

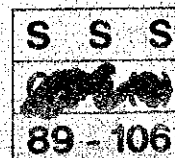
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PRESIDENCIA DE LA REPUBLICA
SECRETARIA TECNICA DE PLANIFICACION

THE STUDY
ON
WATER POLLUTION CONTROL PLAN
FOR
THE LAKE YPACARAI
AND ITS BASIN

DATA BOOK

AUGUST 1989

JAPAN INTERNATIONAL COOPERATION AGENCY

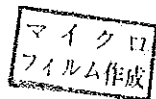


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**THE STUDY
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DATA BOOK

AUGUST 1989

JAPAN INTERNATIONAL COOPERATION AGENCY

**THE STUDY
ON
WATER POLLUTION CONTROL PLAN
FOR
THE LAKE YPACARAI
AND ITS BASIN**

LIST OF REPORTS

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	SUPPORTING REPORT II	METEOROLOGY, HYDROLOGY AND HYDRAULICS
	SUPPORTING REPORT III	VEGETATION AND AQUATIC LIFE
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	SUPPORTING REPORT VII	WATER POLLUTION SIMULATION
	SUPPORTING REPORT VIII	WATER POLLUTION CONTROL TEST
	SUPPORTING REPORT IX	WATER POLLUTION CONTROL PLAN

SUPPORTING REPORT I

TOPOGRAPHY, GEOLOGY AND SOIL

Table S1.1.3 Order Analysis of Drainage System of Catchment Area

No of stream	Total	4th	3rd	2nd	1st	Name of stream
Pirayu	353.70					
P 1	20.10		13.92 (	(1) 2.84 (2) 3.34	Arroyo Zanja Morati
P 2	9.90			9.90		
P 3	3.90			3.90		
P 4	0.00			0.00		
P 5	8.10			0.26 (	(1) 3.81 (2) 4.03
P 6	21.90		21.90		Arroyo Zanja Guaz'u	
P 7	24.30			14.30 (	(1) 1.97 (2) 2.00 (3) 1.78 (4) 4.25
P 8	13.40			1.18 (	(1) 6.31 (2) 5.41
P 9	3.90		3.90		Arroyo Pirayu	
P 10	16.30			5.02 (	(1) 5.68 (2) 3.34 (3) 2.25
P 11	10.50			3.90 (	(1) 3.13 (2) 1.41 (3) 2.06
P 12	6.90			6.90	Arroyo Parana	
P 13	2.10			2.10		
P 14	3.70			3.70		
P 15	8.60			0.60 (	(1) 5.59 (2) 2.50
P 16	13.70			1.80 (	(1) 4.10 (2) 3.60 (3) 4.20
P 17	6.70		6.70		Arroyo Peña	
P 18	8.10			1.04 (	(1) 3.72 (2) 3.34

(1)

No. of stream	Total	4th	3rd	2nd	1st	Name of stream
P 19	5.20				5.20	
P 20	9.90			4.24 (	(1) 3.13 (2) 2.53	
P 21	8.60			2.75 (	(1) 2.53 (2) 2.72	Ao Cardena
P 22	17.90			4.55	(1) 2.50 (2) 1.91 (3) 1.75 (4) 3.47 (5) 3.72	
P 23	28.10			13.93 (	(1) 4.81 (2) 4.16 (3) 5.20	Arroyo Ramirez
P 24	4.70				4.70	
P 25	16.60			8.10 (	(1) 2.84 (2) 5.66	
P 26	8.00				8.00	
P 27	8.30				8.30	
P 28	10.60			5.86 (	(1) 3.18 (2) 1.56	
P 29	7.80			3.08 (	(1) 0.81 (2) 3.91	
P 30	3.50		3.50			Arroyo Pirayu
P 31	3.90				3.90	
P 32	1.30				1.30	
P 33	10.80			5.74 (	(1) 4.03 (2) 1.03	Arroyo Castillo
P 34	4.60			4.60		Arroyo Pirayu
P 35	15.60			15.60		Arroyo Pirayu
P 36	6.80			6.80		Arroyo Yaguar-Resaca (Arroyo Y Pucu
	353.70					

No of stream	Total	4th	3rd	2nd	1st	Name of stream
<u>Yucuyty</u>	<u>343.90</u>					
Y 1	59.60		18.20 (	(1) 20.56 (2) 20.34		Arroyo Yuquyry
Y 2	63.90		3.46 (	(1) 20.23 (2) 40.16		Arroyo Cerumbe Cua Arroyo Mbaepirunaa
Y 3	45.90		18.18 (	(1) 13.47 (2) 14.25		Arroyo Paso Mburica Arroyo Rojas Canada
Y 4	28.10	16.23		(1) 3.31 (2) 3.25 (3) 5.31		Arroyo Yuquyry
Y 5	29.80		11.25 (	(1) 15.66 (2) 2.88		
Y 6	24.20		19.89 (	(1) 2.78 (2) 1.53		Arroyo San Lorenzo
Y 7	8.50		3.75 (	(1) 3.05 (2) 1.69		
Y 8	11.50	11.50				Arroyo San Lorenzo
Y 9	12.90		0.49 (	(1) 3.75 (2) 8.66		Arroyo Ycua Dure
Y 10	7.10			7.10		
Y 11	52.40	50.31		2.09		Arroyo Yuquyry
	<u>343.90</u>					

No of stream	Total	4th	3rd	2nd	1st	Name of stream
<u>East Coast</u>	<u>75.20</u>					
E 1	2.30				2.30	
E 2	5.30			1.79 (	(1) 0.94 (2) 1.16 (3) 1.41	
E 3	6.30			0.20 (	(1) 1.63 (2) 4.47	
E 4	6.30		3.96		(1) 2.34	Arroyo Acarsy
E 5	2.30				2.30	
E 6	1.20				1.20	
E 7	7.90			5.46 (	(1) 0.88 (2) 1.56	Paso Cadete
E 8	3.40				3.40	
E 9	1.00				1.00	
E 10	4.40			0.12 (	(1) 1.34 (2) 2.94	
E 11	3.10				3.10	
E 12	12.50			3.72 (	(1) 2.28 (2) 2.81 (3) 3.68	
E 13	2.70				2.70	
E 14	4.20				4.20	
E 15	1.70				1.70	
E 16	0.80				0.80	
E 17	9.80			5.17 (	(1) 1.38 (2) 3.25	Arroyo Villa
	<u>75.20</u>					

No of stream	Total	4th	3rd	2nd	1st	Name of stream
West Coast	60.20					
W1	8.60				8.60	Ac Ybyrdty
W2	8.50			2.41 (	(1) 2.05 (2) 4.03	
W3	4.20				4.20	
W4	1.60				1.60	
W5	8.10				8.10	
W6	4.30				4.30	
W7	2.70				2.70	
W8	5.70			1.80 (	(1) 2.34 (2) 2.56	
W9	2.70				2.70	
W10	3.90				3.90	
W11	8.90			0.28 (	(1) 3.78 (2) 4.84	
	60.20					

No of stream	Total	4th	3rd	2nd	1st	Name of stream
Salado	191.40					
S1	2.10				2.10	
S2	7.60				7.60	
S3	17.40			5.80 (	(1) 5.88 (2) 1.22 (3) 4.50	
S4	15.10			5.41 (	(1) 4.16 (2) 2.56 (3) 2.97	
S5	18.00			1.87 (	(1) 5.44 (2) 10.69	
S6	1.20		1.20			
S7	34.70				34.70	Arroyo San Ceronimo
S8	20.10				20.10	Arroyo Instran
S9	10.80			0.55 (	(1) 4.41 (2) 5.84	1
S10	2.30				2.30	
S11	2.40				2.40	
S12	58.70					
	191.40					

	Vol	%
Pirayu	353.70	32.6
Yuquyry	343.90	31.7
East coast	75.20	6.9
West coast	60.20	5.6
Salado	191.40	17.7
Lago	59.60	5.5
Total	1,084.00	100.0

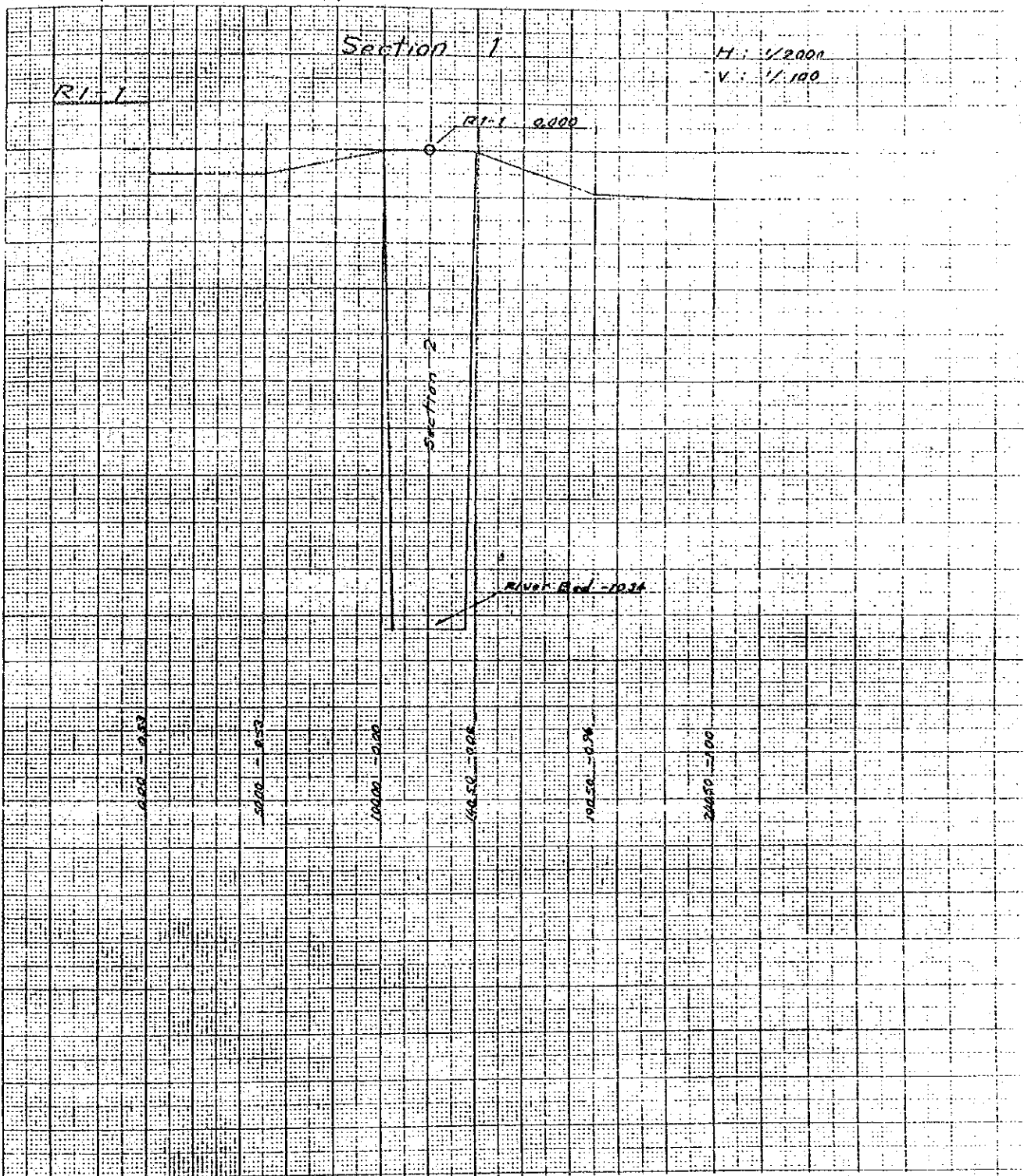


Fig. S1.1.12 Cross Section of Main Rivers Connecting with Lake Ypacarai

(Section 1 ~ Section 24)

