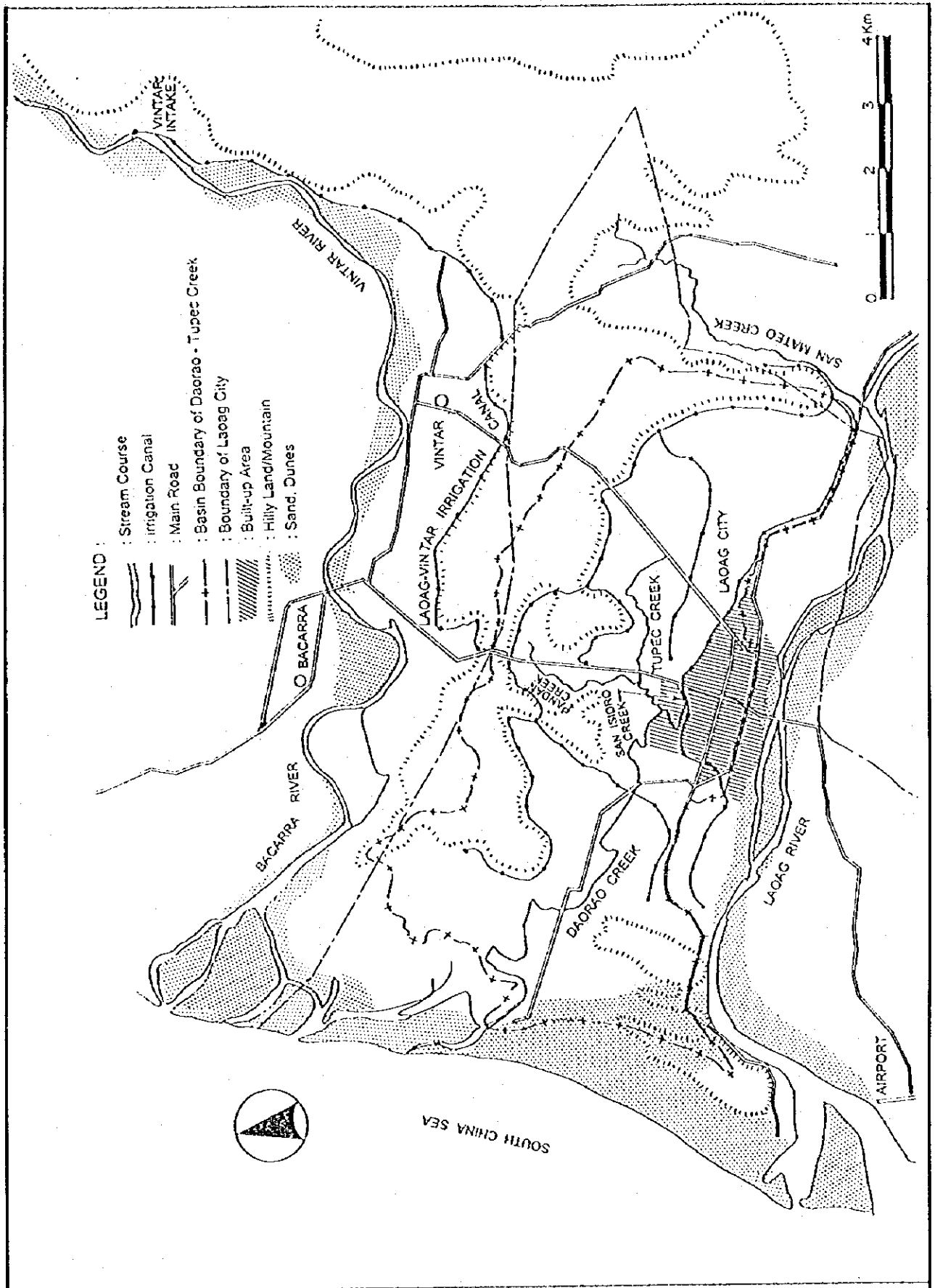


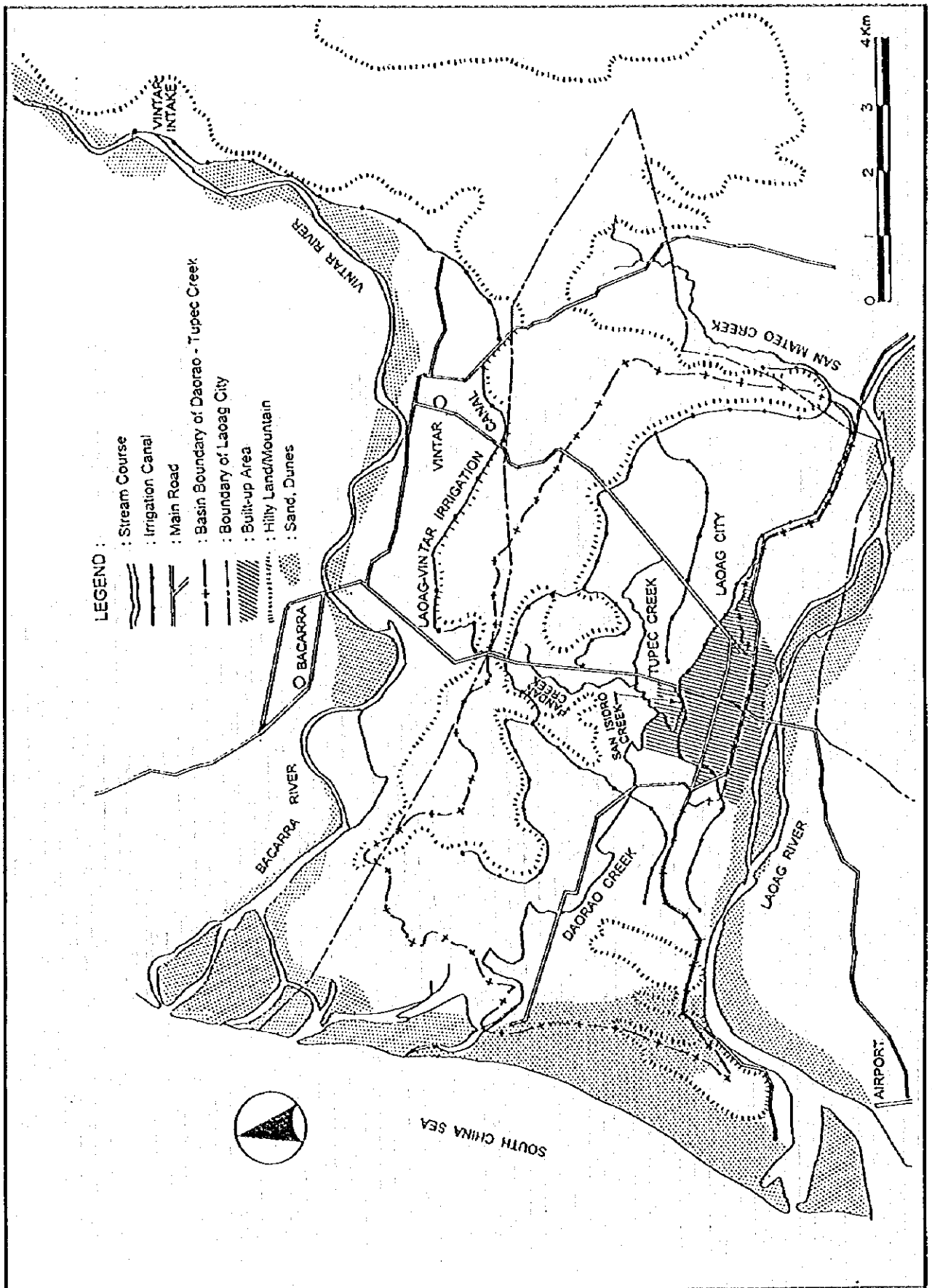
FIGURES



THE STUDY ON SABO AND FLOOD CONTROL
IN THE LAOAG RIVER BASIN

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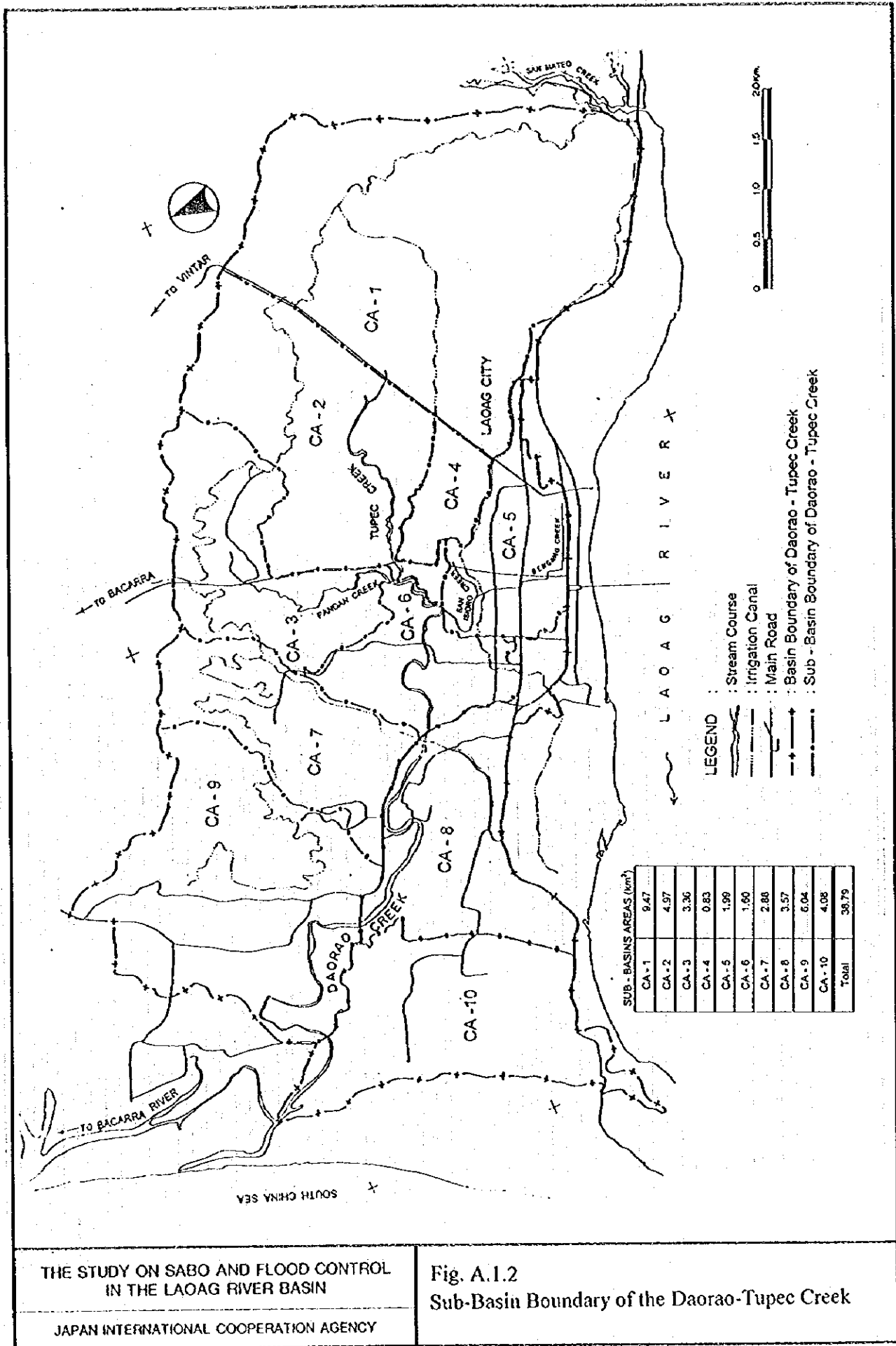
Fig. A.1.1
Salient Topographic Features of the Basin



THE STUDY ON SABO AND FLOOD CONTROL
IN THE LAOAG RIVER BASIN

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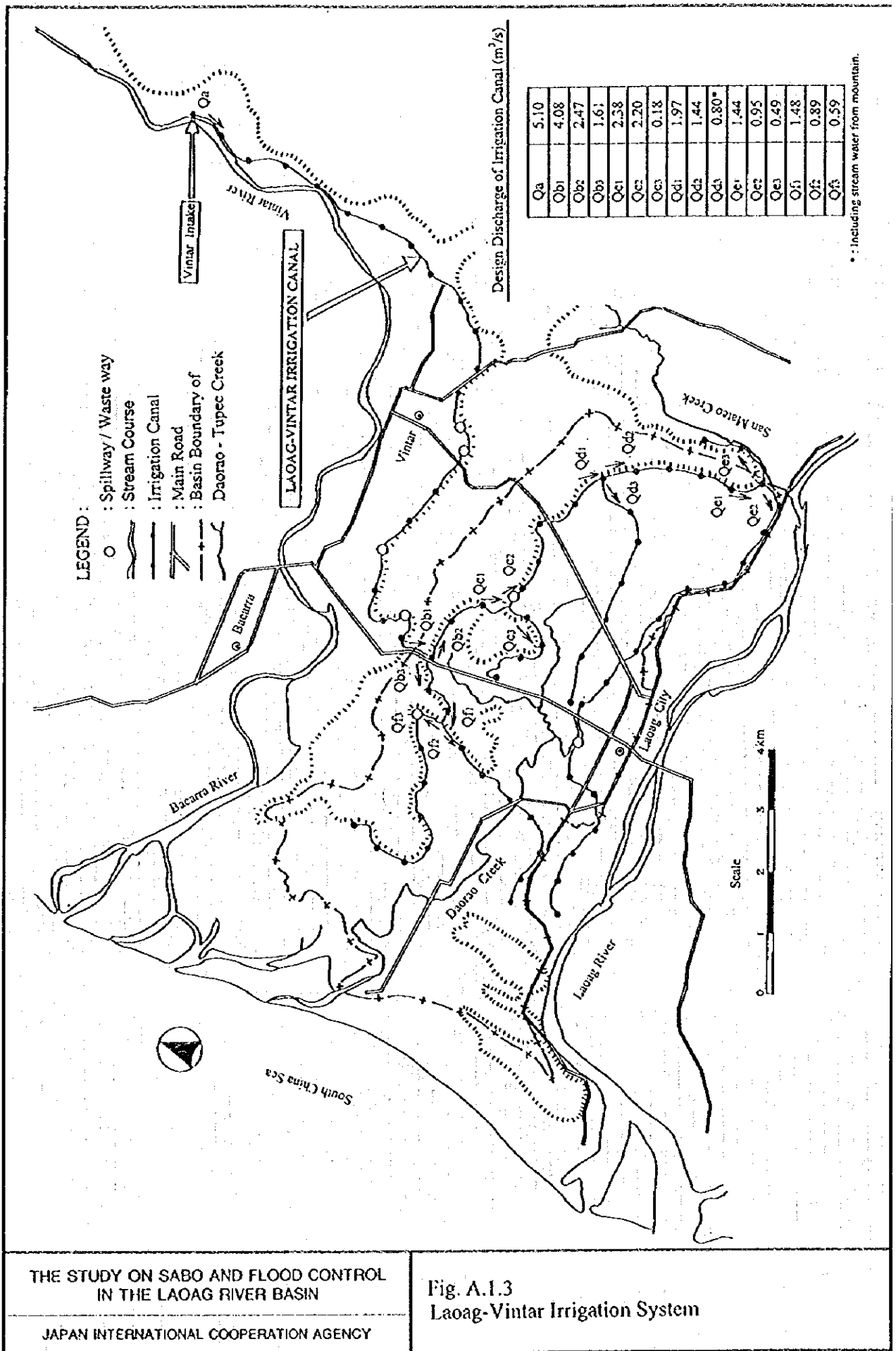
Fig. A.1.1
Salient Topographic Features of the Basin



