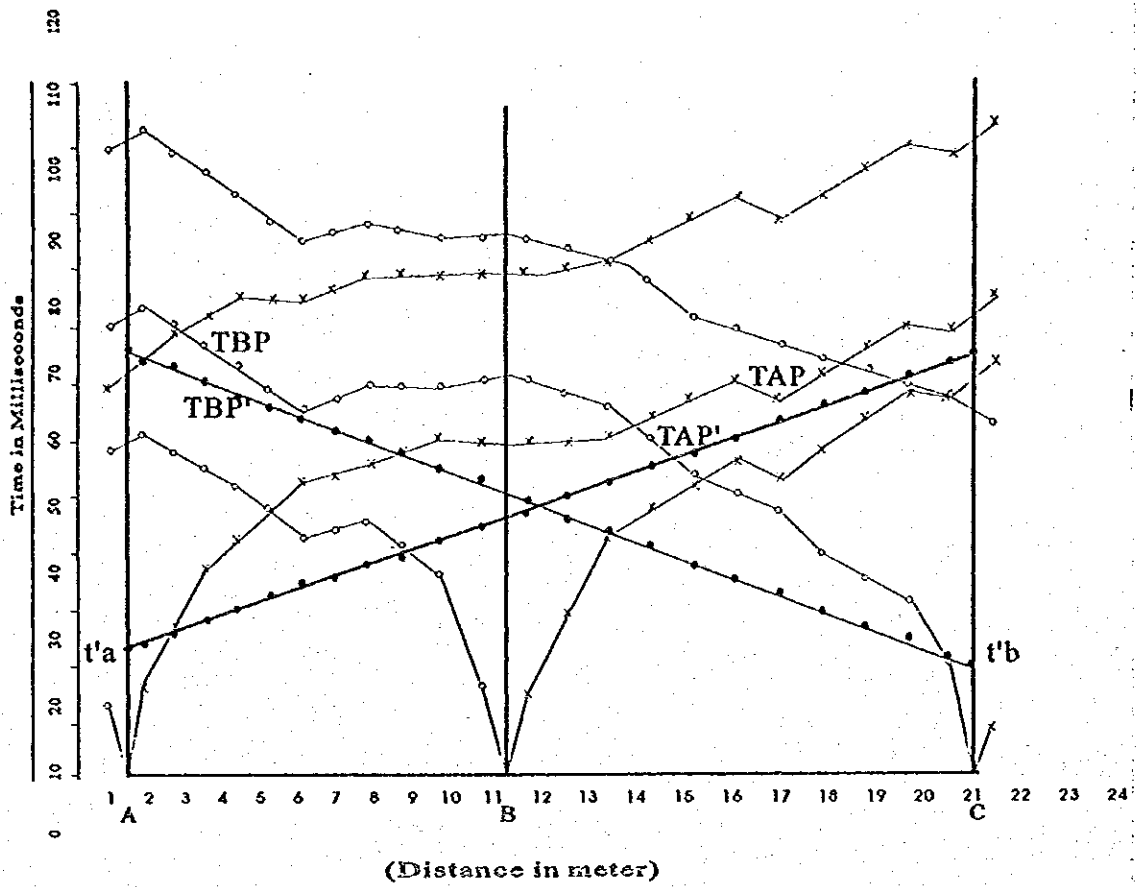


Fig. 2.1.5 Measurement Positions on Shearing Test



LEGEN:

- 1 24 Geophone Number
- l_0 Time depth
- v Velocity

Fig. 2.1.6 Time Depth Calculation

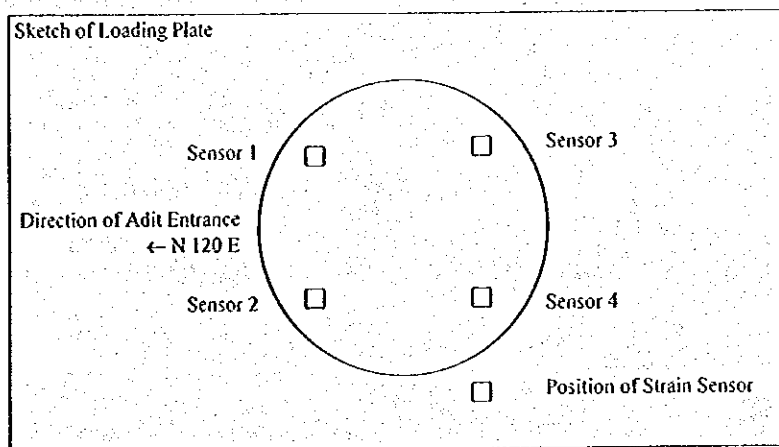
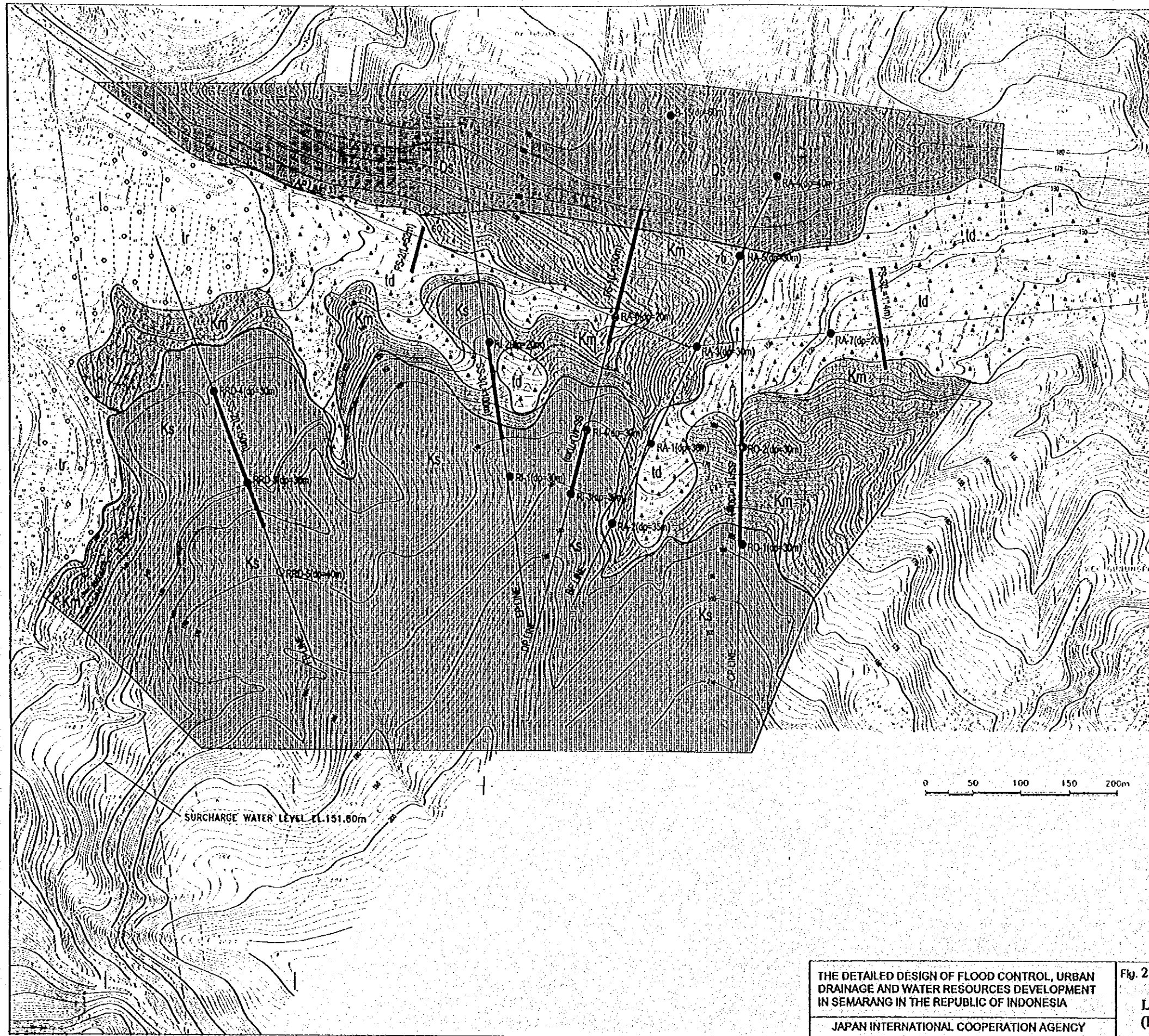