Section 2

H: 1/200

V: 1/100

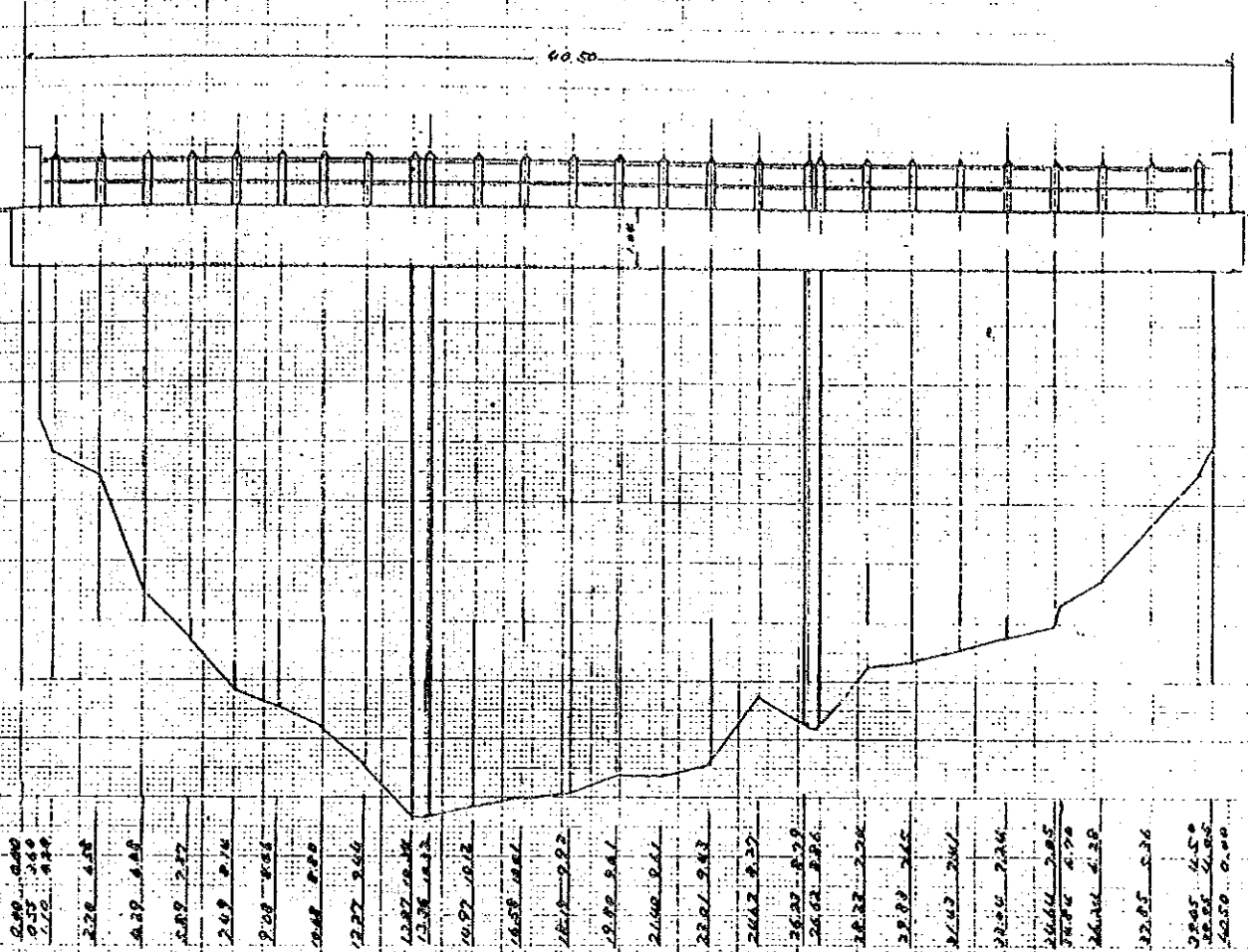
R1-1

40.50

0

5

10



0.00
0.35
1.70

2.20
4.50

6.80
2.27

2.60
2.16

9.20
4.65

0.48
8.80

12.27
9.66

13.87
12.38

13.36
14.33

10.07
10.12

16.58
14.61

18.18
9.22

19.88
9.41

24.00
9.61

22.01
9.43

24.62
8.27

26.20
8.79

26.82
8.86

28.22
2.06

29.88
3.65

27.43
2.61

22.56
7.24

26.64
2.85

28.86
4.78

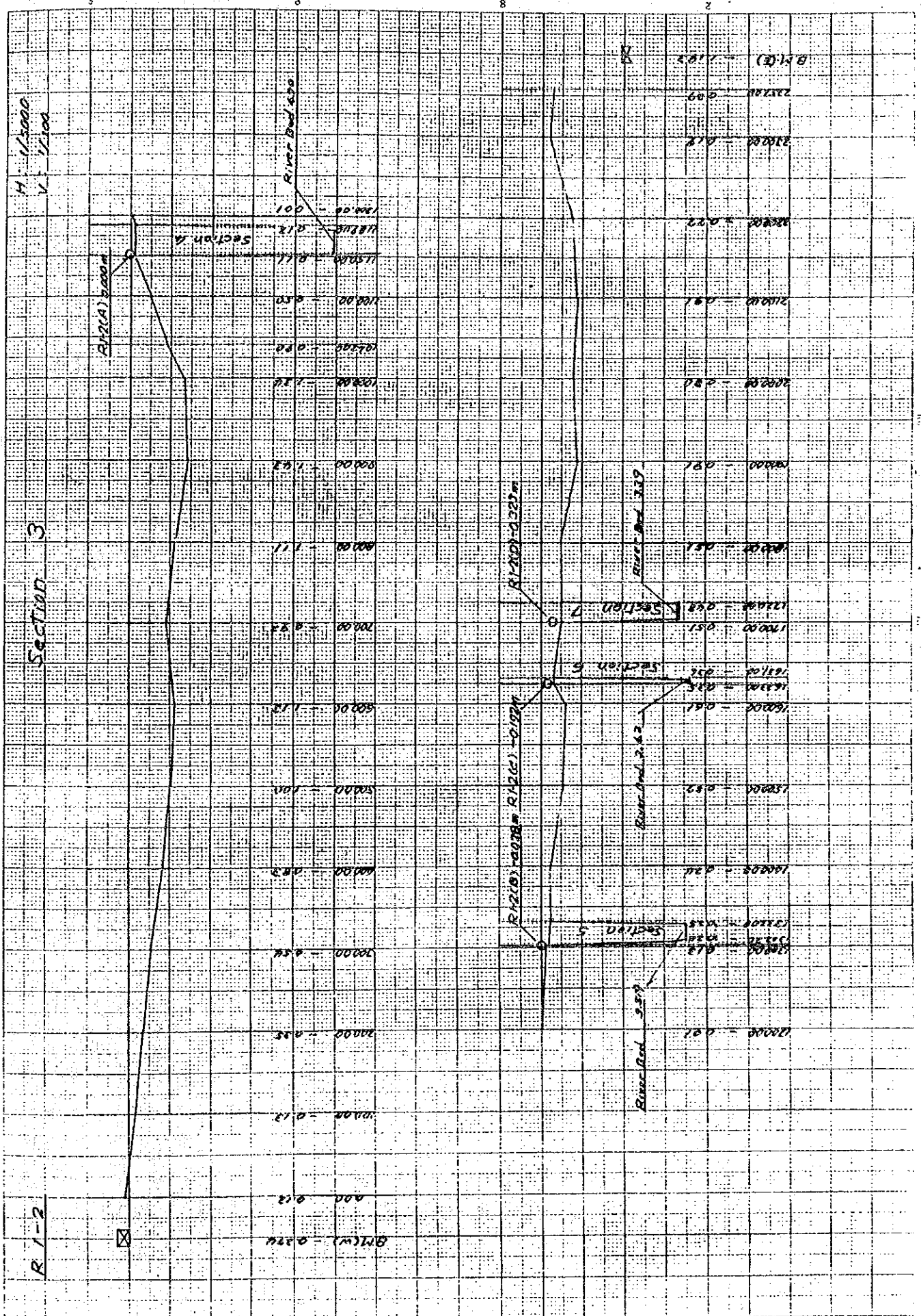
26.46
4.28

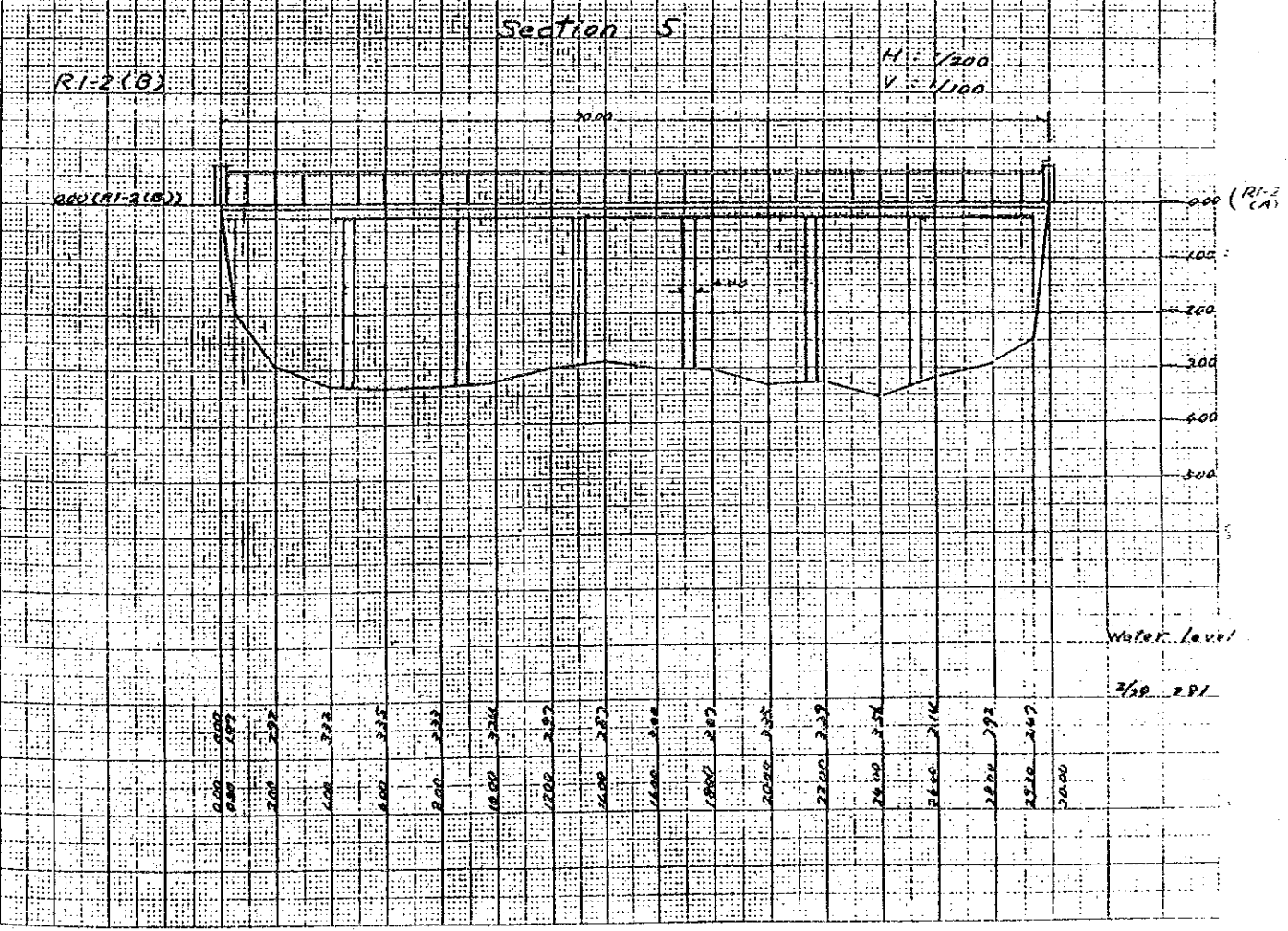
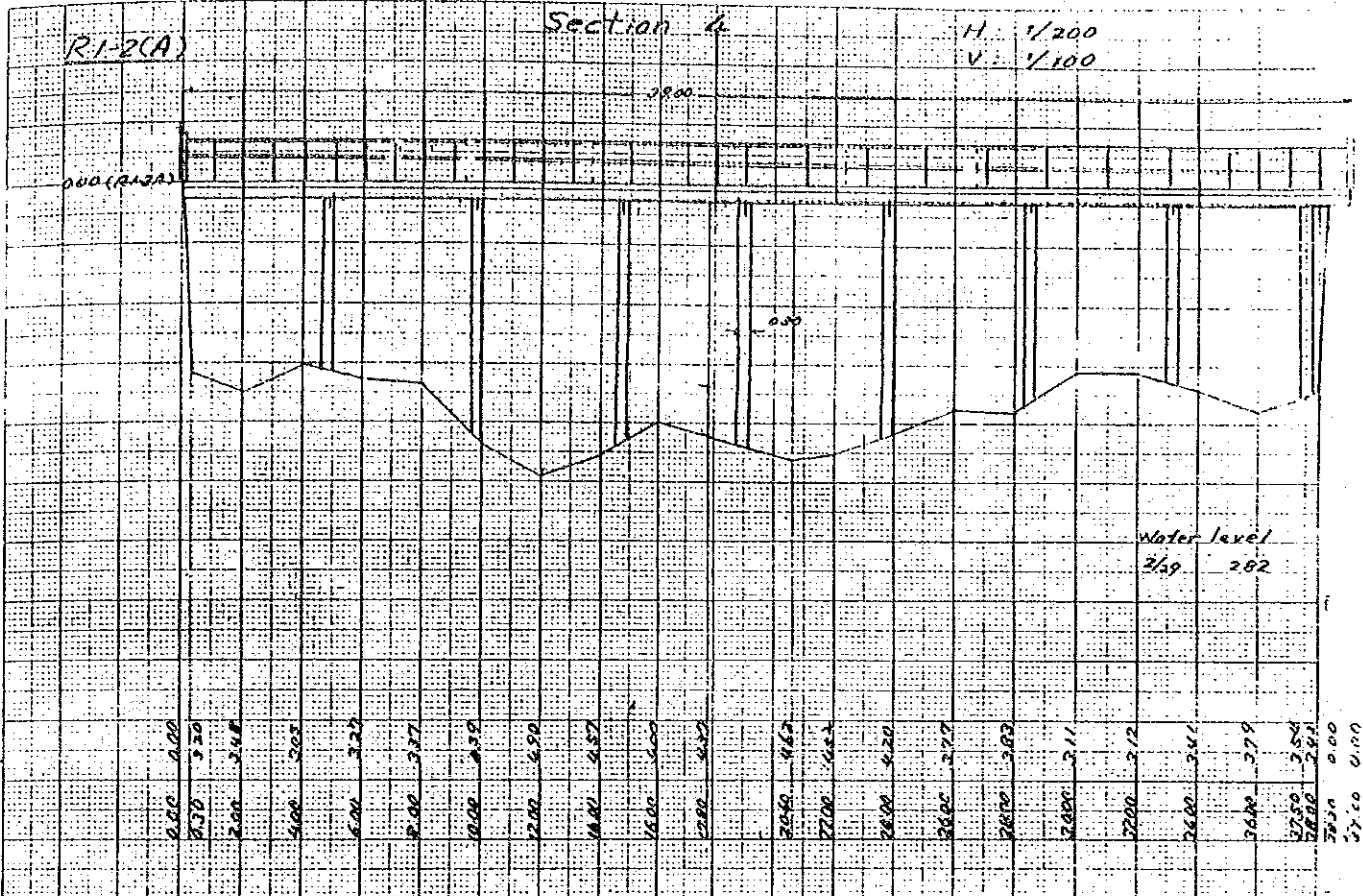
22.05
5.36

22.05
4.50

22.05
0.00

Water Level
2/6 6.87
3/3 2.02





R 1-2 (C)

Section 6

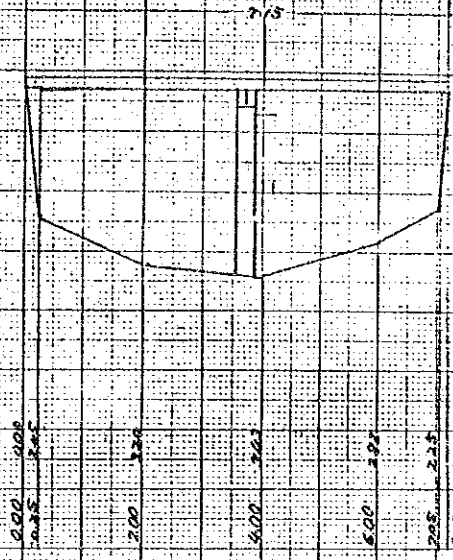
H : 1/100
V : 1/100

0.00 (R 1-2 (C))

7.15

0.00 (R 1-2 (A))

1.00
2.00
3.00
4.00
5.00



Water level
2.79 2.79

Section 7

R 1-2 (D)