THE STUDY ON SABO AND FLOOD CONTROL
IN THE LAOAG RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

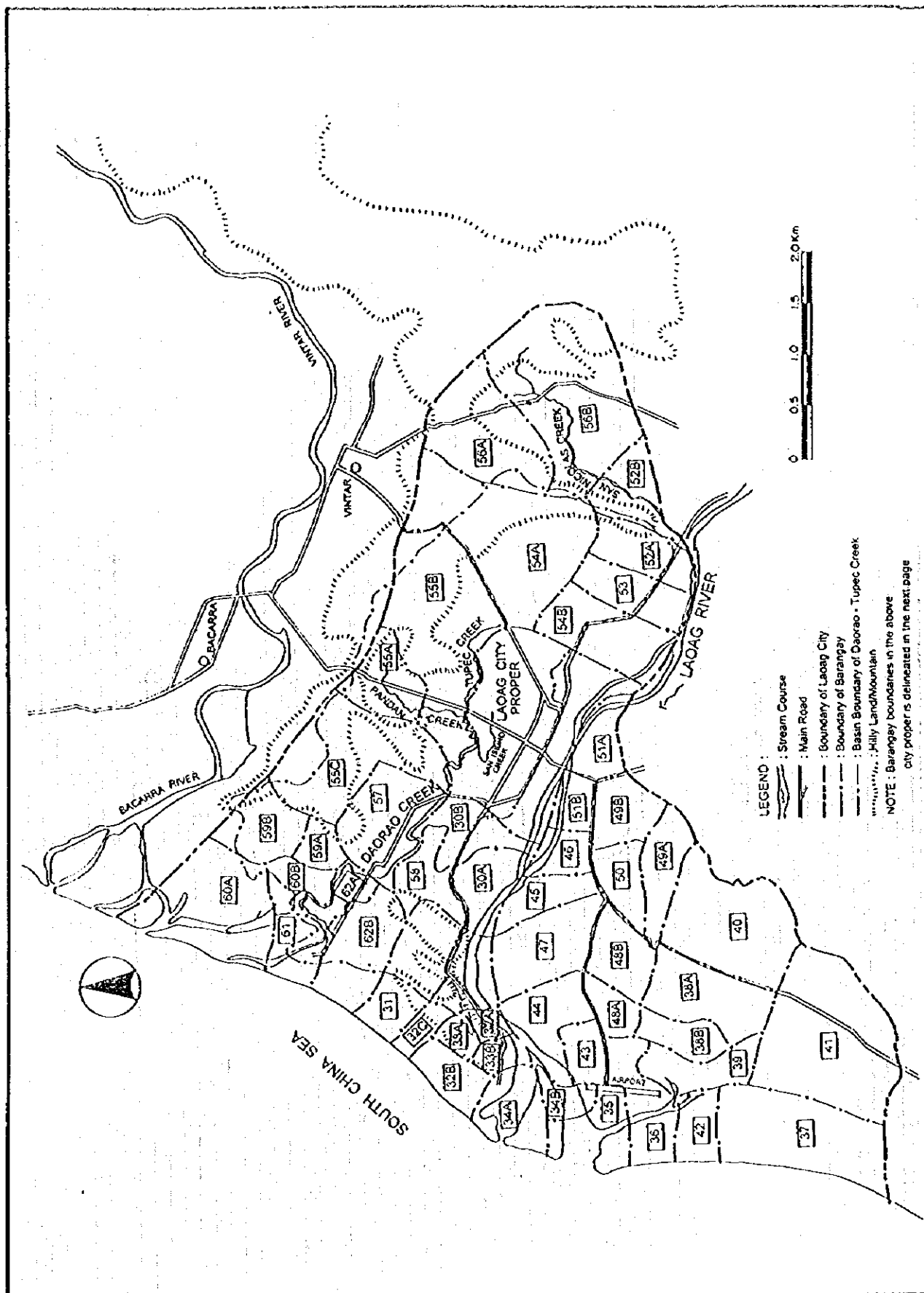
Fig. A.1.2
Sub-Basin Boundary of the Daorao-Tupec Creek



THE STUDY ON SABO AND FLOOD CONTROL
IN THE LAOAG RIVER BASIN

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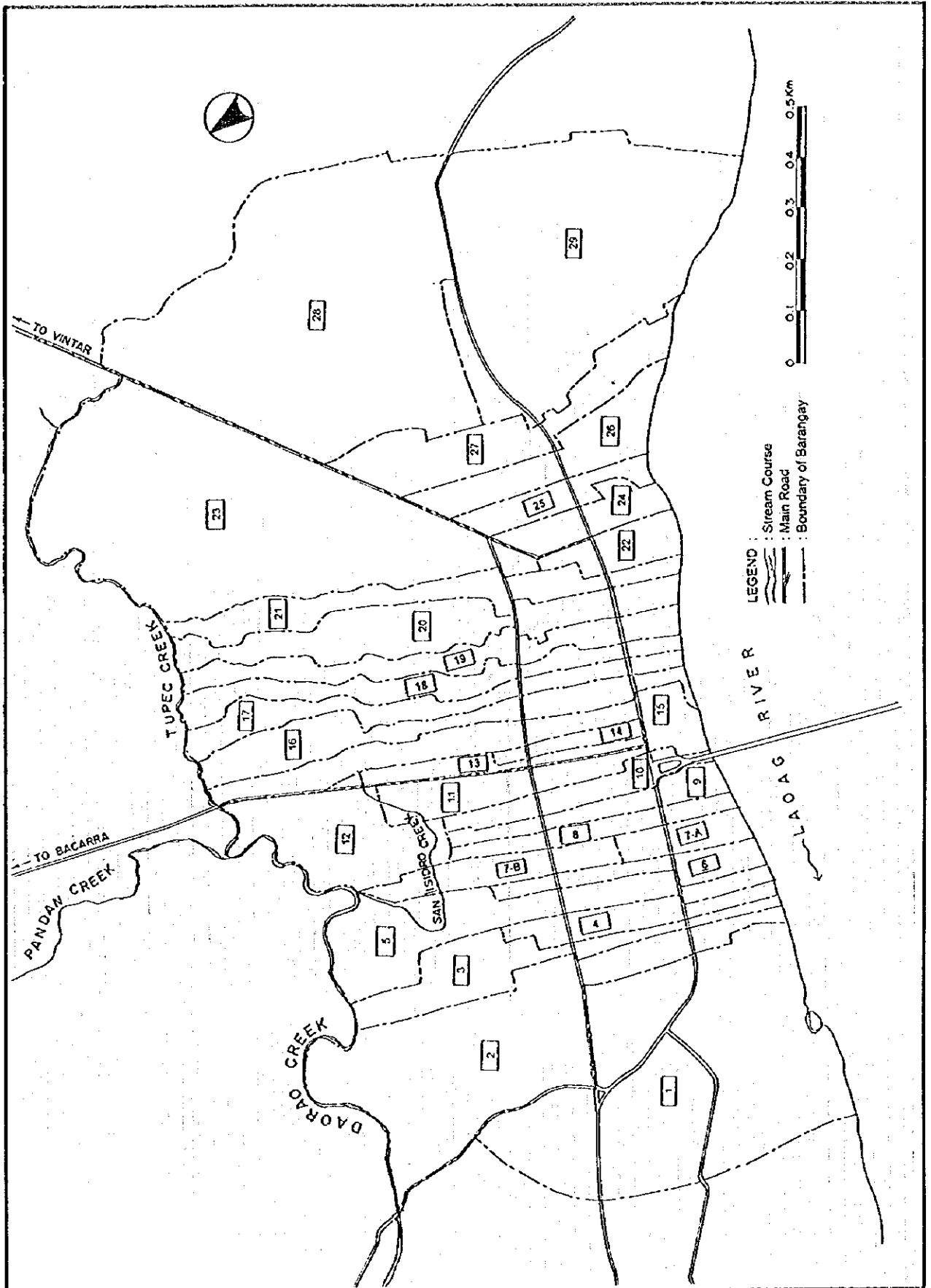
Fig. A.1.3
Laoag-Vintar Irrigation System



THE STUDY ON SABO AND FLOOD CONTROL
IN THE LAOAG RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. A.1.4 (1)
Administrative Boundary of Laoag City



THE STUDY ON SABO AND FLOOD CONTROL
IN THE LAOAG RIVER BASIN

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Fig. A.1.4 (2)
Administrative Boundary of Laoag City
(City Proper)

Name and Area of Barangays in Laoag City

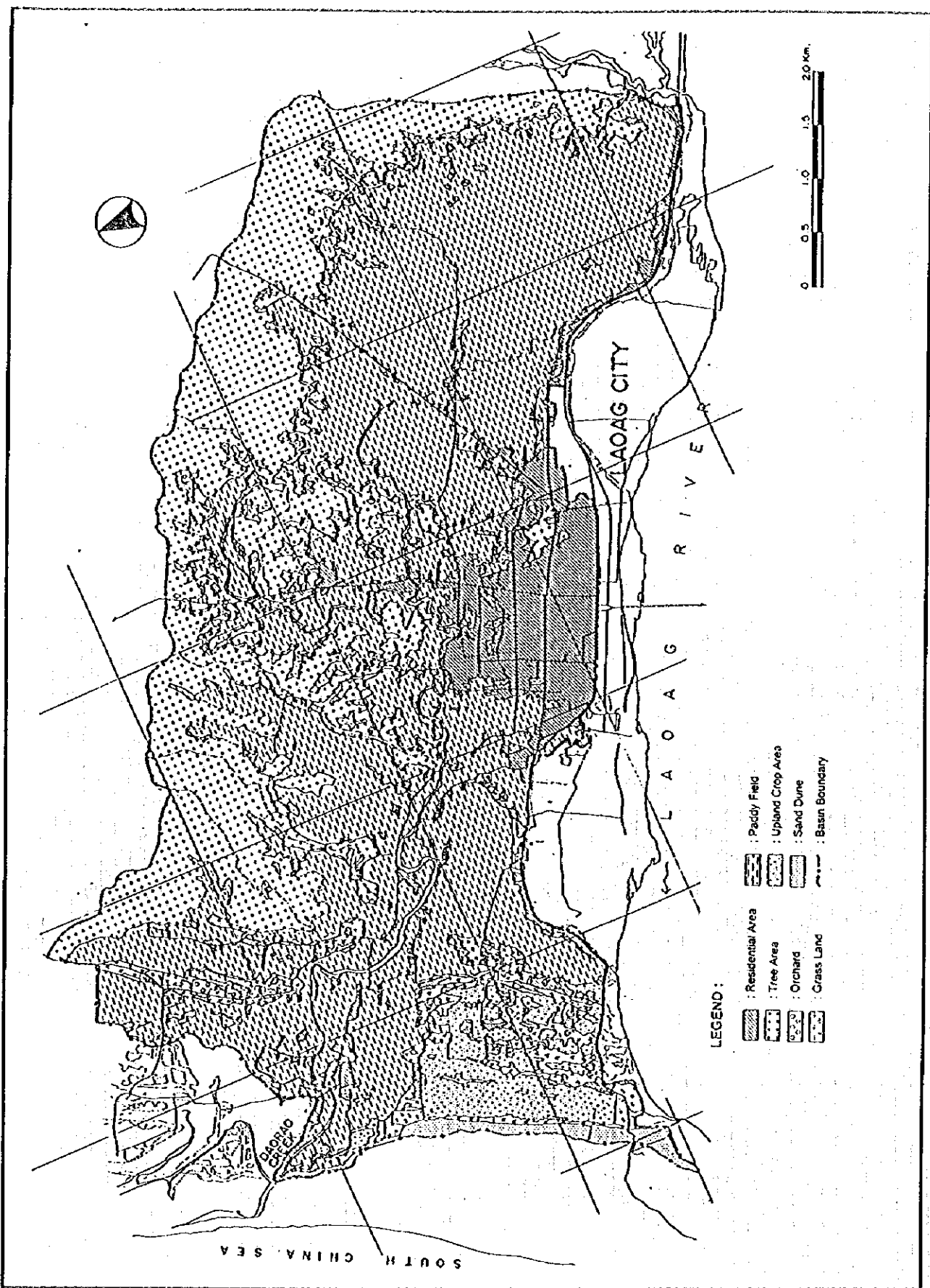
City Proper			Outside City Proper		
No.	Name	Area (ha)	No.	Name	Area (ha)
1	San Lorenzo (Pob.)	106.4	30 - B	Santa Maria	187.2
2	Santa Joaquina (Pob.)	74.0	30 - A	Suyo	30.4
3	Nstra. Sra. Del Rosario (Pob.)	15.2	31	Talingaan	566.5
4	San Guillermo (Pob.)	19.3	32 - A	La Paz East	6.0
5	San Pedro (Pob.)	23.8	32 - C	La Paz East	106.6
6	San Agustin (Pob.)	10.9	32 - B	La Paz West	31.3
7 - A	Nstra. Sra. De Natividad (Pob.)	8.4	33 - B	La Paz Proper	10.6
7 - B	Nstra. Sra. De Natividad (Pob.)	13.2	33 - A	La Paz Proper	39.6
8	San Vicente (Pob.)	9.9	34 - B	Gabu Norte East	3.0
9	Santa Angela (Pob.)	10.1	34 - A	Gabu Norte West	87.0
10	San Jose (Pob.)	14.3	35	Gabu Sur	106.6
11	Santa Baibina (Pob.)	14.0	36	Araniw	91.5
12	San Isidro (Pob.)	26.7	37	Calayab	408.3
13	Nstra. Sra. De Visitacion (Pob.)	19.3	38 - A	Mangato East	109.5
14	Santo Tomas (Pob.)	4.6	38 - B	Mangato West	101.4
15	San Guillermo (Pob.)	12.5	39	Santa Rosa	132.8
16	San Jacinto (Pob.)	14.8	40	Balatong	466.8
17	San Francisco (Pob.)	14.8	41	Balacad	433.4
18	San Quirino (Pob.)	25.9	42	Apaya	233.8
19	Santa Marcela (Pob.)	23.1	43	Cavit	69.4
20	San Miguel (Pob.)	24.0	44	Zamboanga	159.6
21	San Pedro (Pob.)	32.8	45	Tangid	131.2
22	San Andres (Pob.)	8.0	46	Nalbo	105.2
23	San Matias (Pob.)	99.2	47	Bengcag	213.6
24	Nstra. Sra. De Consolacion (Pob.)	10.0	48 - A	Cabungaan North	157.0
25	Santa Cayetana (Pob.)	10.8	48 - B	Cabungaan South	117.2
26	San Marcelinno (Pob.)	214.6	49 - A	Darayday	131.4
27	Nstra. Sra. De Soledad (Pob.)	25.5	49 - B	Raraburan	69.6
28	San Bernardo (Pob.)	101.1	50	Buttong	160.4
29	Santo Tomas (Pob.)	106.5	51 - A	Nangalisan East	59.1
			51 - B	Nangalisan West	31.3
			52 - B	Lataag	189.8
			52 - A	San Mateo	46.2
			53	Rioeng	216.0
			54 - B	Camangaan	143.4
			54 - A	Lagui-Sail	596.3
			55 - A	Barit-Pandan	312.6
			55 - B	Salet-Bulangun	377.0
			55 - C	Vira	248.3
			56 - A	Bacsil North	352.7
			56 - B	Bacsil South	510.9
			57	Pila	272.1
			58	Casili	99.2
			59 - B	Dibua North	202.5
			59 - A	Dibua South	214.1
			60 - A	Caoacan	49.3
			60 - B	Madiladig	369.7
			61	Cataban	148.6
			62 - A	Navotas North	80.3
			62 - B	Navotas South	166.7
	Sub Total	1,093.7		Sub Total	9,153.0
	Total			10,246.7	