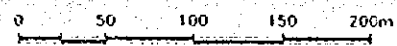
Fig. 2.1.7 Setting Up the Transducers



LEGEND

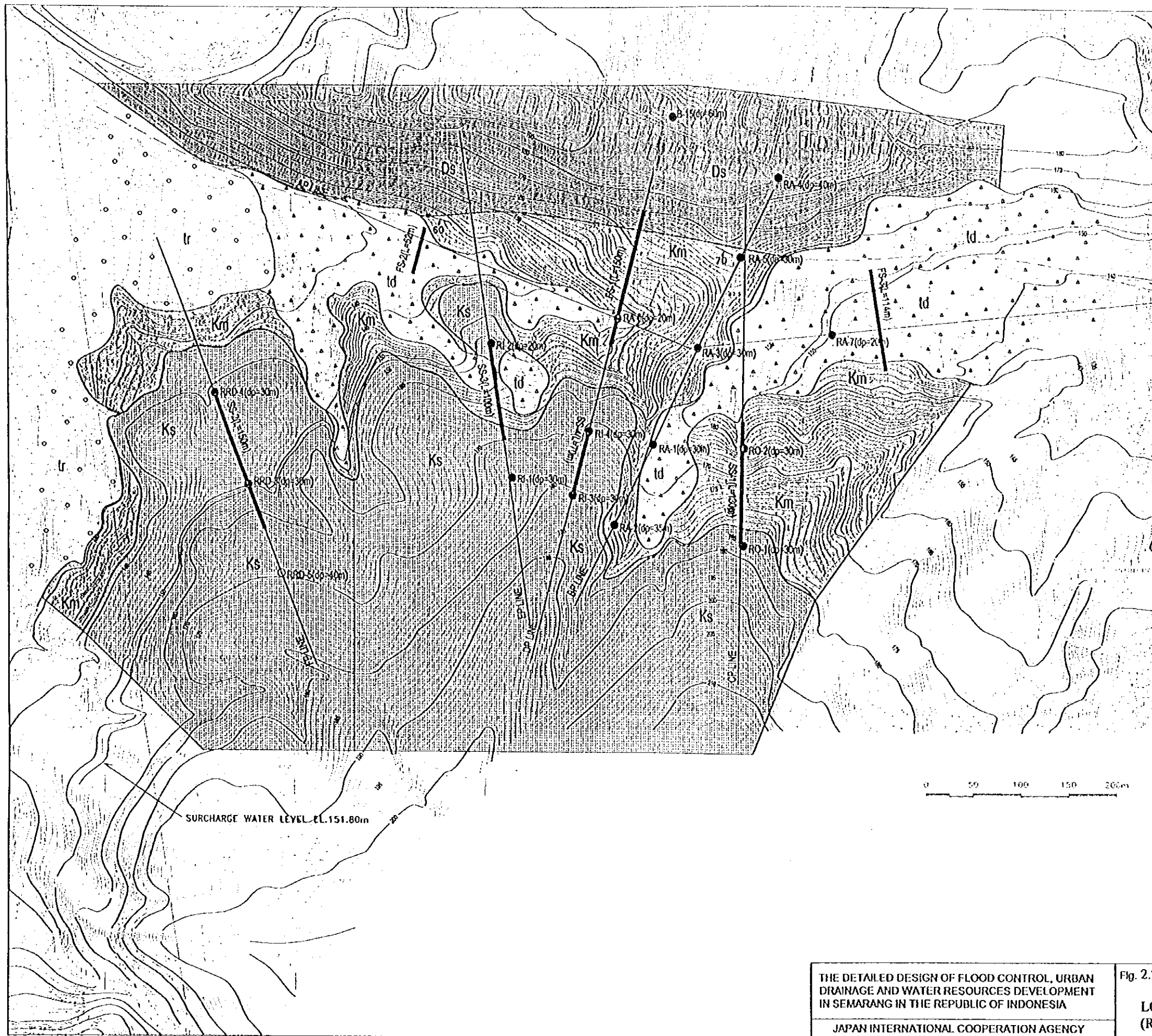
(Geological Strata)		Age	Formation and Strata Name	Symbol	Description
Quaternary	Holocene		Embarkment	B	The embarkment is distributed at the pass. It consists of gravel and soil.
			Talus deposit	TA	The deposit is distributed at the skirt of the mountainside slope. It consists of talus soil and sand, debris and boulders.
			Terrace deposit	OT	The deposit forms the terrace plain along the dykebed, and the relative height of the plain is less than 3 m from the dykebed. Terrace deposit can be divided into two layers, the upper layer mainly consists of silt, and the lower layer mainly consists of sand and gravel.
Tertiary-Quaternary	Pliocene-Pleistocene		Sedimentary Rock Unit	Ks	Kaligawe formation is distributed at the south side of a fault, which located 400 m southwest of the damsite. This fault has direction from east to northwest and forms a boundary of Demer formation and Kerek and Kaligawe formations. Sedimentary rock unit is formed by complicated alternation which mainly consists of conglomerate, conglomeratic sandstone, siliceous sandstone and sandstone. Cracks hardly develop in the bedrock, and the degree of cementation and the hardness of rock are comparatively low.
			Sedimentary Rock Unit	Dm	Demer formation is distributed at the north side of the above-mentioned fault. Sedimentary rock unit is formed by complicated alternation which mainly consists of siliceous sandstone, conglomeratic sandstone and volcanic conglomerate. Cracks hardly develop in the bedrock, and the degree of cementation and the hardness of rock are comparatively low.
Tertiary	Miocene-Pliocene		Kerek	Kr	Kerek formation is distributed at the south side of the above-mentioned fault. Sedimentary rock unit mainly consists of siltstone whose color is grayish dark gray, and partly contains coral limestone. The hardness of siltstone is comparatively low, and slickenside develops around the fault.

- BOUNDARY OF GEOLOGICAL UNIT AND STRATUM
- FAULT AND DISFURC
- (LOCATION OF BORING HOLES AND TRENCHES)
- HOLE NUMBER(TOTAL DEPTH)
- TRENCH NUMBER(TOTAL LENGTH)



THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA
 JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 2.2.1
 LOCATION MAP OF THE GEOLOGICAL SURVEY (RESERVOIR AREA)



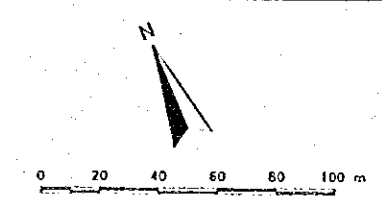
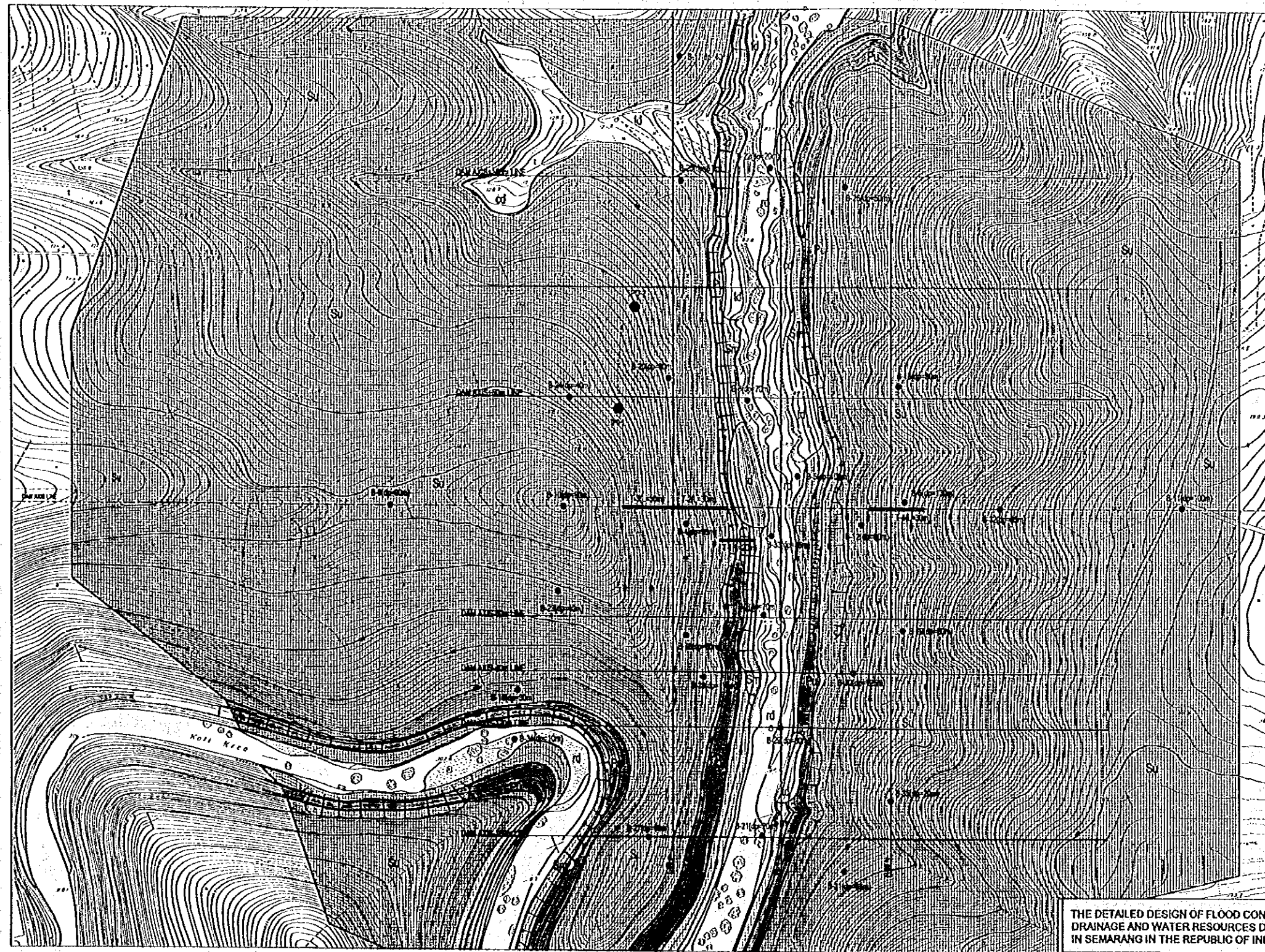
(Geological Strata)

Age	Formation and Strata Name	Symbol	Description
Quaternary	Embankment	B	The embankment is distributed at the pass. It consists of gravel and soil.
	Flood deposit	A	The deposit is distributed at the foot of the mountain slope. It consists of talus soil and sand, detritus and talus rocks.
	Terrace deposit	O ₁ , O ₂	The deposit forms the terrace plain along the riverbed, and the relative height of the plain is less than 3 m from the riverbed. Terrace deposit can be divided into two layers, the upper layer mainly consists of silt, and the lower layer mainly consists of sand and gravel.
Tertiary-Quaternary	Secondary Rock Unit	Ks	Kaligata formation is distributed at the south side of a fault, which located 400 m south west of the dam site. This fault has direction from east to north west and forms a boundary of Damar formation and Karak and Kaligata formations. Secondary rock unit is formed by complicated alteration with mainly consists of conglomerate, conglomeratic sandstone, siliceous sandstone and sandstone. Cracks hardly develop in the bedrock, and the degree of cementation and the hardness of rock are comparatively low.
		Ds	Damar formation is distributed at the north side of the above mentioned fault. Secondary rock unit is formed by complicated alteration with mainly consists of siliceous sandstone, conglomeratic sandstone and volcanic conglomerate. Cracks hardly develop in the bedrock, and the degree of cementation and the hardness of rock are comparatively low.
Tertiary	Karak	Ks	Karak formation is distributed at the south side of the above mentioned fault. Secondary rock unit mainly consists of siltstone whose color is greenish dark gray, and partly contains coral limestone. The hardness of siltstone is comparatively low, and slickenside develops around the fault.

