

FEDERATIVE REPUBLIC OF BRAZIL

**FINAL REPORT
ON
THE ITAJAI RIVER BASIN
FLOOD CONTROL PROJECT**

PART II

**FEASIBILITY STUDY ON
RIVER IMPROVEMENT PROJECT
IN BLUMENAU-GASPAR STRETCH**

DATA BOOK

JANUARY 1988

**JAPAN INTERNATIONAL COOPERATION AGENCY
TOKYO, JAPAN**

SDS

88-005(5/5)

FEDERATIVE REPUBLIC OF BRAZIL

**FINAL REPORT
ON
THE ITAJAI RIVER BASIN
FLOOD CONTROL PROJECT**

PART II

**FEASIBILITY STUDY ON
RIVER IMPROVEMENT PROJECT
IN BLUMENAU-GASPAR STRETCH**

DATA BOOK

JANUARY 1988

**JAPAN INTERNATIONAL COOPERATION AGENCY
TOKYO, JAPAN**

JICA LIBRARY



1065433[3]

国際協力事業団

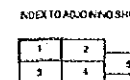
17603

17603

LIST OF DATA

- I. RIVER CROSS SECTIONS IN
BLUMENAU-GASPAR RIVER STRETCH
- II. FLOOD RUNOFF RECORDS
- III. STORM RAINFALL RECORDS
- IV. HOURLY RAINFALL RECORDS
- V. MONTHLY RAINFALL RECORDS
- VI. DAILY RAINFALL RECORDS
- VII. RESERVOIR OPERETION RECORDS

**I. RIVER CROSS SECTIONS IN
BLUMENAU-GASPAR RIVER STRETCH**

[illegible]

JAPAN INTERNATIONAL COOPERATION AGENCY
The new JICA issued by PartaForm

1:10,000

PROJECTION : UTM/ETRA TRANSVERSE MERCATOR
DATUM VERTICAL : CAMPESINA - STA. CATAMPA
DATUM HORIZONTAL : SAD-69
SOURCES : AERIAL PHOTOGRAPHY 1:25,000 (1976, 1987)
CONTROLS : CONTROL NATIONAL 6 METERS 1:50,000
PREPARED BY : UNIT 5 METERS 1:50,000



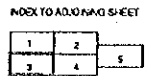
This map was prepared by TerraFoto

1:10.000

1000 2000 3000 4000 5000 6000 7000 8000 9000 10000

NOTATION

PROJECTION : UNIVERSAL TRANSVERSE MERCATOR
DATUM : ADAMS 1965
DATUM NAME : ADAMS 1965
SOURCE : AERIAL PHOTOGRAPH (25000 1:100,000)
CONTROLS : CONTROL INTERVAL 5 METERS (1:100,000)
PREPARED BY : 1967

[illegible]

JAPAN INTERNATIONAL COOPERATION AGENCY
This work was sponsored by *Terrafoto*
under the supervision of Jacobus Egbert.

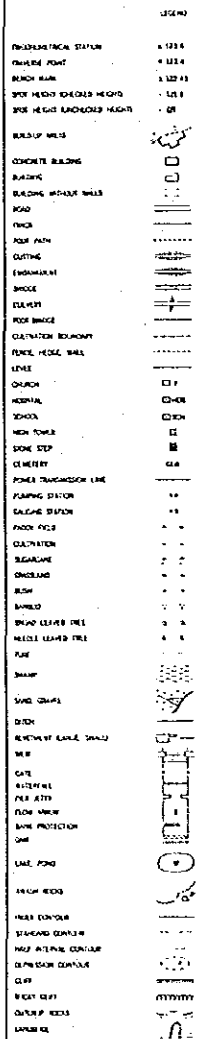
SHEET NO. 3

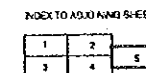
I-3

E-10.000

NOTATION

PROJECTOR	UNIVERSAL TRANSVERSE INDICATOR
GRAPH PAPER	SCHLAFER - STA. CATHAM
DATA MEASUREMENT	DATA 88
SOURCES	NEURAL PHOTOGRAPHY 12-28 1978, 1985
CONTROL	CONTINUOUS INTERVAL 1 METER 0.57 METER
TIME/DATE	1987 5 METER 0.57 METER



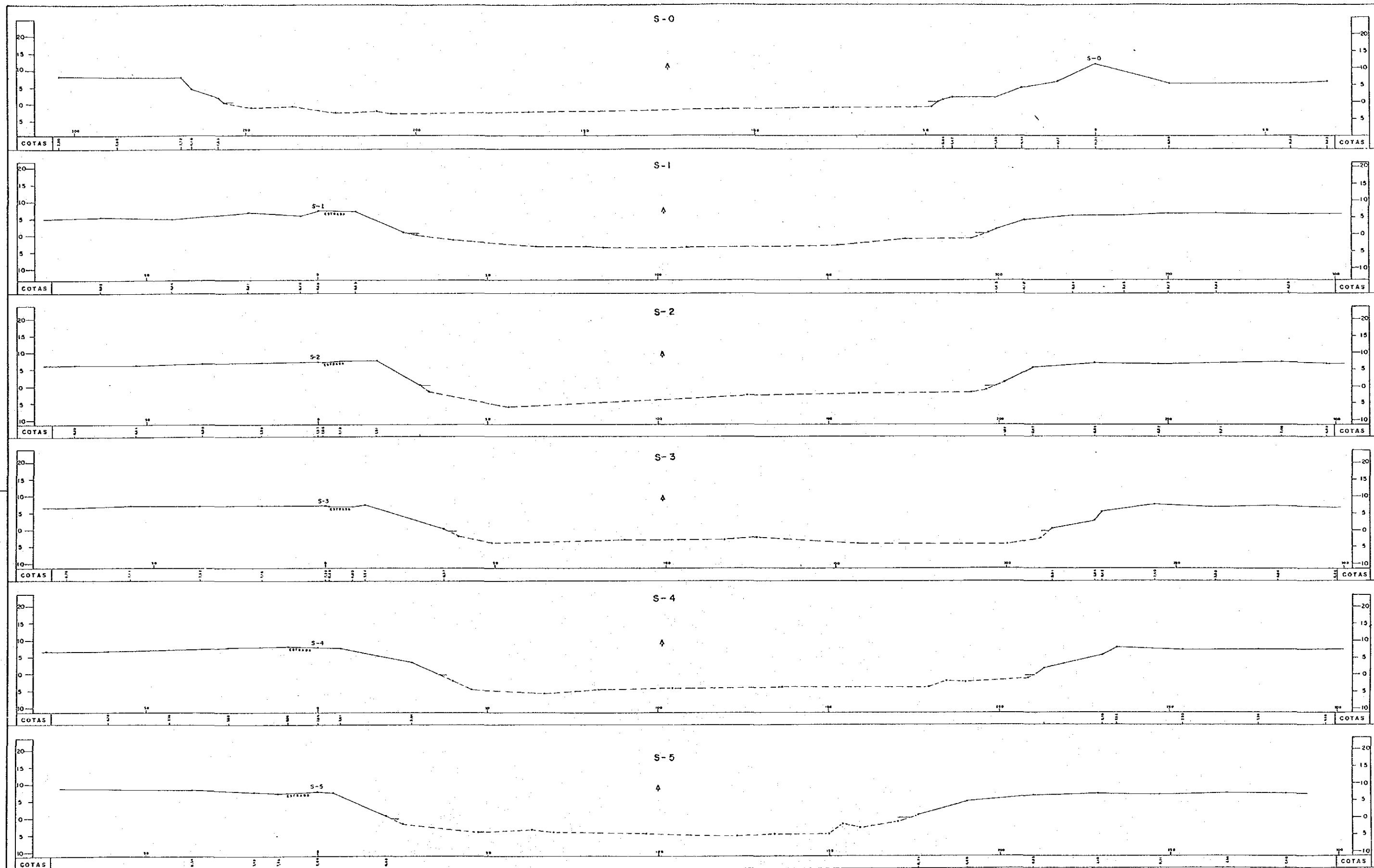


TERMINOLOGY	SYMBOL	UNIT
TERMINATION STATION		1.031
THUNDER POINT		1.032
WIND NAME		1.033
POD HEIGHT EXPOSED HEIGHT		1.034
POD HEIGHT APPROXIMATE HEIGHT		1.035
BUILD UP HEELS		1.036
CONCRETE BUILDING		1.037
BRICK		1.038
BRICKS WITHIN WALLS		1.039
TRAIL		1.040
POD PUMP		1.041
CLOSING		1.042
CUSTOMER		1.043
BRIDGE		1.044
CLASH		1.045
POD BRIDGE		1.046
QUARTER BOUNDARY		1.047
PLATE, HEEL, BALL		1.048
LEAF		1.049
CHURCH		1.050
WORTH		1.051
BECK		1.052
WIND POINT		1.053
WIND STOP		1.054
CLASH		1.055
POD TRANSDUCER LINE		1.056
PUMPING STATION		1.057
CLOSING STATION		1.058
POD FEEL		1.059
CLASHING		1.060
BRIDGE		1.061
WINDLINE		1.062
BUSH		1.063
BRIDGE		1.064
WIND LEAFER TREE		1.065
WIND LEAFER TREE		1.066
TREE		1.067
BRUSH		1.068
WIND CHANNEL		1.069
GRASS		1.070
BLASTING LANCE, BRUSH		1.071
WIND		1.072
SITE		1.073
WINDLINE		1.074
POD PUMP		1.075
POD PROJECTION		1.076
POD		1.077
LINE, POND		1.078
BRUSH REEDS		1.079
WIND CONTOUR		1.080
BRUSH CONTOUR		1.081
WIND WINDLINE CONTOUR		1.082
BRUSH WINDLINE CONTOUR		1.083
CLASH		1.084
WIND CLASH		1.085
BRUSH CLASH		1.086
WINDLINE		1.087

SHEET NO. 5

JAPAN INTERNATIONAL COOPERATION AGENCY

1:10,000	
NOTATION	
PROJECTION	UNIVERSAL TRANSVERSE MERCATOR
DATUM VERTICAL	BANGLADESH - SEA CHARTING
DATUM HORIZONTAL	SAD 68
SOURCES	NAVAL PHOTOGRAPHS 1:25,000 1979, 1987
CONTour	CONTOUR INTERVAL 3 METERS FEAT MEAN
PREPARED BY	1:625
	3 METERS MEAT MEAN



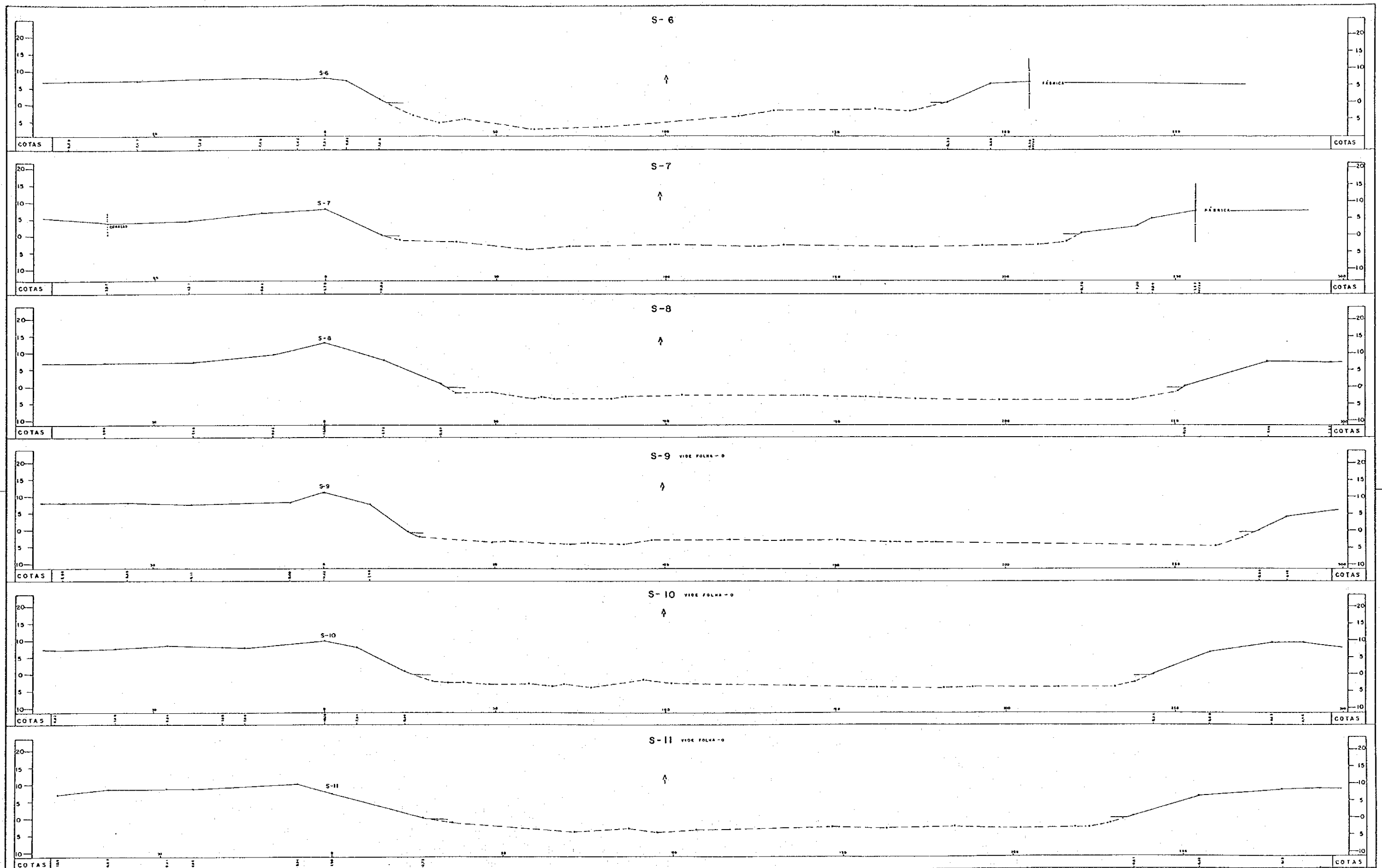
THE ITAJAI RIVER BASIN FLOOD CONTROL PROJECT

ITAJAI RIVER CROSS - SECTIONS

SCALE 1:500

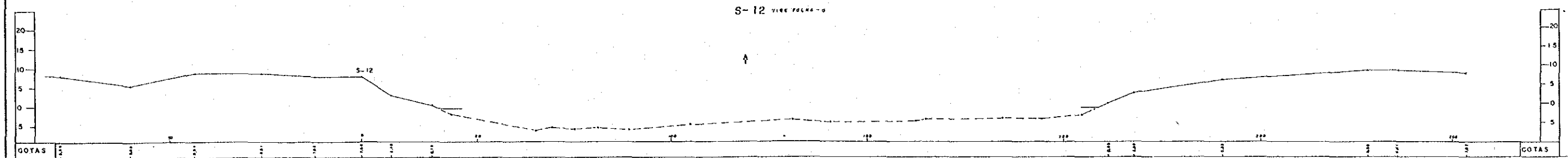
SURVEYED IN 1987

JAPAN INTERNATIONAL COOPERATION AGENCY

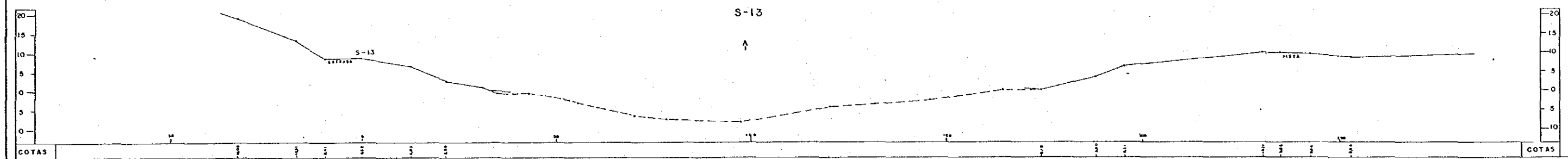


THE ITAJAI RIVER BASIN FLOOD CONTROL PROJECT
 ITAJAI RIVER CROSS - SECTIONS
 SCALE - 1:500
 SURVEYED IN 1987
 JAPAN INTERNATIONAL COOPERATION AGENCY