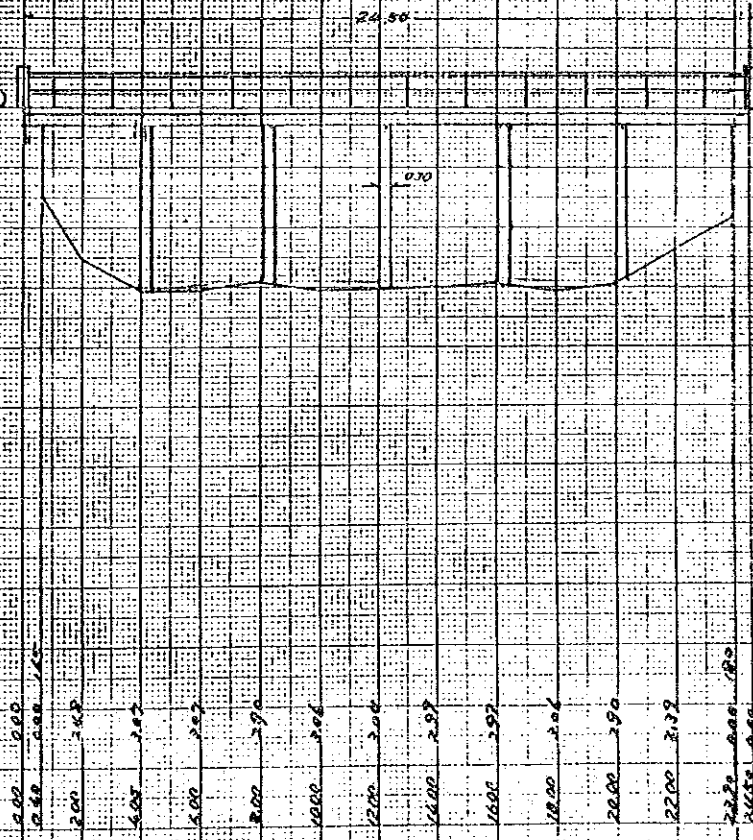
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V : 1/100

0.00 (R 1-2 (D))

24.50

0.00 (R 1-2 (A))

1.00
2.00
3.00
4.00
5.00

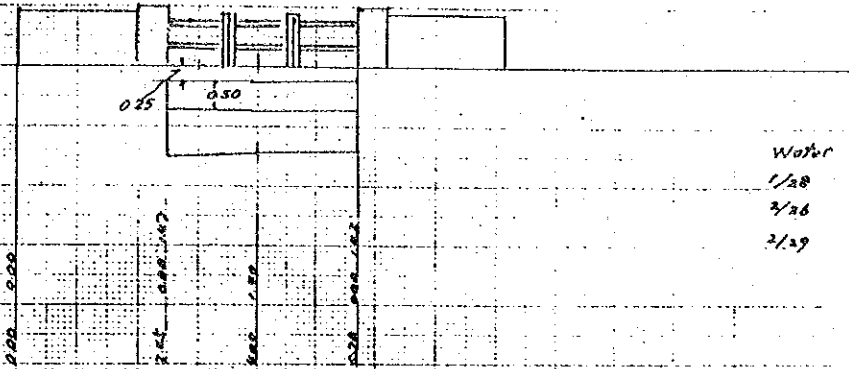


Water level
2.65 2.65

A - 22

Section 8

H : 1/100
V : 1/100



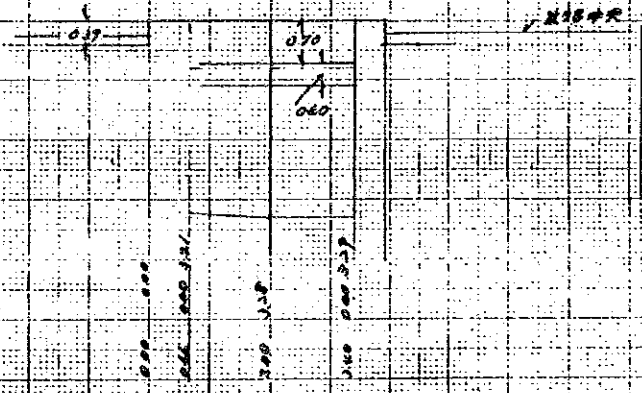
Water Level

1/28	1.57
2/26	1.43
3/29	1.45

A - 21

Section 9

H : 1/100
V : 1/100



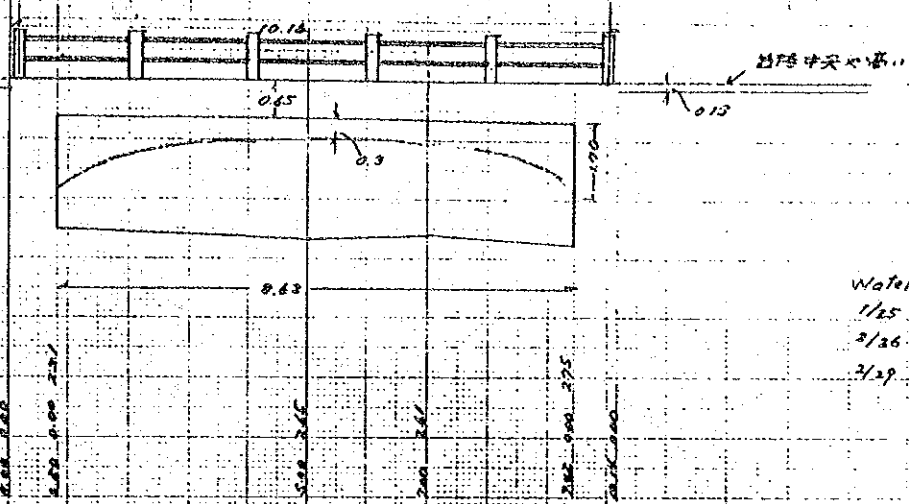
Water Level

1/28	3.27
2/25	3.28
3/27	3.29

A-16

Section 10

H : 1/100
V : 1/100

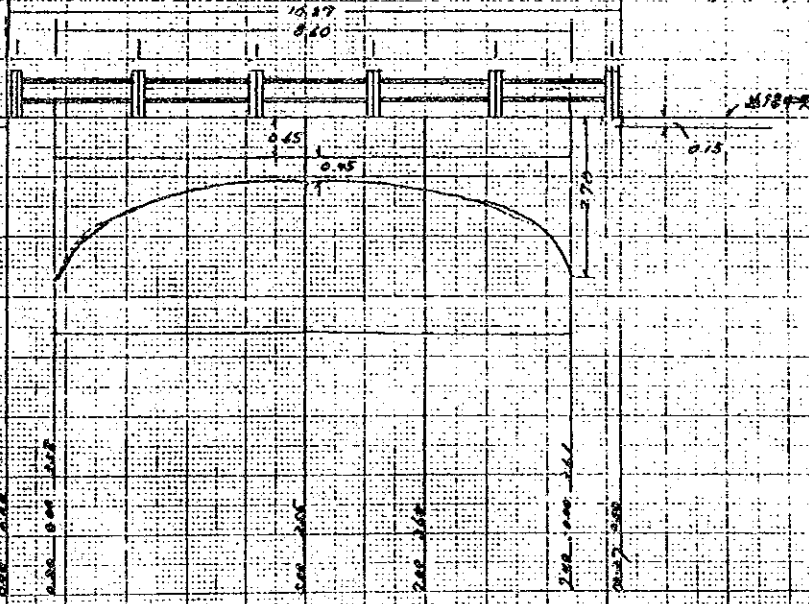


Water Level	
1/25	2.54
2/26	2.63
3/29	2.74

R-6

Section 11

H : 1/100
V : 1/100

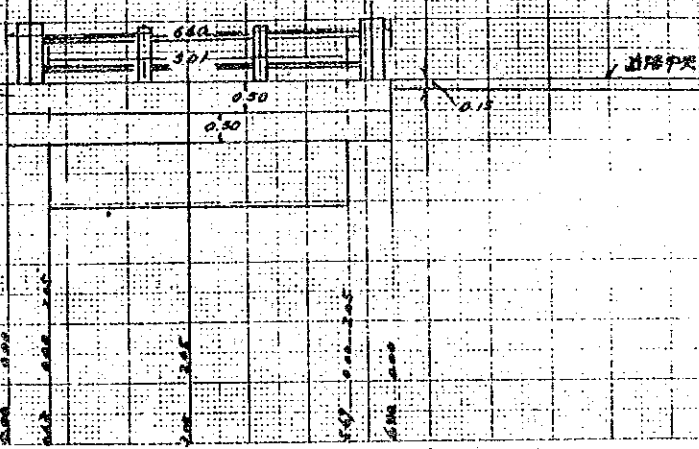


Water Level	
1/25	2.47
2/26	2.81
3/29	2.82

A-14

Section 12

H : 1/100
V : 1/100

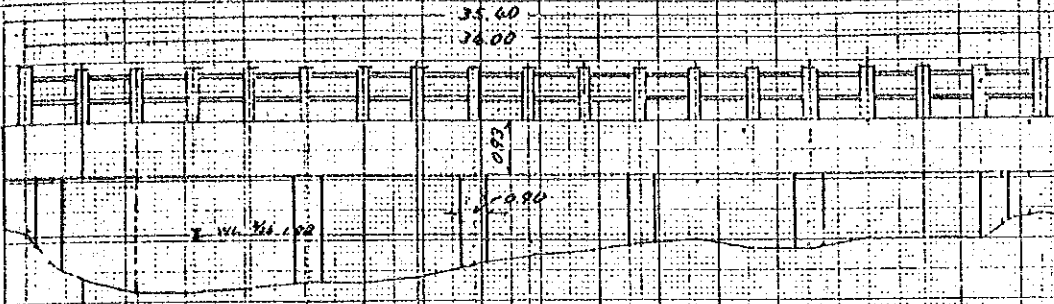


Water Level	
2/26	2.34
3/29	2.34

A-8

Section 14

H: 1/200
V: 1/100



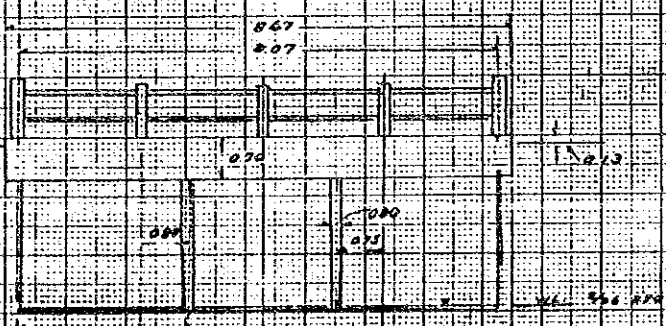
- 2.002 2.000 2.022
- 2.004 2.000 2.024
- 2.006 2.000 2.026
- 2.008 2.000 2.028
- 2.010 2.000 2.030
- 2.012 2.000 2.032
- 2.014 2.000 2.034
- 2.016 2.000 2.036
- 2.018 2.000 2.038
- 2.020 2.000 2.040
- 2.022 2.000 2.042
- 2.024 2.000 2.044
- 2.026 2.000 2.046
- 2.028 2.000 2.048
- 2.030 2.000 2.050
- 2.032 2.000 2.052
- 2.034 2.000 2.054
- 2.036 2.000 2.056
- 2.038 2.000 2.058
- 2.040 2.000 2.060
- 2.042 2.000 2.062
- 2.044 2.000 2.064
- 2.046 2.000 2.066
- 2.048 2.000 2.068
- 2.050 2.000 2.070
- 2.052 2.000 2.072
- 2.054 2.000 2.074
- 2.056 2.000 2.076
- 2.058 2.000 2.078
- 2.060 2.000 2.080
- 2.062 2.000 2.082
- 2.064 2.000 2.084
- 2.066 2.000 2.086
- 2.068 2.000 2.088
- 2.070 2.000 2.090
- 2.072 2.000 2.092
- 2.074 2.000 2.094
- 2.076 2.000 2.096
- 2.078 2.000 2.098
- 2.080 2.000 2.100