- BOUNDARY OF GEOLOGICAL UNIT AND STRATUM
- FAULT AND DIPSTRIKE
- (LOCATION OF BOREHOLE AND TRENCHES)
- HOLE NUMBER(TOTAL DEPTH)
- TRENCH NUMBER(TOTAL LENGTH)

THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA
 JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 2.2.1
 LOCATION MAP OF THE GEOLOGICAL SURVEY (RESERVOIR AREA)



LEGEND

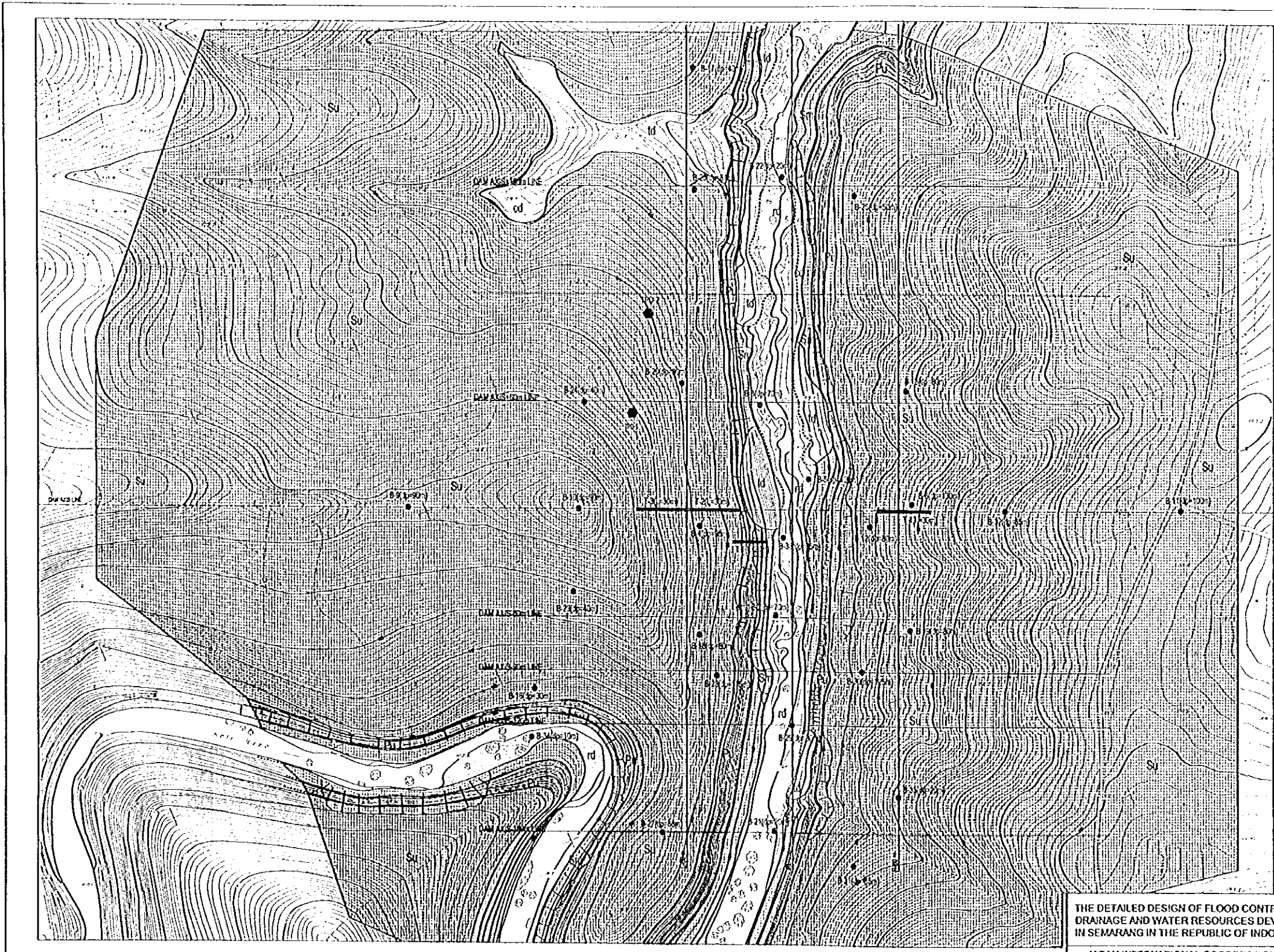
(Geological Strata)

Age	Formation and Strata Name	Symbol	Description
Quaternary Holocene	Riverbed deposit	rd	Riverbed deposit consists of gravel, sand and clay. And it contains the huge fallen rocks in the gorge area, which was made by Koro river.
	Talus deposit	td	Talus deposit consists of colluvial soil and sand, debris, fallen rocks. And it is accumulated on the foot of mountaineous slope and cliff.
Tertiary-Quaternary Pliocene-Pleistocene	Upper Sedimentary Rock Unit	Su	The unit mainly consists of alternation of conglomerate, conglomeratic sandstone, tuffaceous sandstone and sandstone, and partly contains mafic tuff and volcanic conglomerate. The change of grain size of sandstone is big, and lamina is formed partly. The matrix of conglomerate consists of same material of sandstone, and gravel consists of andesite and pumice, and diameter of gravel is smaller than 50cm. Cracks hardly develop in the bedrock, and the degree of cementation of conglomerate, tuffaceous sandstone, sandstone and tuff is comparatively low, and lower cementation layer is formed partly in sandstone, conglomerate.
	Upper Pyroclastic Rock Unit	Ss	The unit mainly consists of volcanic breccia, and partly contains mafic tuff and andesite lava. The volcanic breccia contains fragments of andesite and pumice, and mafic tuff. Cracks hardly develop in the bedrock, and the hardness of rock is comparatively high.
	Middle Sedimentary Rock Unit	Sd	The unit mainly consists of alternation of conglomerate, conglomeratic sandstone, sandstone and tuffaceous sandstone, and partly contains mafic tuff. The texture of each rock and conditions of bedrock are almost same as the upper sedimentary rock unit.

- BOUNDARY OF GEOLOGICAL UNIT AND STRATUM
- (LOCATION OF BORE HOLES AND ADITS AT THE PHASE 1 INVESTIGATION)
- : BORE HOLE (NUMBER, TOTAL DEPTH)
- : ADIT (NUMBER, TOTAL LENGTH)
- (LOCATION OF BORING HOLES AND TEST PITS AT THE PHASE 2 INVESTIGATION)
- : BORE HOLE (NUMBER, TOTAL DEPTH)
- : TEST PIT (NUMBER)

THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA
JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 2.2.2
LOCATION MAP OF THE GEOLOGICAL SURVEY (DAMSITE)



LEGEND

(Geological Strata)