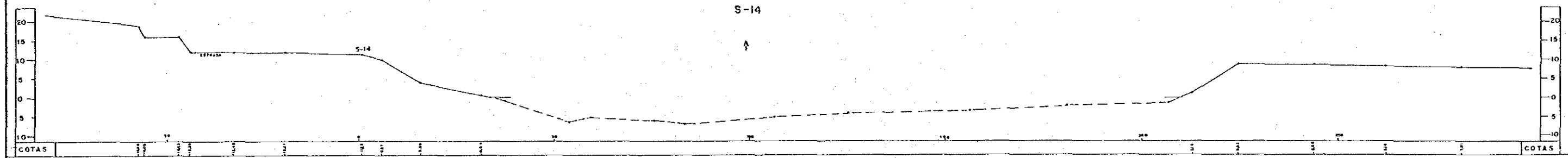
S-12 VIRE POLNA-0



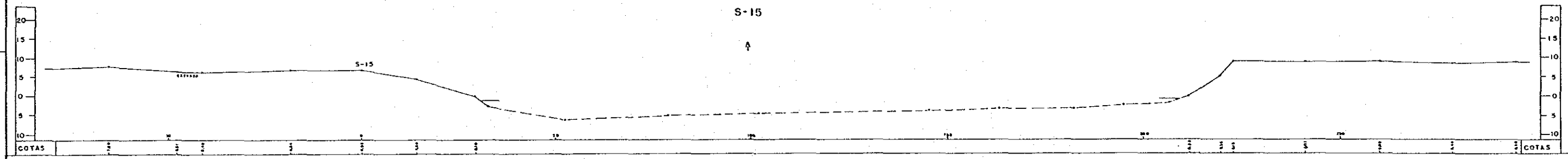
S-13



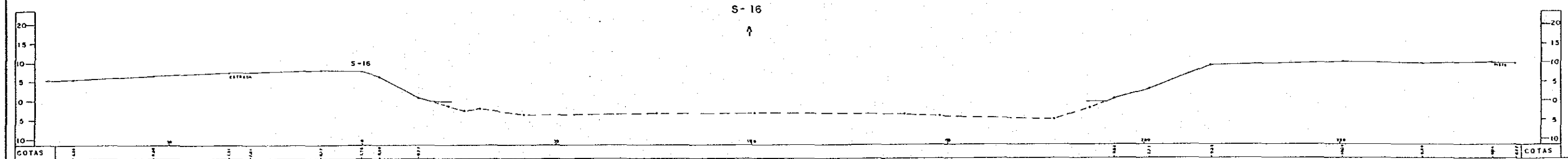
S-14



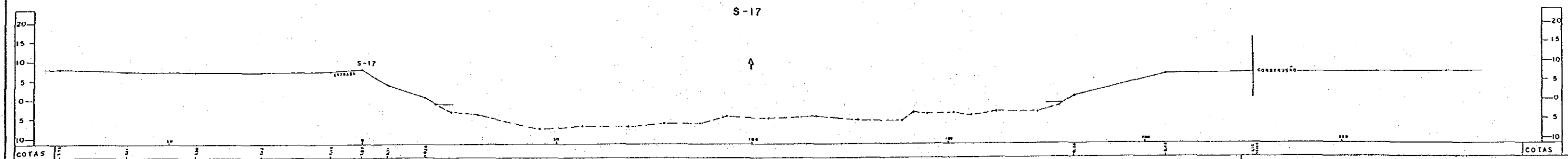
S-15



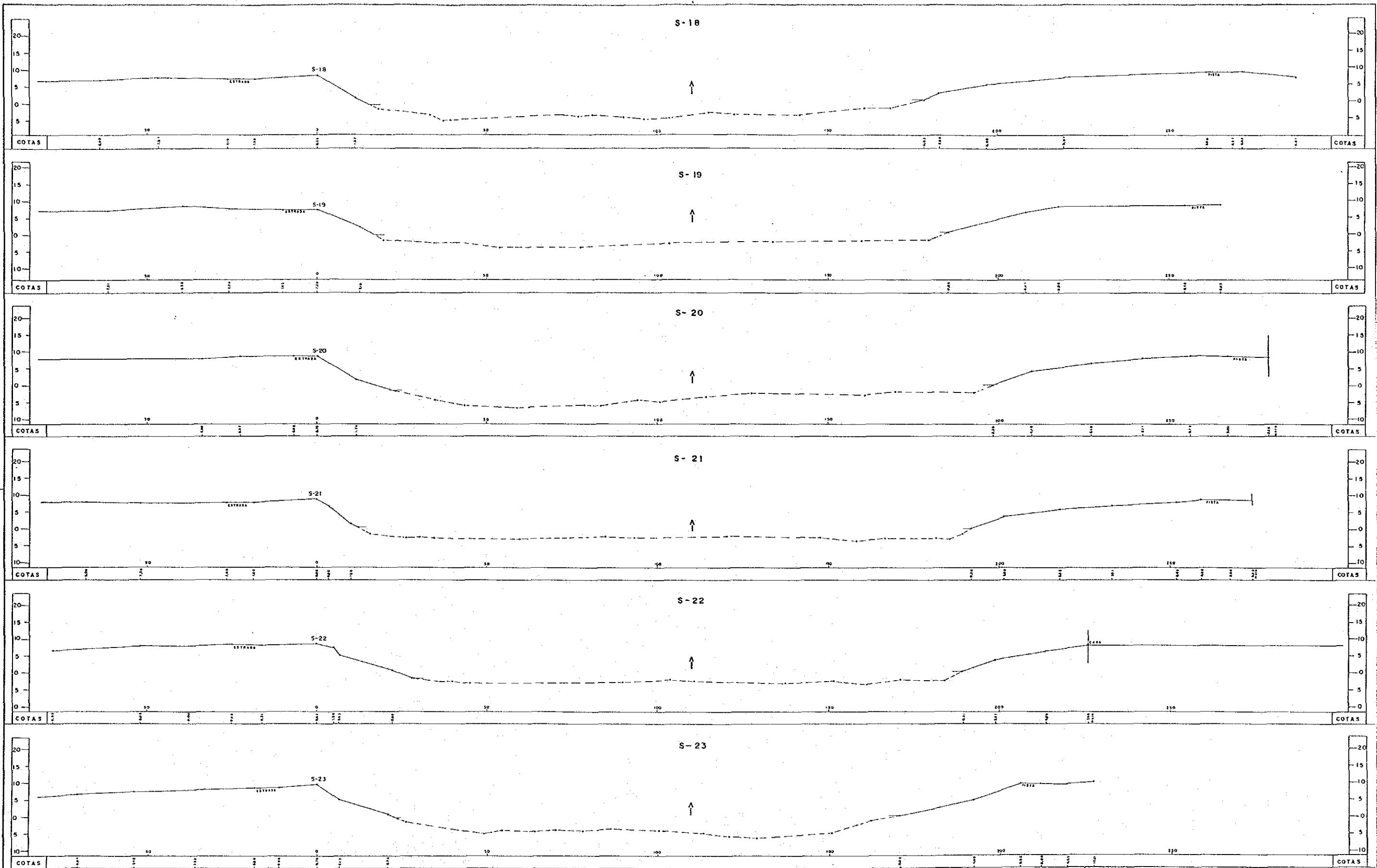
S-16



S-17



THE ITAJAI RIVER BASIN FLOOD CONTROL PROJECT
 ITAJAI RIVER CROSS - SECTIONS
 SCALE -- 1:500
 SURVEYED IN 1987
 JAPAN INTERNATIONAL COOPERATION AGENCY



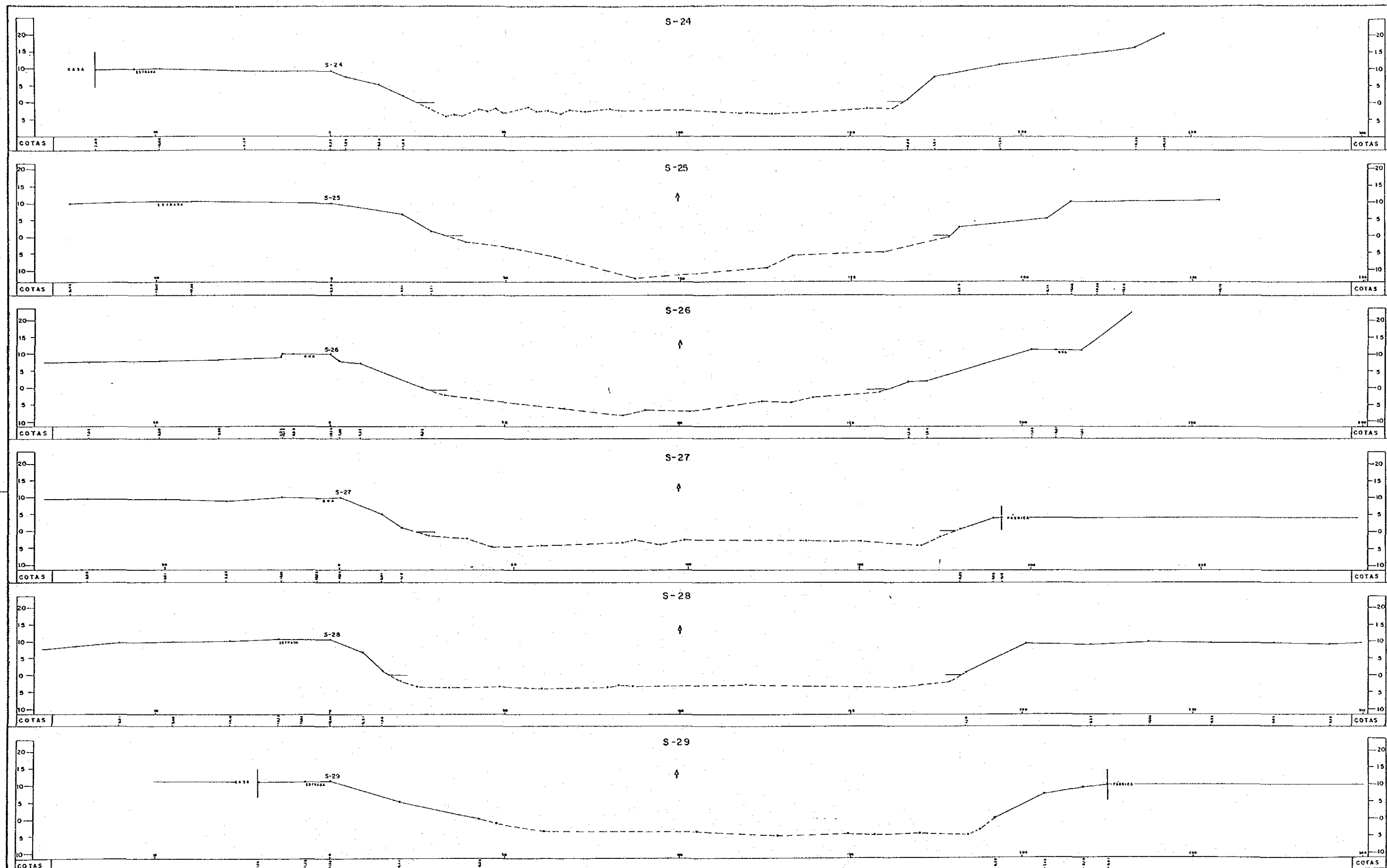
THE ITAJAI RIVER BASIN FLOOD CONTROL PROJECT

ITAJAI RIVER CROSS - SECTIONS

SCALE 1 : 500

SURVEYED IN 1987

JAPAN INTERNATIONAL COOPERATION AGENCY



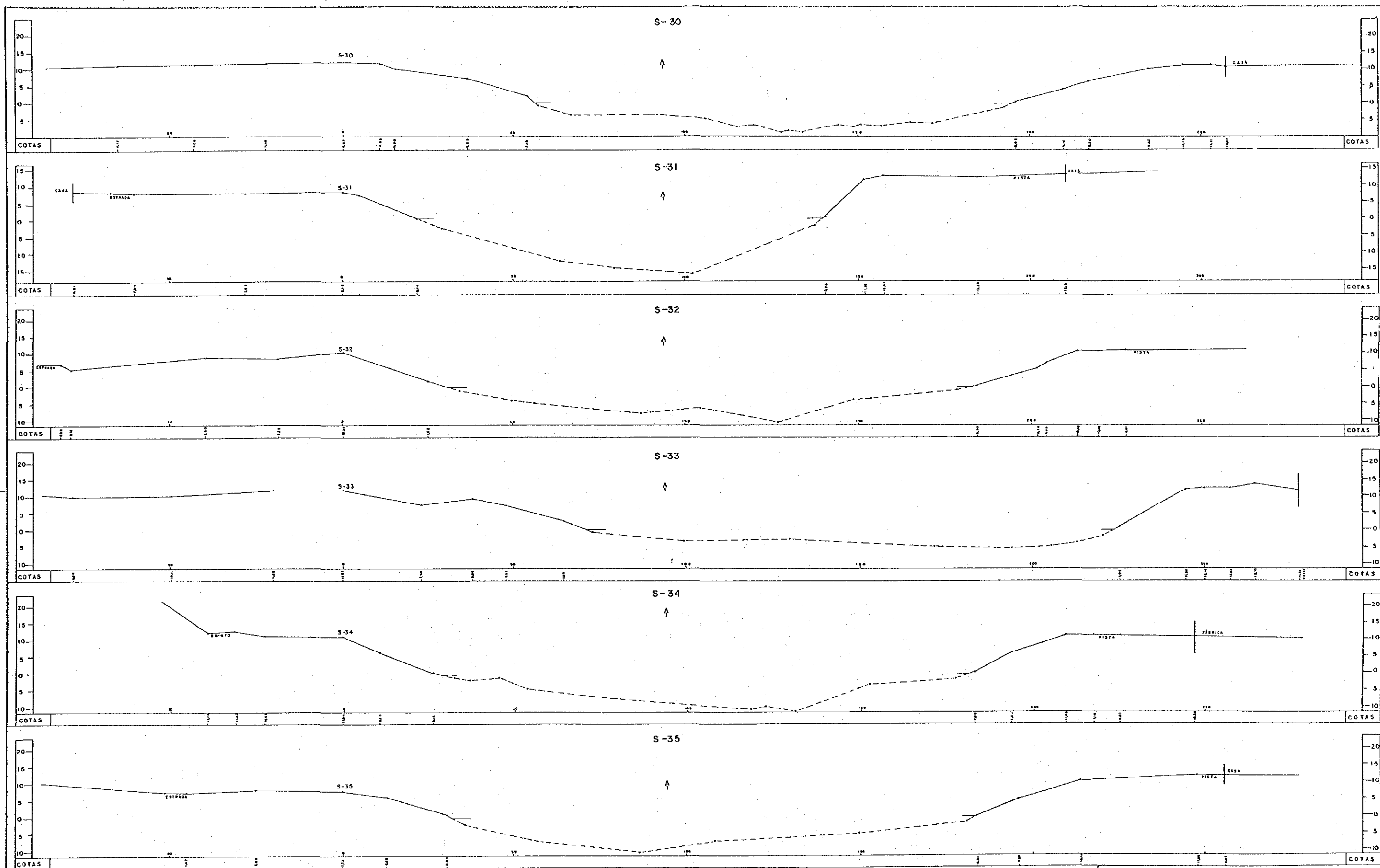
THE ITAJAI RIVER BASIN FLOOD CONTROL PROJECT

ITAJAI RIVER CROSS - SECTIONS

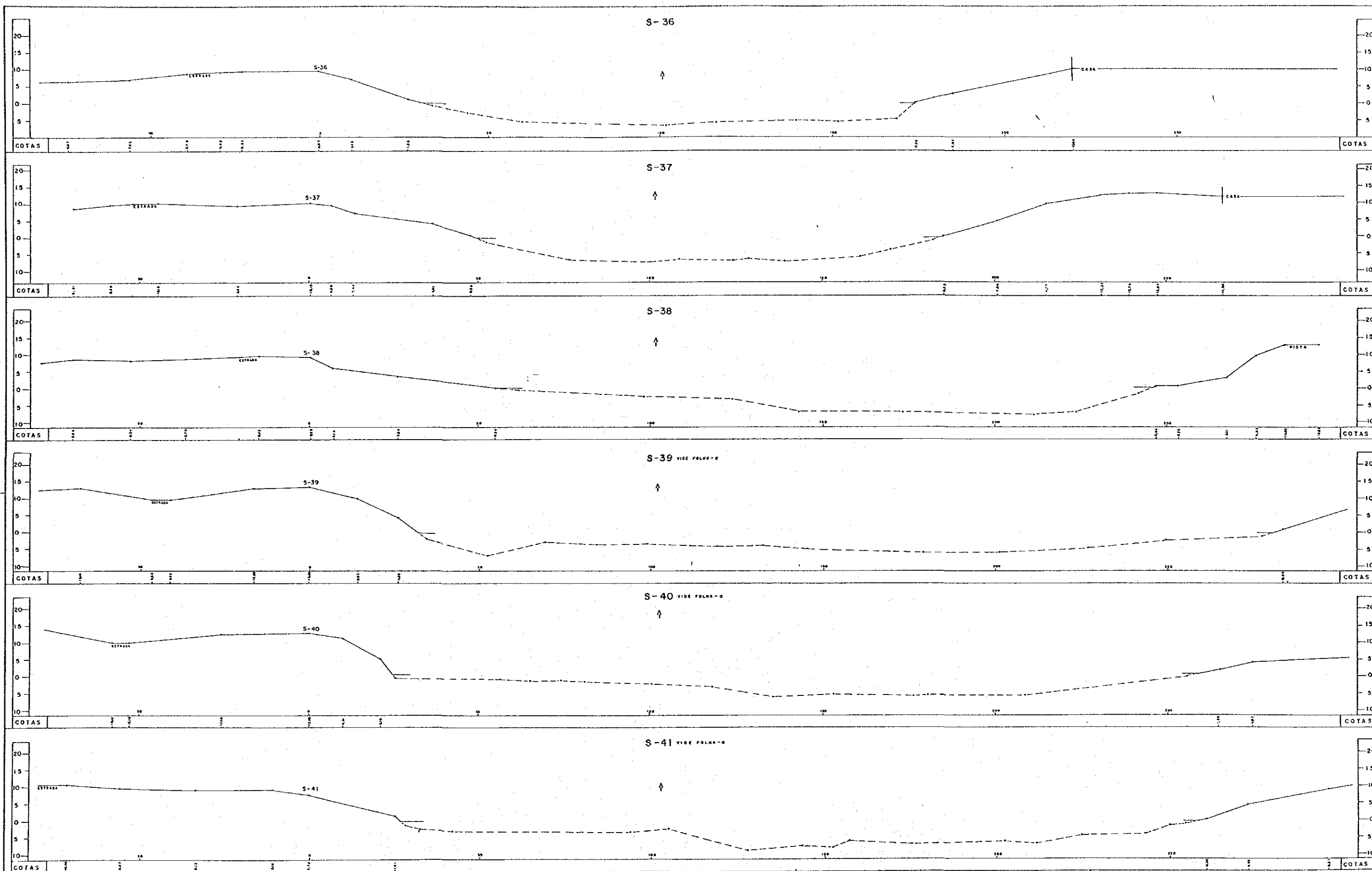
SCALE - 1:500

SURVEYED IN 1987

JAPAN INTERNATIONAL COOPERATION AGENCY



THE ITAJAI RIVER BASIN FLOOD CONTROL PROJECT
 ITAJAI RIVER CROSS - SECTIONS
 SCALE - 1:500
 SURVEYED IN 1987
 JAPAN INTERNATIONAL COOPERATION AGENCY



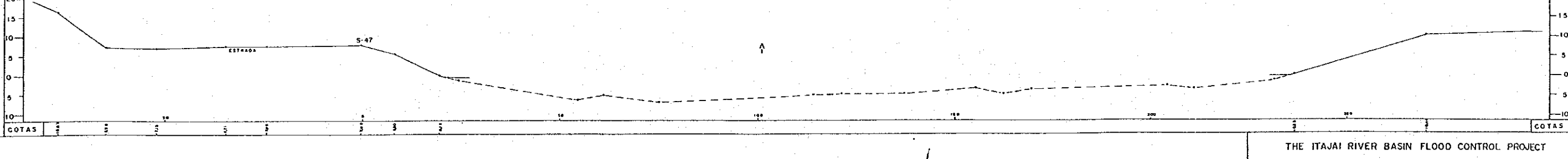
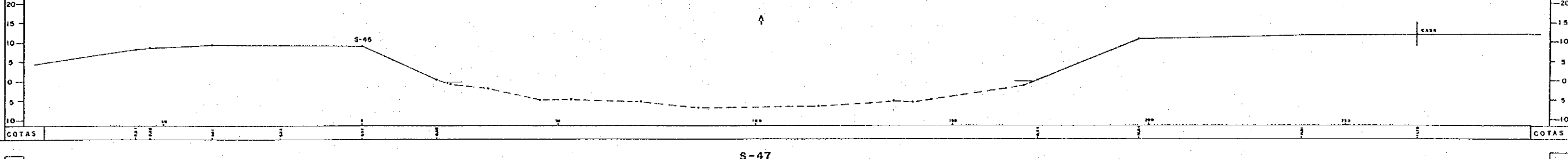
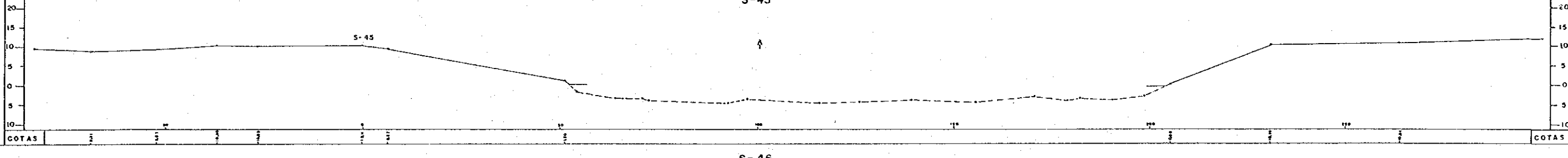
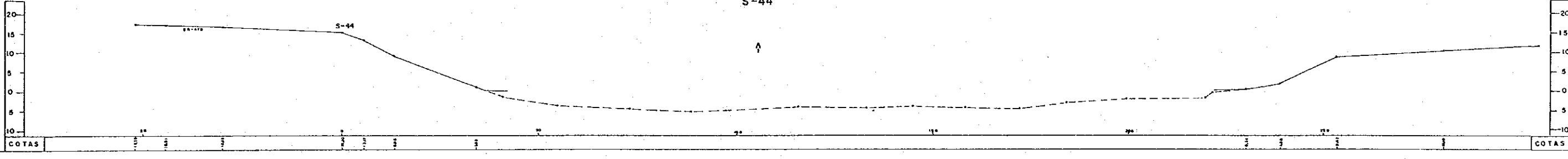
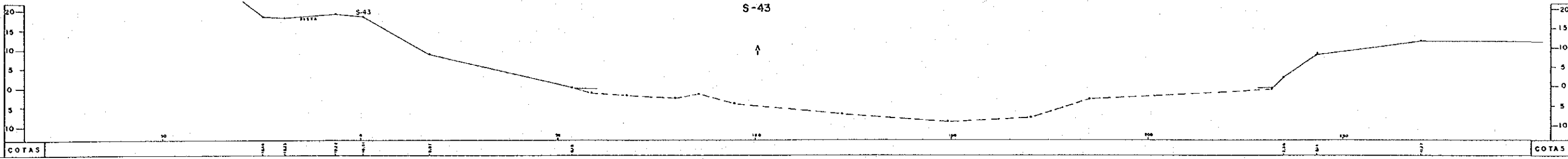
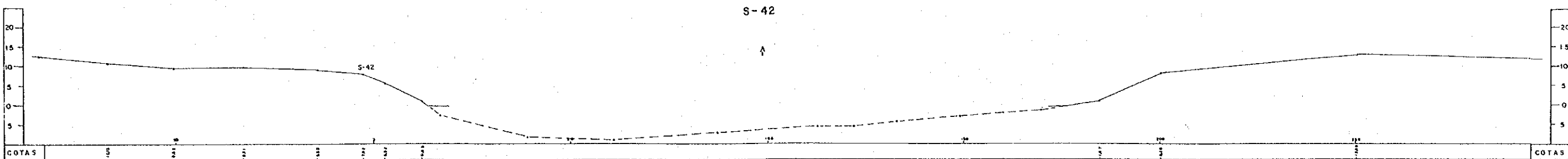
THE ITAJAI RIVER BASIN FLOOD CONTROL PROJECT