Water Level
3/6 1.00

A-9

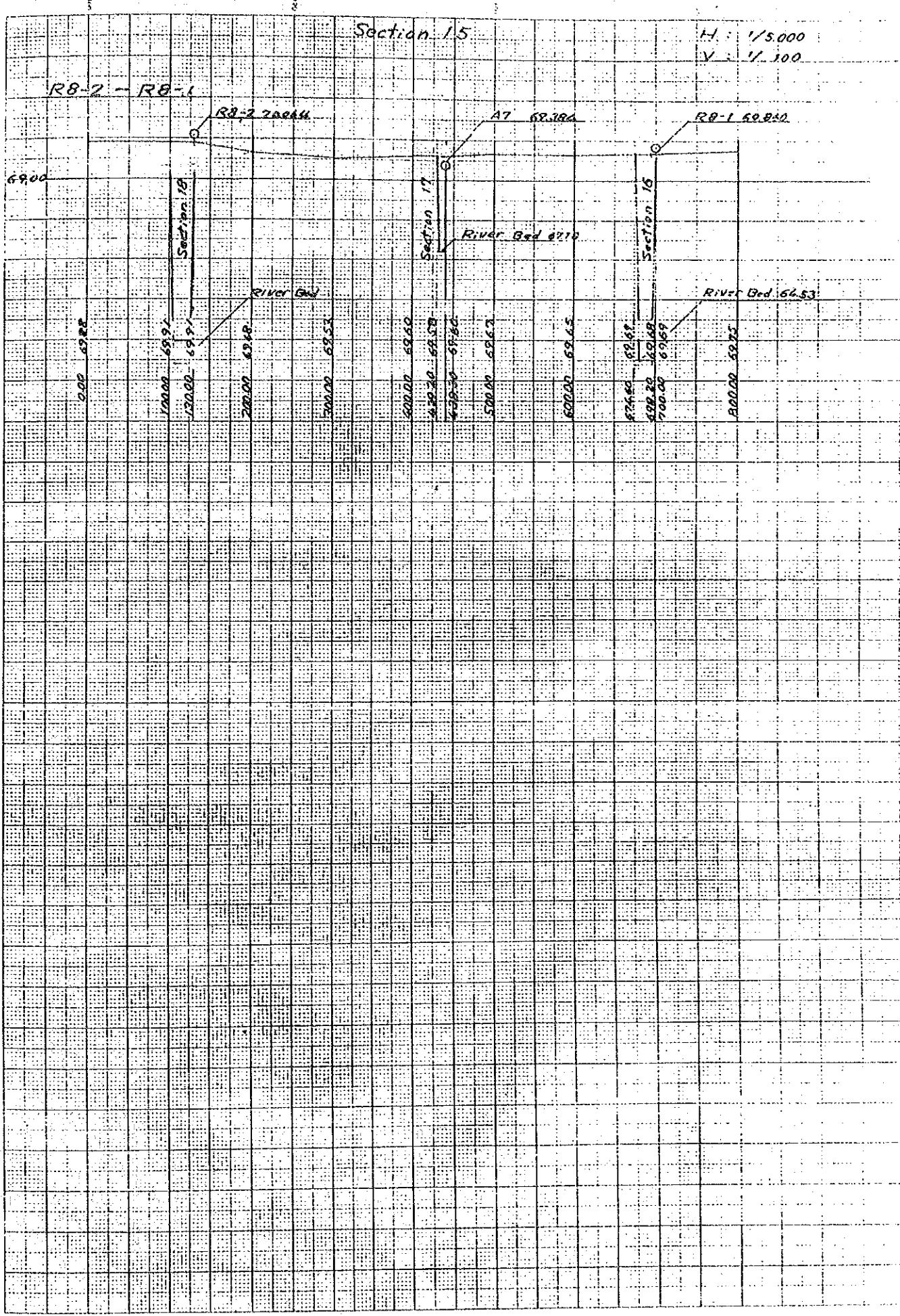
Section 13

H: 1/100
V: 1/100



- 2.000 2.000 2.000
- 2.002 2.000 2.002
- 2.004 2.000 2.004
- 2.006 2.000 2.006
- 2.008 2.000 2.008
- 2.010 2.000 2.010
- 2.012 2.000 2.012
- 2.014 2.000 2.014
- 2.016 2.000 2.016
- 2.018 2.000 2.018
- 2.020 2.000 2.020
- 2.022 2.000 2.022
- 2.024 2.000 2.024
- 2.026 2.000 2.026
- 2.028 2.000 2.028
- 2.030 2.000 2.030
- 2.032 2.000 2.032
- 2.034 2.000 2.034
- 2.036 2.000 2.036
- 2.038 2.000 2.038
- 2.040 2.000 2.040
- 2.042 2.000 2.042
- 2.044 2.000 2.044
- 2.046 2.000 2.046
- 2.048 2.000 2.048
- 2.050 2.000 2.050
- 2.052 2.000 2.052
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- 2.058 2.000 2.058
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- 2.064 2.000 2.064
- 2.066 2.000 2.066
- 2.068 2.000 2.068
- 2.070 2.000 2.070
- 2.072 2.000 2.072
- 2.074 2.000 2.074
- 2.076 2.000 2.076
- 2.078 2.000 2.078
- 2.080 2.000 2.080
- 2.082 2.000 2.082
- 2.084 2.000 2.084
- 2.086 2.000 2.086
- 2.088 2.000 2.088
- 2.090 2.000 2.090
- 2.092 2.000 2.092
- 2.094 2.000 2.094
- 2.096 2.000 2.096
- 2.098 2.000 2.098
- 2.100 2.000 2.100