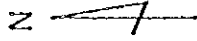
Age	Formation and Strata Name	Symbol	Description
Quaternary Holocene	Revolbed deposit	rd	Revolbed deposit consists of Gravel, sand and clay. And it contains the huge talus rocks in the gorge area, which was made by Kraso River.
	Talus deposit	td	Talus deposit consists of collapse soil and sand, debris, talus rocks. And it is accumulated on the foot of mountain-side slope and gull.
Tertiary-Quaternary Pliocene-Pleistocene Cenozoic	Upper Sedimentary Rock Unit	Su	The unit mainly consists of alternation of conglomerate, conglomeratic sandstone, tuffaceous sandstone and sandstone, and partly contains mafic tuff and volcanic conglomerate. The change of grain size of sandstone is big, and lamina is formed partly. The matrix of conglomerate consists of same matrix of sandstone, and gravel consists of andesite and porphyry, and diameter of gravel is smaller than 50cm. Cracks hardly develop in the bedrock, and the degree of cementation of conglomerate, tuffaceous sandstone, sandstone and tuff is comparatively low, and lower cementation layer is formed partly in sandstone, conglomerate.
	Upper Pyroclastic Rock Unit	Su	The unit mainly consists of volcanic breccia, and partly contains mafic tuff and andesite lens. The volcanic breccia contains fragments of andesite and porphyry, and mafic tuff consists of mafic tuff. Cracks hardly develop in the bedrock, and the hardness of rock is comparatively high.