ITAJAI RIVER CROSS - SECTIONS

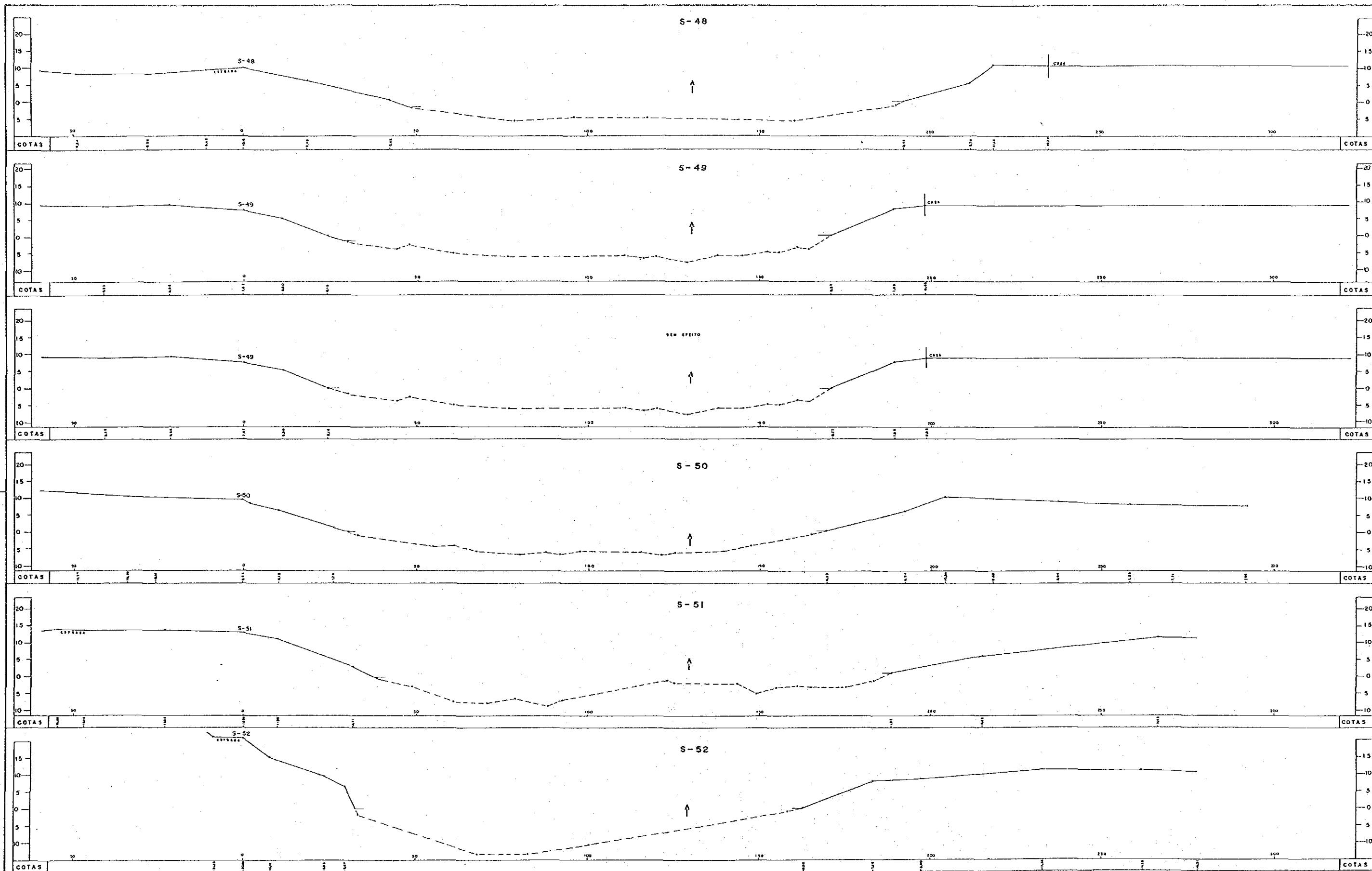
SCALE - 1:500

SURVEYED IN 1987

JAPAN INTERNATIONAL COOPERATION AGENCY



THE ITAJAI RIVER BASIN FLOOD CONTROL PROJECT
 ITAJAI RIVER CROSS - SECTIONS
 SCALE - 1:500
 SURVEYED IN 1987
 JAPAN INTERNATIONAL COOPERATION AGENCY



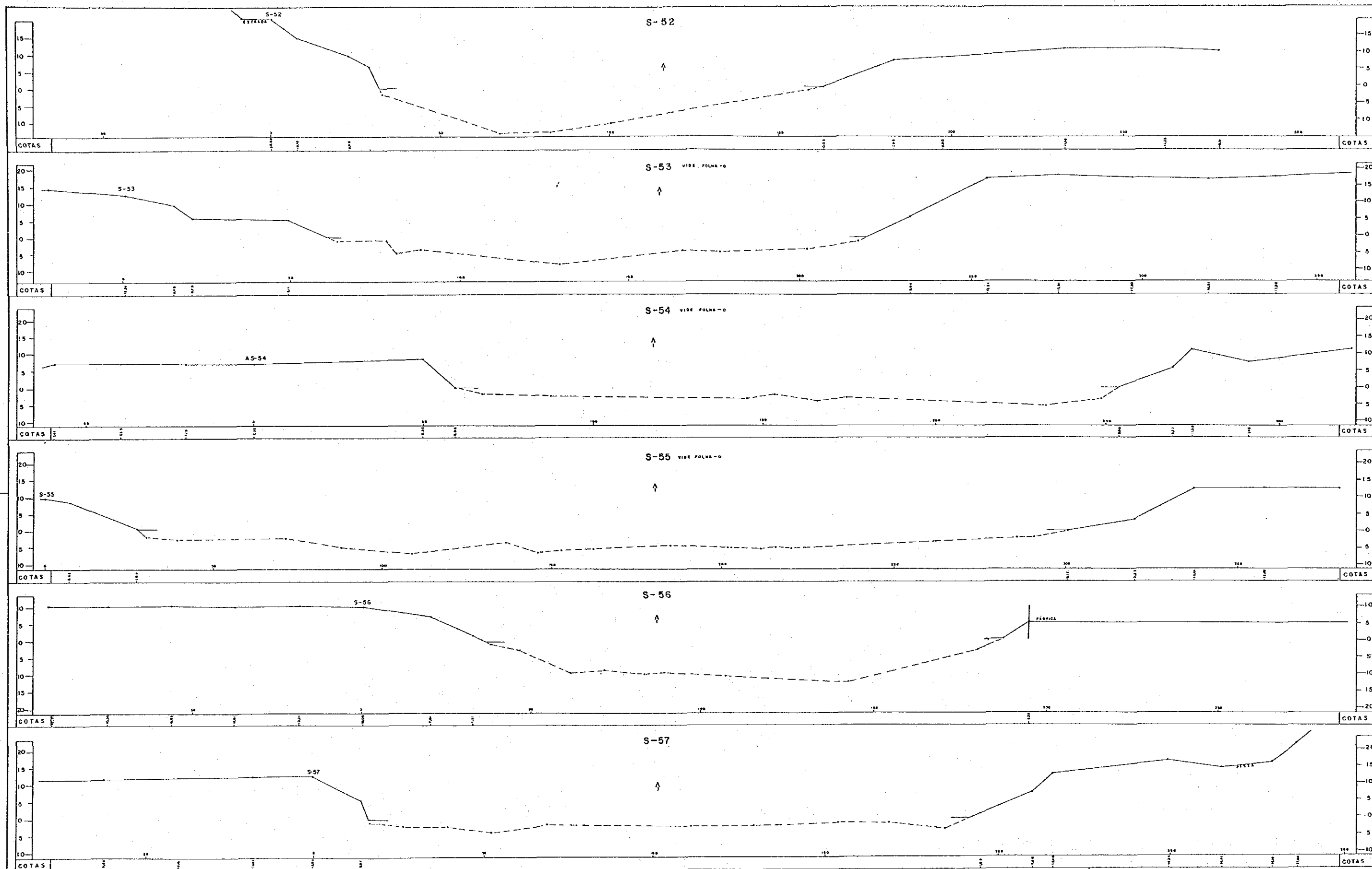
THE ITAJAI RIVER BASIN FLOOD CONTROL PROJECT

ITAJAI RIVER CROSS - SECTIONS

SCALE 1:500

SURVEYED IN 1987

JAPAN INTERNATIONAL COOPERATION AGENCY



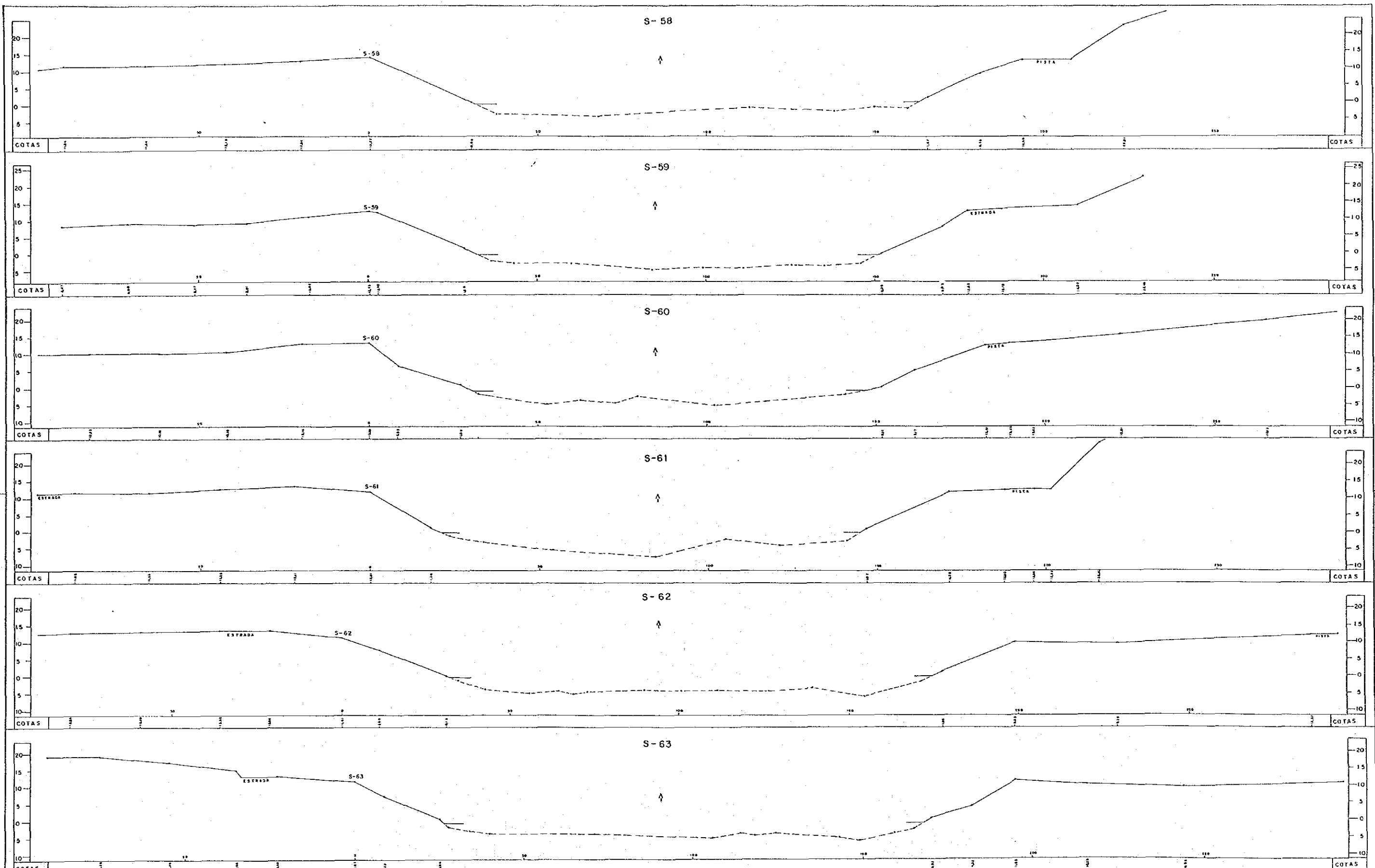
THE ITAJAI RIVER BASIN FLOOD CONTROL PROJECT

ITAJAI RIVER CROSS - SECTIONS

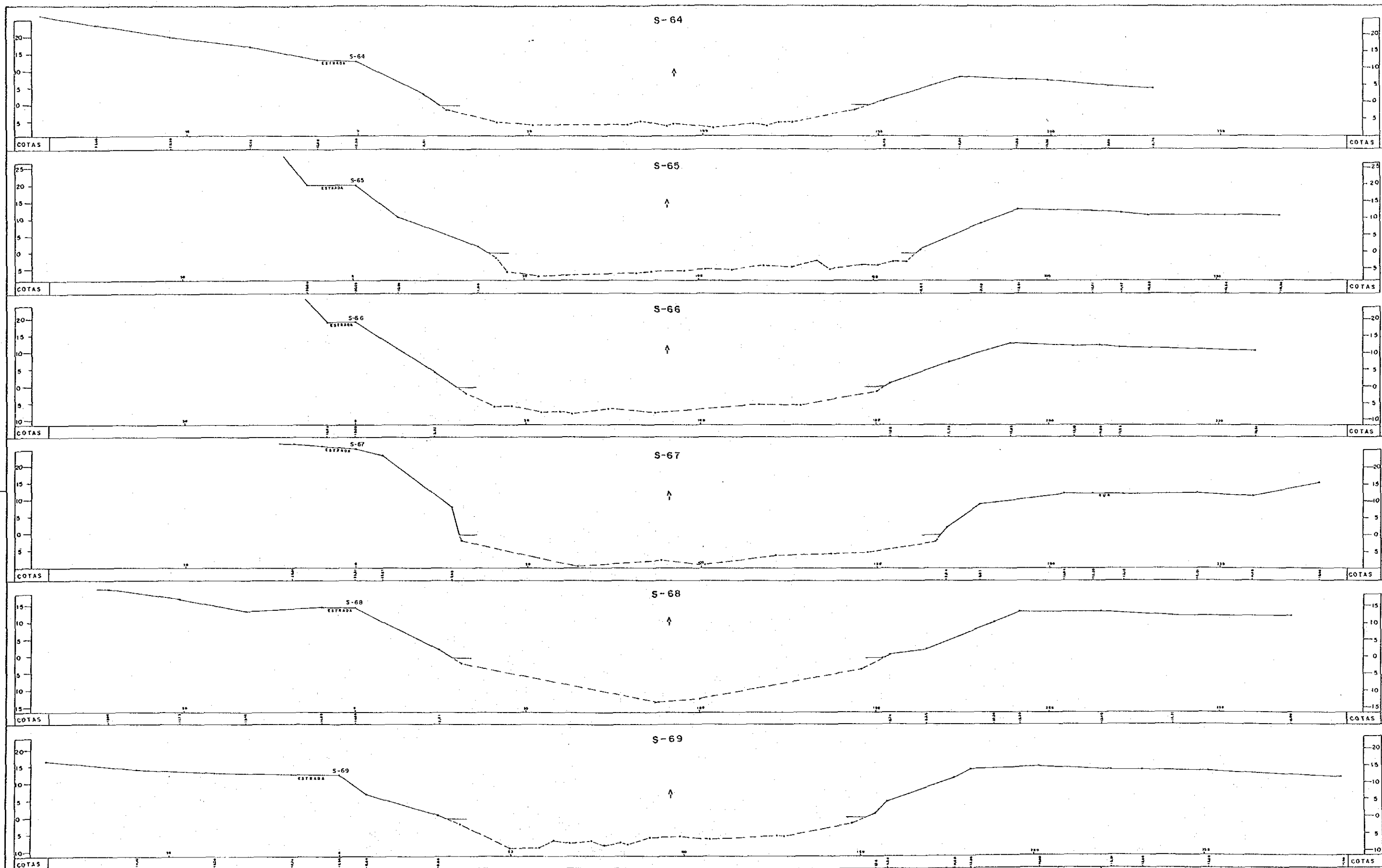
SCALE - 1:500

SURVEYED IN 1987

JAPAN INTERNATIONAL COOPERATION AGENCY



THE ITAJAI RIVER BASIN FLOOD CONTROL PROJECT
 ITAJAI RIVER CROSS - SECTIONS
 SCALE - 1:500
 SURVEYED IN 1987
 JAPAN INTERNATIONAL COOPERATION AGENCY



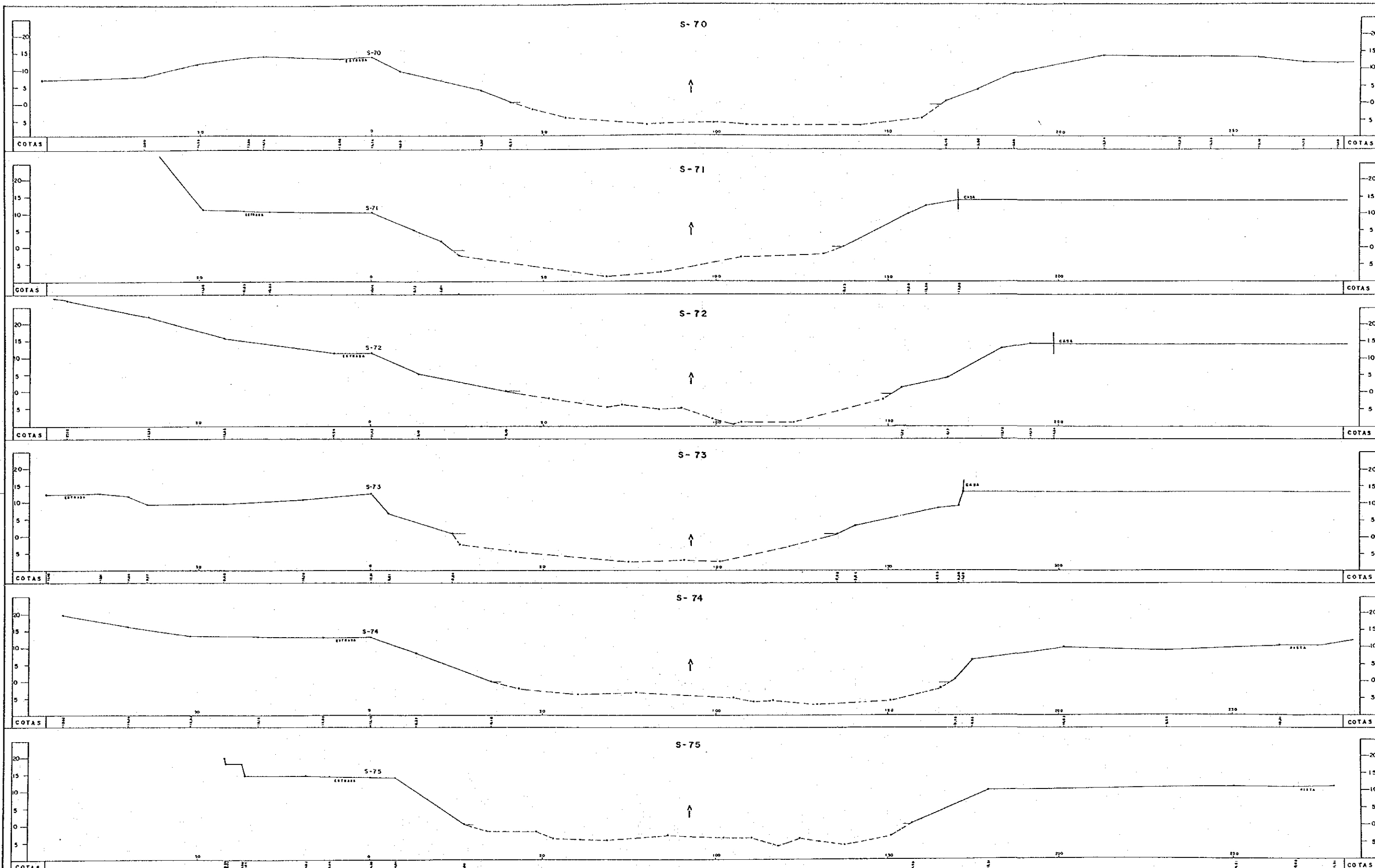
THE ITAJAI RIVER BASIN FLOOD CONTROL PROJECT