THE STUDY ON SABO AND FLOOD CONTROL
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Fig. A.1.4 (3)

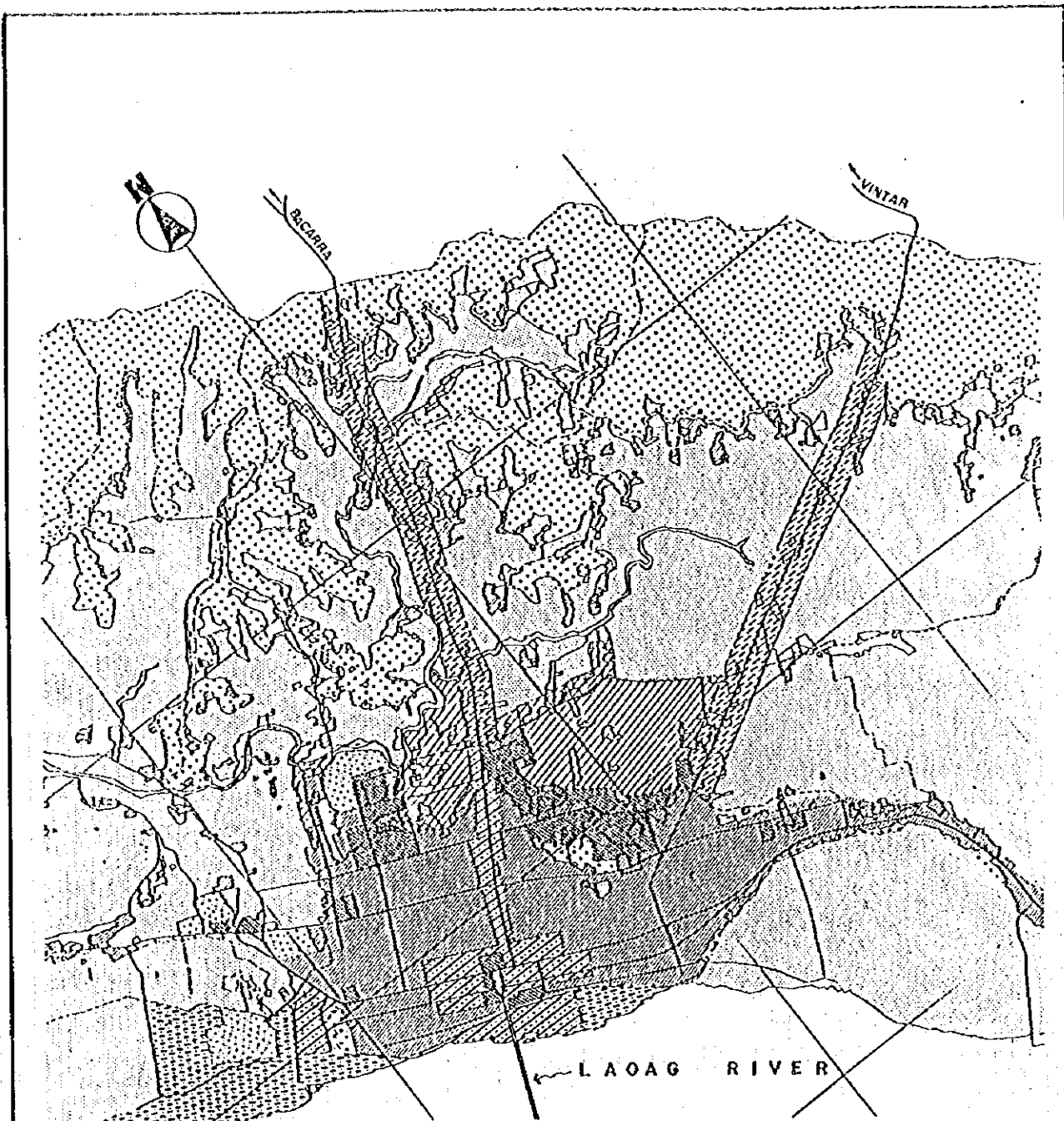
Administrative Boundary of Laoag City
(List of Barangay Names)



THE STUDY ON SABO AND FLOOD CONTROL
IN THE LAOAG RIVER BASIN

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Fig. A.1.5
Existing Land Use Map of
the Daorao-Tupec Creek Basin



LEGEND:

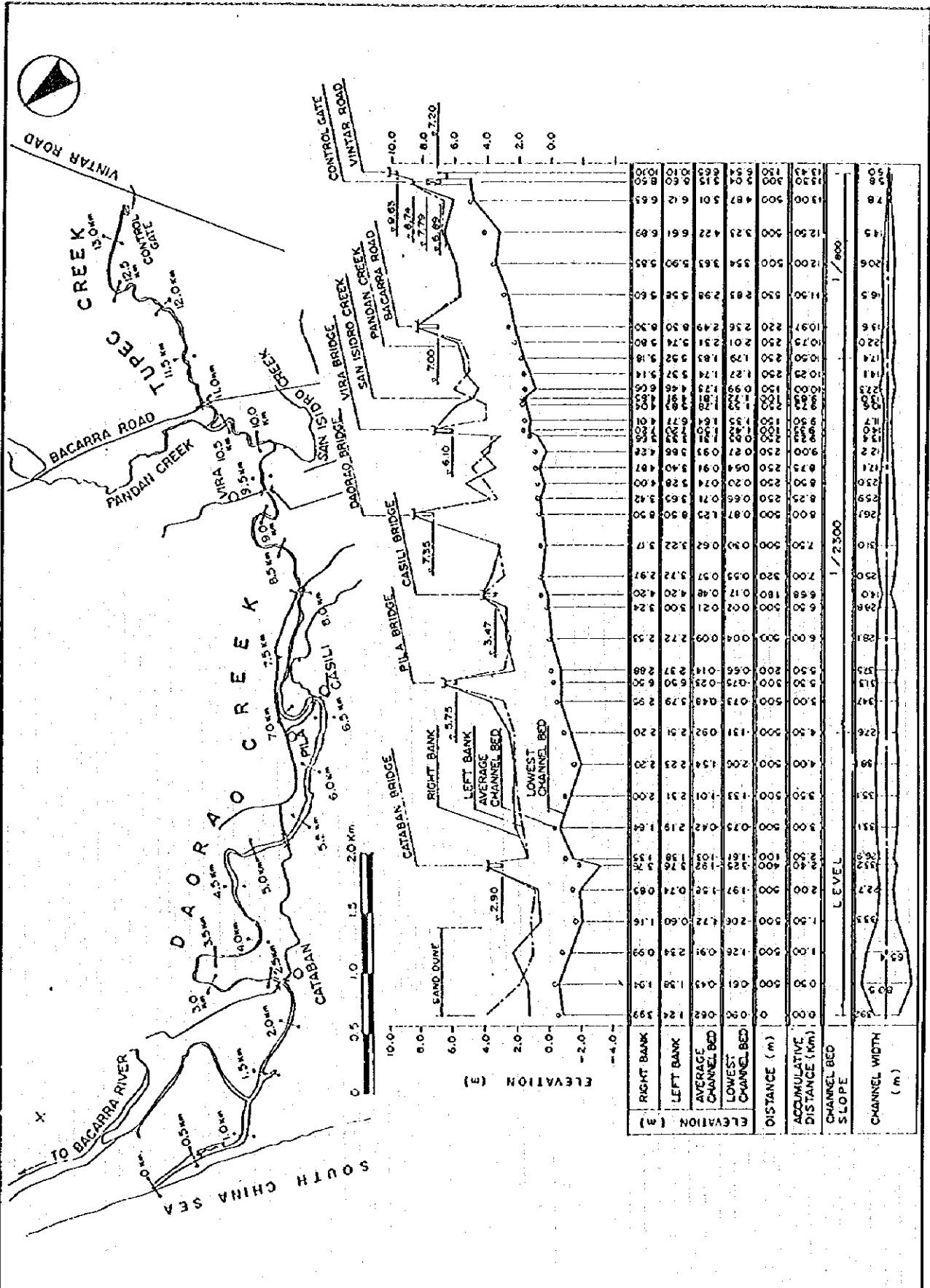
- | | |
|----------------------|----------------------------------|
| : Residential Area | : Expansion for Residential Area |
| : Commercial Area | : Expansion for Commercial Area |
| : Institutional Area | : Barren/Old Land |
| : Agricultural Area | : Park/Open space |
| : Forest | : Bodies of Water |

Note: The boundary of each Land Use are not authorize.
 This may prepared by JICA Study Team to be use for the Drainage Plan only.