Water Level
2/6 2.95
2/9 2.75

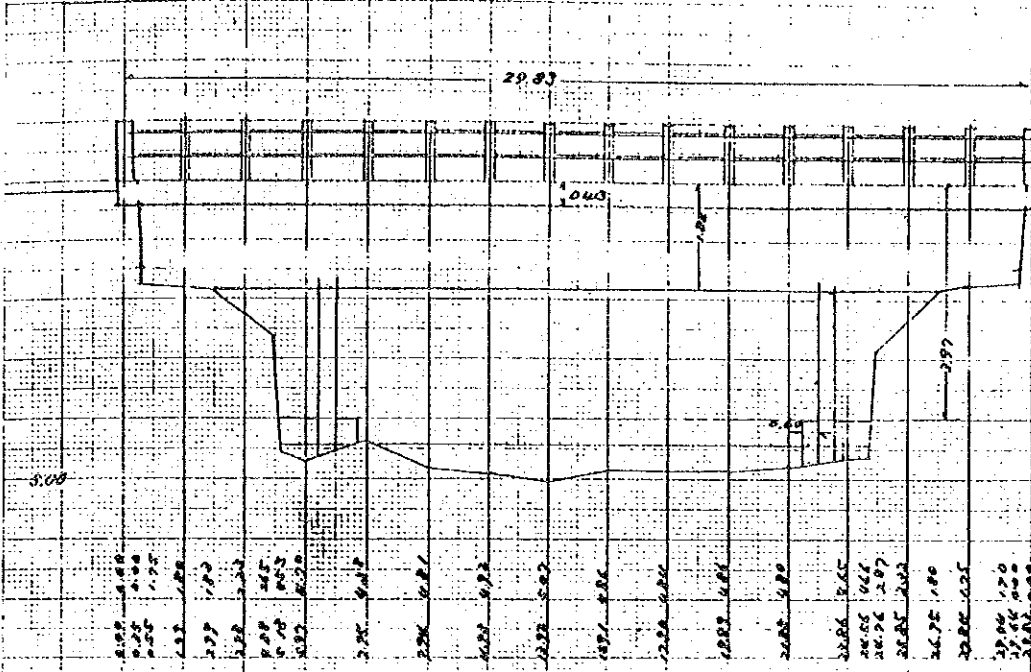


Section 18

H: 1/200
V: 1/100

Eprou

R 8-2



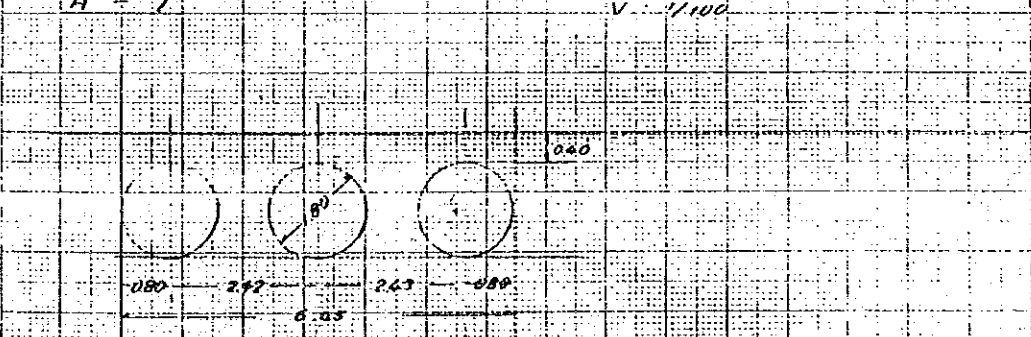
Water Level

2/9	4.44
2/26	4.43
2/25	4.43
2/29	4.46

Section 17

H: 1/100
V: 1/100

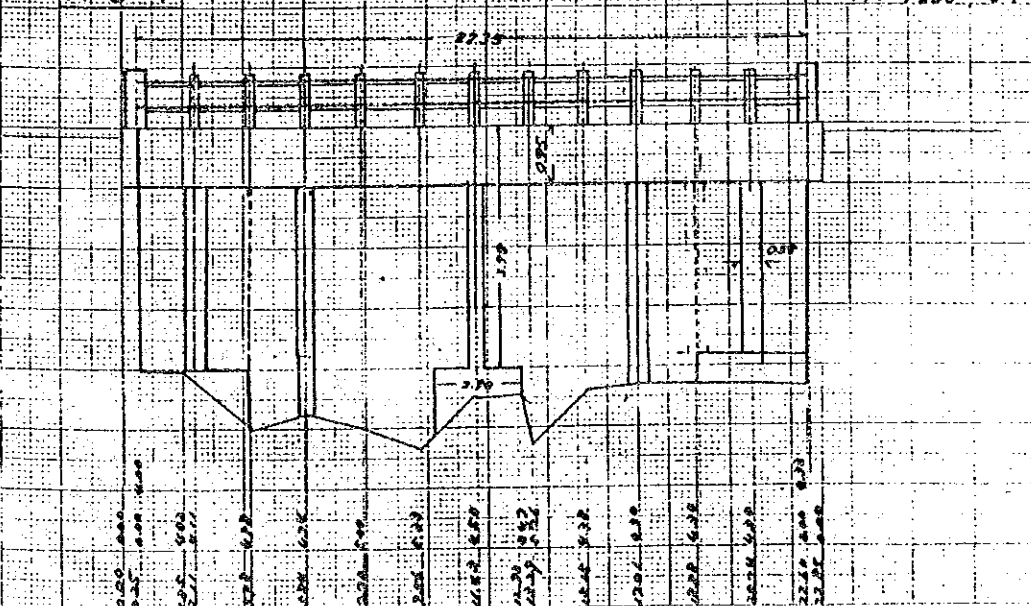
A - 7



Section 16

H: 1/100 V: 1/100

R 8-1



Yayna Eusan

Water Level

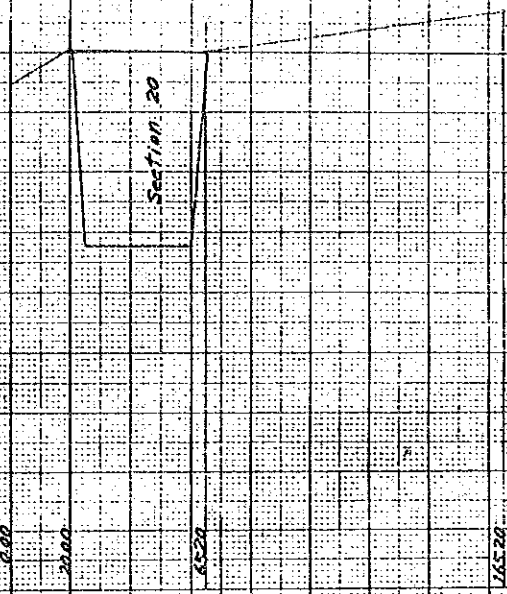
2/9	4.28
2/26	4.24
2/29	4.34

R15-1

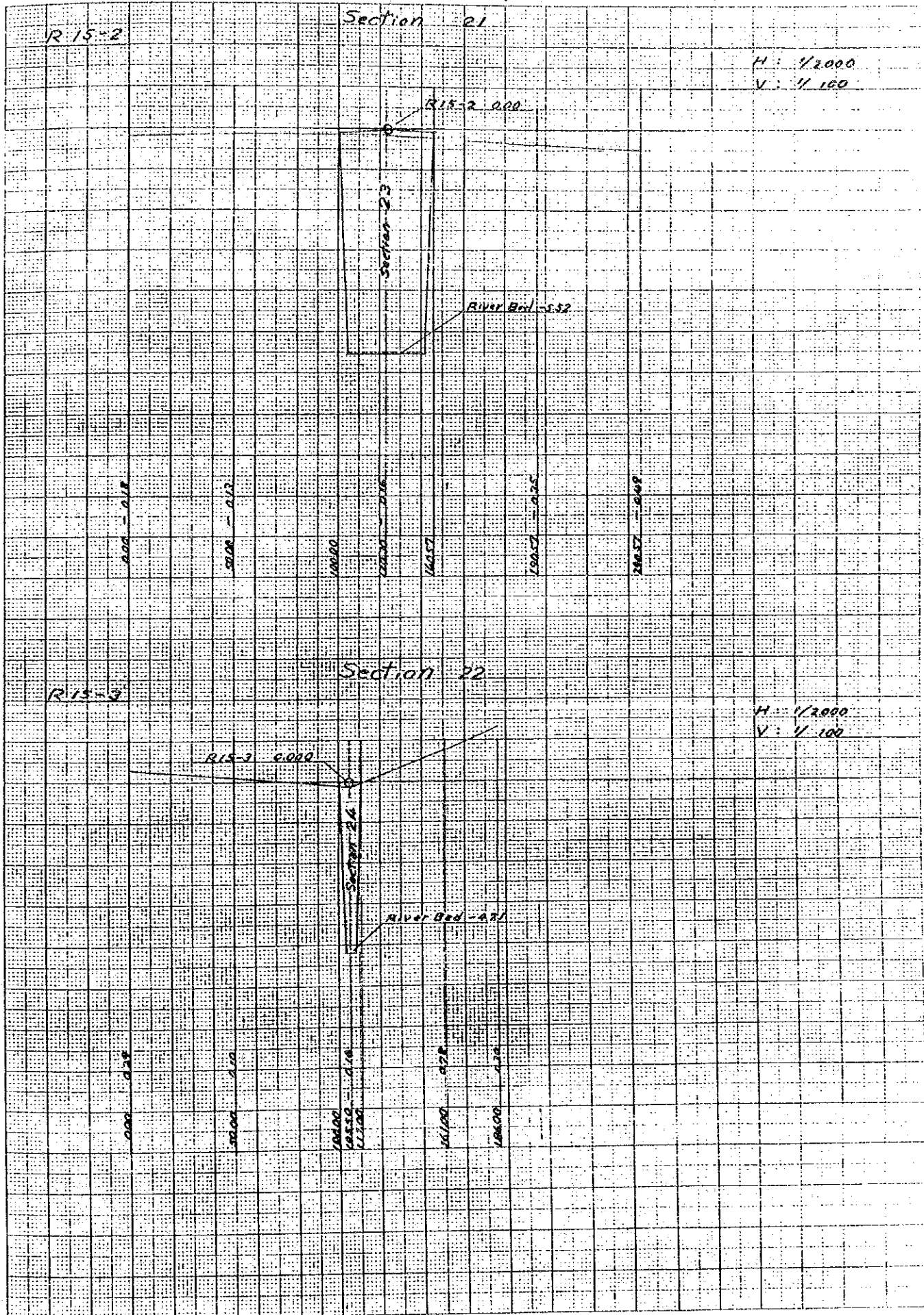
Section 19

H: 1/2000

V: 1/100



Water Level	
2/13	2.32
2/25	2.22

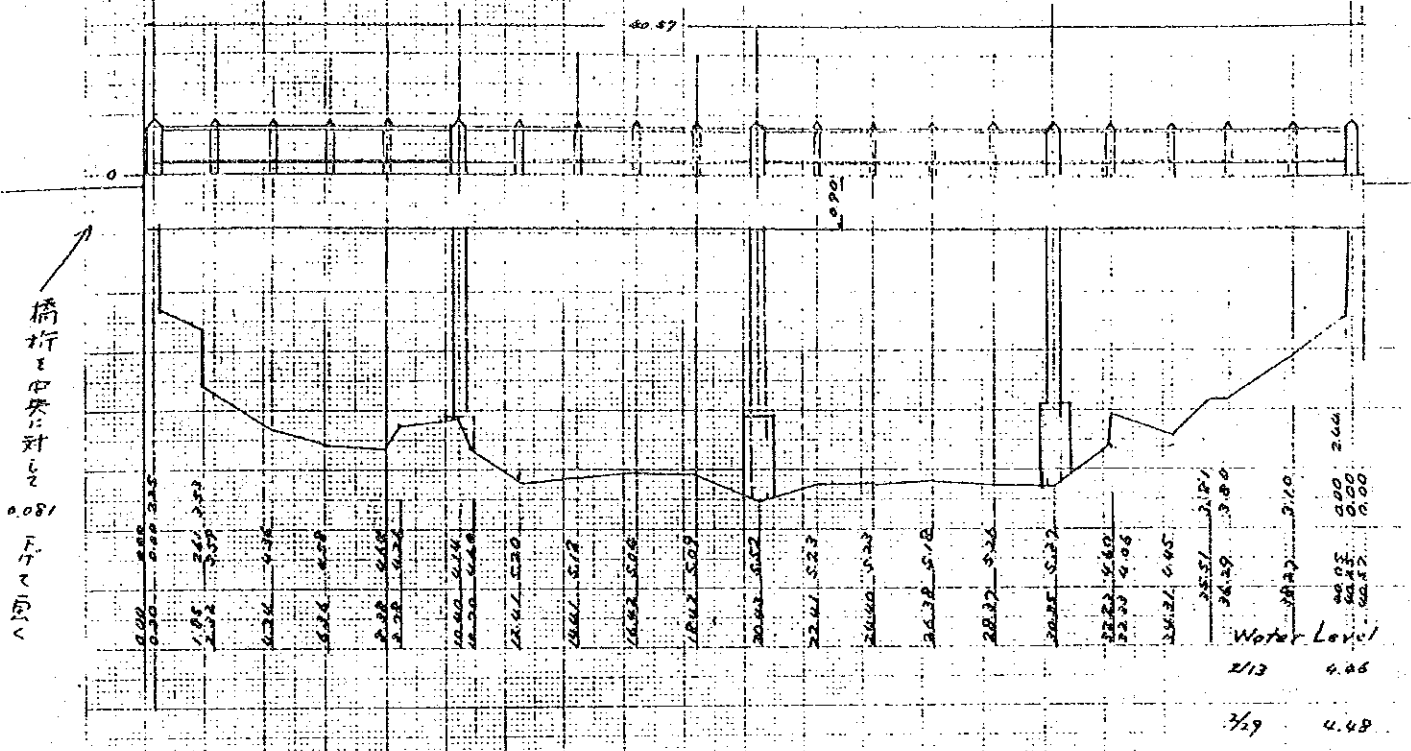


Yuki, 11 21

Section 23

H: 1/200
V: 1/100

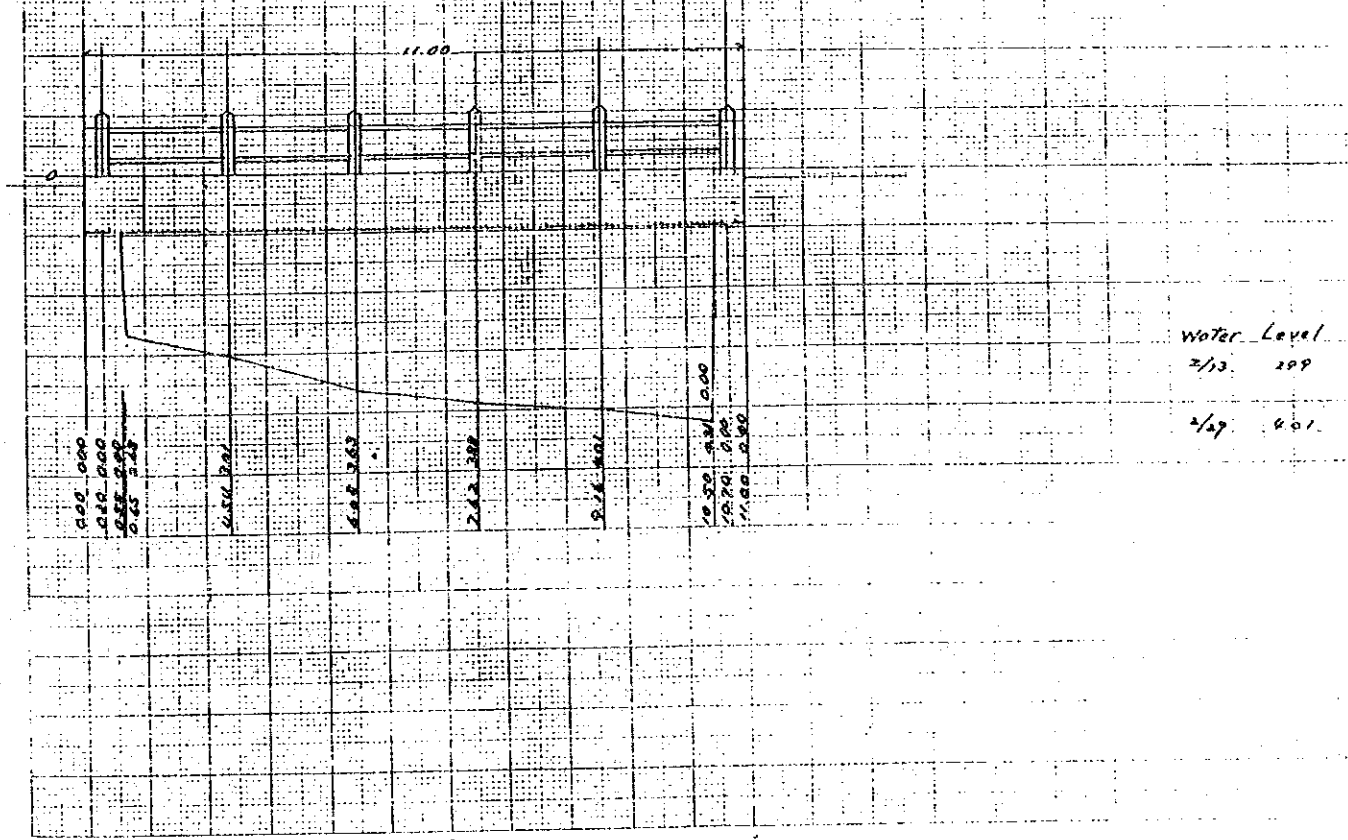
R15-2



Section 24

H: 1/100
V: 1/100

R15-3



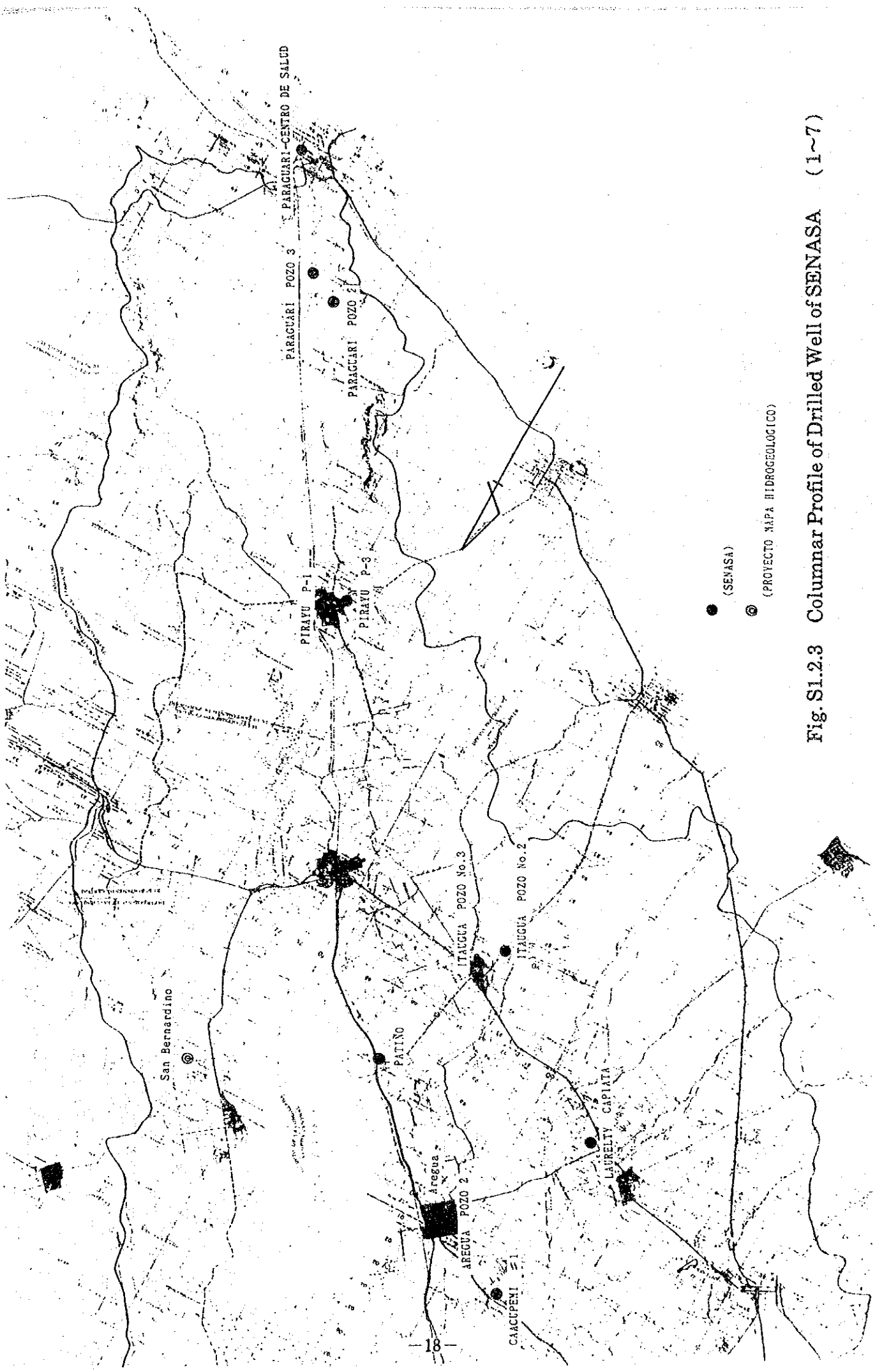


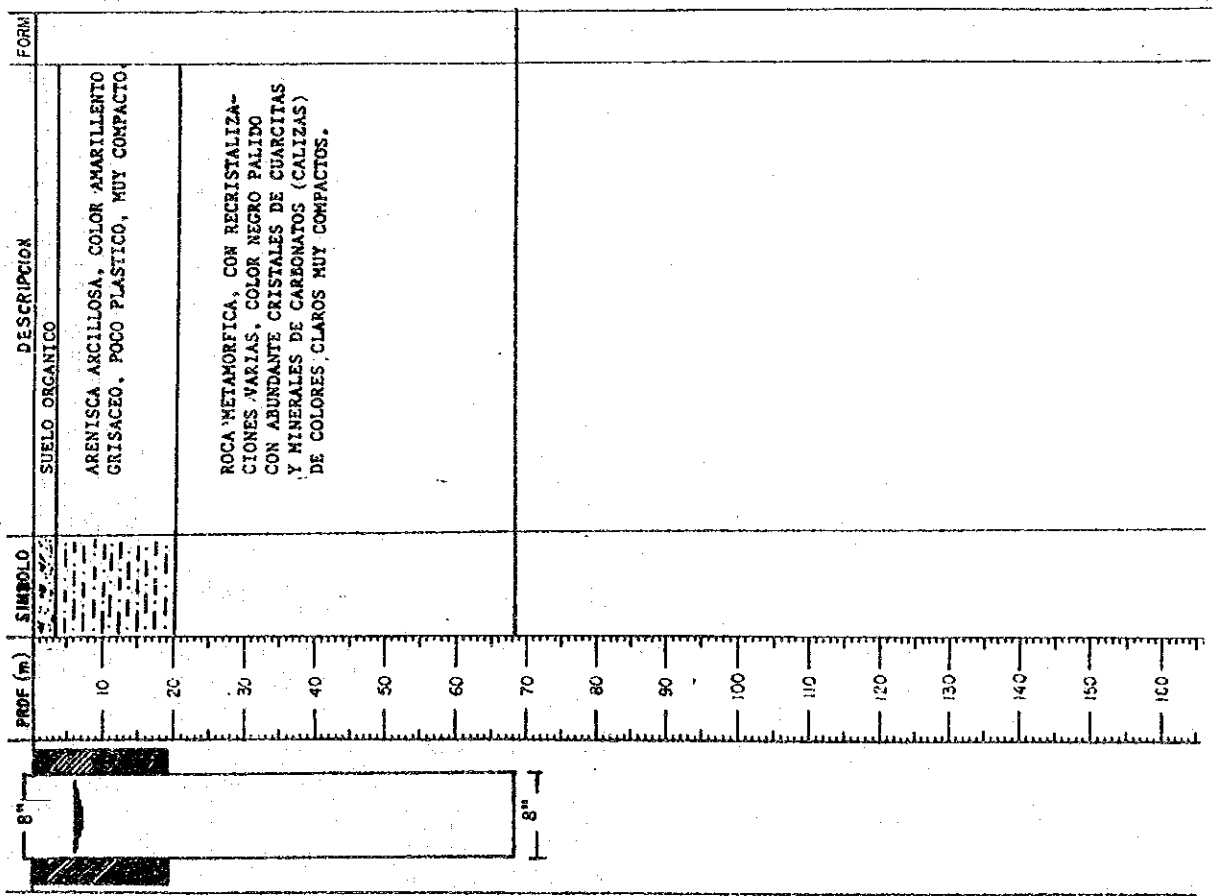
Fig. S1.2.3 Columnar Profile of Drilled Well of SENASA (1~7)

(17)