ITAJAI RIVER CROSS - SECTIONS

SCALE - 1:500

SURVEYED IN 1987

JAPAN INTERNATIONAL COOPERATION AGENCY



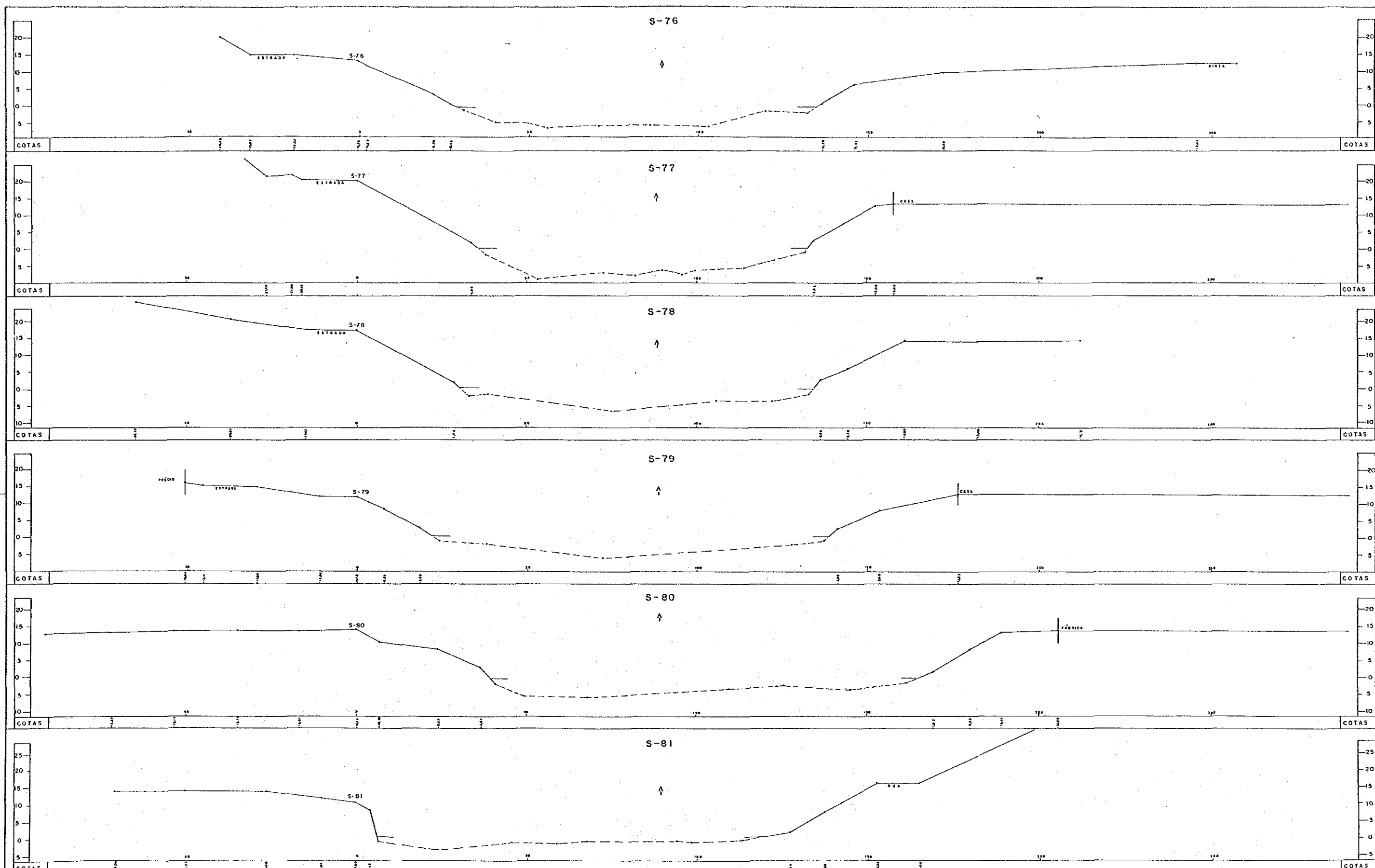
THE ITAJAI RIVER BASIN FLOOD CONTROL PROJECT

ITAJAI RIVER CROSS - SECTIONS

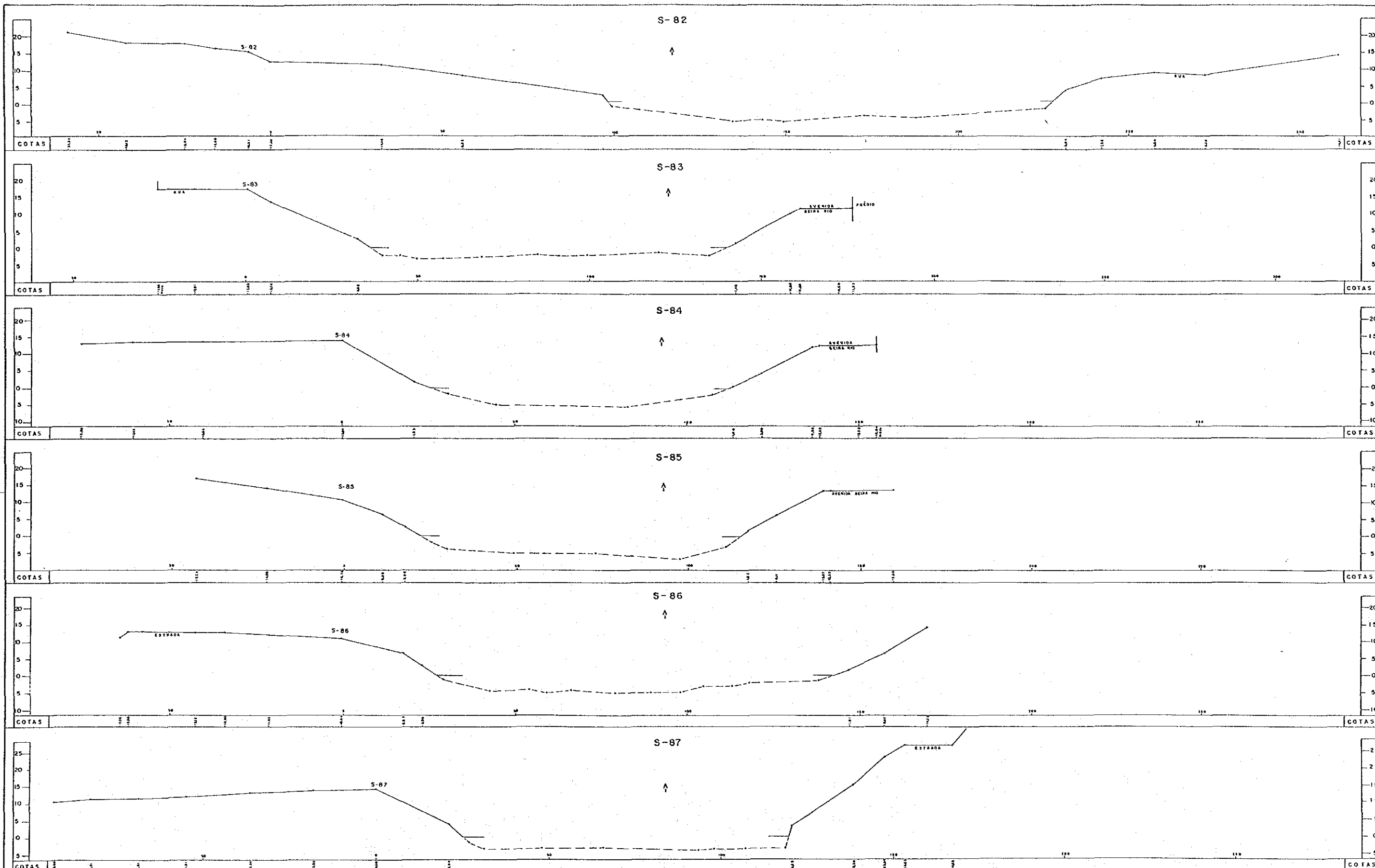
SCALE 1 : 500

SURVEYED IN 1987

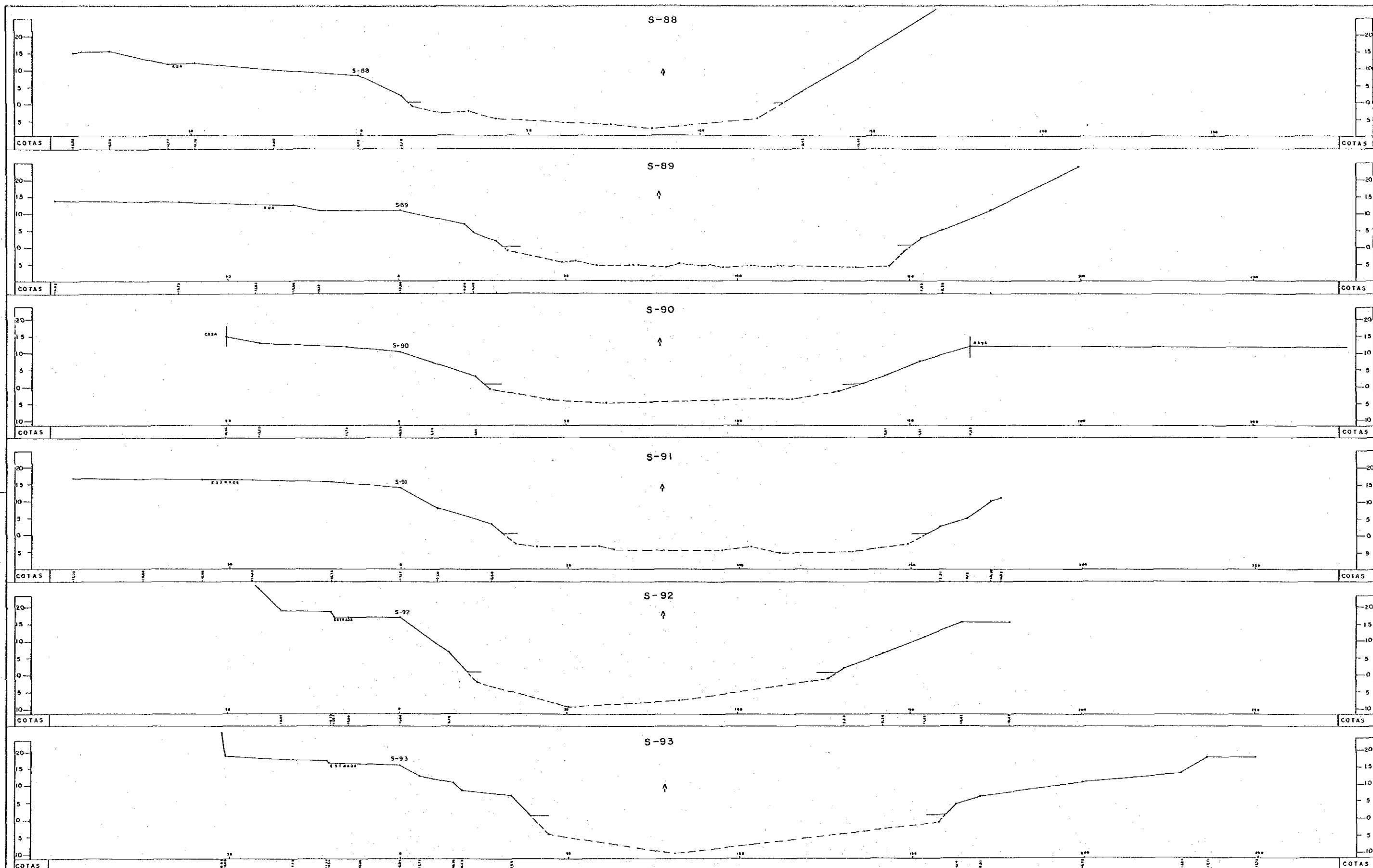
JAPAN INTERNATIONAL COOPERATION AGENCY



THE ITAJAI RIVER BASIN FLOOD CONTROL PROJECT
 ITAJAI RIVER CROSS - SECTIONS
 SCALE --1:500
 SURVEYED IN 1987
 JAPAN INTERNATIONAL COOPERATION AGENCY



THE ITAJAI RIVER BASIN FLOOD CONTROL PROJECT
 ITAJAI RIVER CROSS - SECTIONS
 SCALE - 1:500
 SURVEYED IN 1987
 JAPAN INTERNATIONAL COOPERATION AGENCY



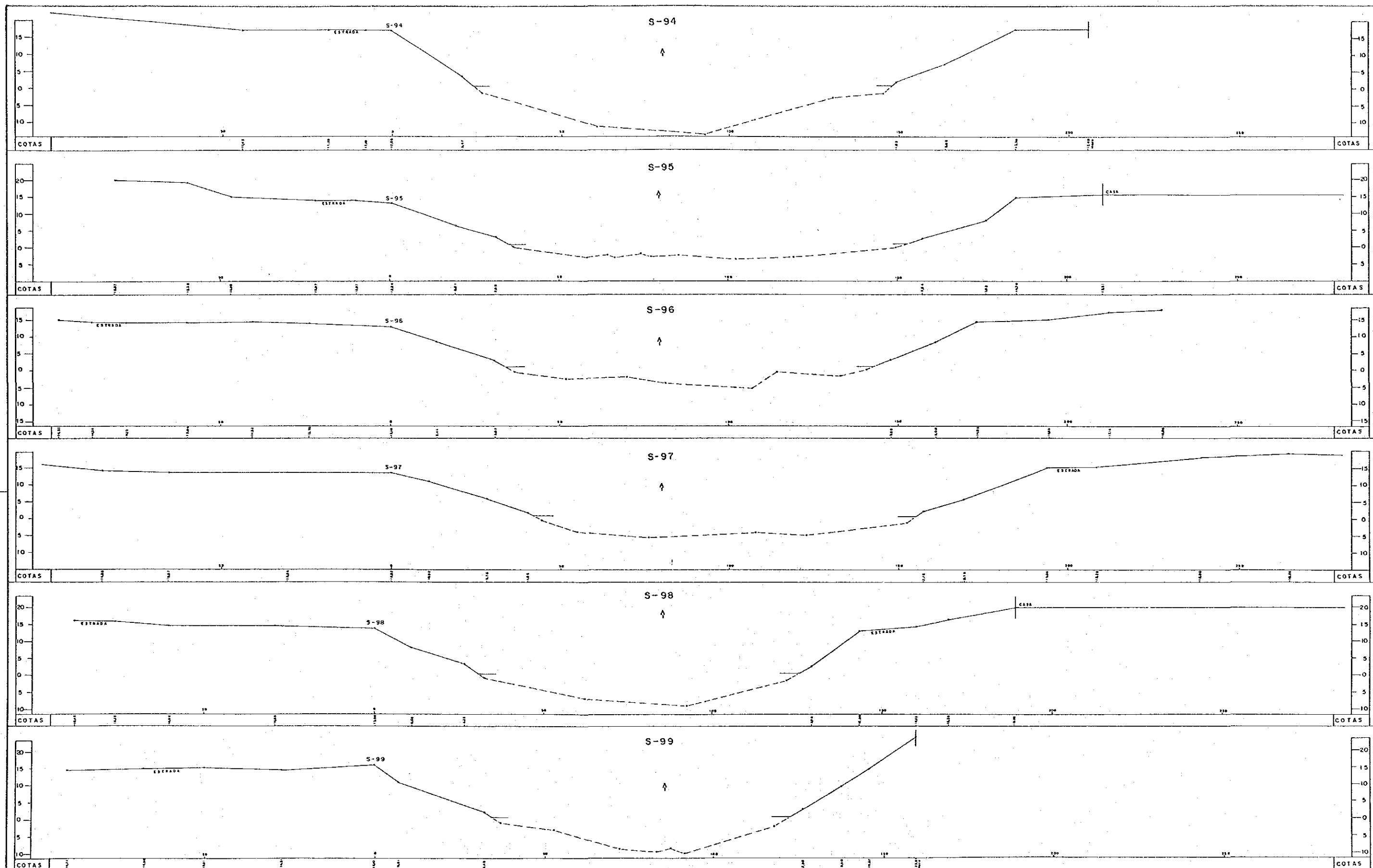
THE ITAJAI RIVER BASIN FLOOD CONTROL PROJECT

ITAJAI RIVER CROSS - SECTIONS

SCALE - 1:500

SURVEYED IN 1987

JAPAN INTERNATIONAL COOPERATION AGENCY



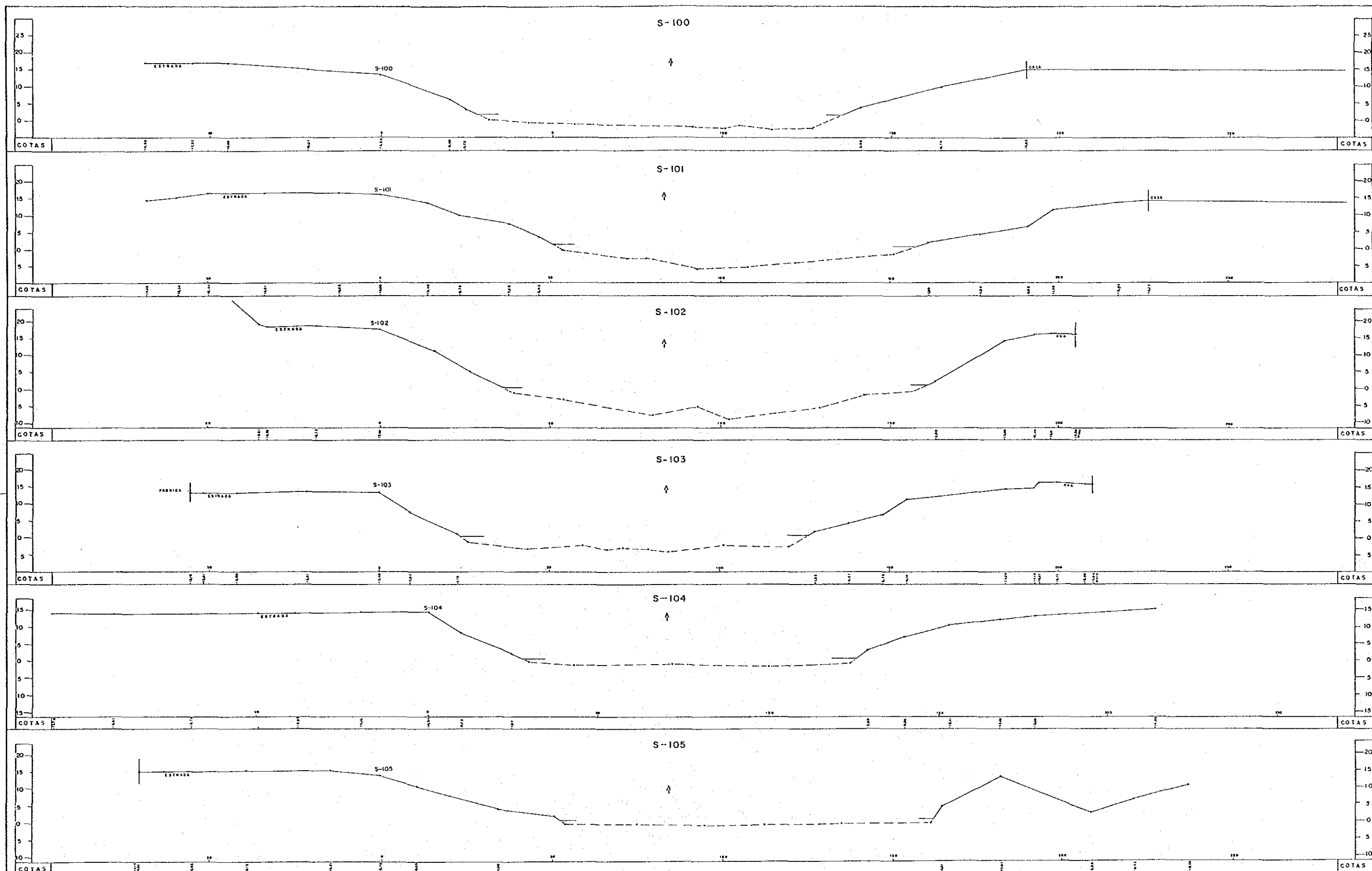
THE ITAJAI RIVER BASIN FLOOD CONTROL PROJECT