THE STUDY ON SABO AND FLOOD CONTROL
 IN THE LAOAG RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. A.1.6
 Future Land Use Map of
 the Daorao-Tupecc Creek Basin



ELEVATION (m)	DISTANCE (m)	CHANNEL BED SLOPE	CHANNEL WIDTH (m)
10.00	0.00		0.00
9.00	0.50		0.50
8.00	1.00		1.00
7.00	1.50		1.50
6.00	2.00		2.00
5.00	2.50		2.50
4.00	3.00		3.00
3.00	3.50		3.50
2.00	4.00		4.00
1.00	4.50		4.50
0.00	5.00		5.00
-1.00	5.50		5.50
-2.00	6.00		6.00
-3.00	6.50		6.50
-4.00	7.00		7.00
	7.50		7.50
	8.00		8.00
	8.50		8.50
	9.00		9.00
	9.50		9.50
	10.00		10.00
	10.50		10.50
	11.00		11.00
	11.50		11.50
	12.00		12.00
	12.50		12.50
	13.00		13.00
	13.50		13.50
	14.00		14.00
	14.50		14.50
	15.00		15.00
	15.50		15.50
	16.00		16.00
	16.50		16.50
	17.00		17.00
	17.50		17.50
	18.00		18.00
	18.50		18.50
	19.00		19.00
	19.50		19.50
	20.00		20.00
	20.50		20.50
	21.00		21.00
	21.50		21.50
	22.00		22.00
	22.50		22.50
	23.00		23.00
	23.50		23.50
	24.00		24.00
	24.50		24.50
	25.00		25.00
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	32.00		32.00
	32.50		32.50
	33.00		33.00
	33.50		33.50
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	34.50		34.50
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	36.50		36.50
	37.00		37.00
	37.50		37.50
	38.00		38.00
	38.50		38.50
	39.00		39.00
	39.50		39.50
	40.00		40.00
	40.50		40.50
	41.00		41.00
	41.50		41.50
	42.00		42.00
	42.50		42.50
	43.00		43.00
	43.50		43.50
	44.00		44.00
	44.50		44.50
	45.00		45.00
	45.50		45.50
	46.00		46.00
	46.50		46.50
	47.00		47.00
	47.50		47.50
	48.00		48.00
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	49.00		49.00
	49.50		49.50
	50.00		50.00

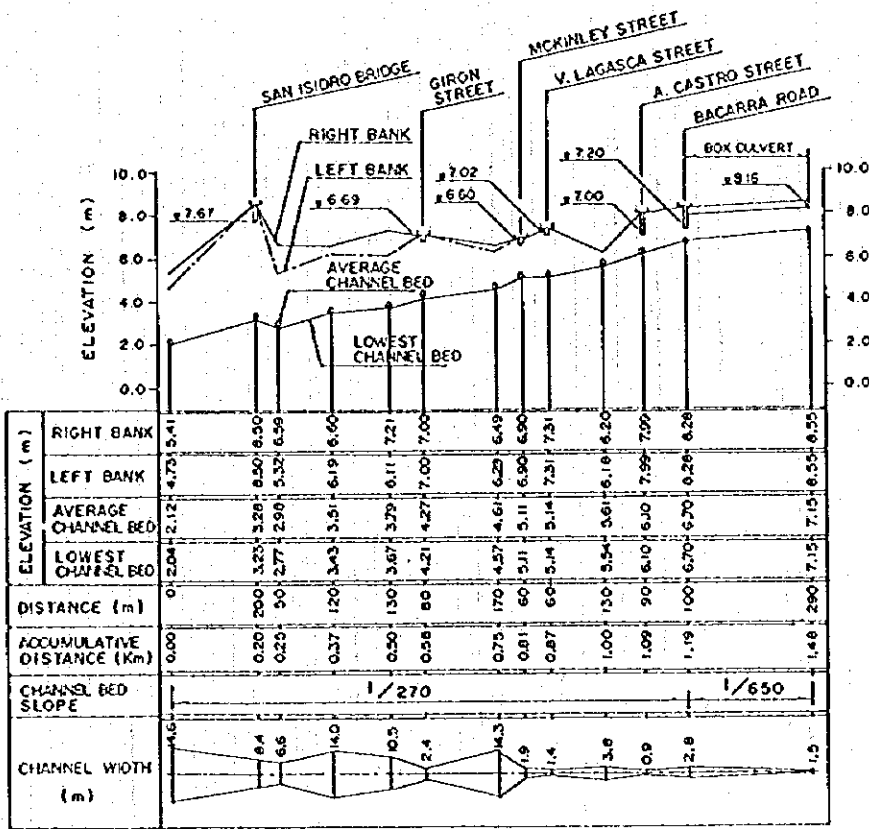
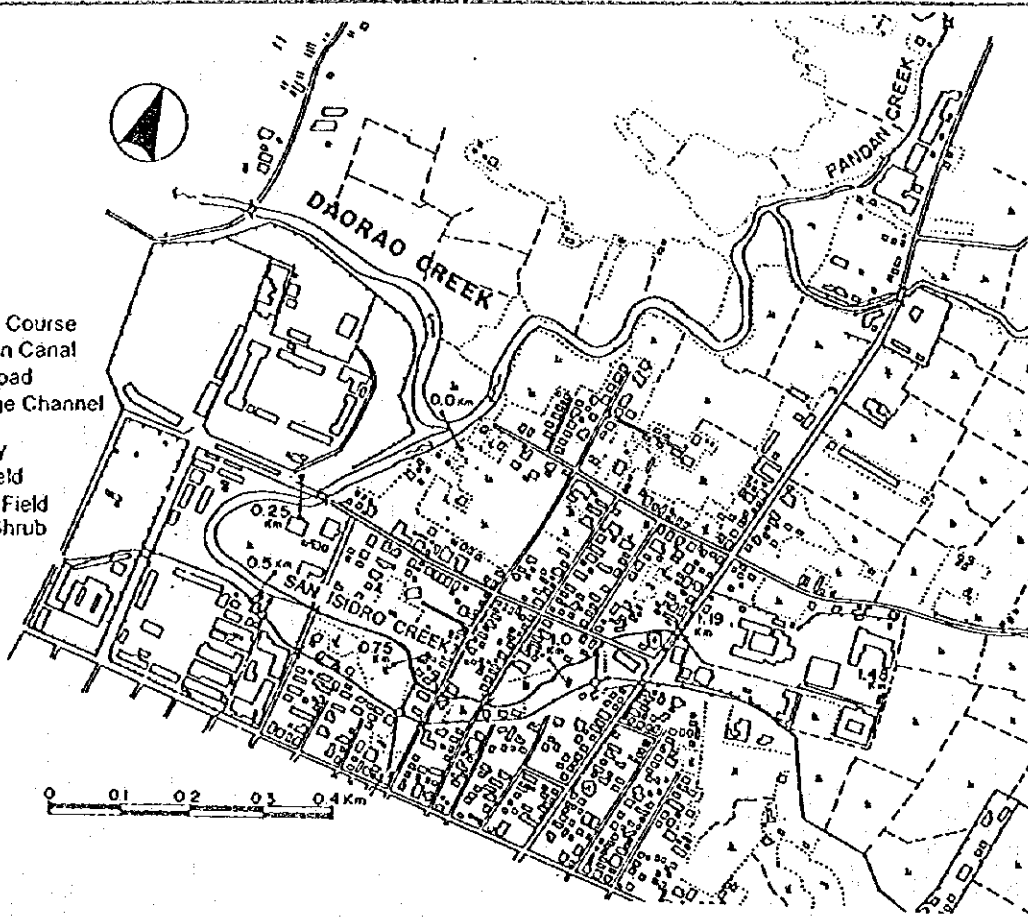
THE STUDY ON SABO AND FLOOD CONTROL
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Fig. A.2.1
Profile of Daorao-Tupeck Creek

LEGEND :

- : Stream Course
- : Irrigation Canal
- : Main Road
- : Drainage Channel
- : Culvert
- : Spillway
- : Rice Field
- : Upland Field
- : Bush, Shrub
- : Wall

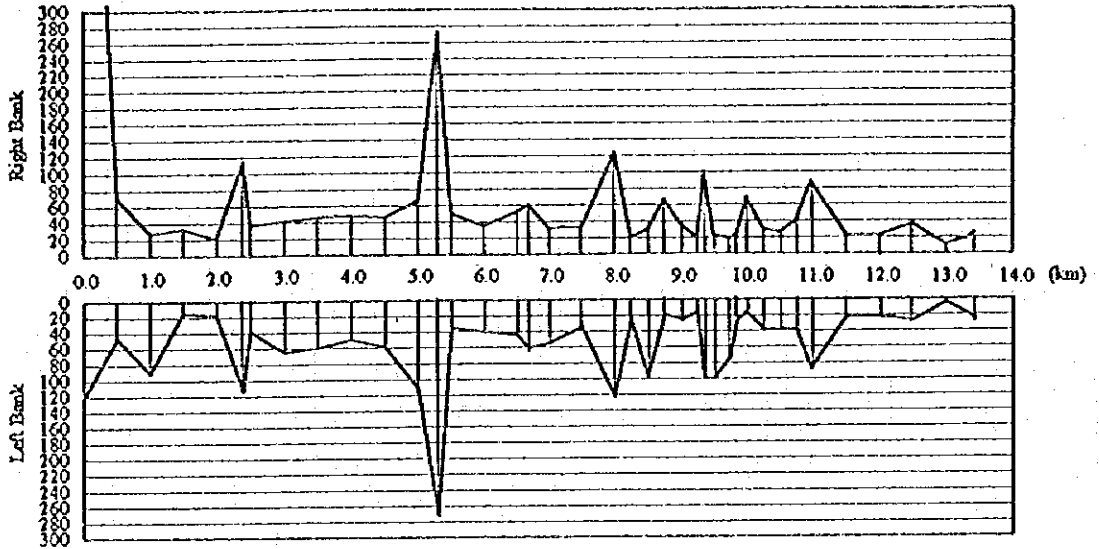


THE STUDY ON SABO AND FLOOD CONTROL
IN THE LAOAG RIVER BASIN

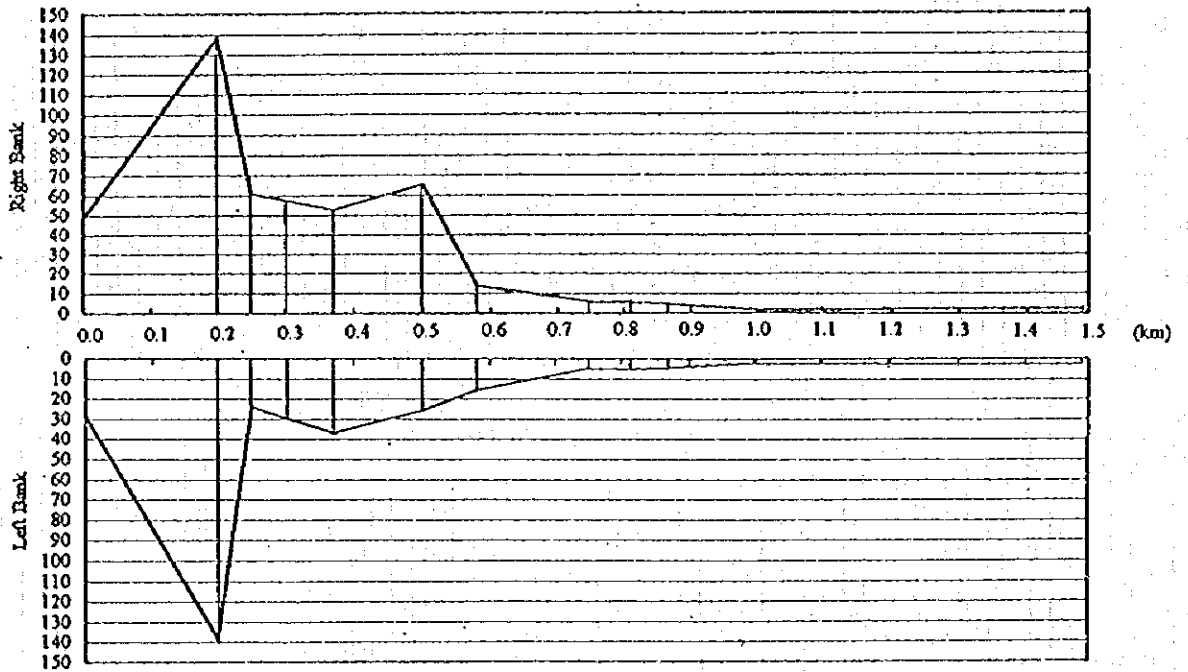
JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. A.2.2
Profile of San Isidro Creek