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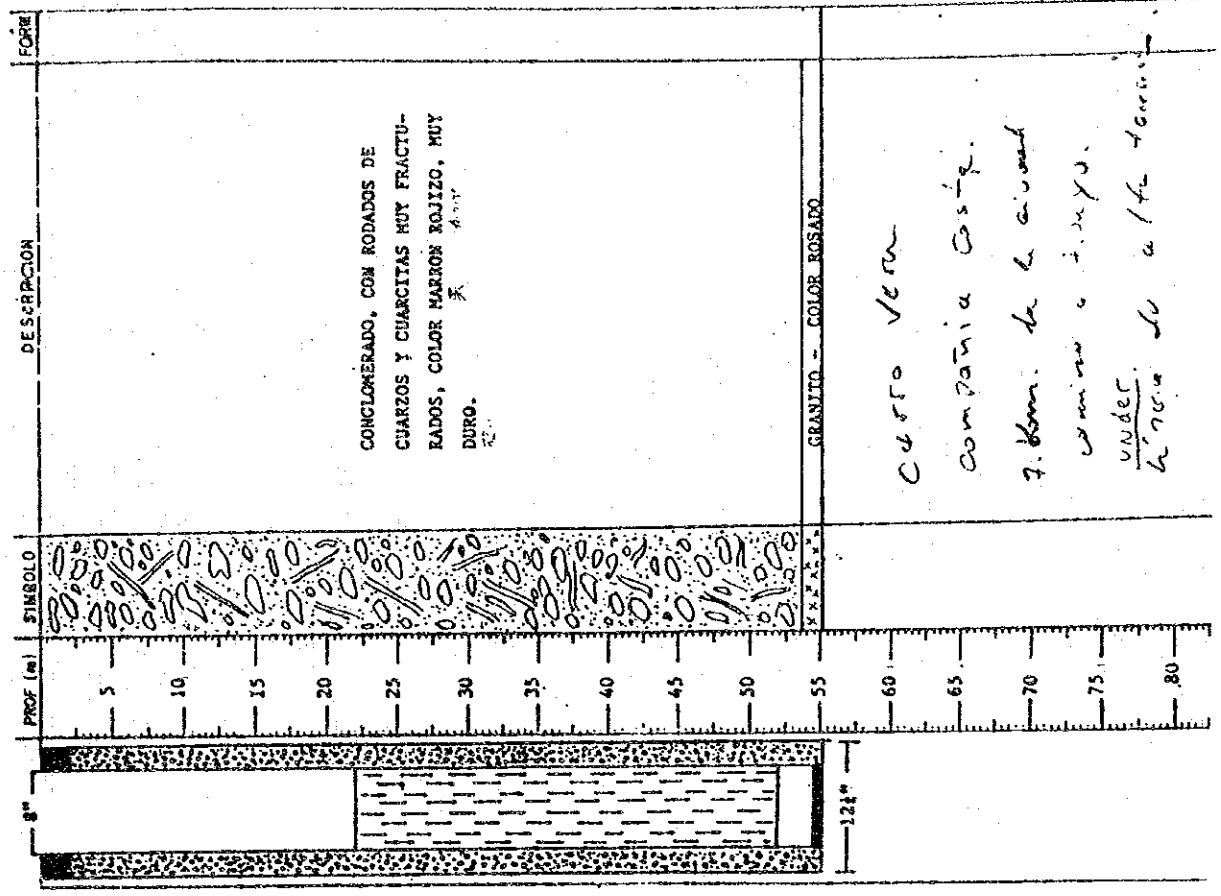
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Reconstrucción



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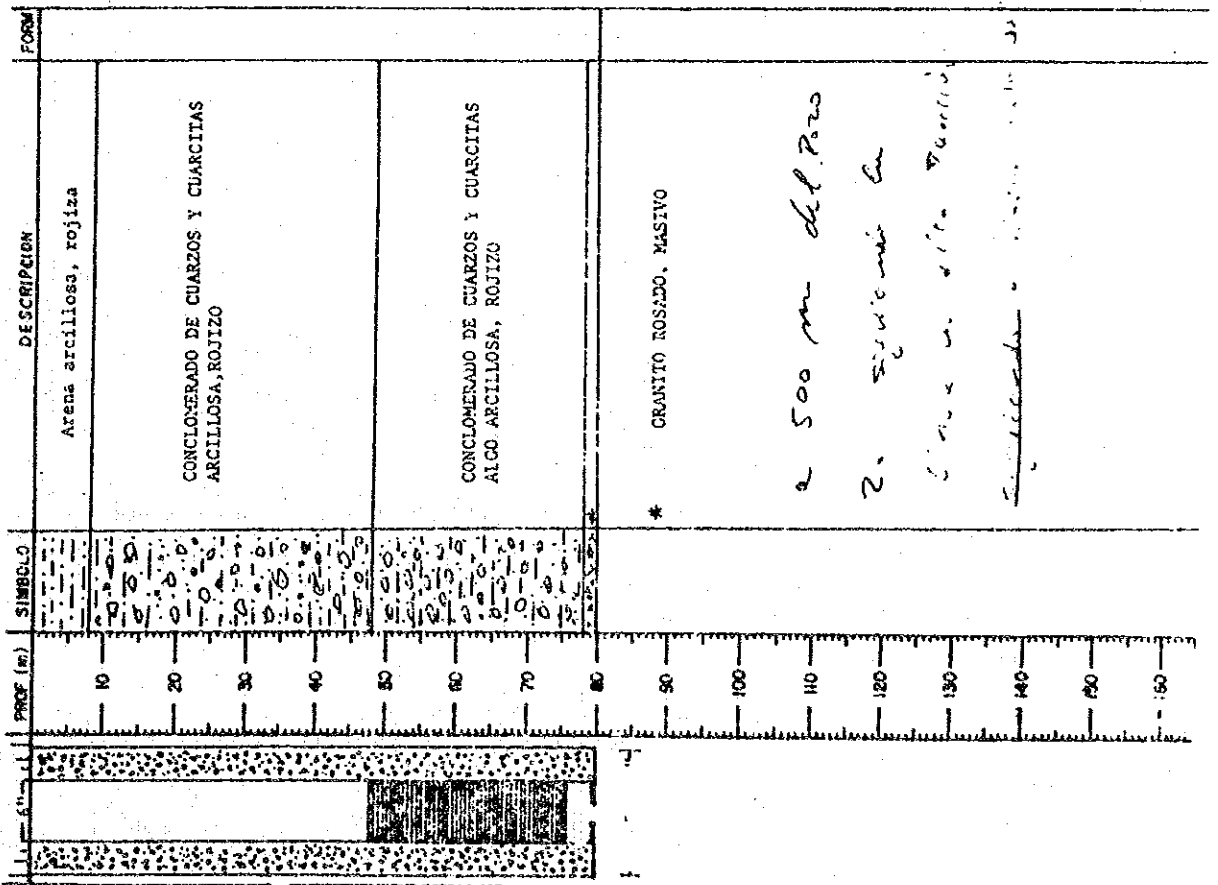
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(2)

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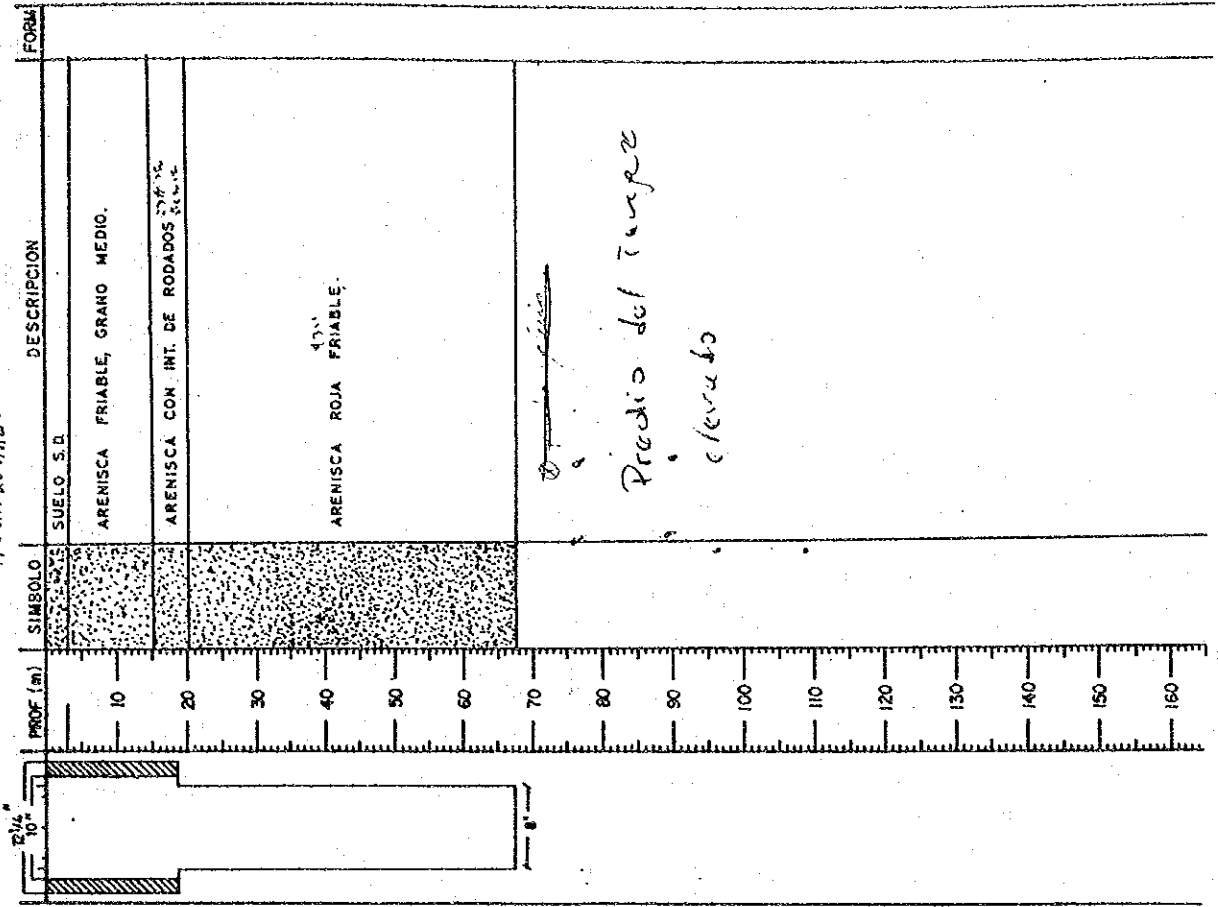
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PERFIL DE POZO PERFORADO

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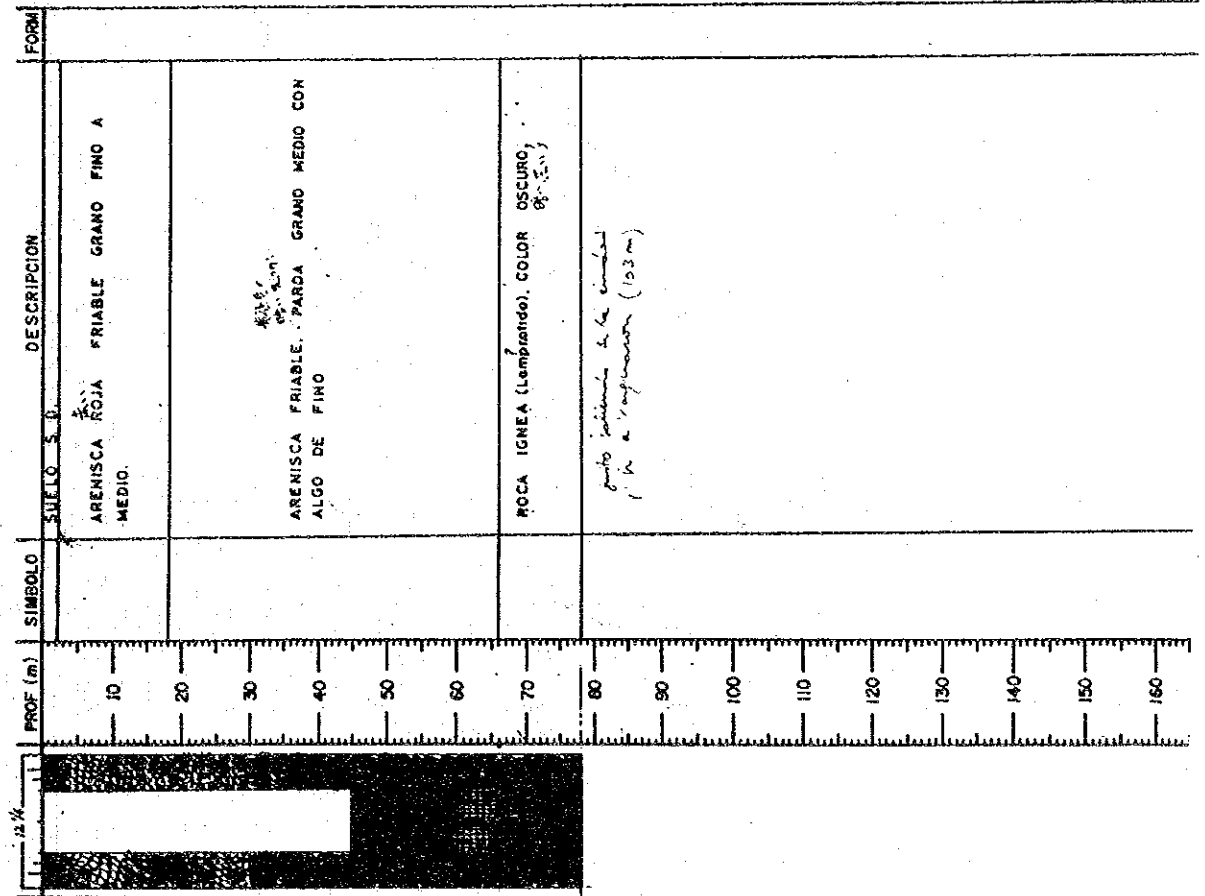
Habiendo



(3)