ITAJAI RIVER CROSS - SECTIONS

SCALE - 1:500

SURVEYED IN 1987

JAPAN INTERNATIONAL COOPERATION AGENCY



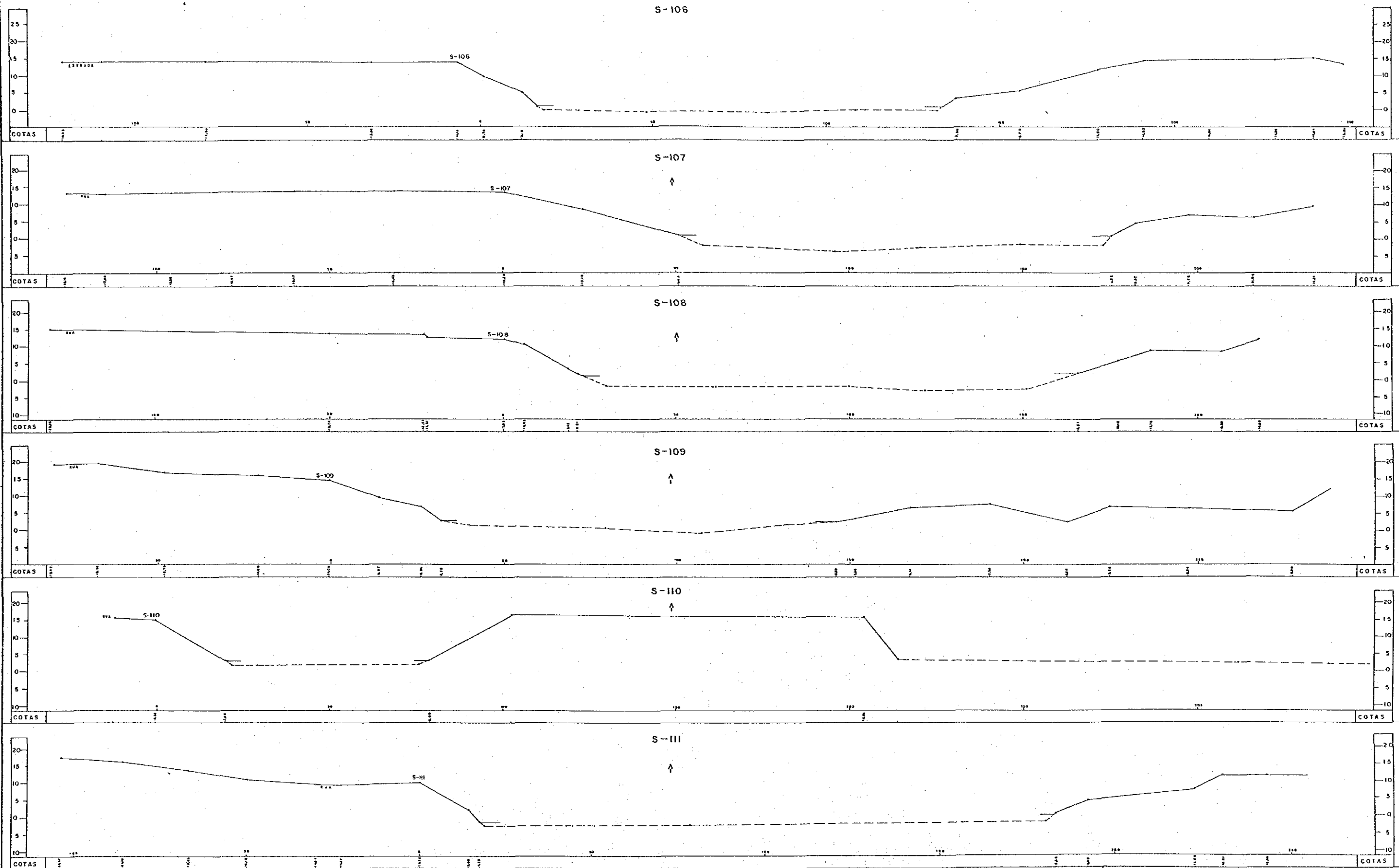
THE ITAJAI RIVER BASIN FLOOD CONTROL PROJECT

ITAJAI RIVER CROSS - SECTIONS

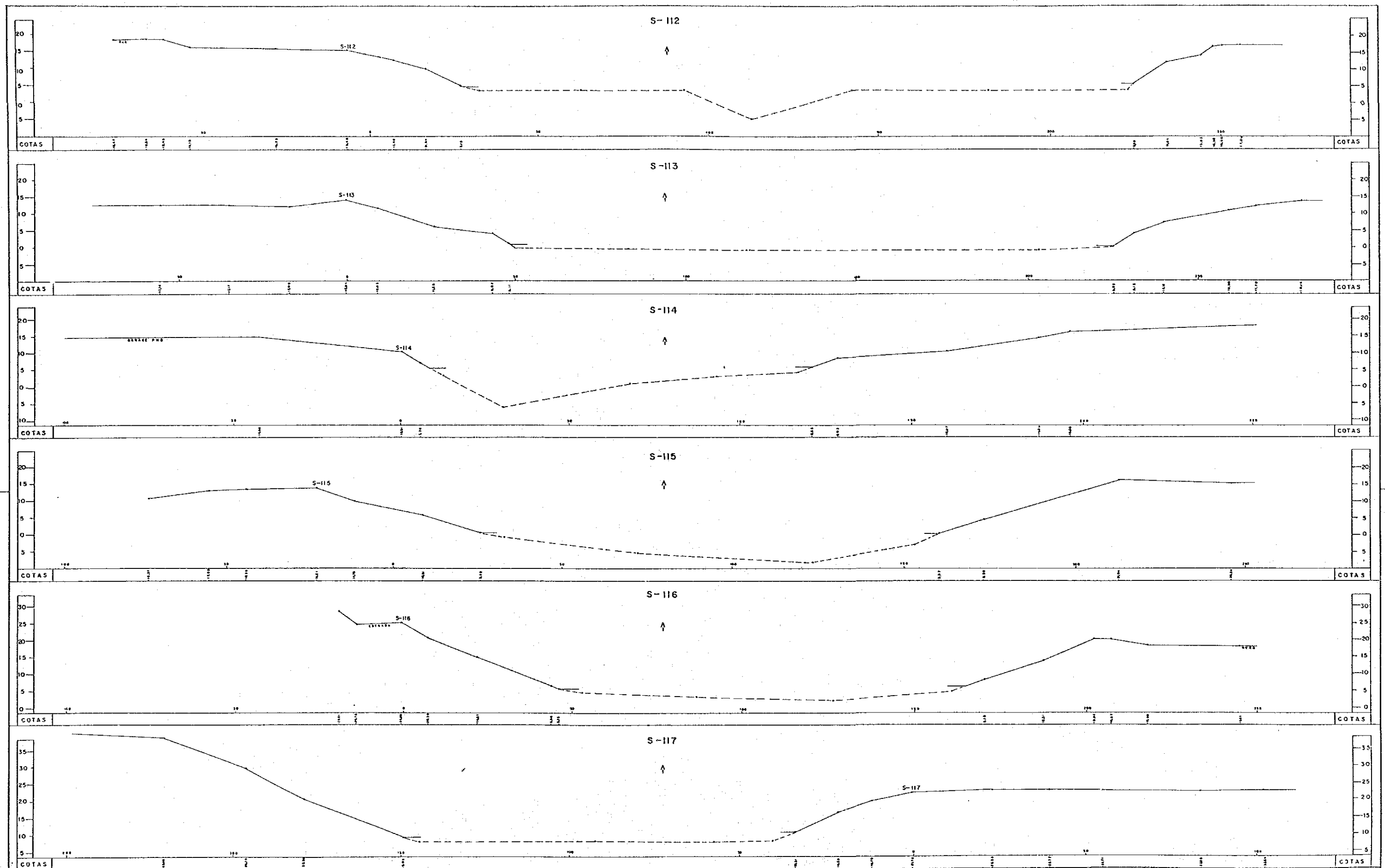
SCALE - 1:500

SURVEYED IN 1987

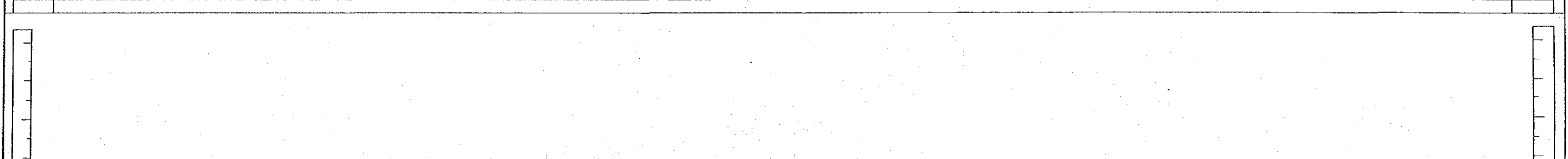
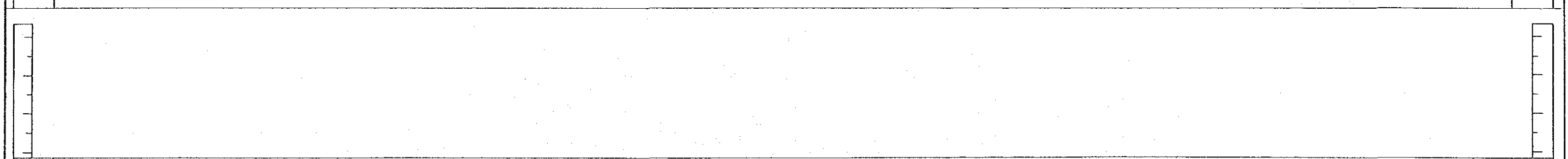
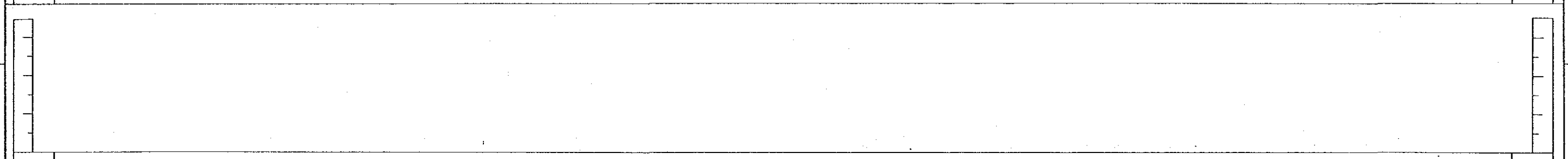
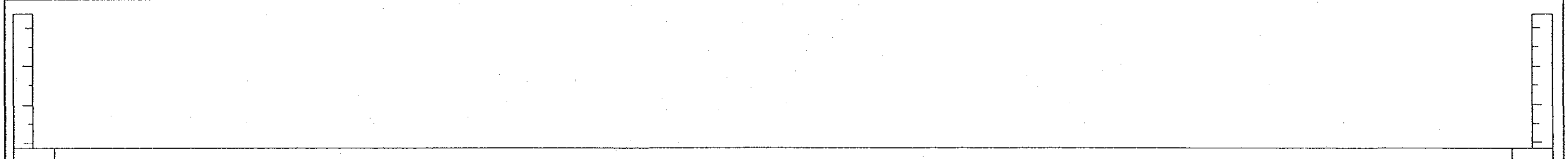
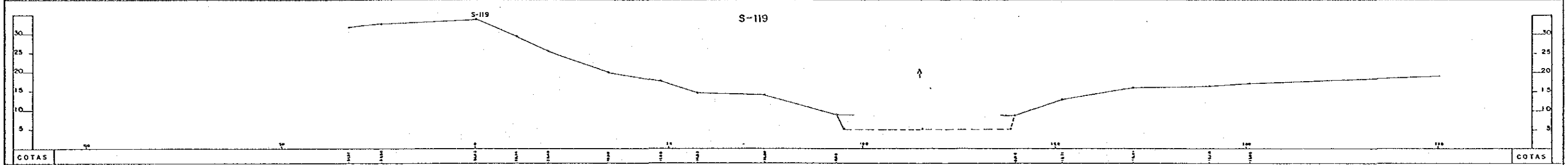
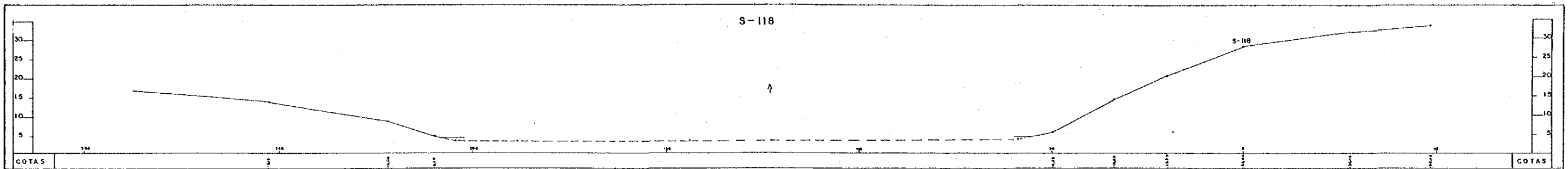
JAPAN INTERNATIONAL COOPERATION AGENCY



THE ITAJAI RIVER BASIN FLOOD CONTROL PROJECT
 ITAJAI RIVER CROSS - SECTIONS
 SCALE - 1:500
 SURVEYED IN 1987
 JAPAN INTERNATIONAL COOPERATION AGENCY



THE ITAJAI RIVER BASIN FLOOD CONTROL PROJECT
 ITAJAI RIVER CROSS - SECTIONS
 SCALE - 1:500
 SURVEYED IN 1987
 JAPAN INTERNATIONAL COOPERATION AGENCY



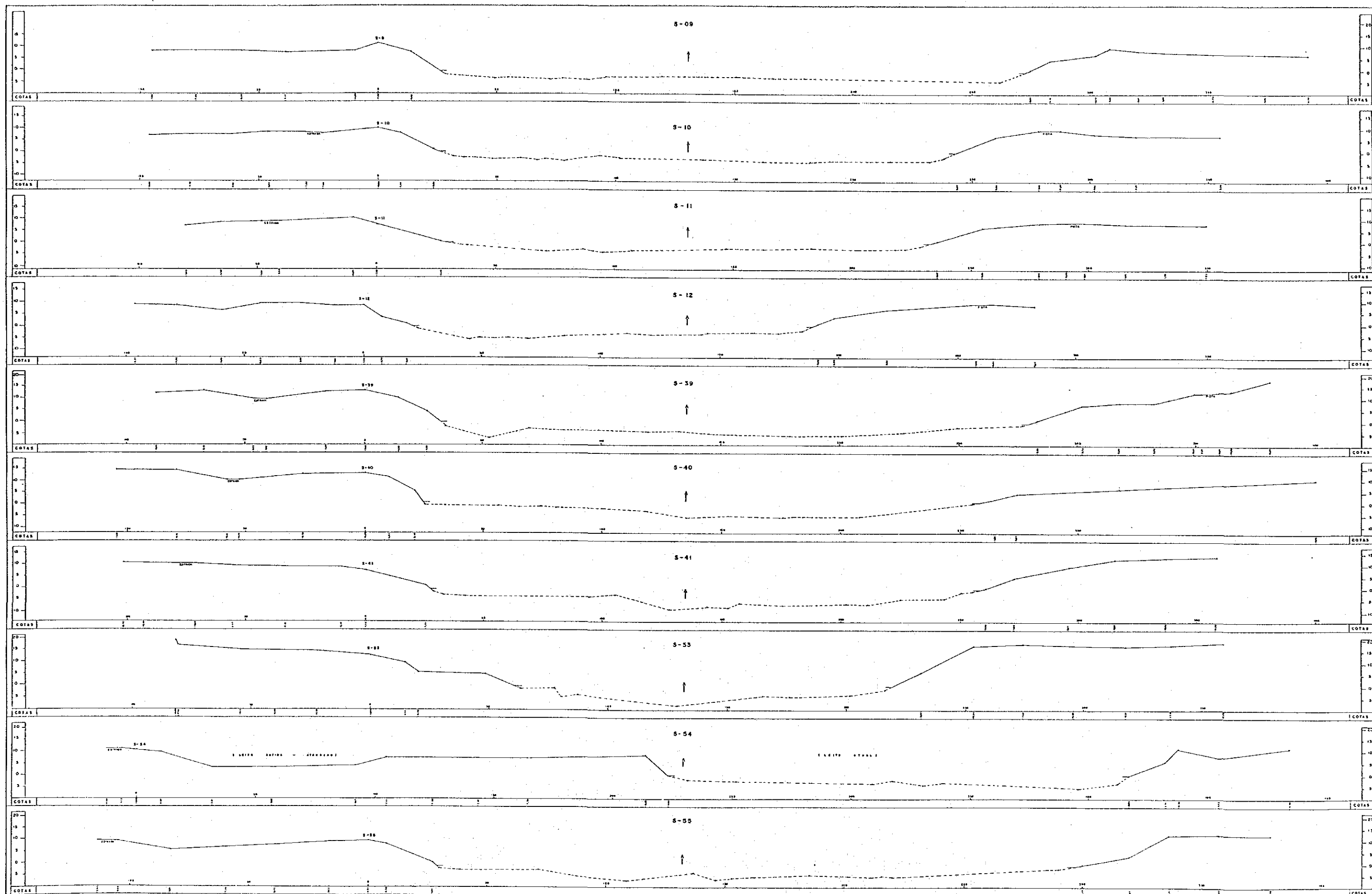
THE ITAJAI RIVER BASIN FLOOD CONTROL PROJECT

ITAJAI RIVER CROSS - SECTIONS

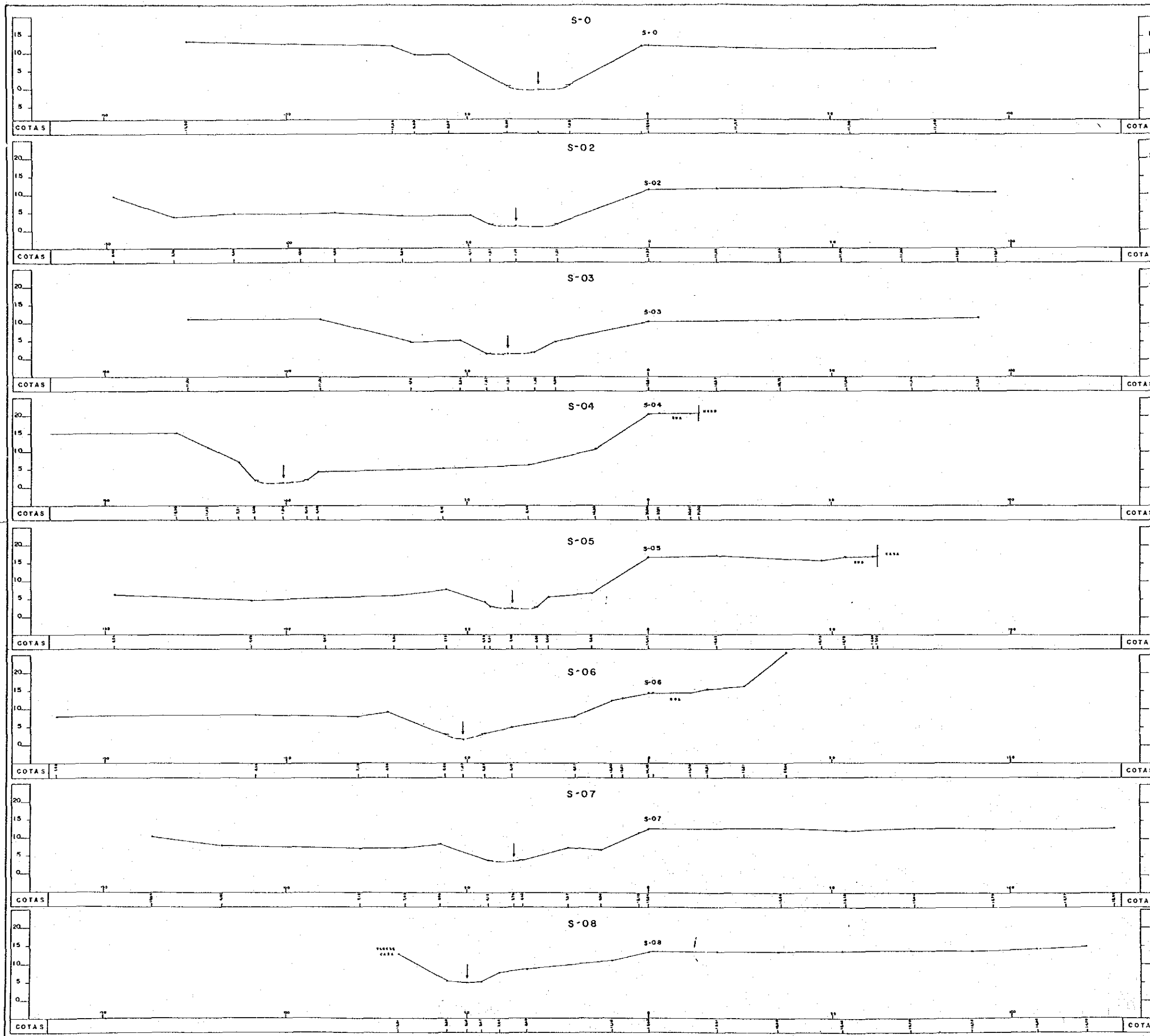
SCALE - 1:500

SURVEYED IN 1987

JAPAN INTERNATIONAL COOPERATION AGENCY



THE ITAJAI RIVER BASIN FLOOD CONTROL PROJECT
 ITAJAI RIVER CROSS - SECTIONS
 SCALE 1:500
 SURVEYED IN 1987
 JAPAN INTERNATIONAL COOPERATION AGENCY