	Middle Sedimentary Rock Unit	Su	The unit mainly consists of alternation of conglomerate, conglomeratic sandstone, sandstone and tuffaceous sandstone, and partly contains mafic tuff. The facies of each rock and condition of bedrock are almost same as the upper sedimentary rock unit.

- ~~~~~ BOUNDARY OF GEOLOGICAL UNIT AND STRATUM
- (LOCATION OF BORE HOLES AND ADITS AT THE PHASE 1 INVESTIGATION)
- : BORE HOLE (NUMBER, TOTAL DEPTH)
- : ADIT (NUMBER, TOTAL LENGTH)
- (LOCATION OF BORING HOLES AND TEST PITS AT THE PHASE 2 INVESTIGATION)
- : BORE HOLE (NUMBER, TOTAL DEPTH)
- ⬤ : TEST PIT (NUMBER)

THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG IN THE REPUBLIC OF INDONESIA
JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 2.2.2
LOCATION MAP OF THE GEOLOGICAL SURVEY (DAMSITE)

Location Map
of Jatibarang Dam



SD-01 = Seismic Line

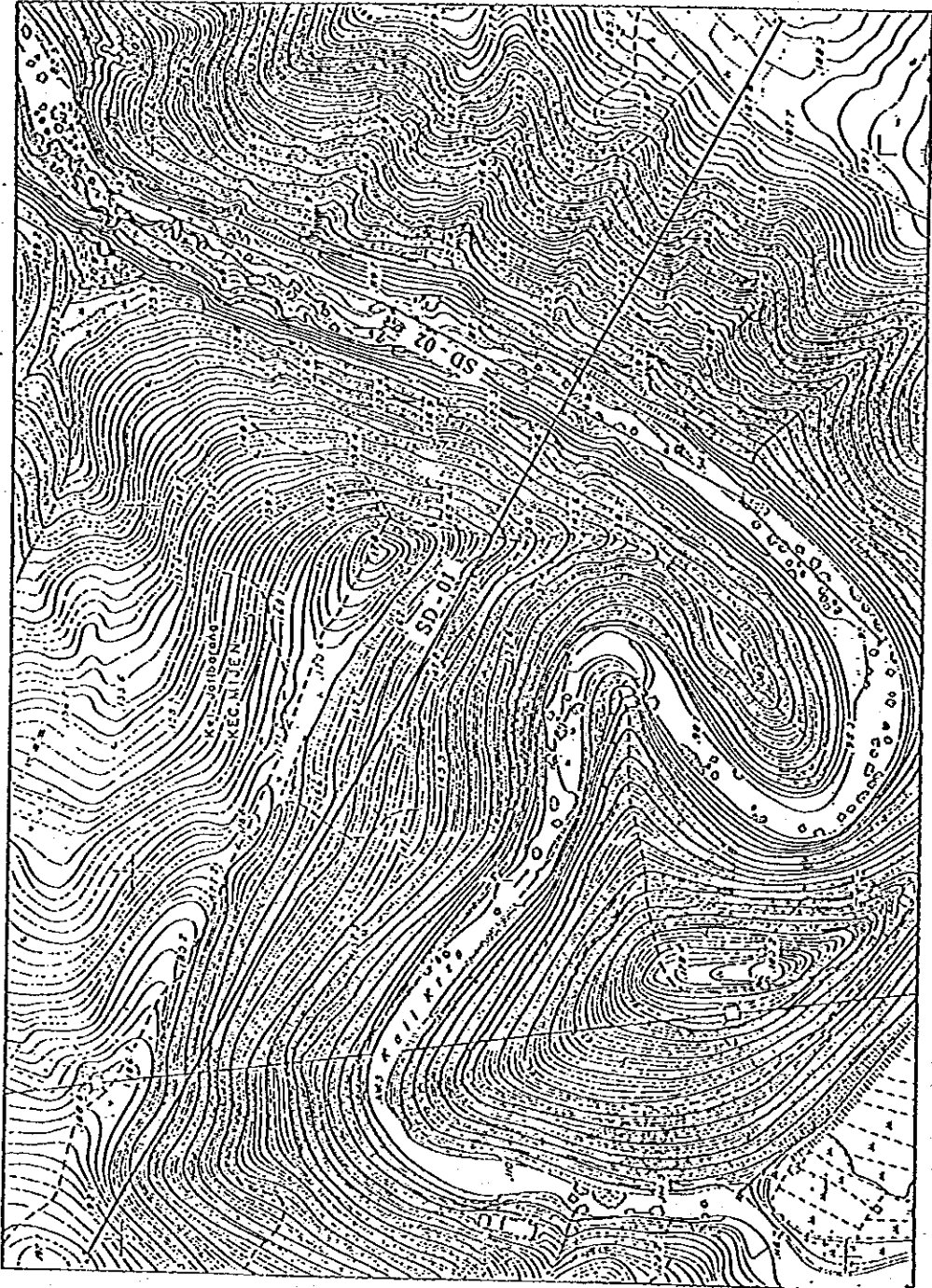
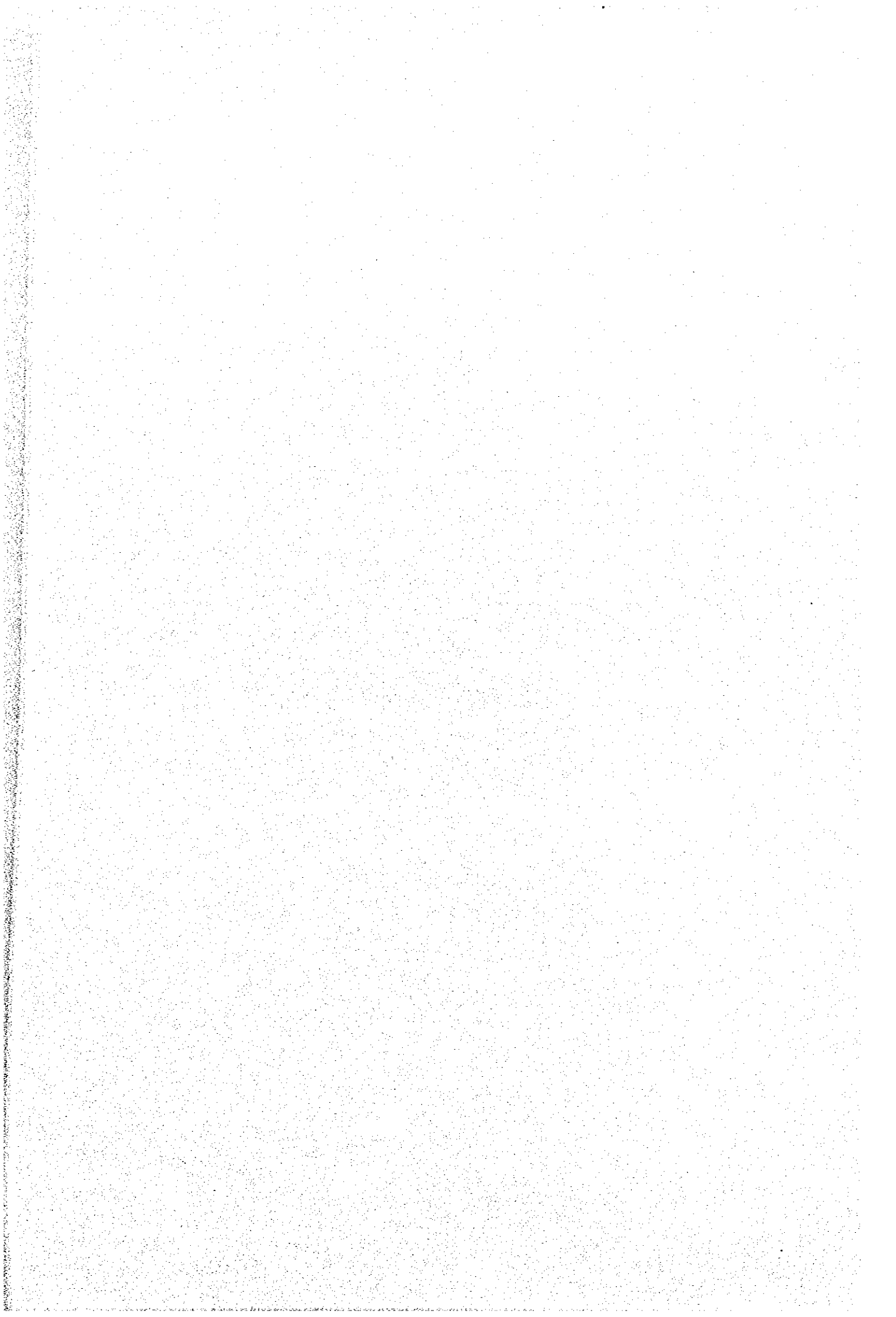
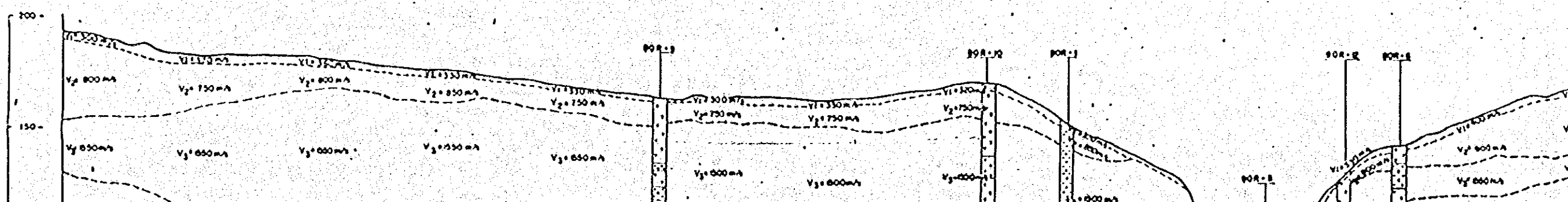
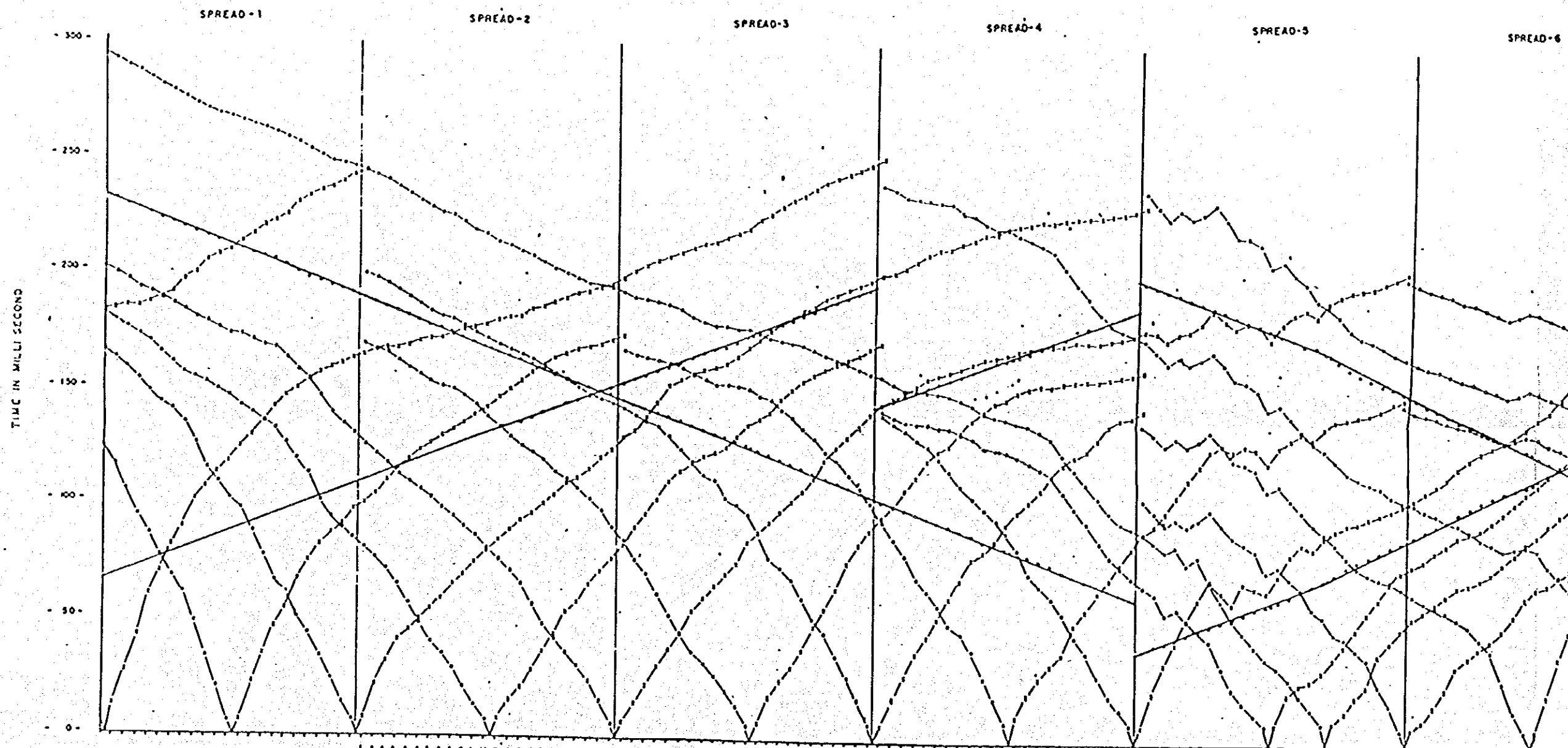
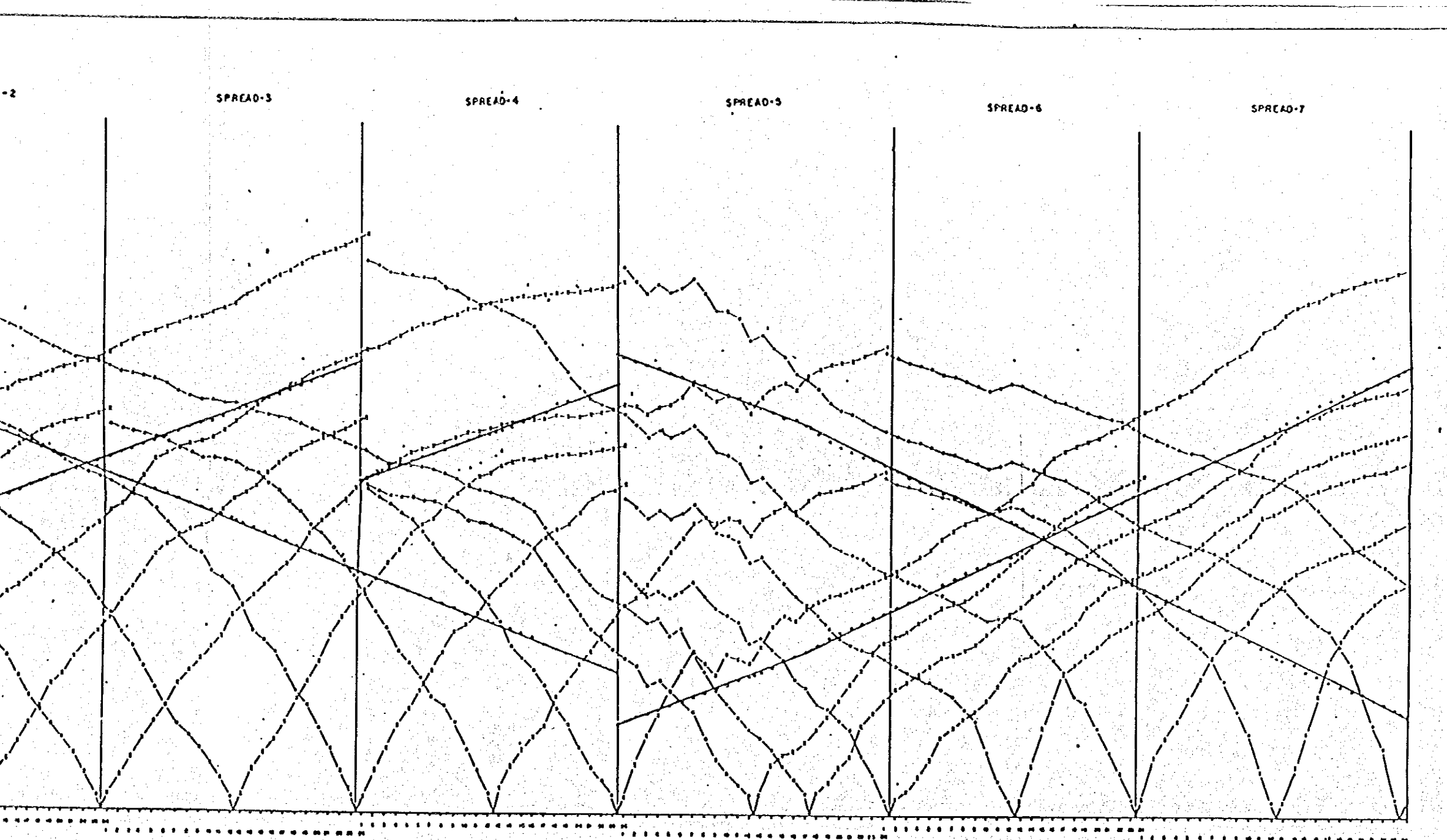


Fig. 2.2.3 Location Map and Geophysical Alignment of Damsite







Sketch Location Map

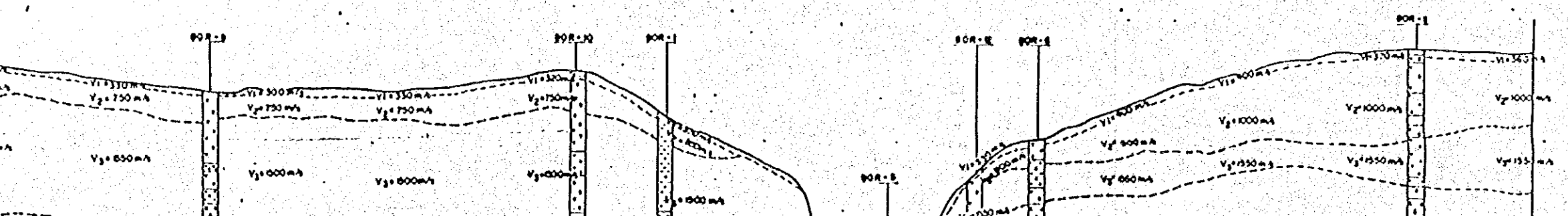
REFRACTION SEISMIC FOR
JATIBARANG DAM PROJECT AT
GAM SITE
GURUNG PATI - SEMARANG

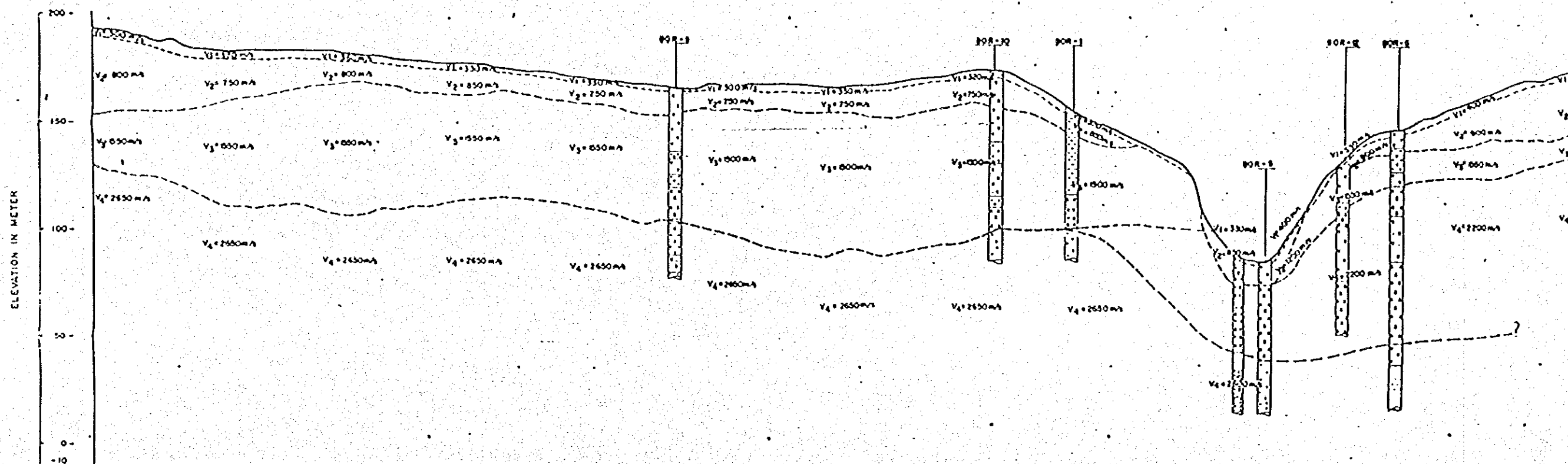
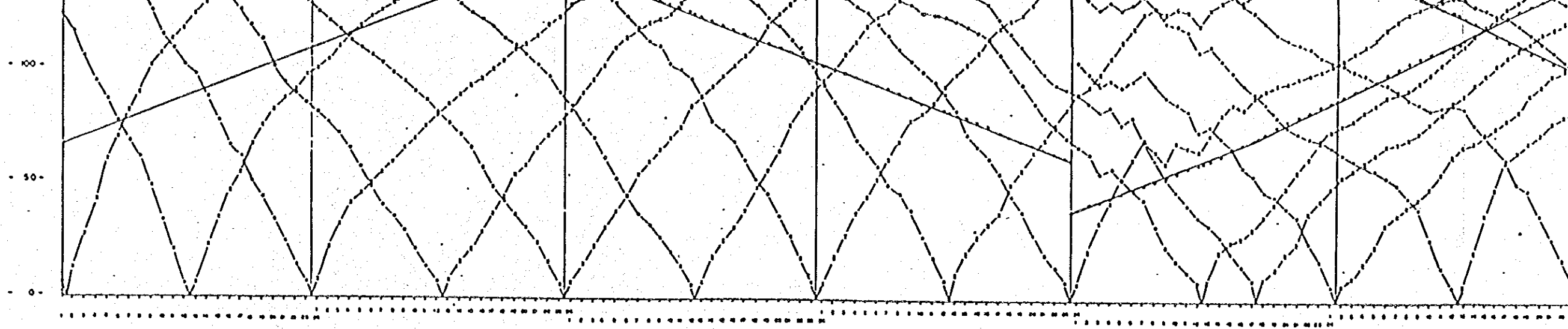
SCALE: Vertical 1:2000
Horizontal 1:2000

LEGEND :

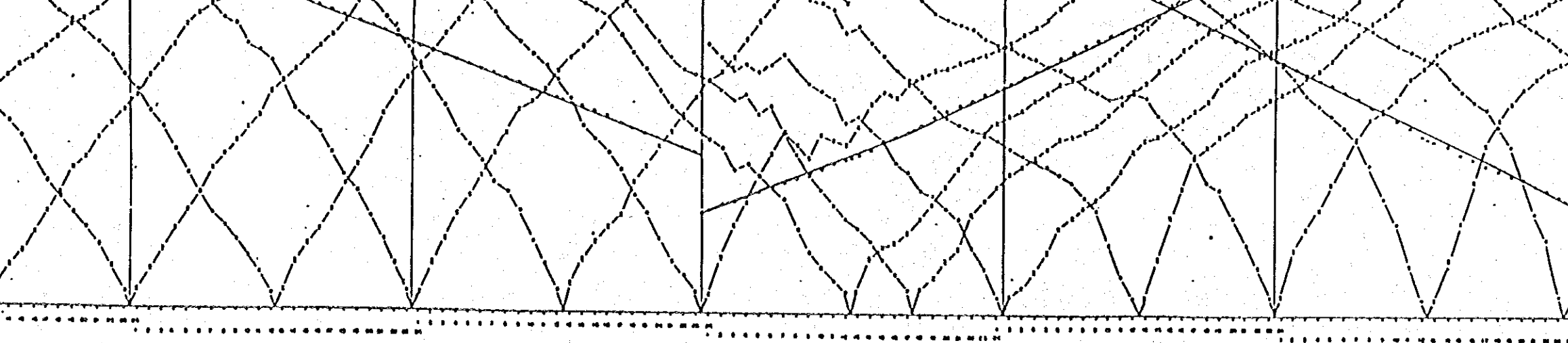
- A Top Soil S₁ Clay soft brown (300m/s - 400m/s)