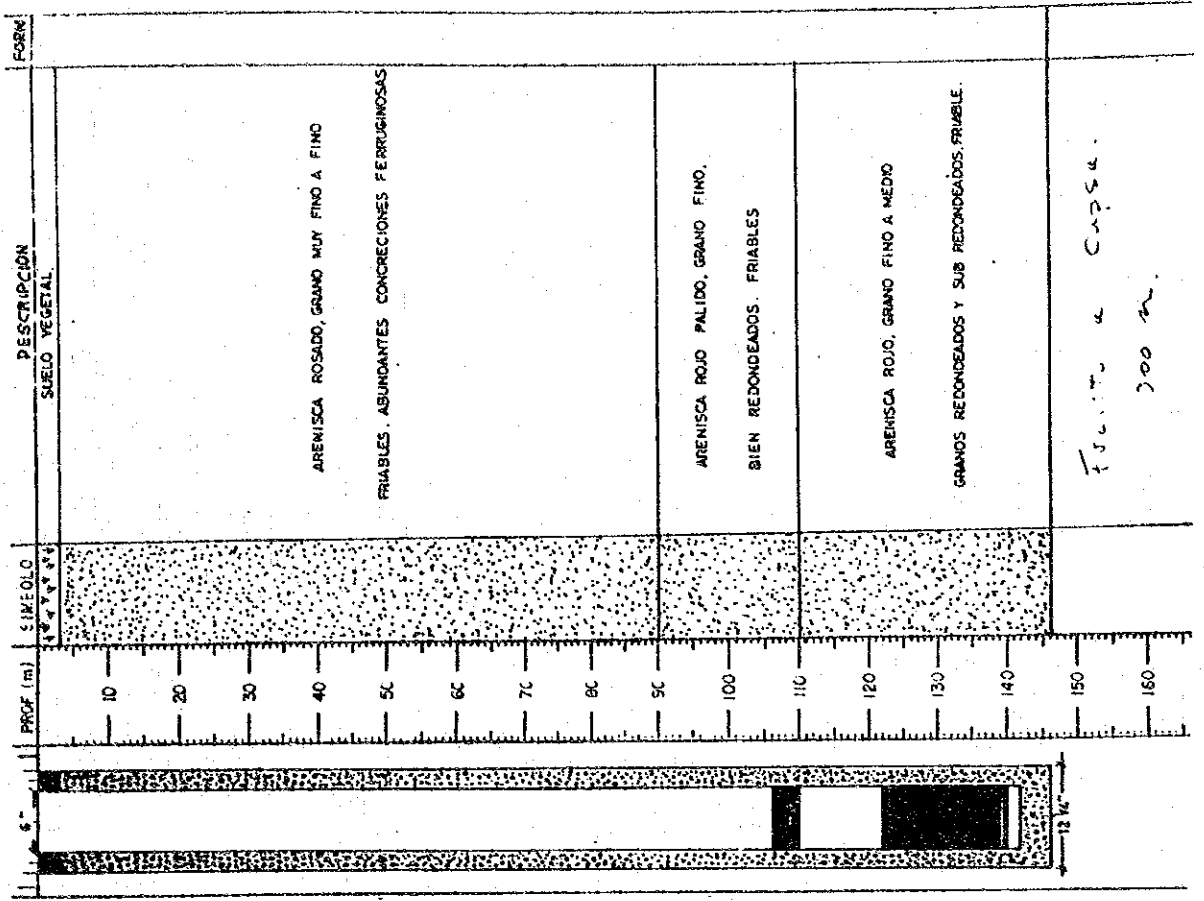
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Nombre: PIRAYÚ P-3



PERFIL DE POZO PERFORADO

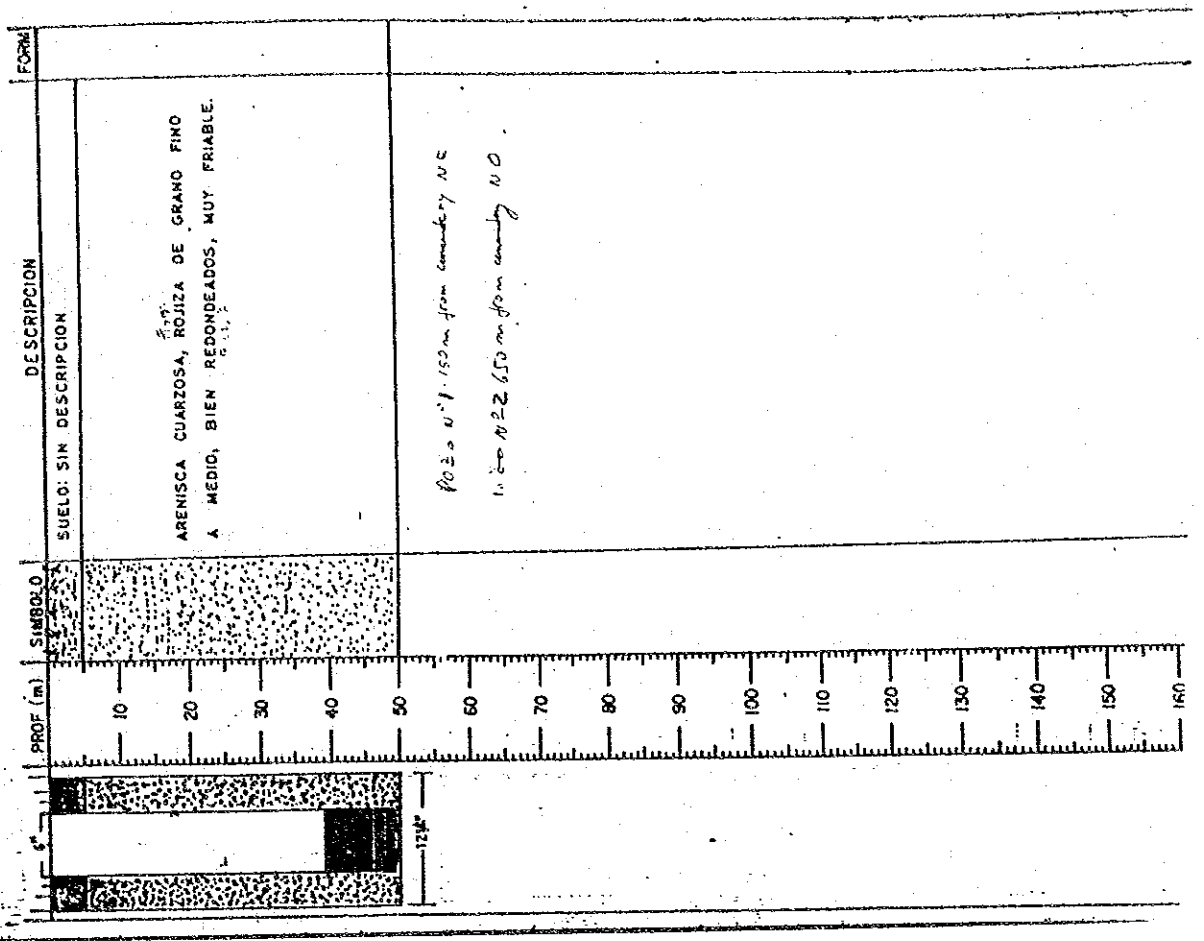
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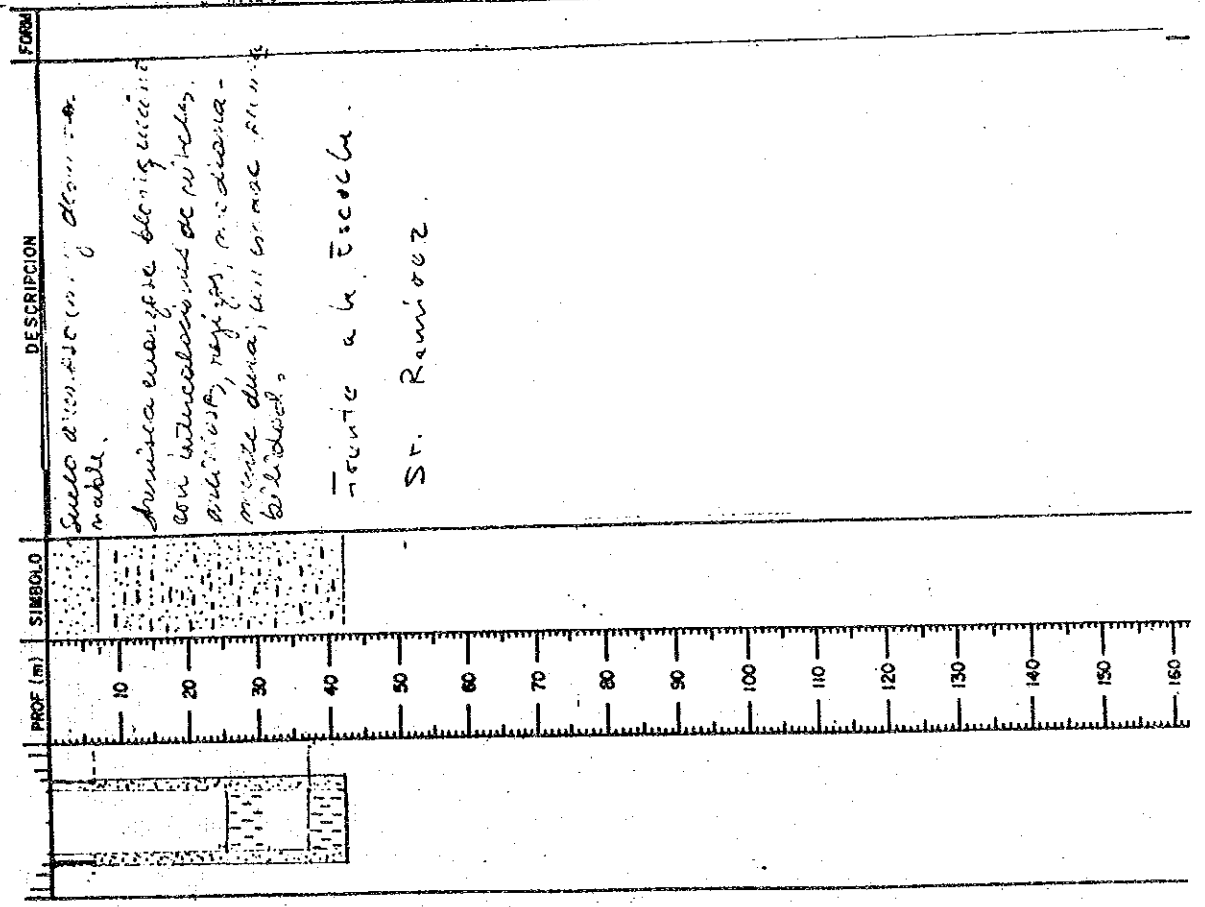
PERFIL DE POZO PERFORADO

Nombre: AREGUA-POZO 2



PERFIL DE POZO PERFORADO

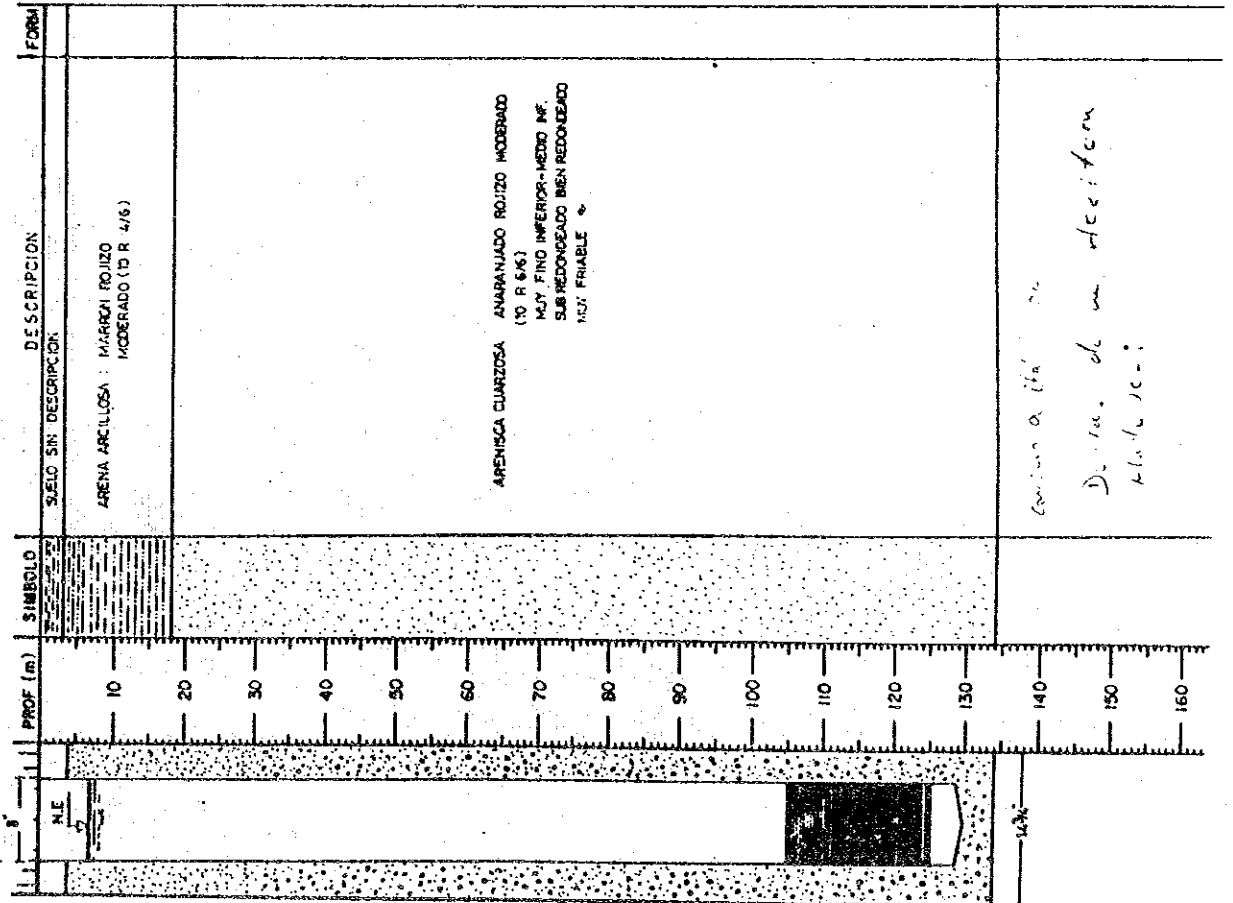
Nombre: Patio (Asegú)



(5)