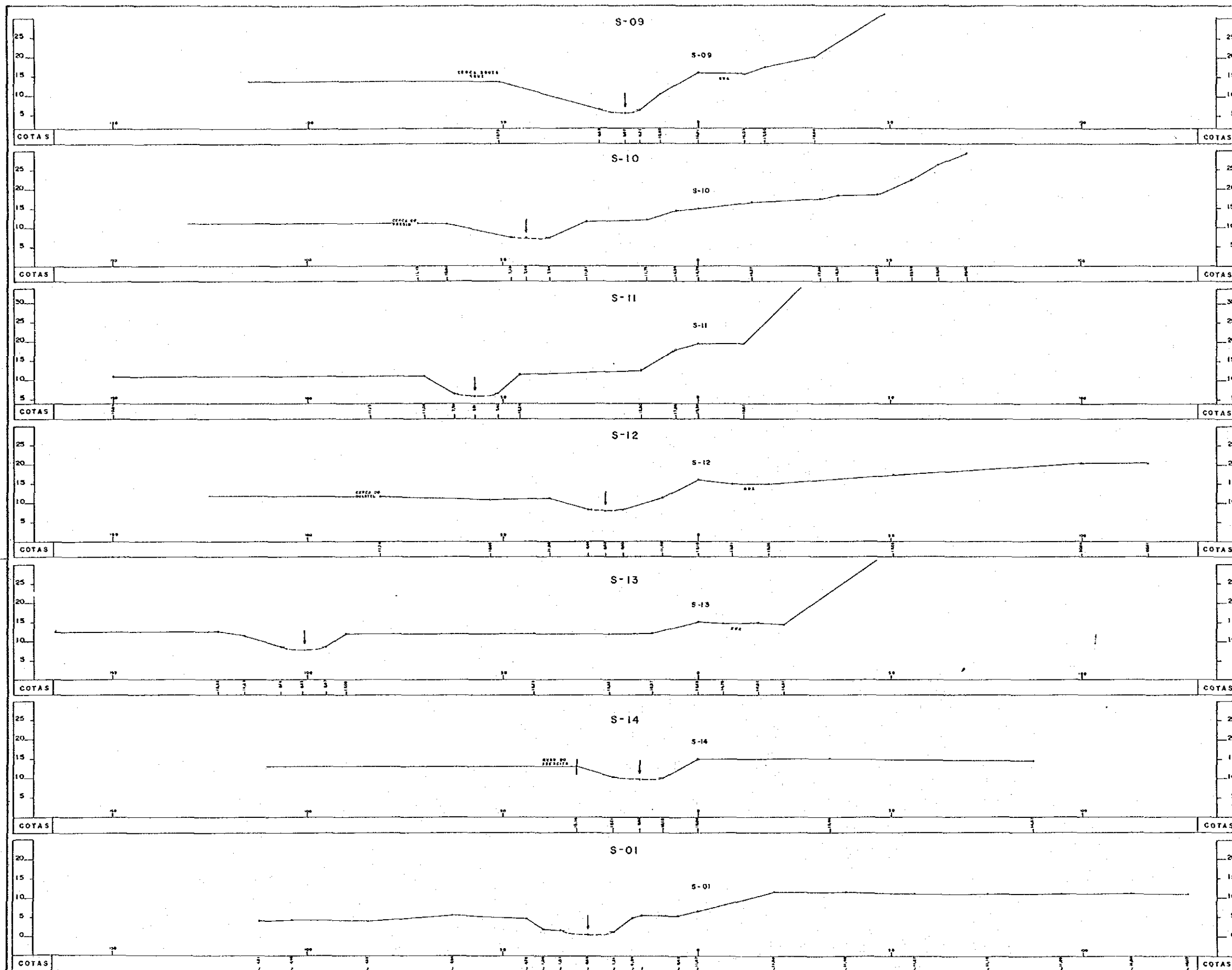
THE ITAJAI RIVER BASIN FLOOD CONTROL PROJECT

GARCIA RIVER CROSS - SECTIONS

SCALE 1:500

SURVEYED IN 1987

JAPAN INTERNATIONAL COOPERATION AGENCY



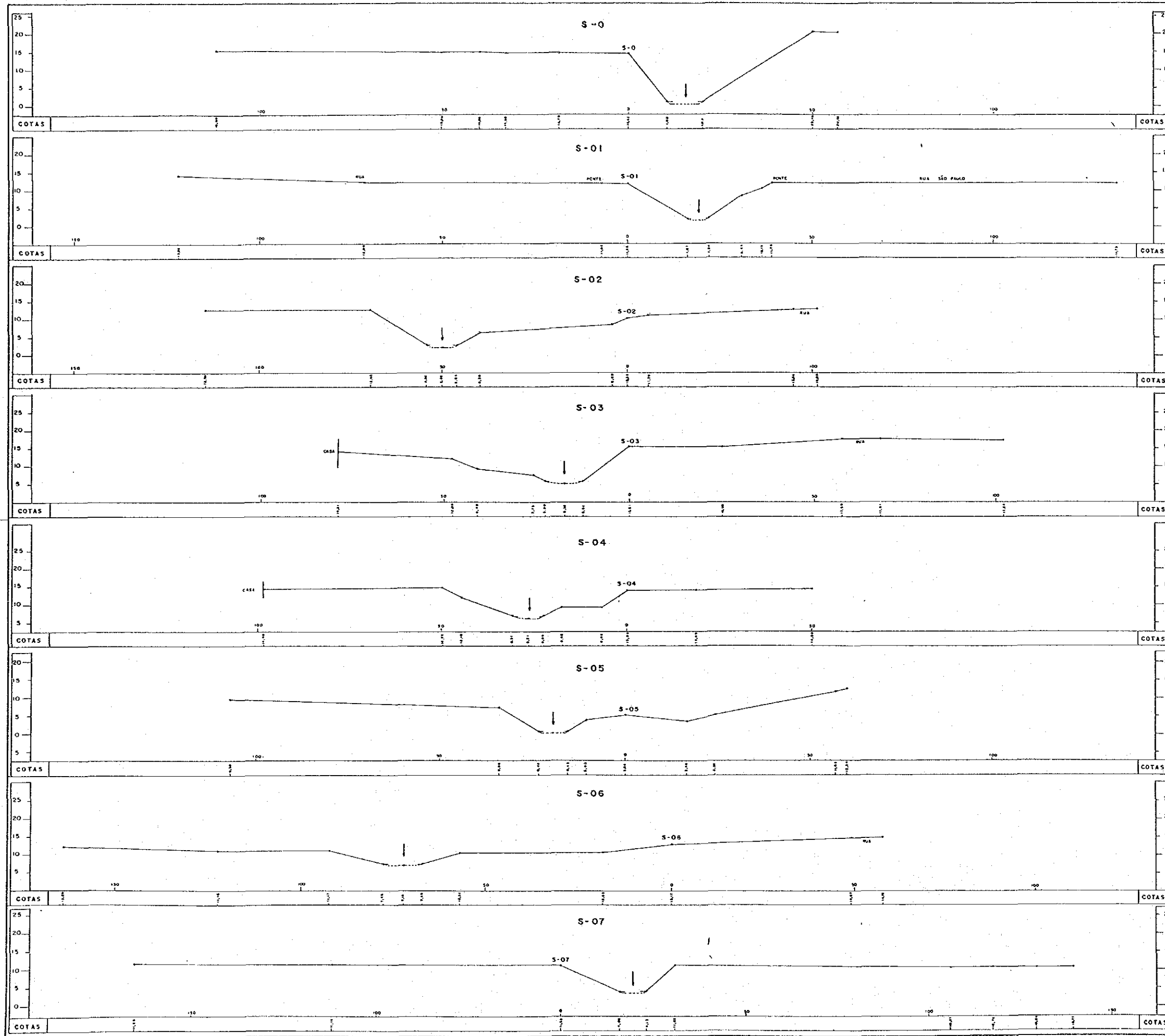
THE ITAJAI RIVER BASIN FLOOD CONTROL PROJECT

GARCIA RIVER CROSS - SECTIONS

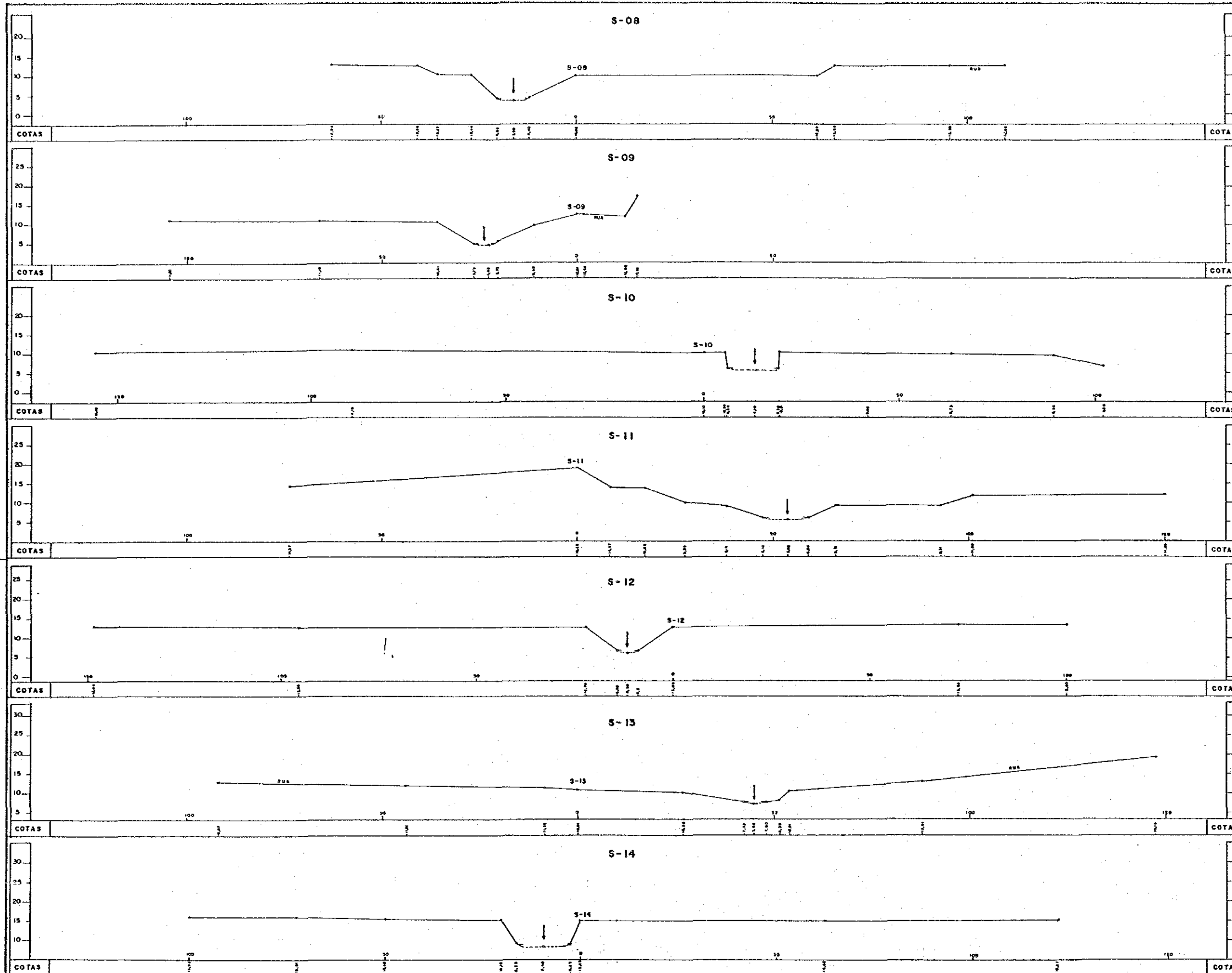
SCALE 1:500

SURVEYED IN 1987

JAPAN INTERNATIONAL COOPERATION AGENCY



THE ITAJAI RIVER BASIN FLOOD CONTROL PROJECT
 VELHA RIVER CROSS - SECTIONS
 SCALE 1:500
 SURVEYED IN 1987
 JAPAN INTERNATIONAL COOPERATION AGENCY



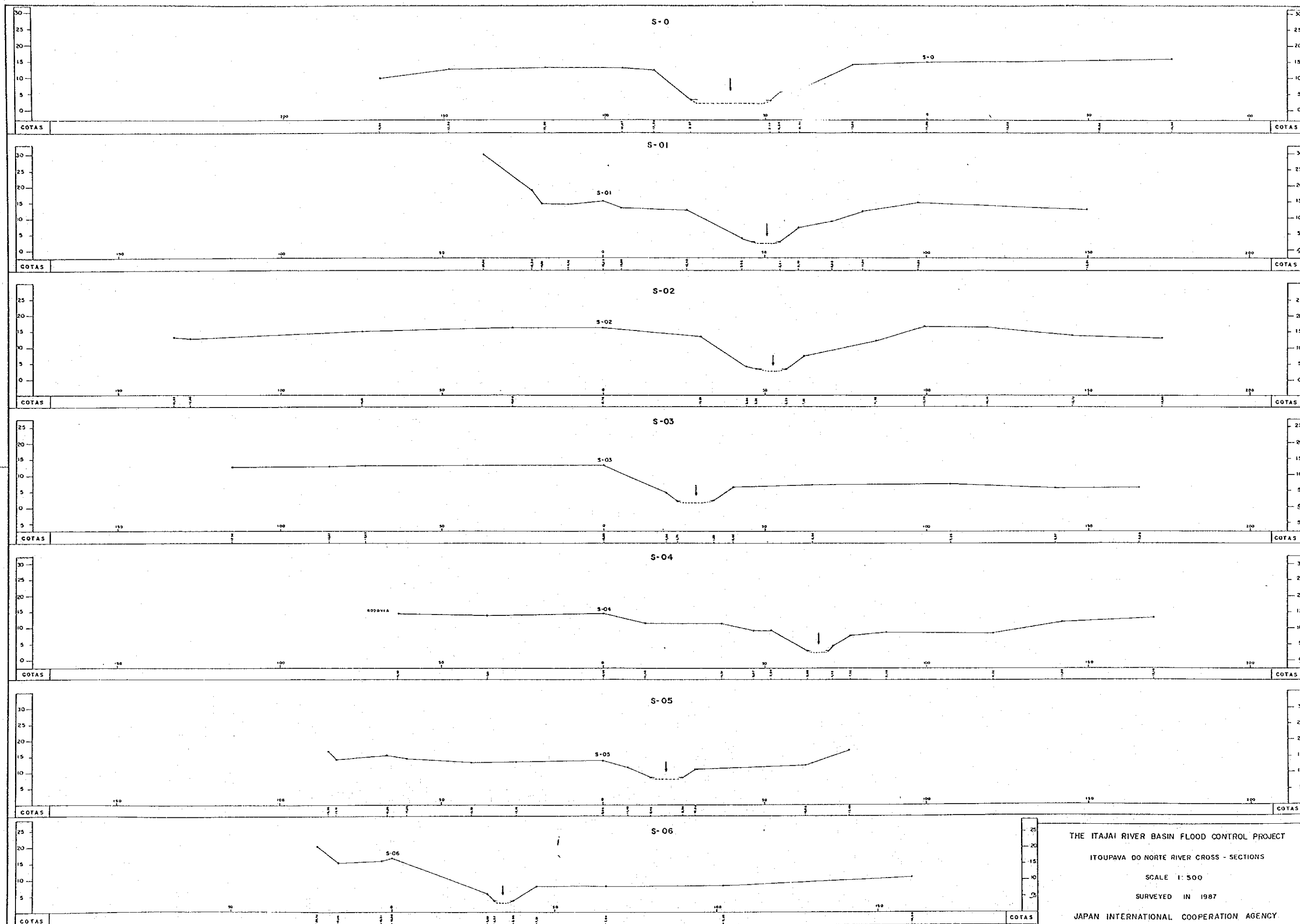
THE ITAJAI RIVER BASIN FLOOD CONTROL PROJECT

VELHA RIVER CROSS - SECTIONS

SCALE 1:500

SURVEYED IN 1987

JAPAN INTERNATIONAL COOPERATION AGENCY



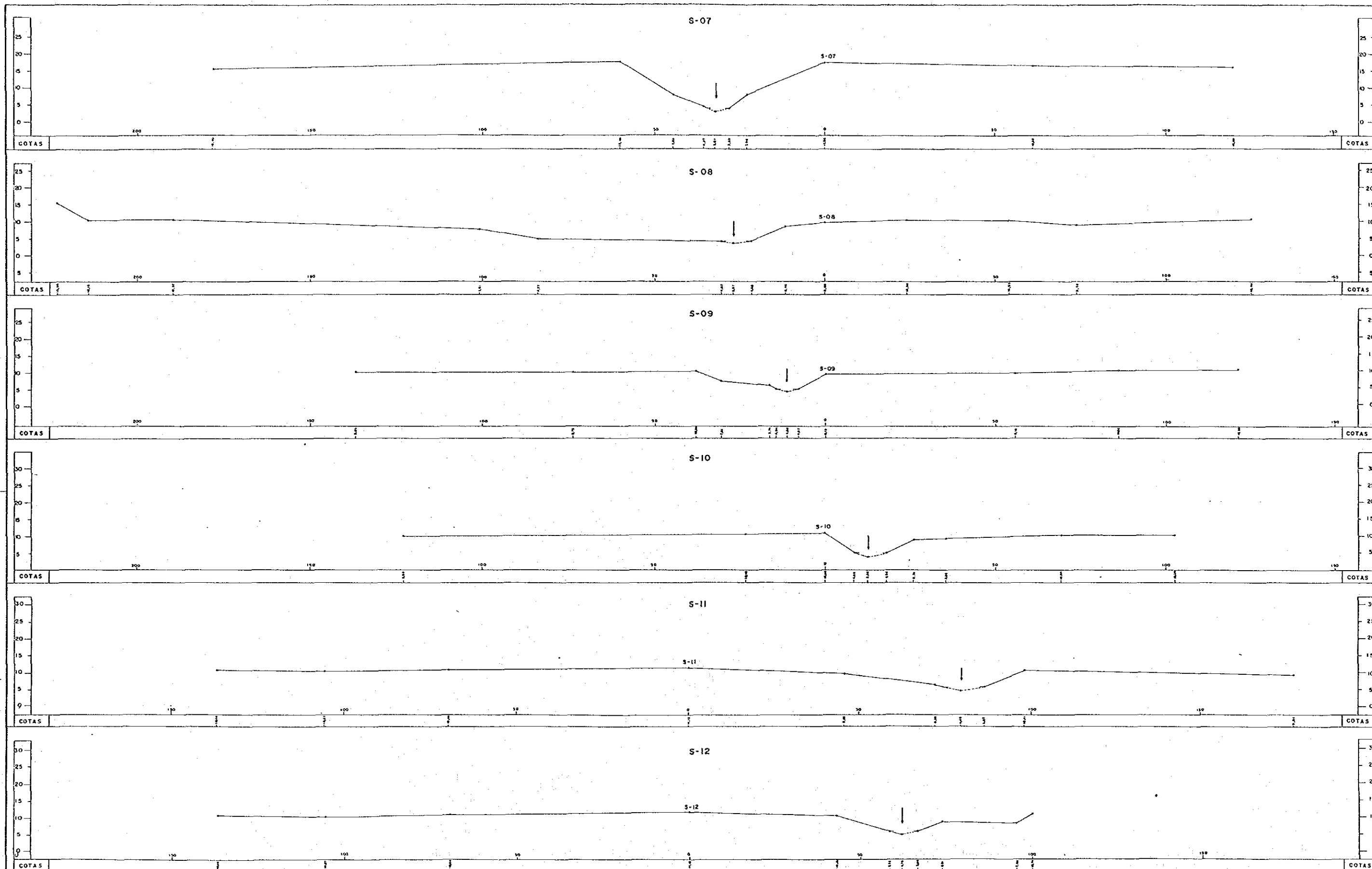
THE ITAJAI RIVER BASIN FLOOD CONTROL PROJECT