- B Light weathered of Tuff Conglomerat. Tuffis dense brown to light brown (700m/s - 850m/s)
- C Conglomerat Sandstone compact blackish grey (1550 m/s)
- D Volcanic Breccia compact blackish grey (2200 m/s)
- E Conglomerat. compact grey (2650 m/s)

- LLLLL Geophone number.
- ~ Layer boundary
- ⋈ Velocity.





PLG NUMBER	DISTANCE	ELEVATION
1		22
2		22
3		22
4		22
5		22
6		22
7		22
8		22
9		22
10		22
11		22
12		22
13		22
14		22
15		22
16		22
17		22
18		22
19		22
20		22
21		22
22		22
23		22
24		22
25		22
26		22
27		22
28		22
29		22
30		22
31		22
32		22
33		22
34		22
35		22
36		22
37		22
38		22
39		22
40		22
41		22
42		22
43		22
44		22
45		22
46		22
47		22
48		22
49		22
50		22
51		22
52		22
53		22
54		22
55		22
56		22
57		22
58		22
59		22
60		22
61		22
62		22
63		22
64		22
65		22
66		22
67		22
68		22
69		22
70		22
71		22
72		22
73		22
74		22
75		22
76		22
77		22
78		22
79		22
80		22
81		22
82		22
83		22
84		22
85		22
86		22
87		22
88		22
89		22
90		22
91		22
92		22
93		22
94		22
95		22
96		22
97		22
98		22
99		22
100		22



Vertical 1:2000
 SCALE: Horizontal 1:2000

LEGEND :

- A Top S. of Silty Clay soft brown (300 m/s - 400 m/s)
 - B Highly weathered of Tuff Conglomerat. siltstone brown, soft brown (1700 m/s - 2250 m/s)
 - C Conglomerat Sandstone compact blackish grey (1550 m/s)
 - D Volcanic Breccia compact blackish grey (2200 m/s)
 - E Conglomerat. compact grey (2650 m/s)
- ||||| Geophone number.
- () Layer boundary
- X Velocity.