(1) DAORAO-TUPEC CREEK



(2) SAN ISIDRO CREEK

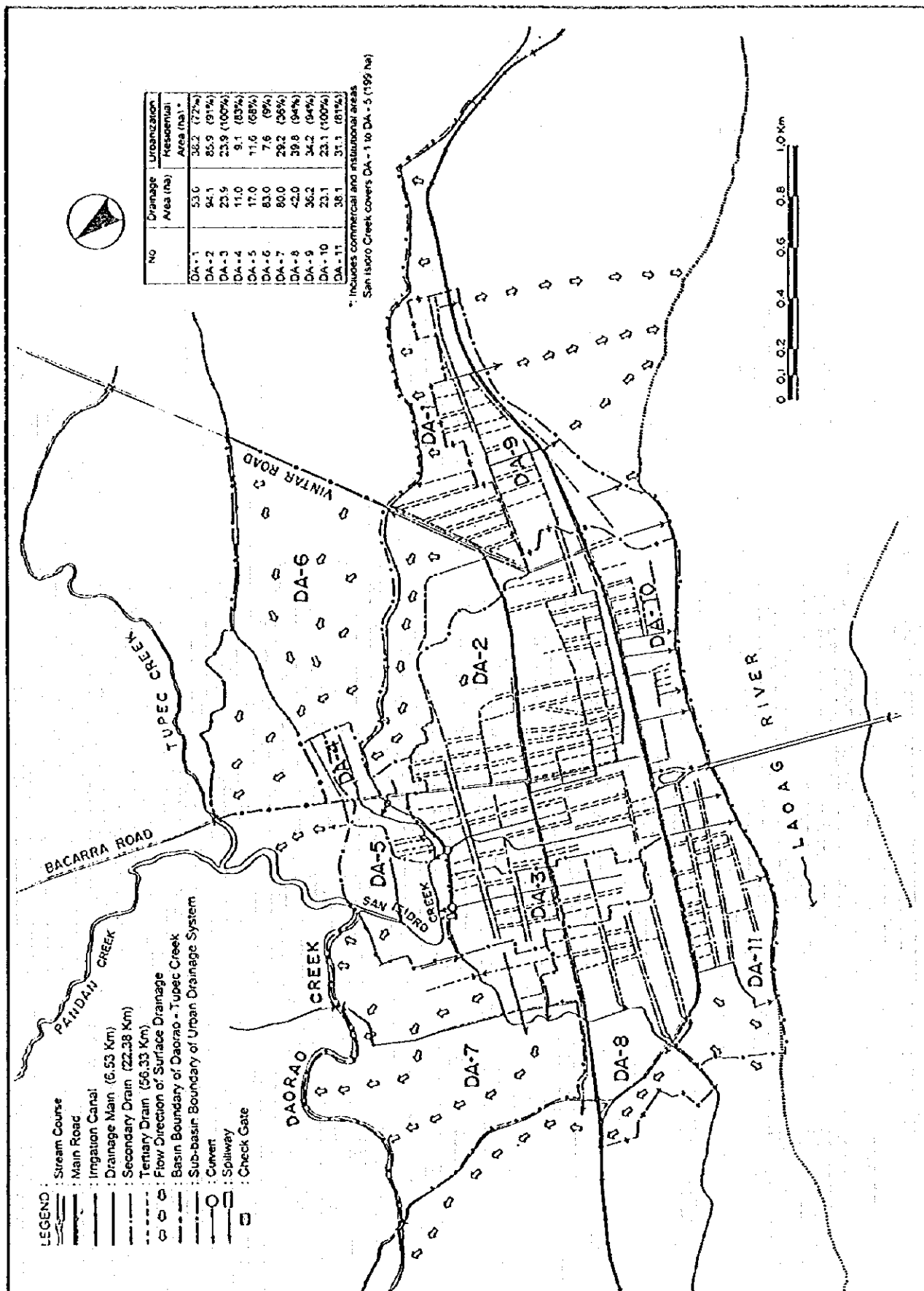


THE STUDY ON SABO AND FLOOD CONTROL
IN THE LAOAG RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. A.2.3

Flood Carrying Capacity of Creeks

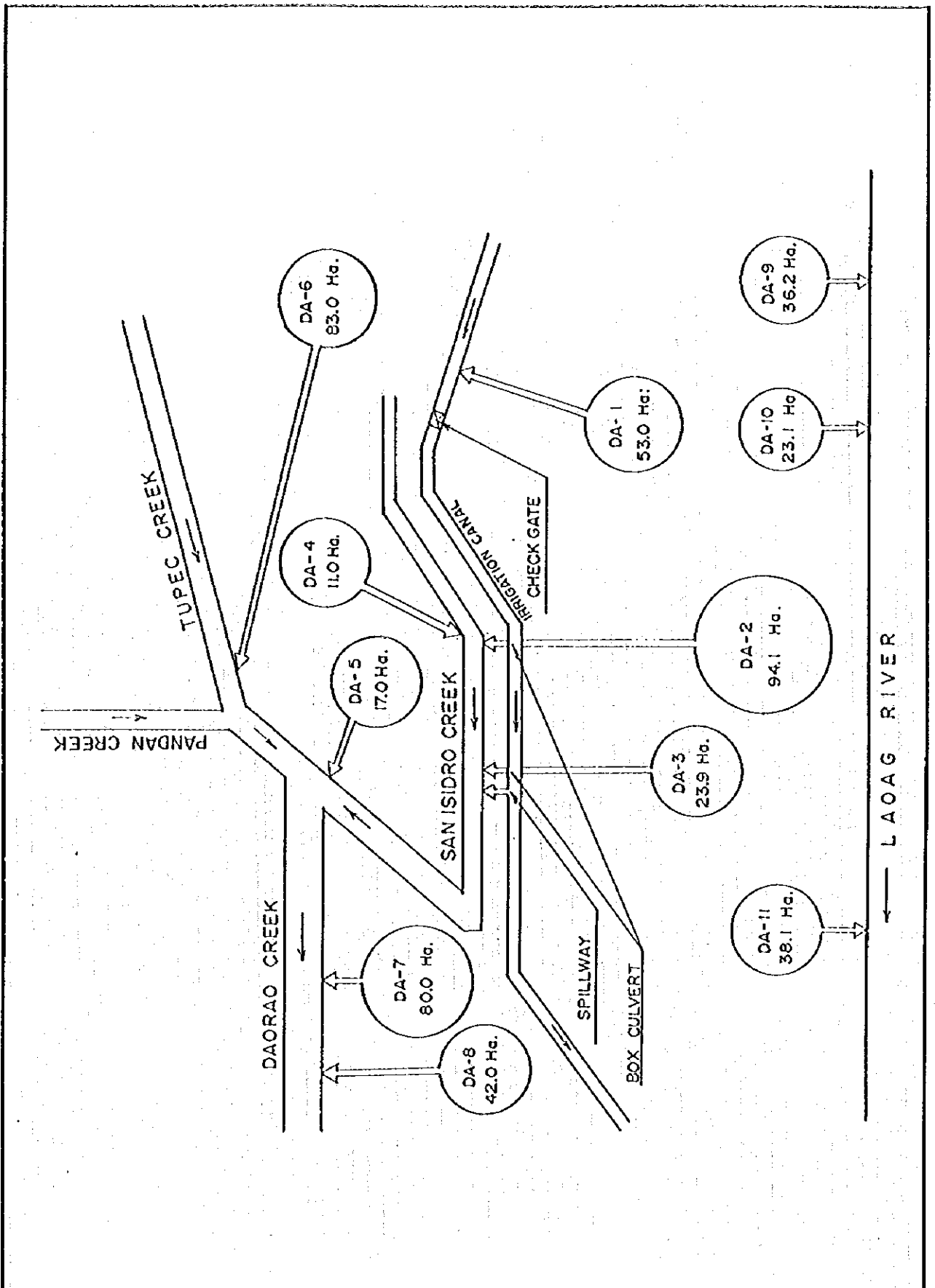


THE STUDY ON SABO AND FLOOD CONTROL
 IN THE LAOAG RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. A.2.4

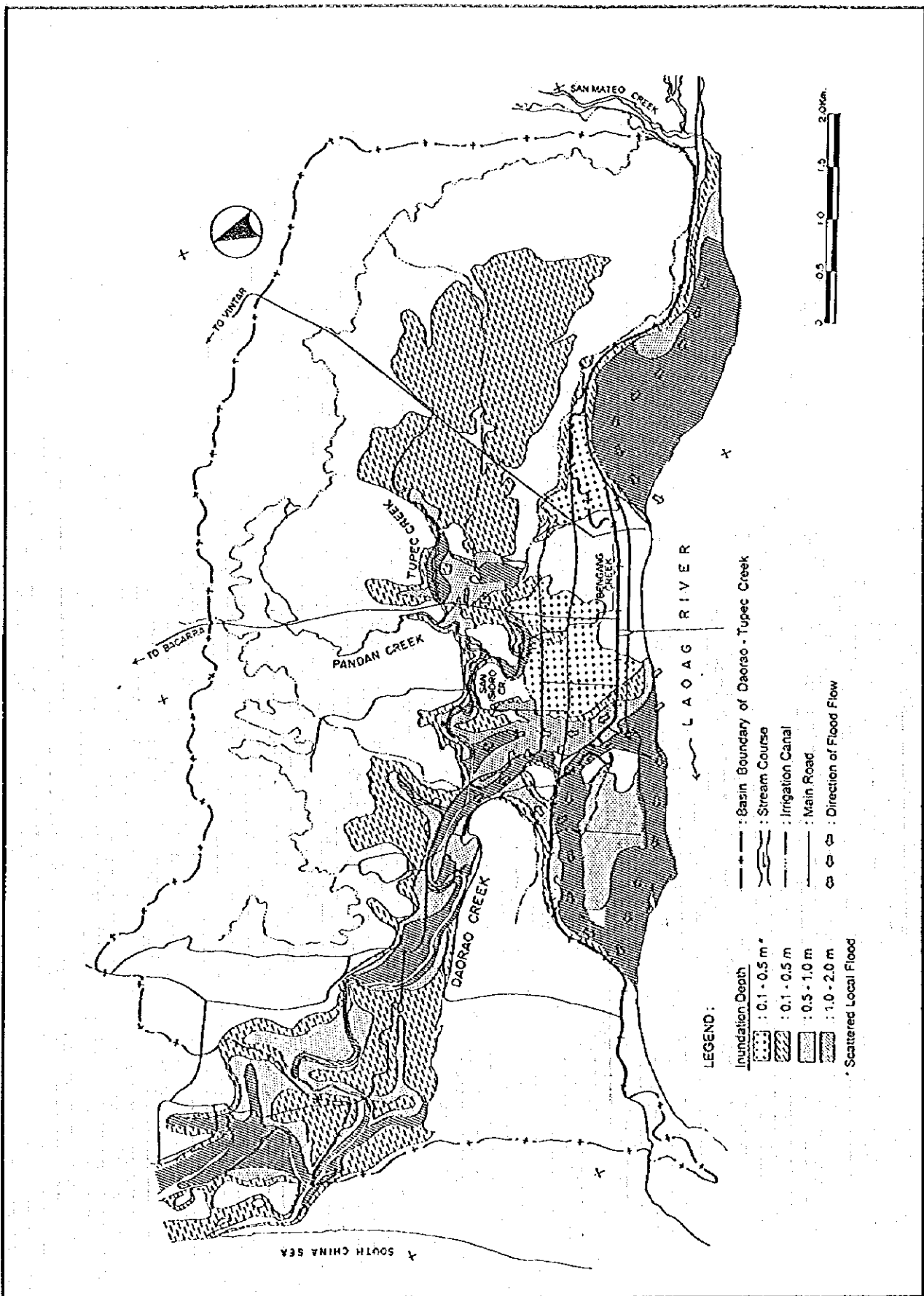
Division of Laoag Urban Drainage Area



THE STUDY ON SABO AND FLOOD CONTROL
IN THE LAOAG RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

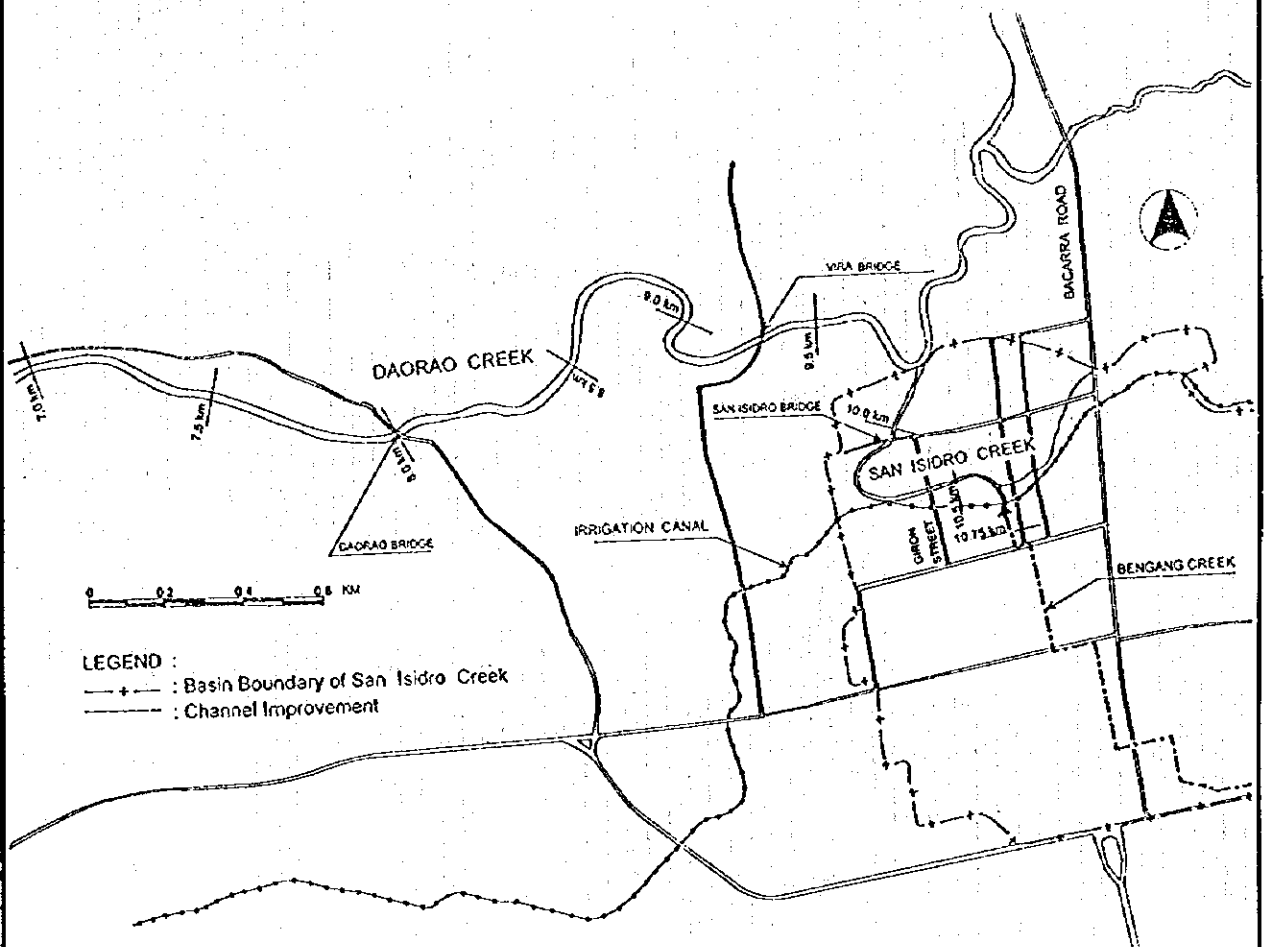
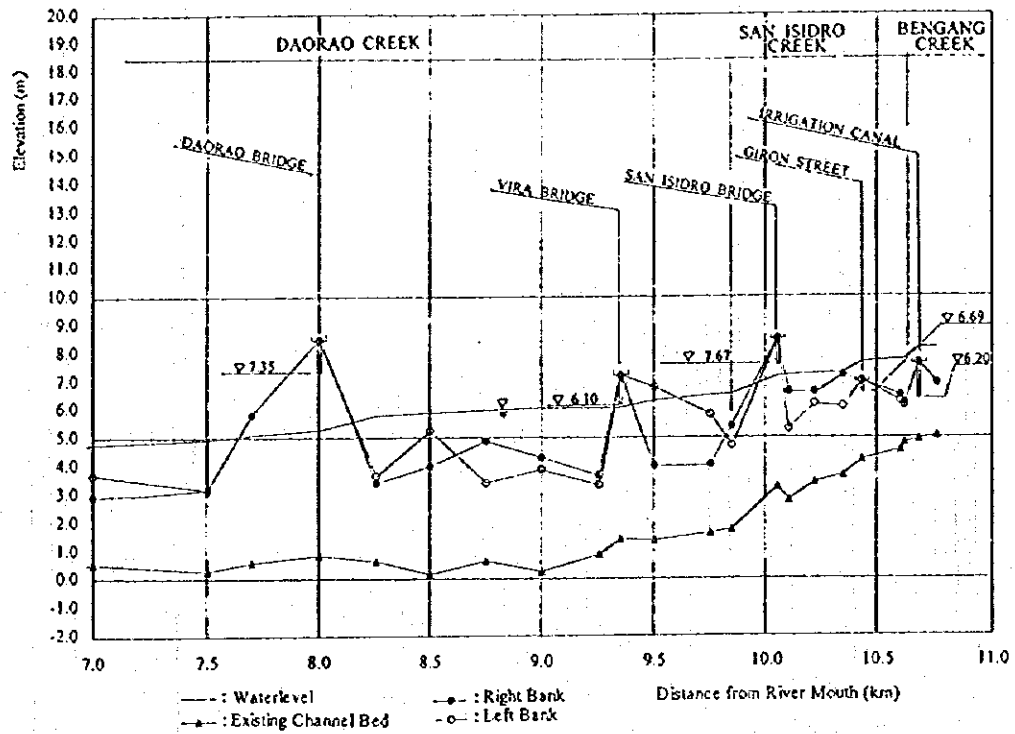
Fig. A.2.5
Schematic Diagram of Laoag Urban Drainage