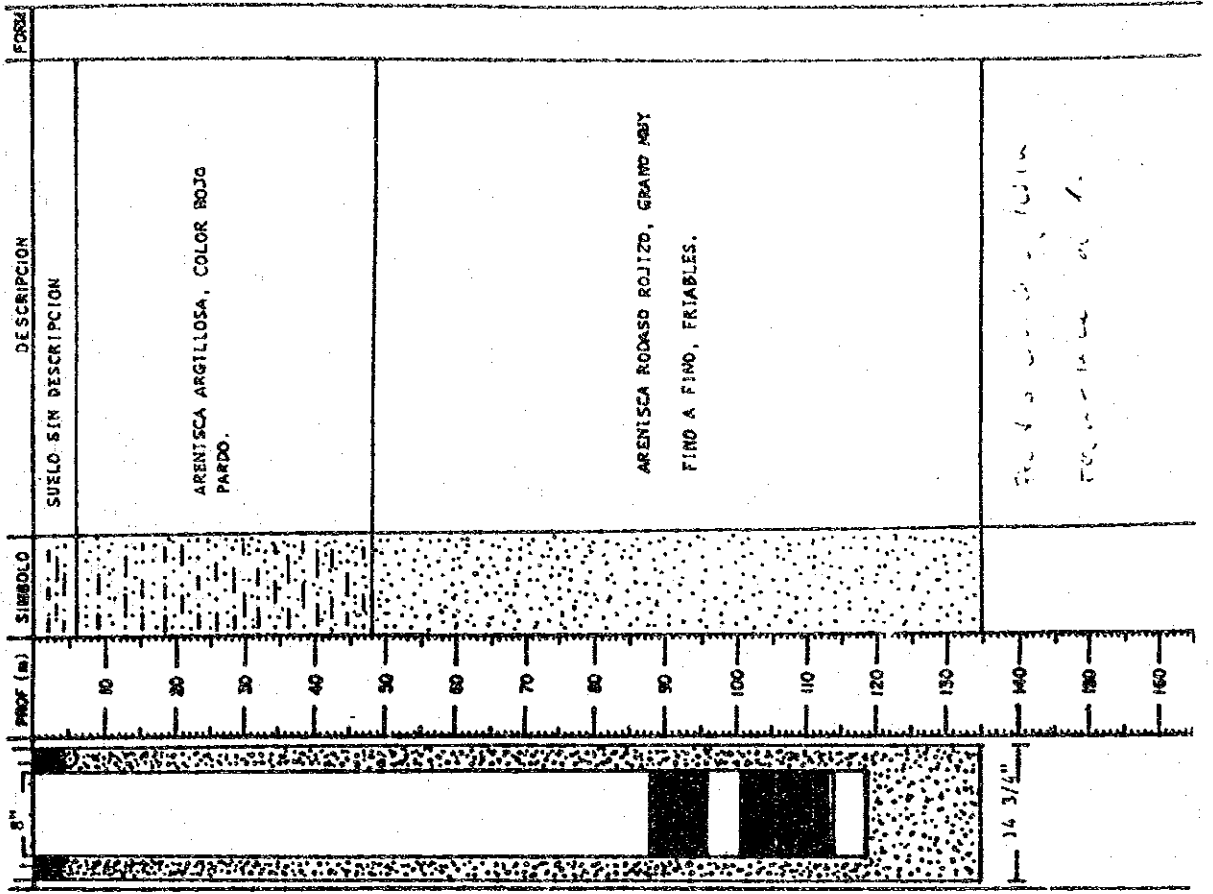
PERFIL DE POZO PERFORADO

Nombre: ITALGUA Pozo Nº2



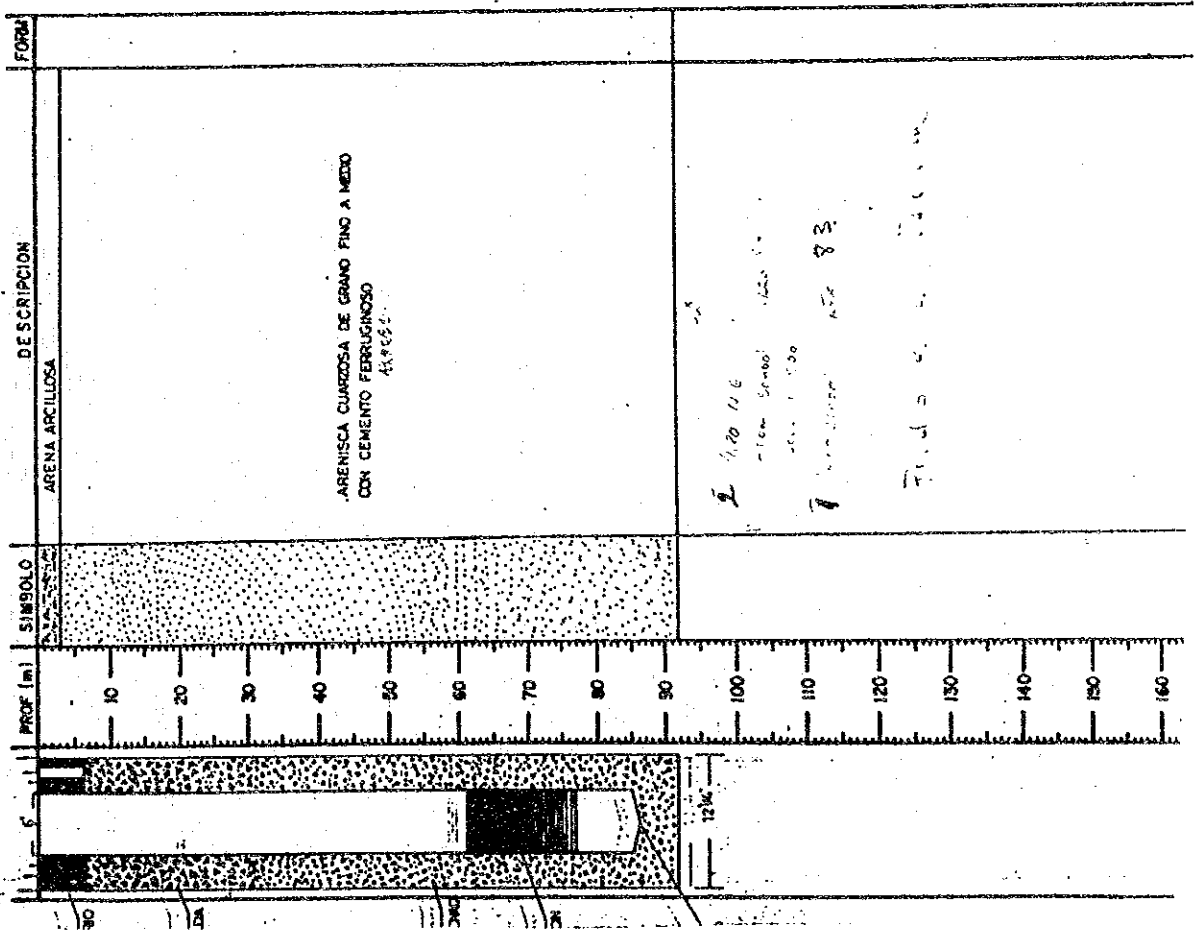
PERFIL DE POZO PERFORADO

Nombre: ITALGUA POZO Nº 3 (PREDIO DEL TANQUE)

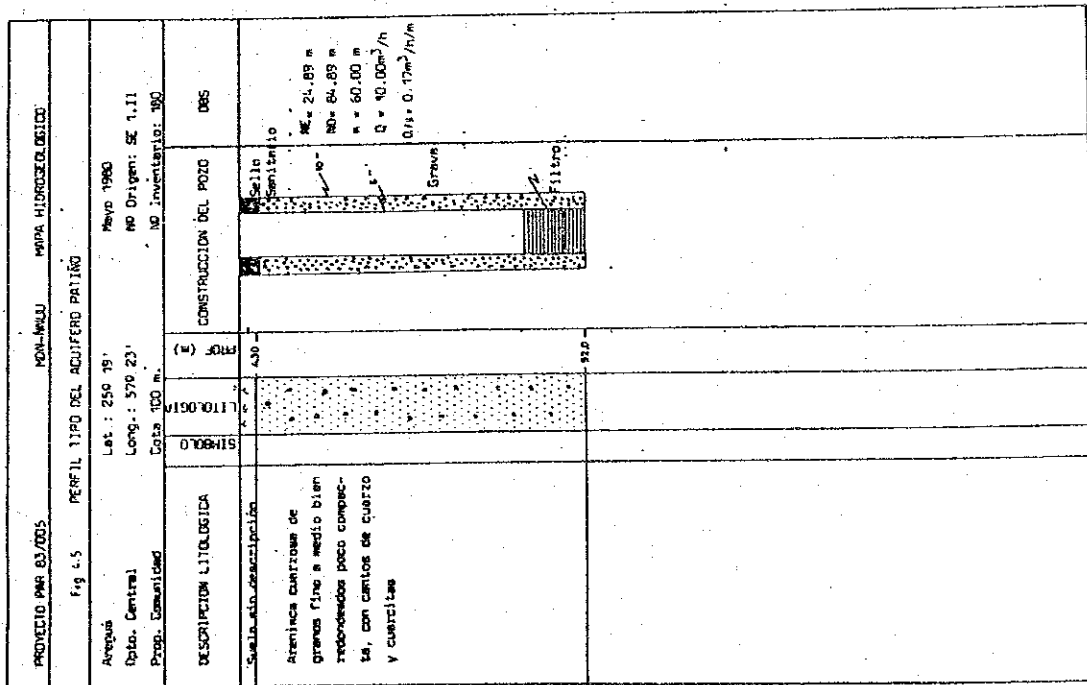
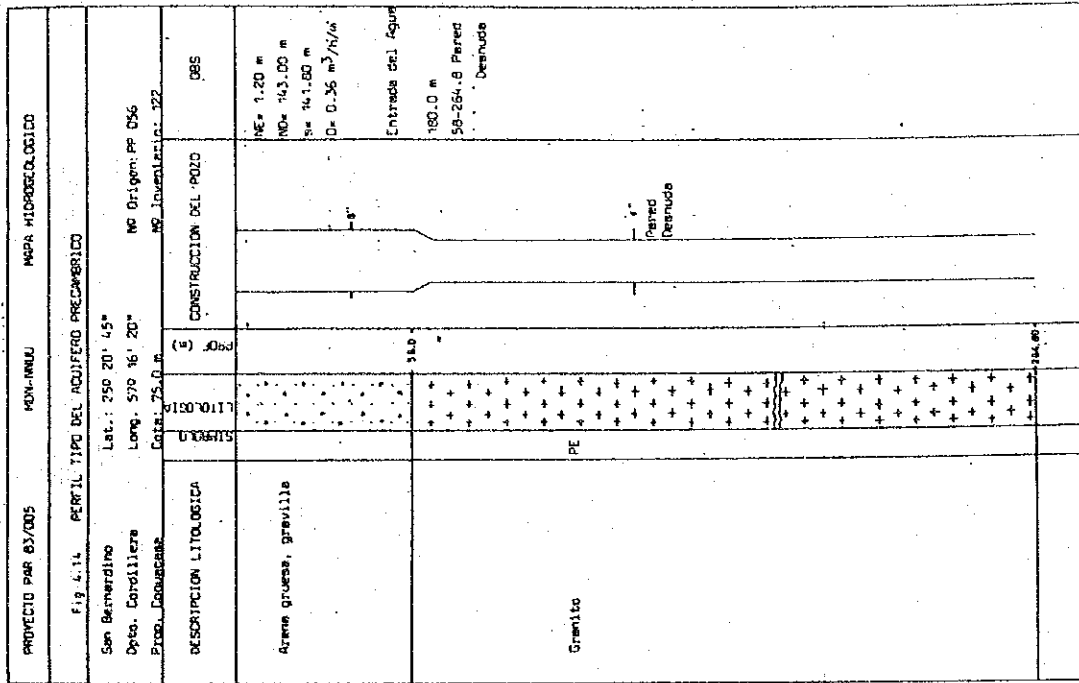


PERFIL DE POZO PERFORADO

Nombre: CAACUPEMI #1



(7)



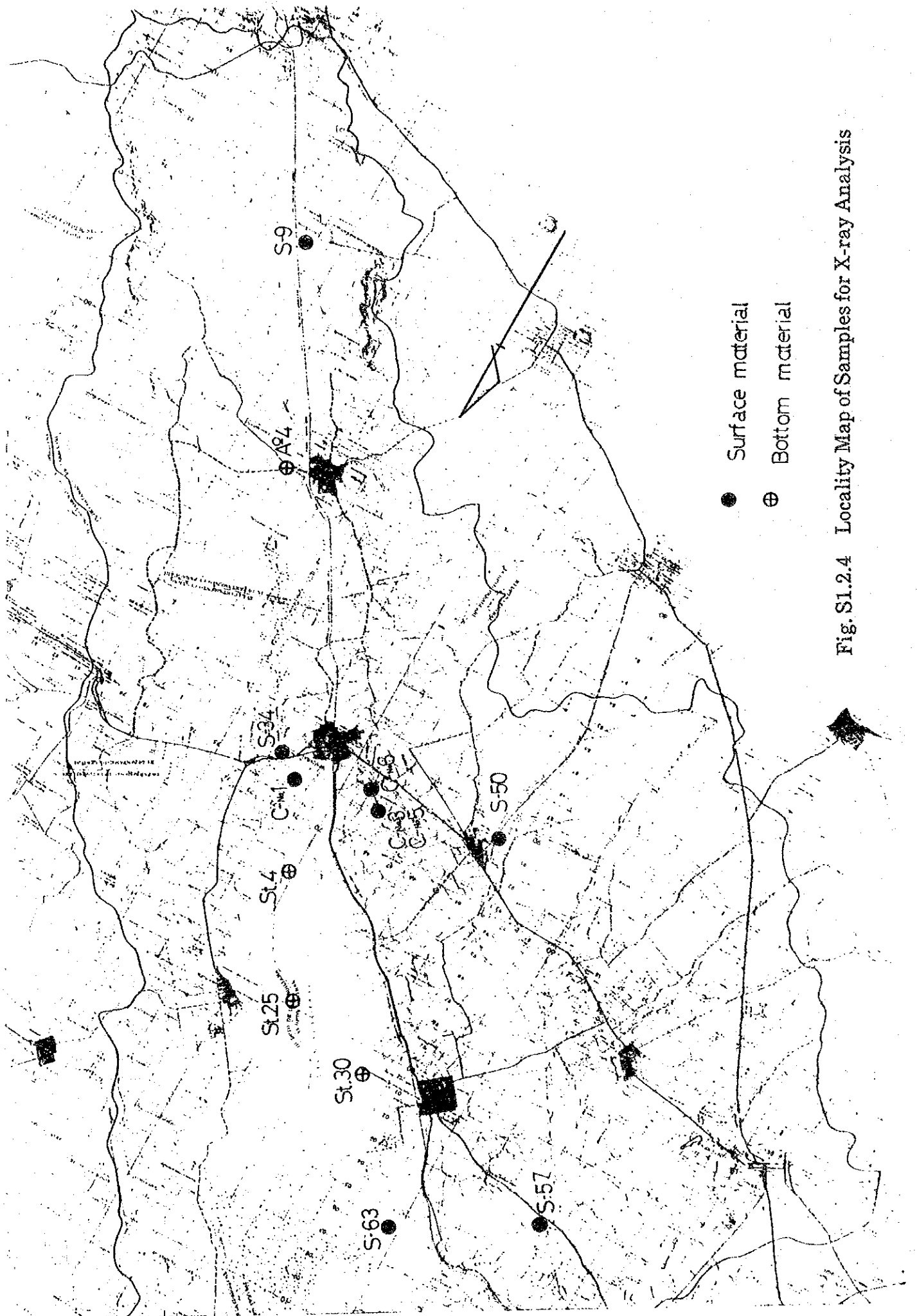


Fig. S1.2.4 Locality Map of Samples for X-ray Analysis