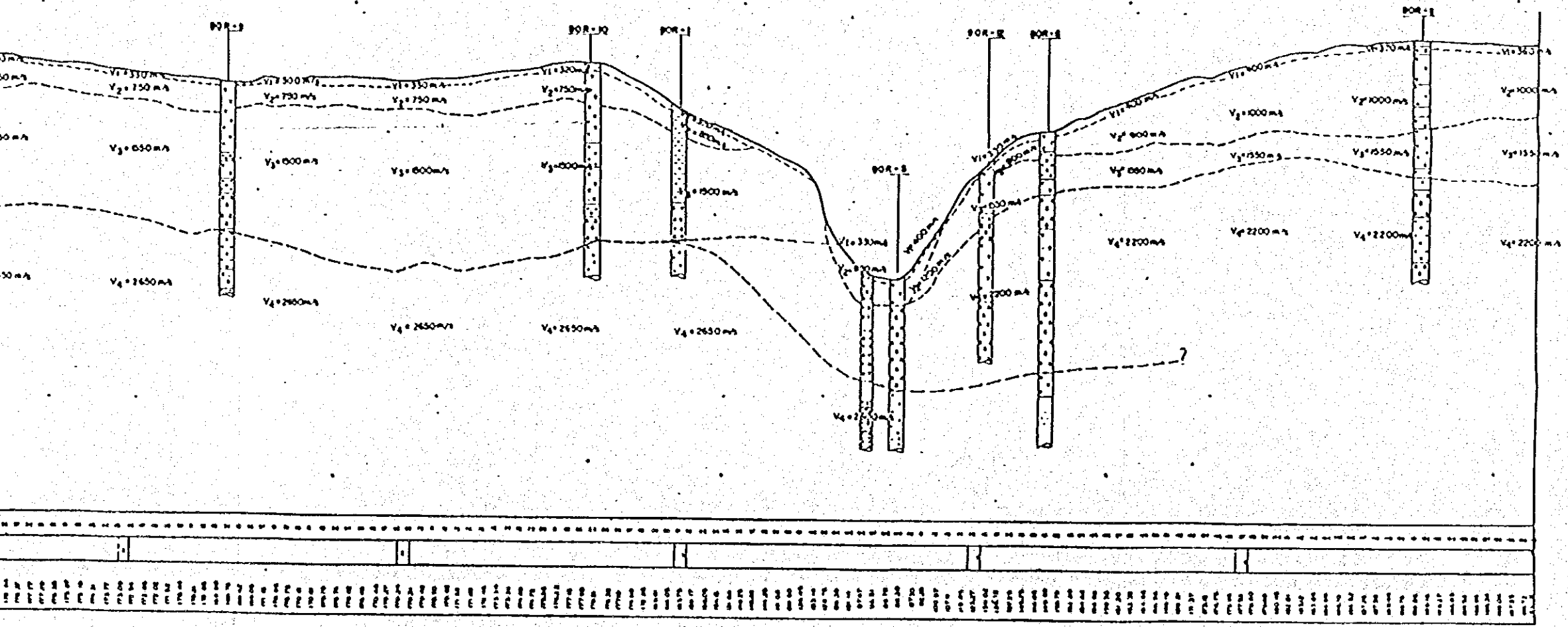
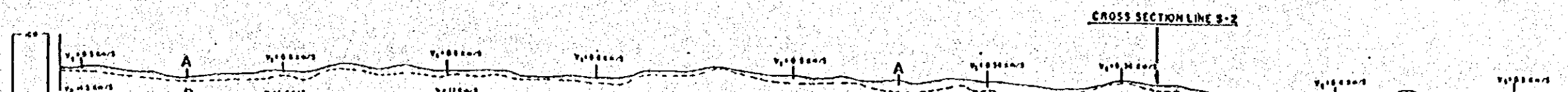
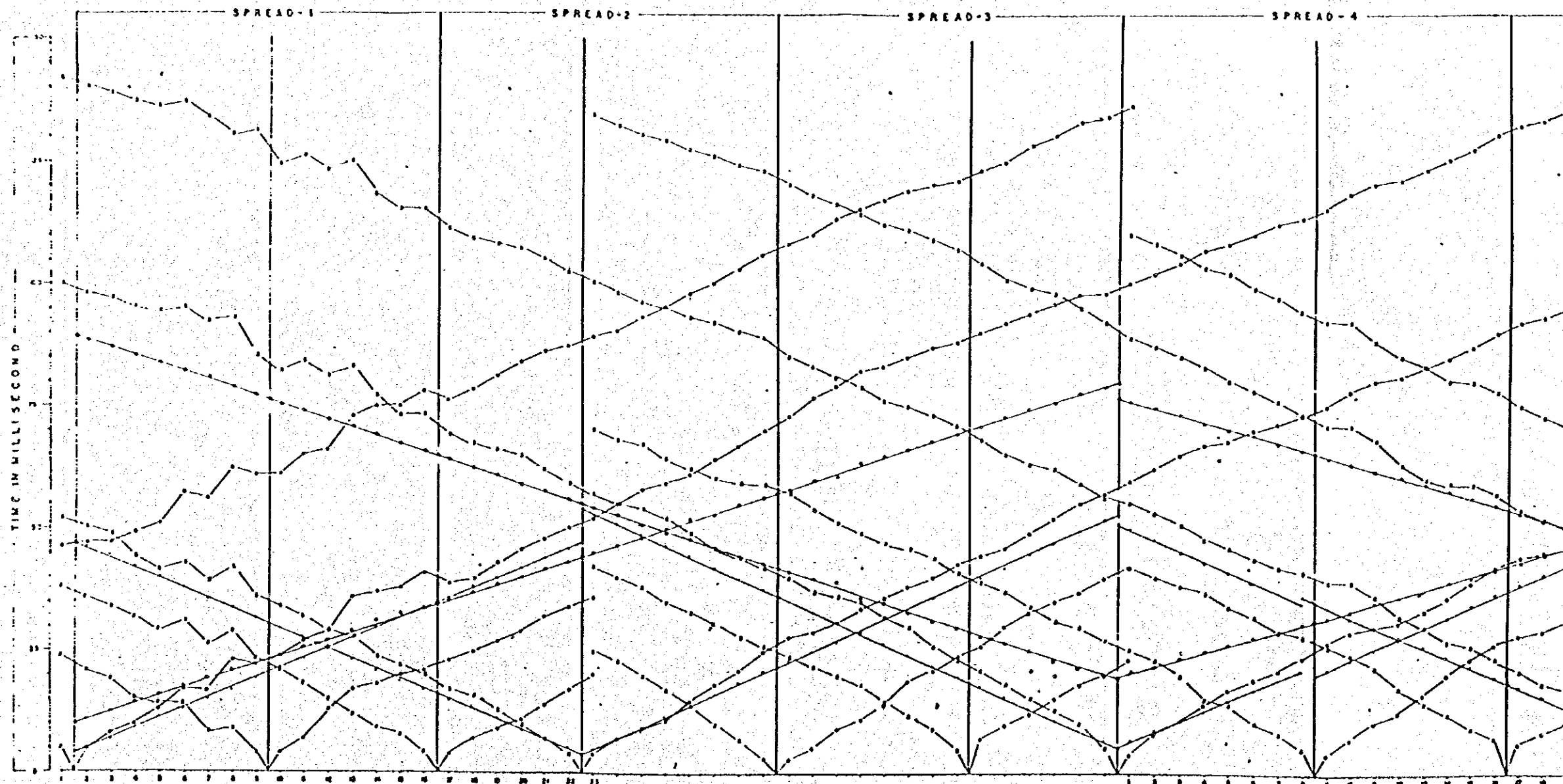
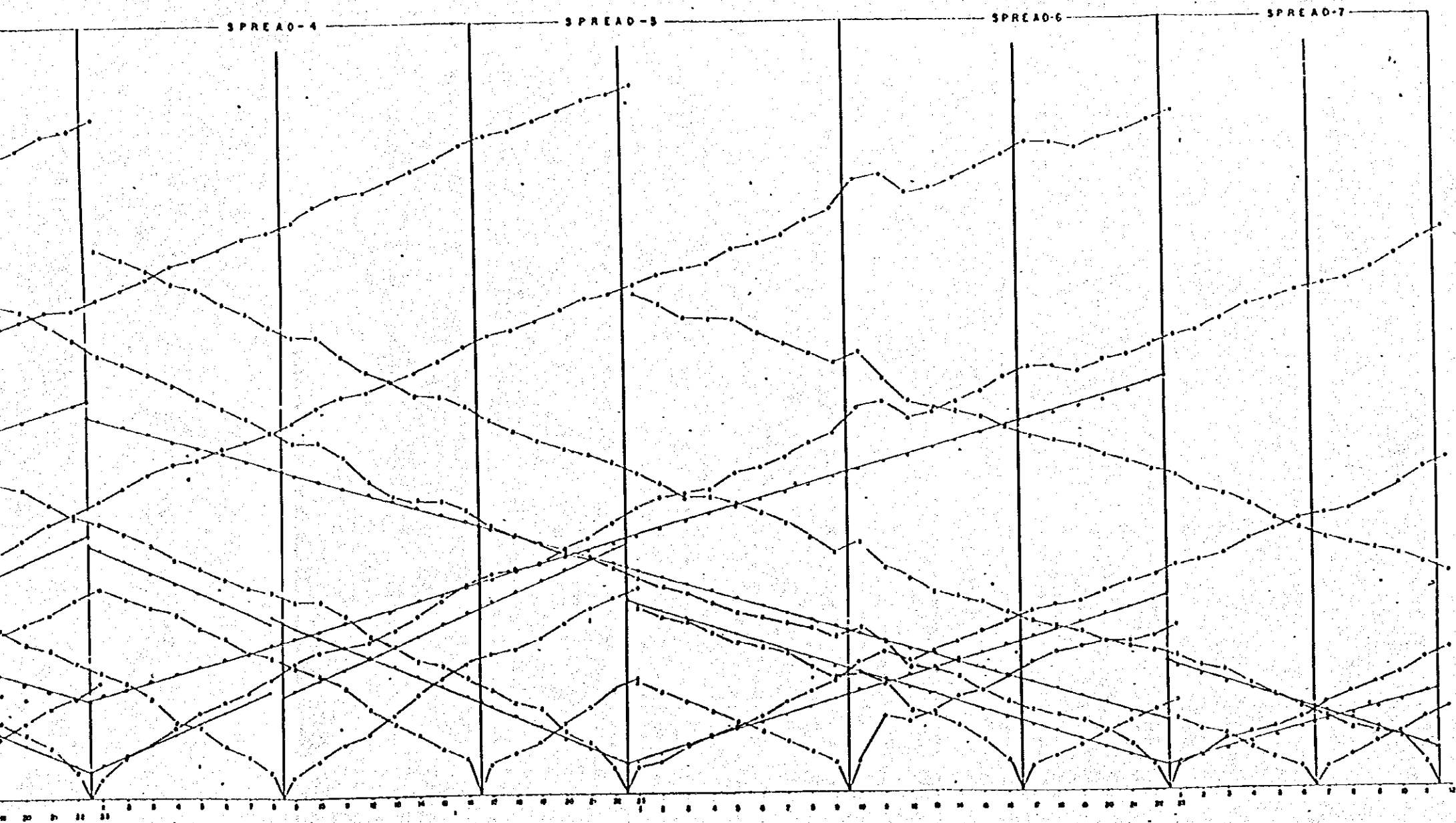


Fig. 2.2.4

JICA, JAPAN INTERNATIONAL COOPERATION AGENCY		SCALE
DIRECTION GENERAL OF WATER RESOURCES DEVELOPMENT		1:1000
MINISTRY OF PUBLIC WORKS		1:1000
T-X GRAPH & SEISMIC SECTION		
LINE S-D-1		
APPROVED BY:	REVISION NO.:	DATE:
		APR 21





Sketch Location Map

REFRACTION SEISMIC FOR
JATIBARANG DAM PROJECT AT
DAM SITE
GURUNG PATI-SEMARANG

SCALE: Vertical 1:1000
Horizontal 1:1000

LEGEND :

- A Top Soil Silty Clay soft brown (300 m/s - 400 m/s)
- B Highly weathered of Tuff Conglomerat. soft to dense brown light brown (700 m/s - 1050 m/s)
- C Conglomerat Sandstone compact block sh gray (1550 m/s)
- D Volcanic Breccia compact block sh gray (2200 m/s)
- E Conglomerat compact gray (2650 m/s)

11133 Geophone number.

Layer boundary.

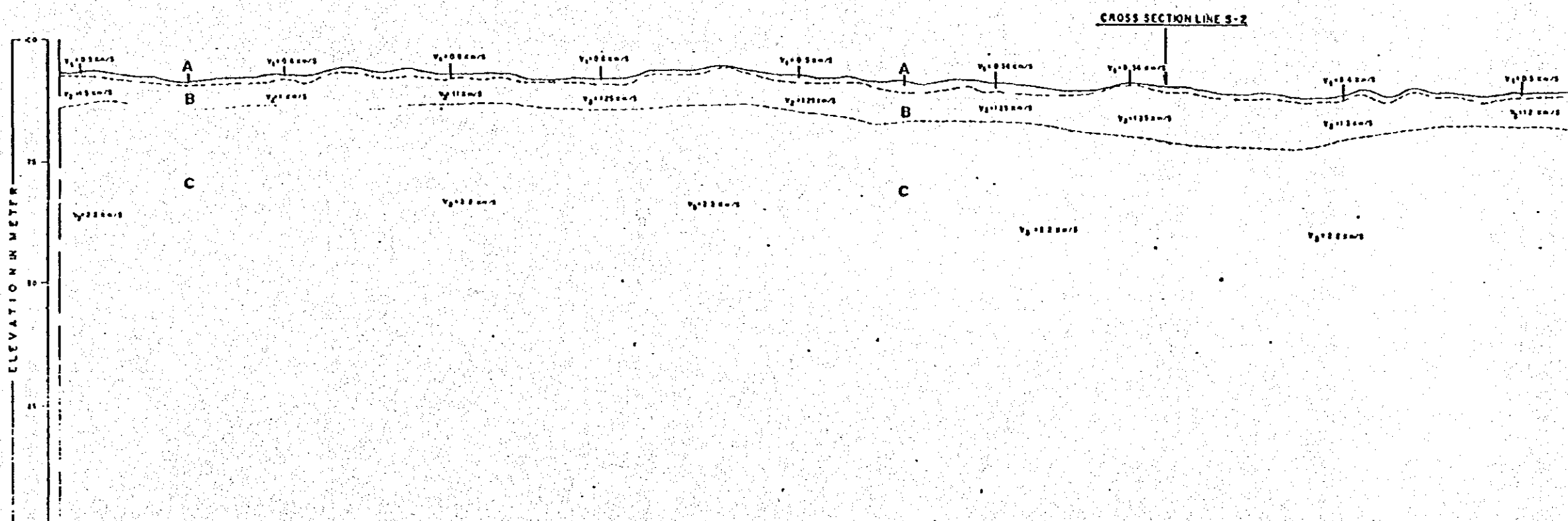
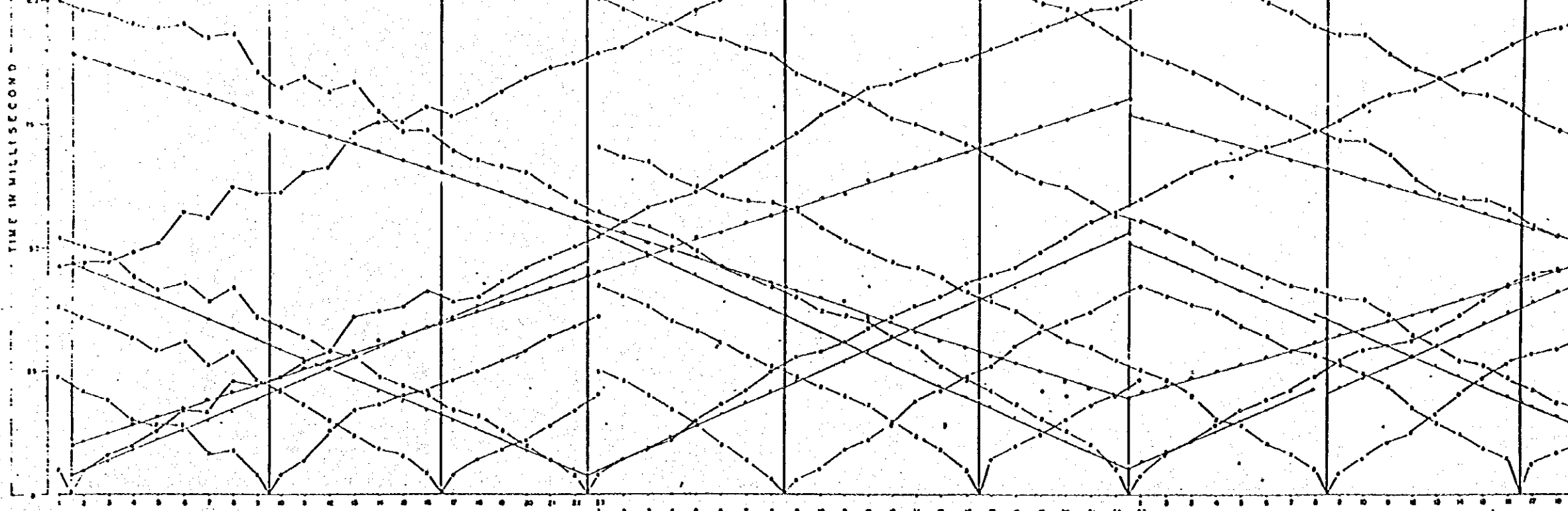
Velocity.

Forward shoot.

Reverse shoot.

CROSS SECTION LINE S-2





Geophone No. :	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	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100															
Page No. :	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	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100															