THE STUDY ON SABO AND FLOOD CONTROL
IN THE LAOAG RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. A.3.1
Flood Inundation Map of Laoag City by 1996
Typhoon Gloring



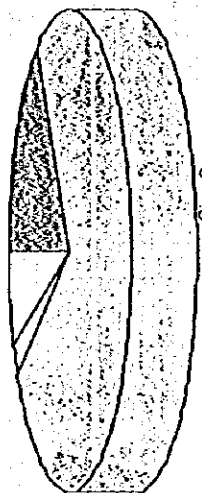
THE STUDY ON SABO AND FLOOD CONTROL
IN THE LAOAG RIVER BASIN

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Fig. A.3.2
Flood Water Level of the San Isidro and Daorao
Creeks with a 5-year Return Period

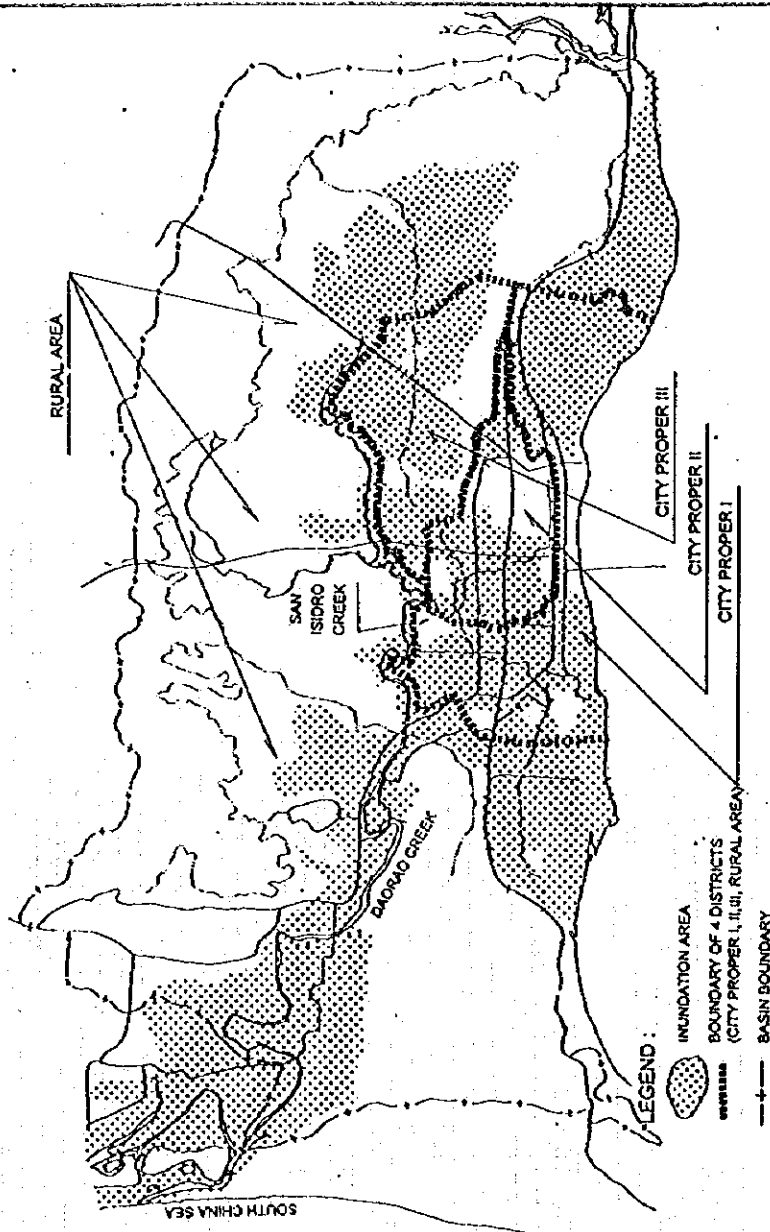
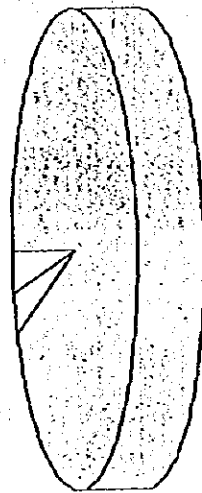
Without Laoag River Improvement/
Mouth Opening of Daorao Creek

City Proper (III)	2.2%
Rural Area	6.5%
City Proper (I)	16.0%



With Laoag River Improvement/
Mouth Opening of Daorao Creek

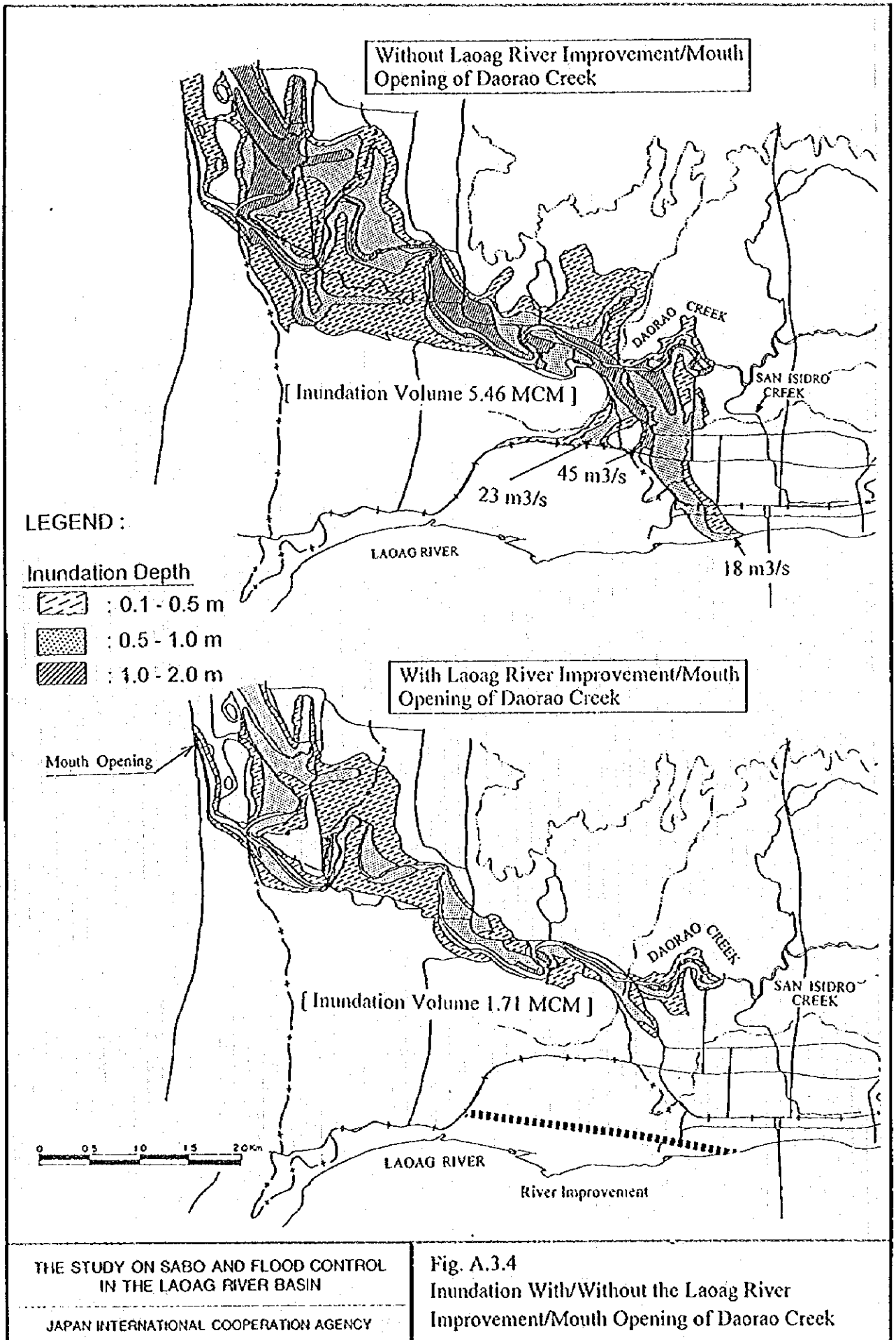
City Proper (III)	2.7%
Rural Area	2.7%
City Proper (I)	0.1%



THE STUDY ON SABO AND FLOOD CONTROL
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Fig. A.3.3
Division of Inundation Area

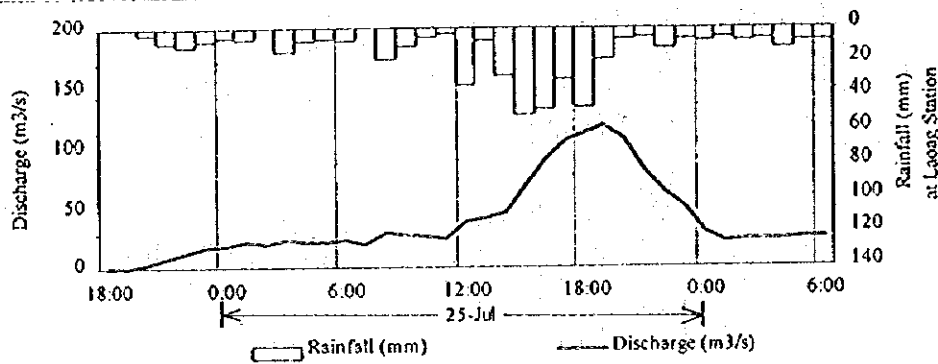


THE STUDY ON SABO AND FLOOD CONTROL
IN THE LAOAG RIVER BASIN

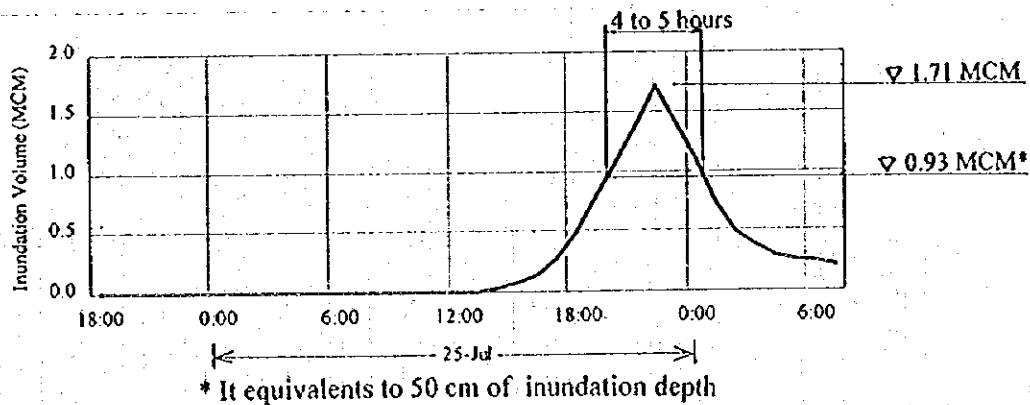
JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. A.3.4
Inundation With/Without the Laoag River
Improvement/Mouth Opening of Daorao Creek