ITUUPAVA DO NORTE RIVER CROSS - SECTIONS

SCALE 1:500

SURVEYED IN 1987

JAPAN INTERNATIONAL COOPERATION AGENCY



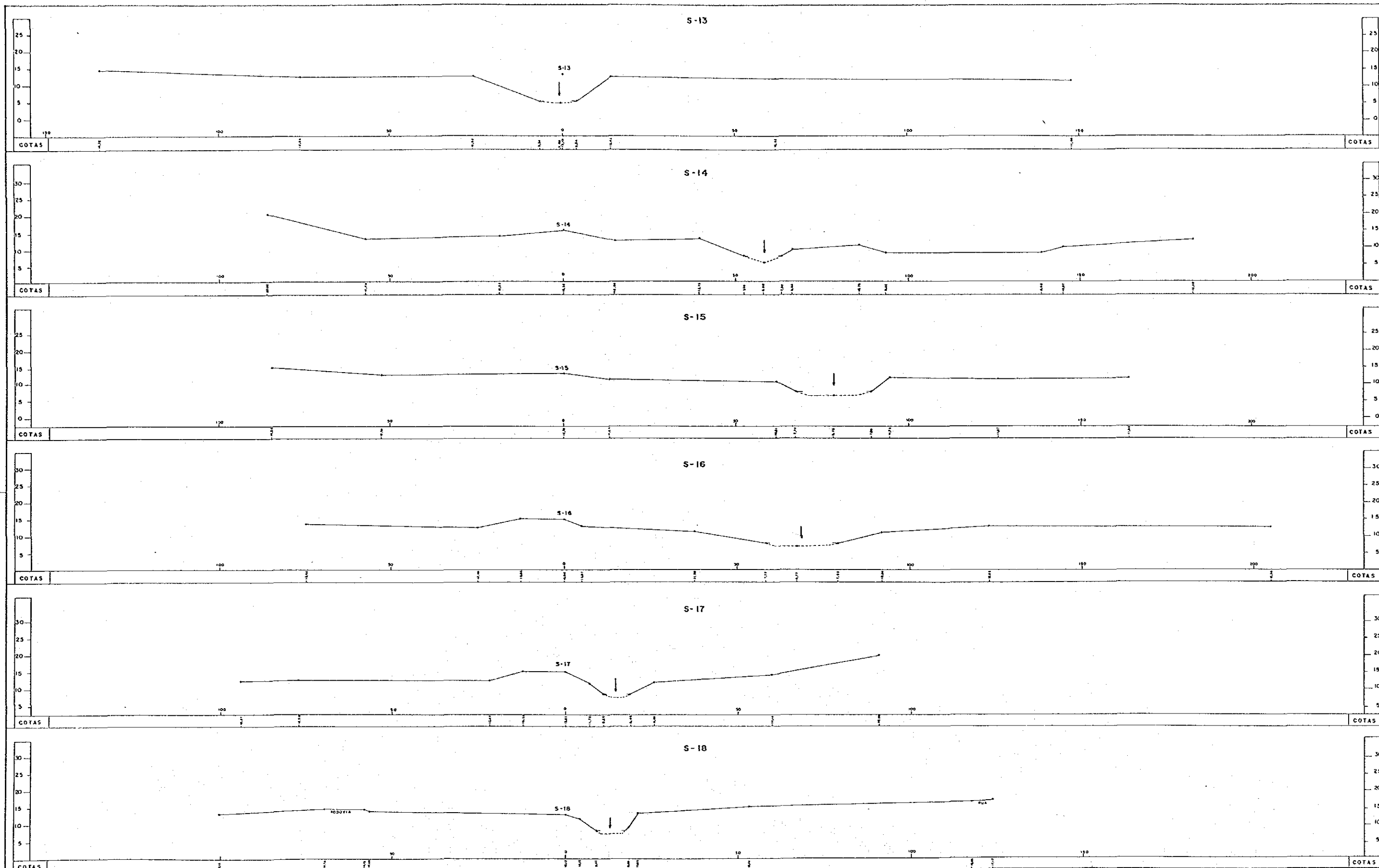
THE ITAJAI RIVER BASIN FLOOD CONTROL PROJECT

ITOUPIAVA DO NORTE RIVER CROSS - SECTIONS

SCALE 1:500

SURVEYED IN 1987

JAPAN INTERNATIONAL COOPERATION AGENCY



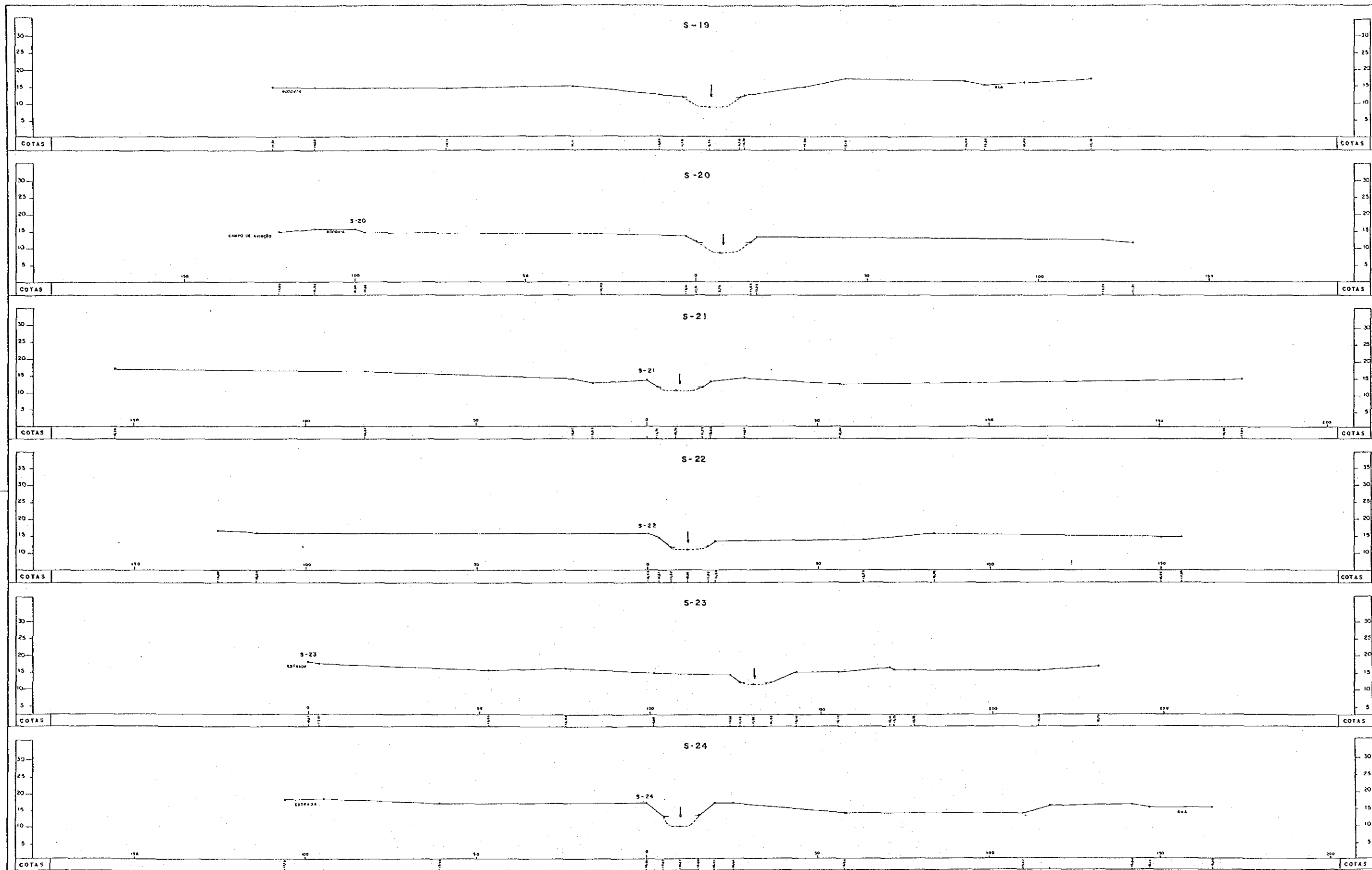
THE ITAJAI RIVER BASIN FLOOD CONTROL PROJECT

ITOUPIAVA DO NORTE RIVER CROSS - SECTIONS

SCALE 1:500

SURVEYED IN 1987

JAPAN INTERNATIONAL COOPERATION AGENCY



THE ITAJAI RIVER BASIN FLOOD CONTROL PROJECT
 ITAIPAVA DO NORTE RIVER CROSS - SECTIONS
 SCALE 1:500
 SURVEYED IN 1987
 JAPAN INTERNATIONAL COOPERATION AGENCY

II. FLOOD RUNOFF RECORDS

II.

Table FLOOD RUNOFF RECORDS IN THE ITAJAI RIVER BASIN IN 1978

Day	Time	Rio do Sul		Ibirama		Timbo		Apiuna		Indaial		Brusque	
		G.H. (cm)	Dis. (cms)	G.H. (cm)	Dis. (cms)	G.H. (cm)	Dis. (cms)	G.H. (cm)	Dis. (cms)	G.H. (cm)	Dis. (cms)	G.H. (cm)	Dis. (cms)
Dec.													
25	0:00	94	27					53	50			109	12
	3:00	96	28					53	50			109	12
	6:00	99	30					53	50			110	12
	7:00	100	31	77	16	54	17	52	48	117	65	117	14
	9:00	107	36					54	52			110	12
	12:00	130	53					56	56			119	15
	15:00	152	62					60	64			140	24
	17:00	168	82	101	50	97	36	72	93	142	122	142	25
	18:00	186	98					72	93			187	45
	21:00	232	139					93	152			267	90
26	0:00	308	213					148	336			360	155
	3:00	465	400					197	525			442	222
	6:00	620	622					360	1267			556	326
	7:00	640	655	443	1004	638	548	400	1476	508	2106		
	9:00	662	690					470	1847			700	480
	12:00	680	720					540	2250			758	546
	15:00	670	703					547	2291			740	520
	17:00	659	685	440	990	646	559	530	2191	592	2836		
	18:00	652	674					522	2145			680	455
	21:00	634	645					488	1948			620	390
27	0:00	616	616					450	1737			553	323
	3:00	596	584					410	1523			488	263
	6:00	572	565					378	1357			414	199
	7:00	561	535	291	466	396	247	362	1277	458	1785		
	9:00	540	505					345	1192			350	150
	12:00	510	461					327	1105			314	122
	15:00	490	433					306	1003			292	107
	17:00	477	416	232	299	258	129	292	936	446	1695	226	66
	18:00	472	409					286	912			274	96
	21:00	455	387					269	832			260	86
28	0:00	436	362					255	771			245	77
	3:00	416	336					234	681			235	71
	6:00	395	312					221	627			226	66
	7:00	386	302	187	188	164	69	218	615	298	752		
	9:00	364	273					210	582			218	61
	12:00	332	237					199	534			212	58
	15:00	307	212									206	55
	17:00	311	216	171	154	140	56	182	487	260	570		
	18:00	314	219					180	457			200	52
	21:00	320	225									195	49
29	0:00	323	228					165	400			191	47
	3:00	325	230										
	6:00	328	233					158	373			182	42
	7:00	328	233	154	122	119	46	158	373	128	86		
	9:00	332	237										
	12:00	341	247					156	366			175	38
	15:00	356	263										
	17:00	368	278	145	105	110	41	155	362	124	78		
	18:00	372	282										
	21:00	381	294										
30	0:00	391	309									164	34
	3:00	400	315										
	6:00	408	325										
	7:00	419	331	136	89	103	38	170	419	238	480		
	9:00	423	345										
	12:00											156	31
	15:00												
	17:00	418	338	131	97	97	36	172	427	240	490		
	18:00												
	21:00												
31	0:00											149	28
	3:00												
	6:00												
	7:00	411	329	124	70	89	32	170	419	236	470		
	9:00												
	12:00												
	15:00												
	17:00	403	319	120	64	80	28	167	408	232	450		

Note : "G.H." and "Dis." mean gauge height and discharge, respectively.

Table FLOOD RUNOFF RECORDS IN THE ITAJAI RIVER BASIN IN 1980

Day	Time	Rio do Sul Novo		Ibirama		Timbo		Apluna		Indaial		Brusque	
		G.H. (cm)	Dis. (cms)	G.H. (cm)	Dis. (cms)	G.H. (cm)	Dis. (cms)	G.H. (cm)	Dis. (cms)	G.H. (cm)	Dis. (cms)	G.H. (cm)	Dis. (cms)
Dec.													
19	0:00	172	86									134	21
	3:00	172	86									134	21
	6:00	166	81									135	21
	7:00	159	75	108	48	90	32	86	131	158	168	136	22
	9:00	160	76									136	22
	12:00	156	73									136	22
	15:00	153	70									136	22
	17:00	148	67	110	50	86	31	94	155	152	147	137	22
	18:00	151	69									136	22
	21:00	162	78									137	22
20	0:00	187	100									138	23
	3:00	198	108									140	24
	6:00	238	144									142	25
	7:00	261	165	122	67	212	97	102	179	216	388	144	26
	9:00	310	215									146	27
	12:00	402	318									148	28
	15:00	472	409									151	29
	17:00	516	470	296	482	220	103	196	521	222	408	153	30
	18:00	530	490									158	32
	21:00	605	599									190	46
21	0:00	650	671									336	137
	3:00	690	736									402	189
	6:00	720	786									441	221
	7:00	724	793	552	1527	678	598	584	2510	580	2740	450	230
	9:00	730	803									470	247
	12:00	750	837									510	285
	15:00	757	849									539	309
	17:00	757	849	730	2475	728	687	770	3690	660	3500	545	315
	18:00	757	849									540	310
	21:00	757	849									534	304
22	0:00	756	847									529	299
	3:00	754	844									525	293
	6:00	740	820									510	285
	7:00	738	817	482	1192	650	565	550	2309	636	3260	500	275
	9:00	730	803									475	251
	12:00	720	786									435	217
	15:00											390	180
	17:00	704	759	382	770	512	376	460	1791	509	2172	365	159
	18:00											354	152
	21:00											328	132
23	0:00											308	118
	3:00											292	107
	6:00											279	97
	7:00	660	687	308	519	342	196	338	1157	440	1650	274	94
	9:00											268	91
	12:00											258	85
	15:00											250	80
	17:00	622	625	278	429	274	141	304	994	204	340	242	75
	18:00											242	75
	21:00											235	71
24	0:00											230	68
	3:00												
	6:00											224	64
	7:00	620	622	242	326	242	117	300	974	208	360	224	64
	9:00												
	12:00											220	62
	15:00												
	17:00	628	636	222	272	261	131	286	909	212	376	212	58
	18:00											211	58
	21:00												
25	0:00												
	3:00												
	6:00												
	7:00	570	30	201	222	229	108	264	810	220	400	197	50
	9:00												
	12:00												
	15:00												
	17:00	529	489	192	200	206	74	242	715	224	428	194	48
	18:00												
	21:00												

Note : "G.H." and "Dis." mean gauge height and discharge, respectively.

Table FLOOD RUNOFF RECORDS IN THE ITAJAI RIVER BASIN IN 1980

Day	Time	Rio do Sul Novo		Ibirama		Timbo		Apluna		Indaial		Brusque	
		G.H. (cm)	Dis. (cms)	G.H. (cm)	Dis. (cms)	G.H. (cm)	Dis. (cms)	G.H. (cm)	Dis. (cms)	G.H. (cm)	Dis. (cms)	G.H. (cm)	Dis. (cms)
Dec.													
26	0:00												
	3:00												
	6:00												
	7:00	520	476	184	182	185	81	227	652	230	440	181	42
	9:00												
	12:00												
	15:00												
	17:00	499	445	173	158	177	80	216	607	232	450	178	40
	18:00												
	21:00												
27	0:00												
	3:00												
	6:00												
	7:00	476	414	162	136	157	65	200	538	242	498	169	36
	9:00												
	12:00												
	15:00												
	17:00	474	412	169	150	153	63	194	512	244	506	165	34
	18:00												
	21:00												
28	0:00												
	3:00												
	6:00												
	7:00	478	417	178	169	190	78	198	529	246	514	210	57
	9:00												
	12:00												
	15:00												
	17:00	494	438	198	215	320	177	212	590	249	526	244	76

Note : "G.H." and "Dis." mean gauge height and discharge, respectively.

Table FLOOD RUNOFF RECORDS IN THE ITAJAI RIVER BASIN IN 1983

Day	Time	Rio do Sul Novo		Ibirama		Timbo		Apiuna		Indaial		Brusque	
		G.H. (cm)	Dis. (cms)	G.H. (cm)	Dis. (cms)	G.H. (cm)	Dis. (cms)	G.H. (cm)	Dis. (cms)	G.H. (cm)	Dis. (cms)	G.H. (cm)	Dis. (cms)
Jul.													
5	0:00												
	3:00												
	6:00												
	7:00	255	161	142	99	143	58	140	306	216	388	188	45
	9:00												
	12:00												
	15:00												
	17:00	254	160	144	103	133	53	133	281	212	376	185	44
	18:00												
	21:00												
6	0:00	260	165										
	3:00	262	167										
	6:00	323	228										
	7:00	354	261	216	257	270	138	188	487	254	546	288	104
	9:00	406	323										
	12:00	467	402										
	15:00	509	460										
	17:00	527	486	332	595	476	333	308	1013	412	1440	402	189
	18:00	536	499										
	21:00	560	534										
7	0:00	592	579										
	3:00	620	622										
	6:00	675	729										
	7:00	698	749	480	1180	-	-	436	1661	530	2340	496	271
	9:00	736	813										
	12:00	780	888										
	15:00	807	936										
	17:00	822	961	630	1925	-	-	720	3365	655	3450	680	455
	18:00	832	979										
	21:00	862	1033										
8	0:00	887	1073										
	3:00	910	1120										
	6:00	922	1144										
	7:00	926	1132	730	2475	-	-	825	4047	754	4494	682	457
	9:00	930	1160										
	12:00	934	1168										
	15:00	938	1176										
	17:00	942	1184	650	2025	-	-	805	3937	756	4516	582	352
	18:00	944	1188										
	21:00	968	1236										
9	0:00	1012	1324										
	3:00	1040	1380										
	6:00	1063	1426										
	7:00	1068	1436	690	2250	-	-	844	4171	776	4736	630	400
	9:00	1080	1460										
	12:00	1094	1488										
	15:00	1102	1504										
	17:00	1105	1510	528	1403	-	-	806	3925	778	4758	662	433
	18:00	1106	1512										
	21:00	1106	1512										
10	0:00	1106	1512										
	3:00	1113	1526										
	6:00	1122	1544										
	7:00	1125	1550	521	1379	575	458	726	3404	706	3966	550	320
	9:00	1138	1576										
	12:00	1150	1600										
	15:00	1162	1624										
	17:00	1169	1638	504	1295	718	670	746	3534	708	3988	626	396
	18:00	1173	1646										
	21:00	1182	1664										
11	0:00	1190	1680										
	3:00	1200	1700										
	6:00	1210	1710										
	7:00	1220	1720	444	1008	670	595	696	3209	708	3988	598	368
	9:00	1222	1724										
	12:00	1235	1770										
	15:00	1248	1796										
	17:00	1262	1824	421	905	592	481	710	3300	706	3966	603	375
	18:00	1270	1840										
	21:00	1292	1884										

Note : "G.H." and "Dis." mean gauge height and discharge, respectively.