Elevation :	75.700	75.650	75.600	75.550	75.500	75.450	75.400	75.350	75.300	75.250	75.200	75.150	75.100	75.050	75.000	74.950	74.900	74.850	74.800	74.750	74.700	74.650	74.600	74.550	74.500	74.450	74.400	74.350	74.300	74.250	74.200	74.150	74.100	74.050	74.000	73.950	73.900	73.850	73.800	73.750	73.700	73.650	73.600	73.550	73.500	73.450	73.400	73.350	73.300	73.250	73.200	73.150	73.100	73.050	73.000	72.950	72.900	72.850	72.800	72.750	72.700	72.650	72.600	72.550	72.500	72.450	72.400	72.350	72.300	72.250	72.200	72.150	72.100	72.050	72.000	71.950	71.900	71.850	71.800	71.750	71.700	71.650	71.600	71.550	71.500	71.450	71.400	71.350	71.300	71.250	71.200	71.150	71.100	71.050	71.000	70.950	70.900	70.850	70.800	70.750	70.700	70.650	70.600	70.550	70.500	70.450	70.400	70.350	70.300	70.250	70.200	70.150	70.100	70.050	70.000

REFRACTION SEISMIC FOR
JATIBARANG DAM PROJECT AT
DAM SITE
GUNUNG PATI-SEMARANG

Vertical : 1:1000
SCALE: Horizontal : 1:1000

LEGEND :

- A** Top Soil Silty Clay soft brown (300m/s-400 m/s)
- B** Highly weathered of T.M.C conglomerate soft to dense brown to light brown (700m/s-1050m/s)
- C** Conglomerate Sandstone compact, block sh grey. (1250 m/s)
- D** Volcanic Breccia compact, block sh grey (2200 m/s)
- E** Conglomerate compact grey. (2650 m/s)

- ||||| Geophone number.
- ~ Layer boundary.
- X Velocity.
- Forward shot.
- Reverse shot.

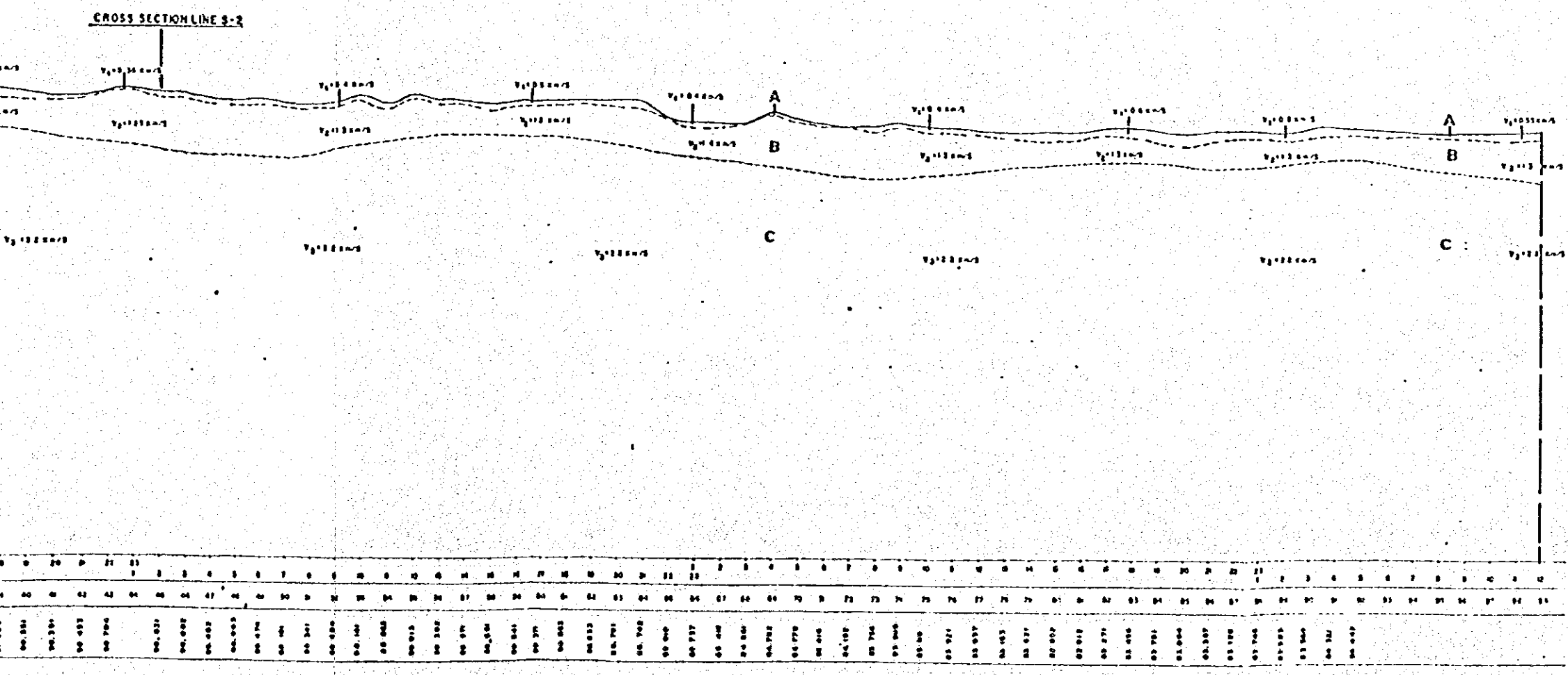
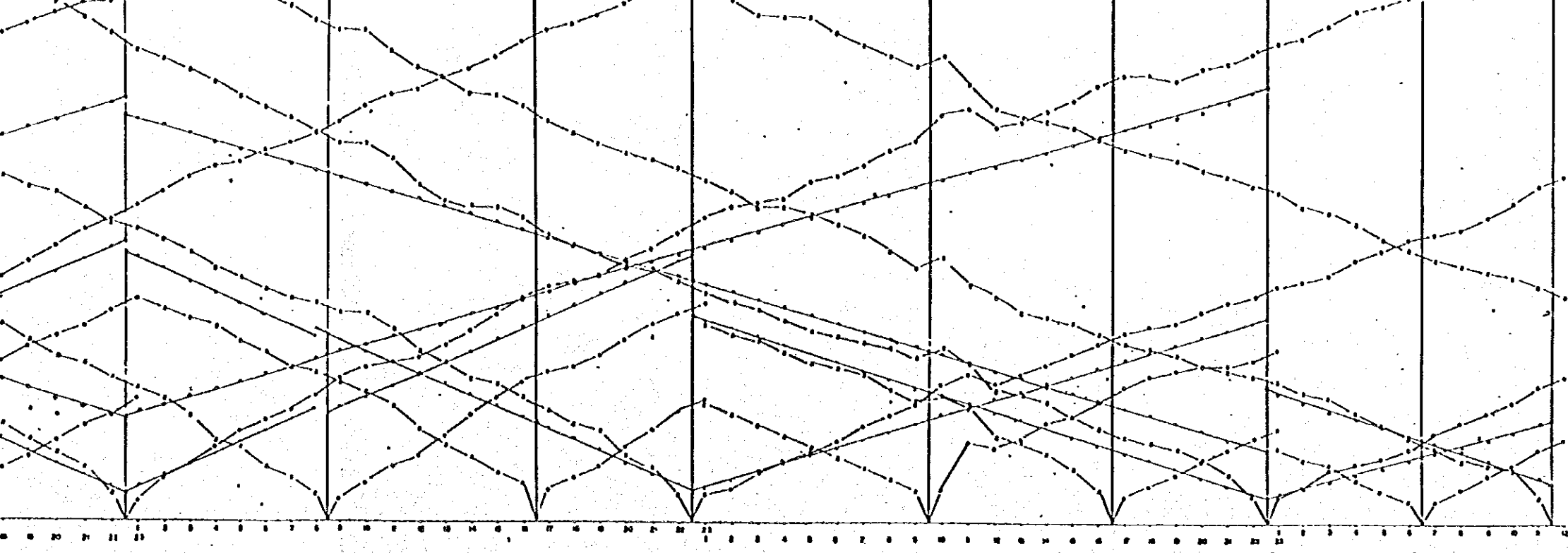


Fig. 2.2.5

JICA JAPAN INTERNATIONAL COOPERATION AGENCY	
DIRECTORATE GENERAL OF WATER RESOURCES DEVELOPMENT	
MINISTRY OF PUBLIC WORKS	
T-X GRAPH & SEISMIC SECTION LINE S-2	
DATE	SCALE