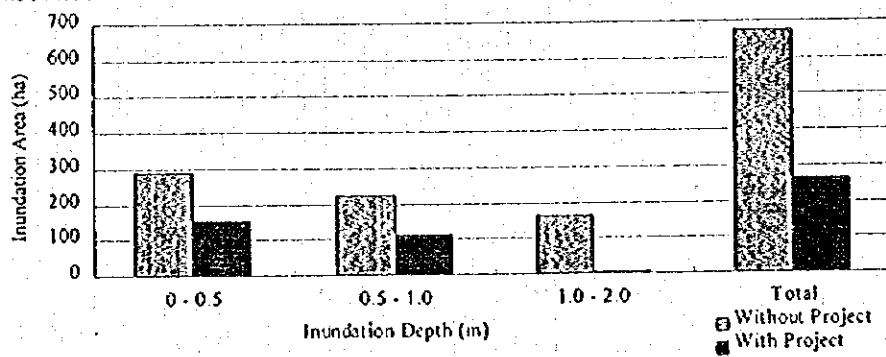
Hydrograph at Mouth of Daorao Creek



Inundation Volume in the Downstream of Daorao Creek



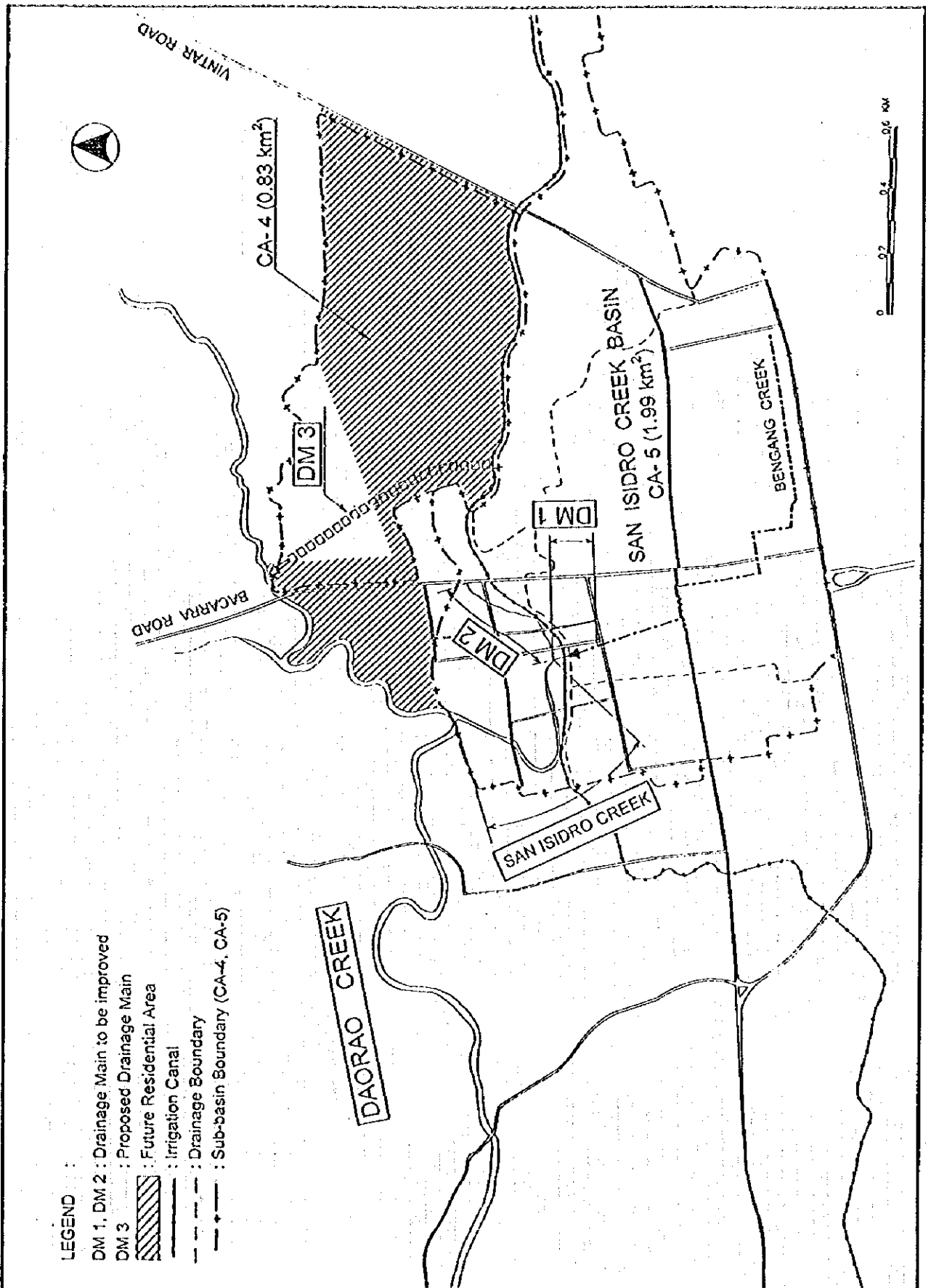
Inundation Area in the Downstream of Daorao Creek



Inundation Area (ha)

Inundation Depth (m)	0.1 - 0.5	0.5 - 1.0	1.0 - 2.0	Total
Without Project	291	224	161	676
With Project	150	111	4	265

Project: Protection work of overflow of the Laoag River
opening work of the river mouth of the Daorao Creek

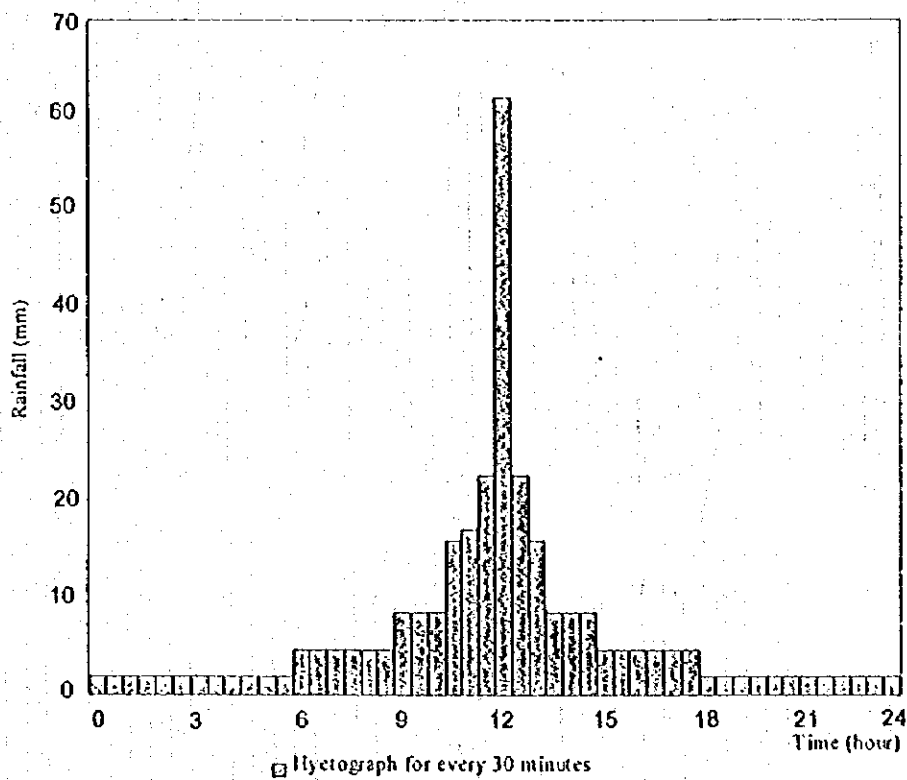


THE STUDY ON SABO AND FLOOD CONTROL
IN THE LAOAG RIVER BASIN

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Fig. A.4.1
Target Area for Drainage Improvement

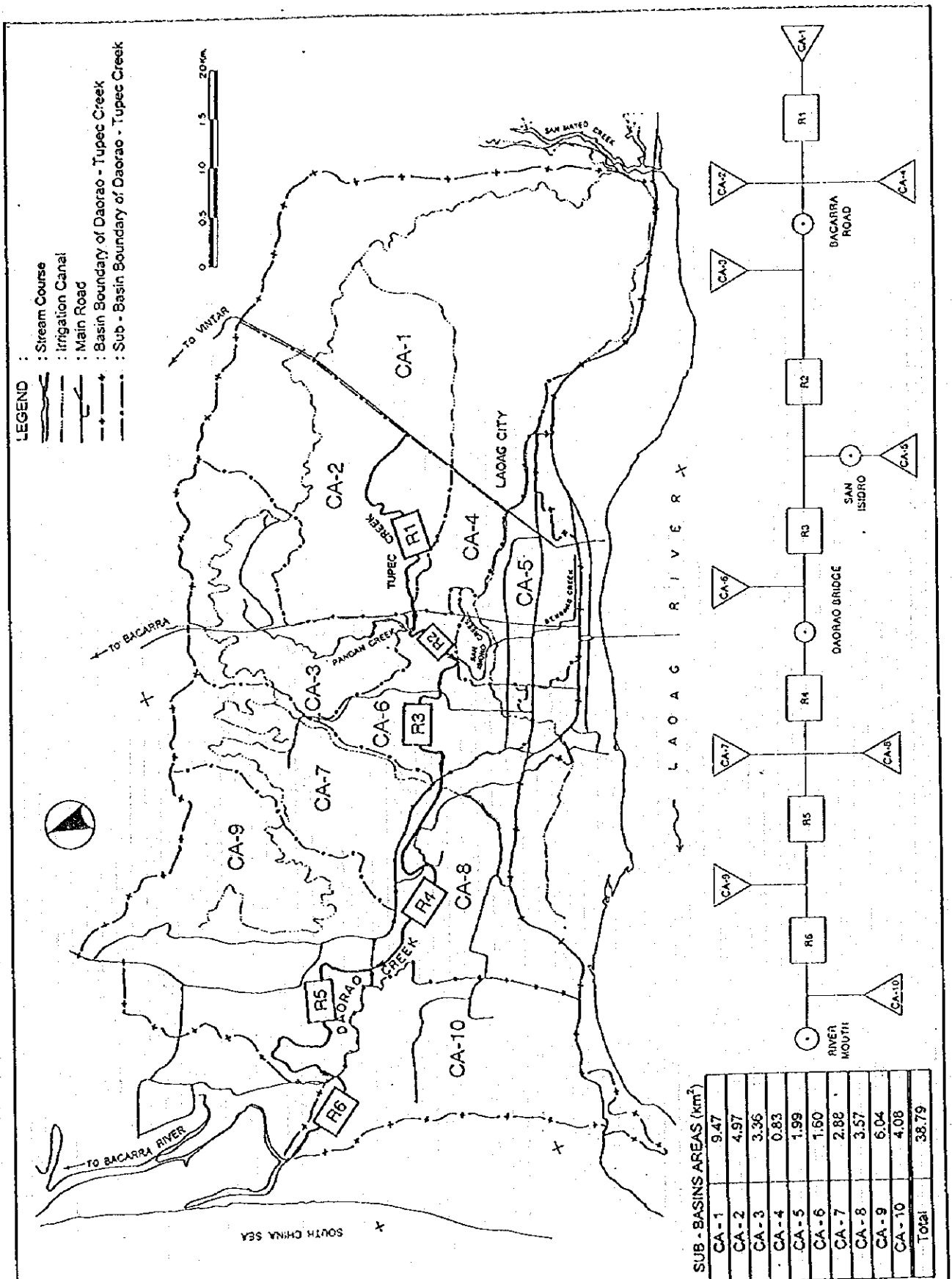
Time (hour)	Rainfall (mm)	Time (hour)	Rainfall (mm)	Time (hour)	Rainfall (mm)	Time (hour)	Rainfall (mm)
0.5	2.0	6.5	4.8	12.5	62.0	18.5	2.0
1.0	2.0	7.0	4.8	13.0	22.9	19.0	2.0
1.5	2.0	7.5	4.8	13.5	16.2	19.5	2.0
2.0	2.0	8.0	4.8	14.0	8.6	20.0	2.0
2.5	2.0	8.5	4.8	14.5	8.6	20.5	2.0
3.0	2.0	9.0	4.8	15.0	8.6	21.0	2.0
3.5	2.0	9.5	8.6	15.5	4.8	21.5	2.0
4.0	2.0	10.0	8.6	16.0	4.8	22.0	2.0
4.5	2.0	10.5	8.6	16.5	4.8	22.5	2.0
5.0	2.0	11.0	16.2	17.0	4.8	23.0	2.0
5.5	2.0	11.5	17.4	17.5	4.8	23.5	2.0
6.0	2.0	12.0	22.8	18.0	4.8	24.0	2.0
Total = 314.7mm							



THE STUDY ON SABO AND FLOOD CONTROL
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JAPAN INTERNATIONAL COOPERATION AGENCY

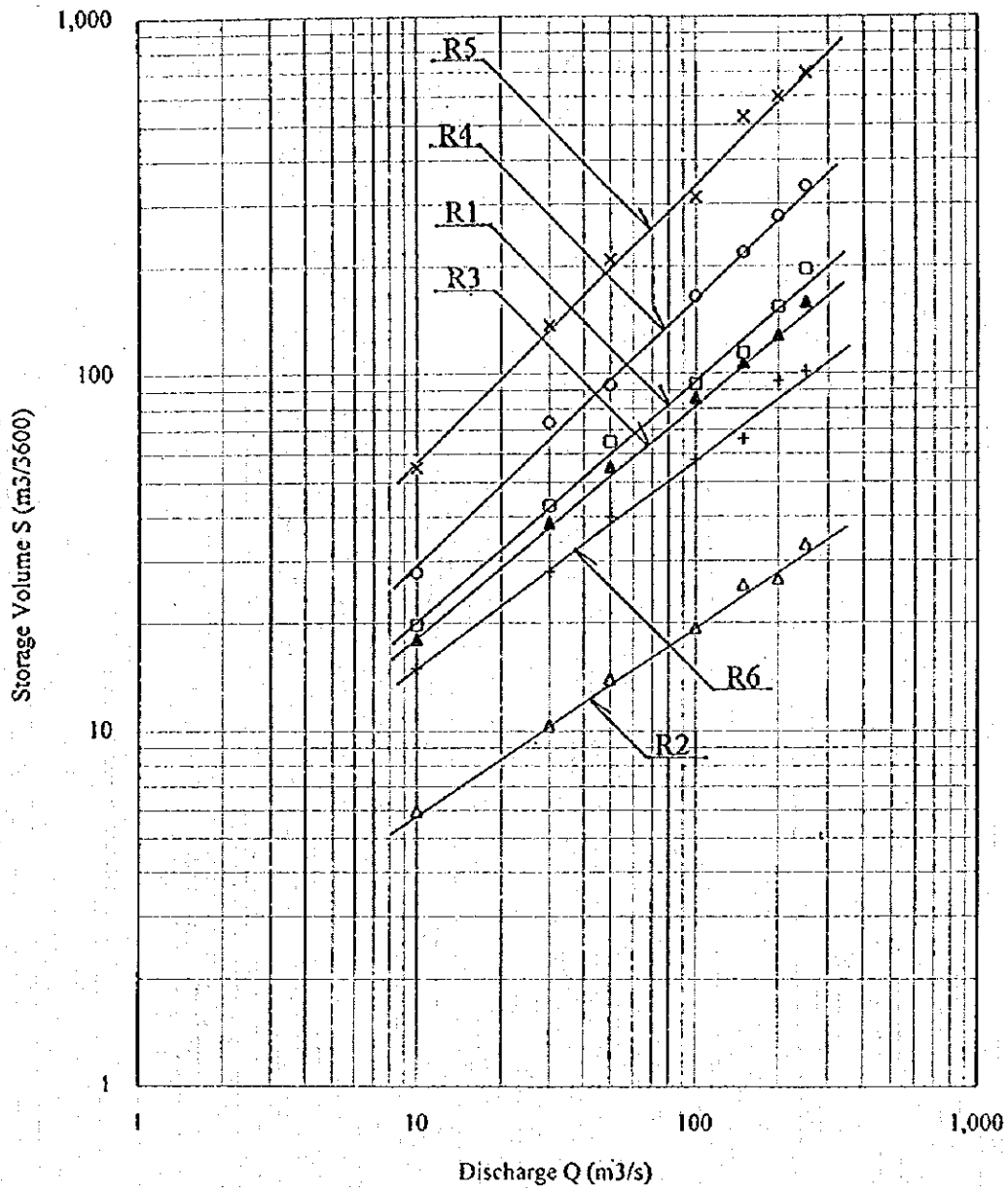
Fig. A.4.2
Model Hyetograph (Point Rainfall)