Table FLOOD RUNOFF RECORDS IN THE ITAJAI RIVER BASIN IN 1983

Day	Time	Rio do Sul Novo		Ibirama		Timbo		Apiuna		Indaial		Brusque	
		G.H. (cm)	Dis. (cms)	G.H. (cm)	Dis. (cms)	G.H. (cm)	Dis. (cms)	G.H. (cm)	Dis. (cms)	G.H. (cm)	Dis. (cms)	G.H. (cm)	Dis. (cms)
Jul.													
12	0:00	1313	1926										
	3:00	1328	1964										
	6:00	1328	1964										
	7:00	1328	1964	467	1118	730	690	800	3885	702	3922	754	538
	9:00												
	12:00												
	15:00												
	17:00	1280	1860	501	1280	767	751	864	4301	740	4340	655	425
	18:00												
	21:00												
13	0:00												
	3:00												
	6:00												
	7:00	1192	1684	404	846	580	464	754	3585	718	4098	478	253
	9:00												
	12:00												
	15:00												
	17:00	1146	1592	349	652	498	358	666	3014	698	3880	427	211
	18:00												
	21:00												
14	0:00												
	3:00												
	6:00												
	7:00	1082	1464	314	537	406	257	590	2545	666	3560	402	189
	9:00												
	12:00												
	15:00												
	17:00	1030	1360	295	479	367	218	546	2285	554	2532	365	159
	18:00												
	21:00												
15	0:00												
	3:00												
	6:00												
	7:00	949	1198	270	403	308	167	488	1948	490	2025	346	146
	9:00												
	12:00												
	15:00												
	17:00	900	1100	261	379	294	156	450	1737	476	1938	327	131
	18:00												
	21:00												

Note : "G.H." and "Dis." mean gauge height and discharge, respectively.

Table FLOOD RUNOFF RECORDS IN THE ITAJAI RIVER BASIN IN 1984

Day	Time	Rio do Sul Novo		Ibirama		Timbo		Apluna		Indaial		Brusque	
		G.H. (cm)	Dis. (cms)	G.H. (cm)	Dis. (cms)	G.H. (cm)	Dis. (cms)	G.H. (cm)	Dis. (cms)	G.H. (cm)	Dis. (cms)	G.H. (cm)	Dis. (cms)
Aug.													
4	0:00												
	3:00												
	6:00												
	7:00	295	200	182	177	150	61	175	438	240	490	195	49
	9:00												
	12:00												
	15:00												
	17:00	278	183	168	148	120	46	181	461	236	470	180	41
	18:00												
	21:00												
5	0:00			166	144								
	3:00			163	139								
	6:00			160	133								
	7:00	288	193	162	137	94	86	198	529	242	498	202	53
	9:00			165	143								
	12:00			176	165								
	15:00			200	220								
	17:00	581	563	253	357	356	208	218	615	544	2452	406	192
	18:00			267	395								
	21:00			305	510								
6	0:00			352	662								
	3:00			396	819								
	6:00			436	975								
	7:00	870	1047	450	1035	564	443	518	2121	606	2960	758	546
	9:00			491	1244								
	12:00			549	1514								
	15:00			594	1736								
	17:00	1060	1420			764	746	840	4145	654	3440		
	18:00			631	1930								
	21:00			656	2061								
7	0:00												
	3:00			656	2061								
	6:00			638	1965								
	7:00	1240	1780			826	854	866	4314	802	5026		NO RECORD
	9:00			612	1812								
	12:00			580	1655								
	15:00			547	2002								
	17:00	1280	1860	531	1415	768	753	796	3859	780	4780		
	18:00			517	1360								
	21:00			452	1046								
8	0:00			431	950								
	3:00			423	914								
	6:00			415	883								
	7:00	1205	1710			622	524	696	3209	684	3740		
	9:00			405	850								
	12:00			392	804								
	15:00			381	766								
	17:00	1190	1680			540	411	584	2510	626	3160		NO RECORD
	18:00			369	722								
	21:00			358	683								
9	0:00			347	645								
	3:00			337	611								
	6:00												
	7:00	1133	1566	333	598	415	266	565	2398	-	-		
	9:00												
	12:00			318	550								
	15:00												
	17:00	1025	1350	305	510	557	433	509	2069	-	-		
	18:00			305	510								
	21:00												
10	0:00			289	460								
	3:00												
	6:00			277	425								
	7:00	958	1216	275	419	291	154	344	1187	-	-		
	9:00												
	12:00												
	15:00												
	17:00	904	1104	237	312	264	133	415	1549	437	1628		
	18:00												
	21:00												

Note : "W.L." and "Dis." mean gauge height and discharge, respectively.

Table FLOOD RUNOFF RECORDS IN THE ITAJAI RIVER BASIN IN 1984

Day	Time	Rio do Sul		Ibirama		Timbo		Apiuna		Indaial		Brusque	
		Novo		G.H. (cm)	Dis. (cms)	G.H. (cm)	Dis. (cms)	G.H. (cm)	Dis. (cms)	G.H. (cm)	Dis. (cms)	G.H. (cm)	Dis. (cms)
		G.H. (cm)	Dis. (cms)										
Aug.													
11	0:00												
	3:00												
	6:00												
	7:00	844	1000	218	262	228	108	385	1393	412	1440		
	9:00												
	12:00												
	15:00												
	17:00	796	915	208	238	212	97	357	1252	400	1350		
	18:00												
	21:00												
12	0:00												
	3:00												
	6:00												
	7:00	730	808	195	208	194	86	326	1100	400	1350		
	9:00												
	12:00												
	15:00												
	17:00	694	742	188	191	184	80	301	979	400	1350		
	18:00												
	21:00												
13	0:00												
	3:00												
	6:00												
	7:00	640	655	180	173	168	71	274	854	400	1350		
	9:00												
	12:00												
	15:00												
	17:00	602	593	175	163	160	66	255	771	400	1350		
	18:00												
	21:00												
14	0:00												
	3:00												
	6:00												
	7:00	568	545	168	148	160	66	238	698	400	1350		
	9:00												
	12:00												
	15:00												
	17:00	552	523	166	144	158	65	230	664	398	1338		
	18:00												
	21:00												
15	0:00												
	3:00												
	6:00												
	7:00	525	483	162	137	144	58	220	623	398	1338		
	9:00												
	12:00												
	15:00												
	17:00	514	467	159	131	140	56	215	604	398	1338		

Note : "W.L." and "Dis." mean gauge height and discharge, respectively.

III. STORM RAINFALL RECORDS

Table STORM RAINFALL ON AUG. 1984

NO. of Station	Date						
	4	5	6	7	8	9	10
2648000	-	-	-	-	-	-	-
2648001	-	-	-	-	-	-	-
2648002	0.0	41.4	54.8	125.0	17.8	1.2	0.0
2648019	0.0	20.0	30.0	20.0	0.0	15.0	0.0
2649000	-	-	-	-	-	-	-
2649001	3.6	21.2	94.8	73.2	20.6	1.4	0.0
2649002	1.0	0.0	110.6	85.5	24.4	0.5	0.0
2649003	0.0	36.0	82.2	58.4	15.8	0.0	6.8
2649004	0.0	0.0	120.0	81.0	22.1	0.0	1.6
2649005	-	-	-	-	-	-	-
2649007	0.0	4.6	105.0	47.0	0.0	0.0	0.0
2649008	10.2	0.4	105.0	75.1	40.6	0.2	0.0
2649009	5.8	11.4	94.5	87.0	2.2	0.4	3.0
2649010	2.0	0.0	117.4	93.4	20.8	0.6	0.0
2649017	1.3	0.0	110.8	75.0	32.2	0.1	0.0
2649019	-	-	-	-	-	-	-
2649020	-	-	-	-	-	-	-
2649024	-	-	-	-	-	-	-
2649037	-	-	-	-	-	-	-
2649038	0.4	23.0	101.2	0.0	101.0	0.0	0.4
2649053	1.8	24.4	93.0	52.0	14.8	0.4	2.0
2649054	0.0	0.0	126.4	51.8	27.4	0.9	0.4
2649055	-	-	-	-	-	-	-
2649056	-	-	-	-	-	-	-
2649058	0.0	0.0	91.8	63.3	22.6	0.0	5.8
2649061	0.4	26.8	93.8	72.2	23.0	0.6	1.4
2650000	0.0	0.0	94.8	86.8	14.6	11.4	0.0
2650014	0.0	20.4	98.0	58.6	12.0	1.1	1.6
2650015	-	-	-	-	-	-	-
2650016	0.0	0.0	97.4	49.0	17.4	0.0	5.0
2748000	0.0	27.2	105.2	-	-	-	-
2748001	-	-	-	-	-	-	-
2748002	-	-	-	-	-	-	-
2748003	-	-	-	-	-	-	-
2748014	-	-	-	-	-	-	-
2749000	3.0	27.0	97.3	78.2	19.4	0.0	1.8
2749001	0.0	26.4	93.1	72.4	11.2	0.0	3.2
2749002	2.0	50.0	88.2	102.3	15.2	0.0	1.4
2749003	2.2	33.1	108.6	64.3	0.0	0.0	0.0
2749004	-	-	-	-	-	-	-
2749005	0.0	18.4	86.0	67.5	12.5	0.0	4.0
2749006	0.0	34.8	110.4	75.2	10.0	0.0	5.4
2749007	2.9	39.2	81.8	80.8	12.8	3.8	6.6
2749008	-	-	-	-	-	-	-
2749011	-	-	-	-	-	-	-
2749013	0.0	54.2	101.5	80.0	20.4	15.8	8.4
2749014	-	-	-	-	-	-	-
2749015	-	-	-	-	-	-	-
2749016	0.0	23.0	148.0	75.0	22.0	0.0	3.0
2749017	4.4	33.2	125.6	106.0	23.4	18.4	1.2
2749020	-	-	-	-	-	-	-
2749022	1.5	20.0	100.3	57.0	13.0	0.0	2.5
2749024	0.0	36.0	106.7	101.5	3.5	0.0	0.0
2749025	27.8	27.0	97.3	78.2	19.4	0.0	0.0
2749027	3.8	7.6	53.0	65.2	7.4	4.2	1.3
2749033	1.3	0.0	148.0	105.4	9.3	0.0	3.2
2749034	-	-	-	-	-	-	-
2749037	1.3	32.2	83.4	80.6	16.4	1.0	10.2
2749039	0.0	41.8	109.6	69.1	5.2	4.6	0.0
2749041	0.0	63.6	109.2	126.6	33.2	0.0	0.0
2750003	1.0	47.7	55.0	60.0	9.0	0.0	4.0
2749009	0.9	40.1	120.0	94.7	13.0	1.4	11.2
2750010	-	-	-	-	-	-	-
2750011	1.1	61.0	110.2	120.2	12.6	10.2	0.2
2749032	0.4	30.0	108.6	71.0	11.4	5.2	7.6

Table STORM RAINFALL ON DEC. 1978

NO. of	Date						NO. of	Date					
Station	23	24	25	26	27	28	Station	23	24	25	26	27	28
2648000	-	-	-	-	-	-	2749014	-	-	-	-	-	0.0
2648001	1.1	1.3	12.3	91.8	0.0	0.0	2749015	24.6	0.0	3.5	12.8	-	0.0
2648002	0.0	0.0	15.5	87.0	0.0	0.0	2749016	1.0	0.0	18.0	100.0	0.0	0.0
2648019	0.0	0.0	0.0	8.0	0.0	0.0	2749017	4.4	0.0	24.8	92.4	0.0	0.0
2649000	-	-	-	-	-	-	2749020	1.6	10.0	4.3	115.0	0.0	0.0
2649001	-	-	-	-	-	-	2749022	4.0	-	10.5	118.5	0.0	0.0
2649002	1.2	0.3	16.0	102.0	0.0	0.0	2749024	1.0	-	21.5	117.5	0.0	0.0
2649003	2.8	0.0	6.0	70.2	0.0	0.0	2749025	-	-	10.0	117.0	0.0	0.0
2649004	0.0	0.0	6.3	116.2	0.0	0.0	2749027	2.1	0.0	7.1	112.0	3.1	27.0
2649005	0.0	0.0	0.0	112.6	0.0	0.0	2749033	0.0	0.0	0.0	145.3	0.0	0.0
2649007	-	-	-	144.0	0.0	0.0	2749034	5.0	9.0	64.6	34.0	0.0	0.0
2649008	0.0	0.0	0.0	75.0	0.0	0.0	2749037	0.0	0.0	26.7	87.4	0.0	0.0
2649009	0.0	0.4	7.8	87.8	0.0	0.0	2749039	0.0	0.0	21.0	136.0	0.6	0.0
2649010	2.6	0.6	19.2	145.0	0.0	0.0	2749041	-	-	-	-	-	-
2649017	1.2	0.0	0.8	148.0	0.0	0.0	2750003	-	-	-	-	-	-
2649019	-	-	-	-	-	-	2749009	0.0	0.0	0.0	4.4	0.0	0.0
2649020	-	-	-	-	-	-	2750010	0.0	0.0	6.1	56.0	0.0	0.0
2649024	-	-	-	-	-	-	2750011	0.0	0.0	8.6	36.1	8.2	0.0
2649037	-	-	-	-	-	-	2749032	0.0	0.0	105.4	7.4	0.0	0.0
2649038	0.0	0.0	0.0	112.6	0.0	0.0							
2649053	0.0	0.0	25.2	115.3	0.0	0.0							
2649054	0.0	0.0	14.8	10.9	0.0	0.0							
2649055	0.0	0.0	2.1	76.8	0.2	0.0							
2649056	6.3	0.0	5.2	71.6	0.2	0.0							
2649058	0.0	0.0	20.8	132.4	0.0	0.0							
2649061	0.0	0.0	25.5	105.0	0.0	0.0							
2650000	0.0	28.3	24.6	0.0	0.0	0.0							
2650014	0.0	0.0	0.0	100.0	0.0	12.2							
2650015	0.0	0.0	0.0	56.4	-	0.0							
2650016	2.5	0.0	13.4	50.0	0.0	0.0							
2748000	2.0	0.0	12.6	135.0	0.0	0.0							
2748001	15.0	0.0	8.4	96.2	0.0	0.0							
2748002	2.3	0.0	0.0	125.2	0.0	0.0							
2748003	0.0	1.8	4.2	105.6	0.0	0.0							
2748014	-	-	-	-	-	0.0							
2749000	1.4	0.0	1.7	118.2	0.0	0.0							
2749001	0.0	0.0	14.7	110.1	0.0	0.0							
2749002	0.0	0.0	12.4	100.0	0.0	0.0							
2749003	0.0	0.0	18.3	120.6	0.0	0.0							
2749004	-	-	-	-	-	0.0							
2749005	-	6.0	8.0	84.0	0.0	0.0							
2749006	0.0	0.0	11.0	108.0	0.0	0.0							
2749007	0.0	0.0	19.4	79.8	0.2	0.0							
2749008	0.0	0.8	16.8	140.0	10.4	0.0							
2749011	-	-	-	-	-	-							
2749013	0.0	0.0	22.4	104.4	1.2	0.0							

Table STORM RAINFALL ON DEC. 1980

NO. of Station	Date						NO. of Station	Date					
	18	19	20	21	22	23		18	19	20	21	22	23
2648000	-	-	-	-	-	-	2749014	-	-	-	-	-	-
2648001	0.0	37.2	21.2	31.2	19.6	8.5	2749015	0.0	6.4	25.6	11.4	0.0	0.0
2648002	0.0	30.2	27.2	33.2	11.4	7.5	2749016	0.0	10.0	21.2	50.0	7.2	0.0
2648019	25.0	0.0	0.0	0.0	0.0	0.0	2749017	0.0	16.4	67.2	80.0	12.2	0.0
2649000	-	-	-	-	-	-	2749020	11.8	0.0	51.2	54.2	12.0	0.0
2649001	-	-	-	-	-	-	2749022	3.0	4.5	42.0	76.0	4.0	0.0
2649002	0.2	10.0	55.8	88.0	19.8	0.0	2749024	0.0	25.0	60.0	85.5	10.5	0.0
2649003	0.0	0.0	4.0	-	-	-	2749025	-	14.0	27.0	98.0	11.0	-
2649004	0.0	7.1	39.2	89.8	10.4	0.0	2749027	0.0	3.8	50.4	154.0	47.4	1.5
2649005	-	-	-	-	-	-	2749033	19.0	0.0	0.0	0.0	0.0	0.0
2649007	0.0	0.6	25.0	59.4	11.8	0.0	2749034	0.0	9.8	66.2	52.4	15.2	0.0
2649008	0.0	15.0	50.4	75.2	75.6	0.0	2749037	0.0	10.2	53.2	64.5	10.2	0.0
2649009	0.0	18.4	21.0	45.0	21.2	14.0	2749039	-	-	-	-	-	-
2649010	0.0	21.6	32.4	88.2	18.0	0.0	2749041	-	-	-	-	-	-
2649017	1.8	6.4	22.4	107.2	14.2	0.4	2750003	0.0	0.0	0.0	0.0	0.0	0.0
2649019	-	-	-	-	-	-	2749009	0.0	5.3	45.2	71.3	8.2	0.0
2649020	-	-	-	-	-	-	2750010	0.0	4.6	48.0	12.4	10.2	0.0
2649024	-	-	-	-	-	-	2750011	0.0	2.2	35.0	42.4	2.1	0.0
2649037	-	-	-	-	-	-	2749032	28.4	41.2	90.2	13.2	0.0	27.0
2649038	-	-	-	-	-	-							
2649053	1.2	24.8	90.2	90.6	7.0	0.0							
2649054	0.0	1.8	31.2	94.8	10.8	2.4							
2649055	-	-	-	-	-	-							
2649056	3.3	2.0	32.0	122.0	20.0	0.0							
2649058	0.0	4.2	52.6	7.3	18.6	0.0							
2649061	0.0	1.6	36.8	103.4	13.0	8.0							
2650000	0.0	20.0	0.0	89.1	0.0	3.0							
2650014	8.6	128.0	100.4	16.0	0.0	0.0							
2650015	0.0	9.2	11.3	72.8	10.2	0.0							
2650016	0.0	17.6	92.8	38.8	3.4	0.0							
2748000	12.4	0.0	0.0	0.0	0.0	0.0							
2748001	0.0	6.2	23.6	43.4	11.8	0.0							
2748002	-	-	-	-	-	-							
2748003	0.0	7.6	32.2	60.4	21.2	0.0							
2748014	-	-	-	-	-	-							
2749000	0.0	11.8	26.4	97.6	7.8	0.0							
2749001	4.0	3.1	40.8	71.2	20.0	0.0							
2749002	0.0	18.4	62.6	74.2	8.4	0.0							
2749003	0.0	5.9	100.3	67.5	5.3	0.0							
2749004	-	-	-	-	-	-							
2749005	1.0	2.5	43.2	52.6	18.4	4.5							
2749006	0.0	2.2	103.2	69.0	9.0	0.0							
2749007	0.0	12.4	41.2	77.6	10.8	0.0							
2749008	-	-	-	-	-	-							
2749011	-	-	-	-	-	-							
2749013	0.0	11.6	56.6	60.0	8.2	2.4							