THE STUDY ON SABO AND FLOOD CONTROL
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Fig. A.4.3
River System Model



□ R1 △ R2 ▲ R3 ○ R4 × R5 + R6

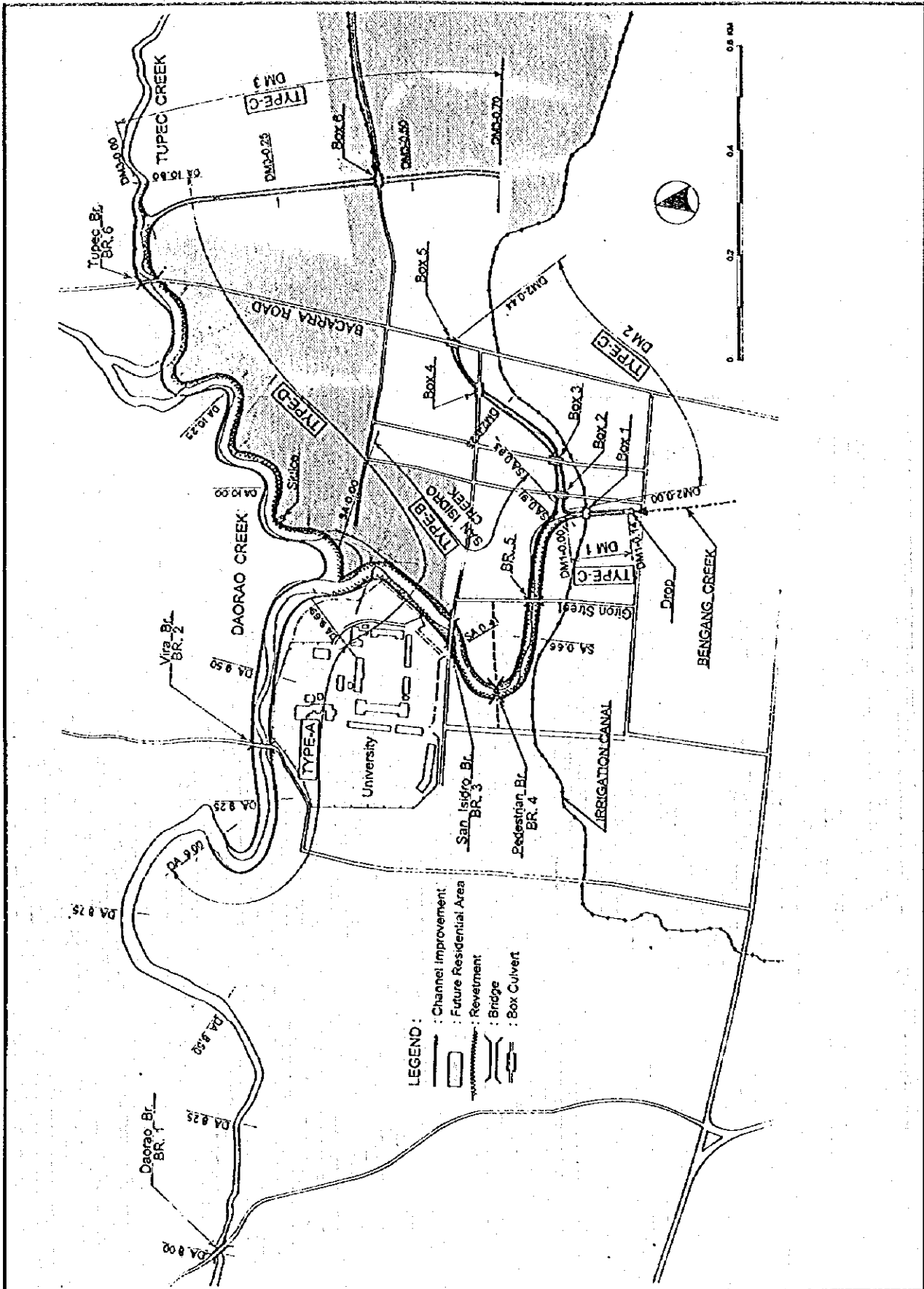
$$S = K \cdot Q^p$$

Channel	R1	R2	R3	R4	R5	R6
K	4.4	1.8	4.2	5.2	9.6	4.0
p	0.67	0.52	0.65	0.75	0.78	0.58
L (km)	2.68	0.9	1.85	2.7	2.9	1.2
I	0.001111	0.001111	0.000435	0.000435	0.000100	0.000100
TL	0.13	0.04	0.15	0.21	0.48	0.20

THE STUDY ON SABO AND FLOOD CONTROL
IN THE LAOAG RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. A.4.4
Parameter of Channel for Runoff Model

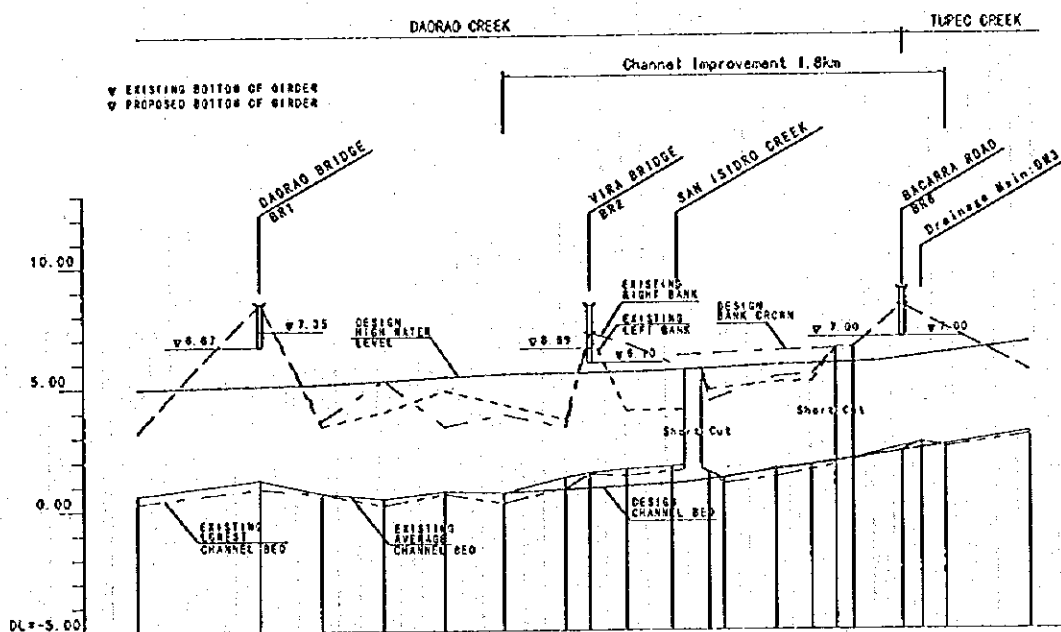


THE STUDY ON SABO AND FLOOD CONTROL
IN THE LAOAG RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. A.4.6
Alignment of Improved Creeks and Drainage
Mains in the Master Plan

Daorao-Tupeac Creek



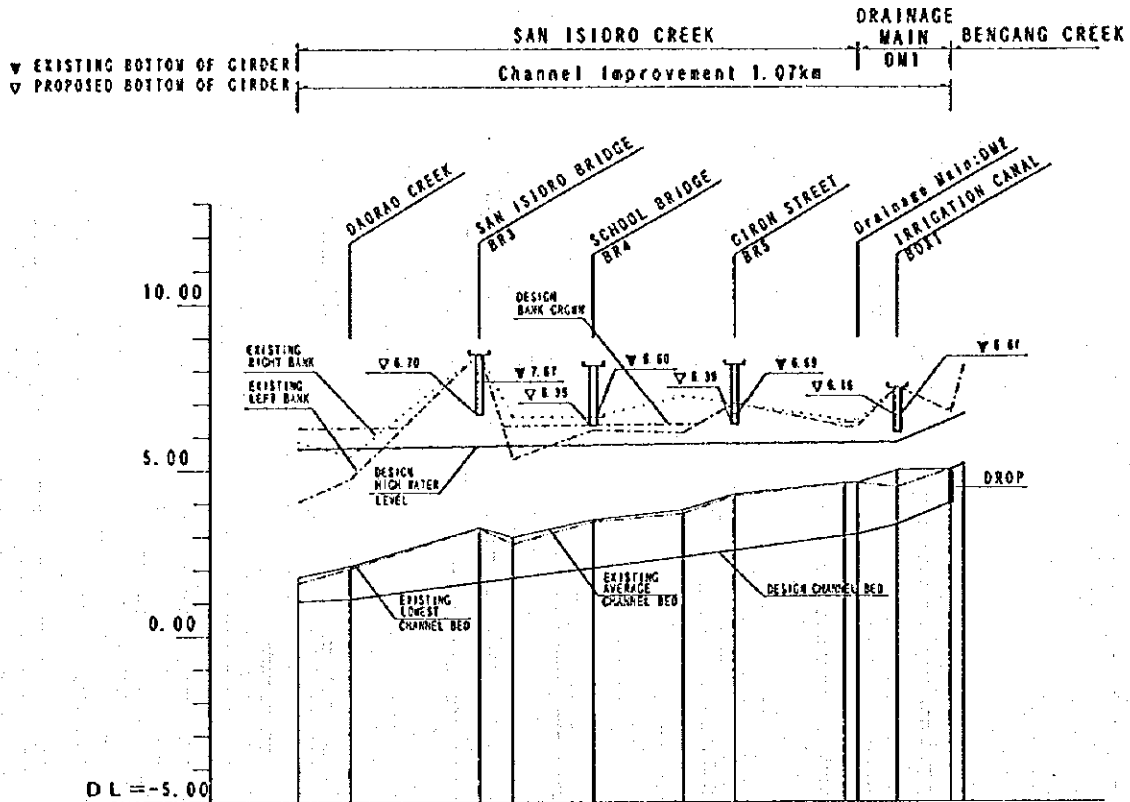
DESIGN	GRADIENT OF DESIGN CHANNEL BED		1/2,000		1/1,000		1/700	
	BANK CROWN							
HIGH WATER LEVEL	4.970	5.060	5.150	5.270	5.430			
CHANNEL BED								
EXISTING								
AVERAGE CHANNEL BED	0.05	1.25	0.71	0.47	0.78			
LOWEST CHANNEL BED								
RIGHT BANK	3.17	6.50	3.47	4.00	4.87			
LEFT BANK	3.22	6.50	3.65	5.28	3.40			
DISTANCE (m)	0	500	250	250	250			
STATION NO.	Da-7.50	Da-8.00	Da-8.25	Da-8.50	Da-8.75	Da-9.00	Da-9.25	Da-9.35
						Da-9.50	Da-9.68	Da-9.84
							Da-10.11	Da-10.25
								Da-10.35
								Da-10.47
								Da-10.65
								Da-10.70
								Da-10.80
								Da-11.12

THE STUDY ON SABO AND FLOOD CONTROL
IN THE LAOAG RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. A.4.7 (1)
Longitudinal Profile of Improved
Channels in the Master Plan

San Isidro Creek, Drainage Main: DM1



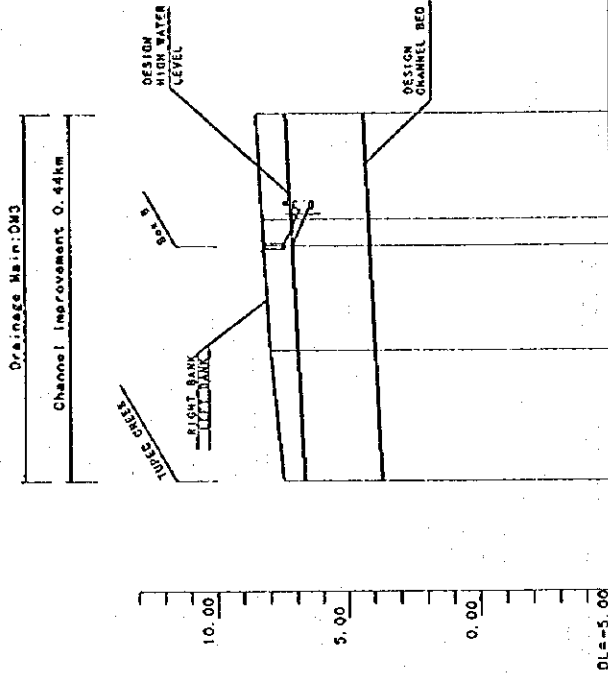
	GRADIENT OF DESIGN CHANNEL BED	1/600		1/410		1/2201/120																																				
		0	160	200	50	120	130	80																																		
DESIGN	BANK CROWN	1.045	5.644	6.224	1.732	5.707	6.307	1.853	5.717	6.317	2.147	5.742	6.342	2.415	5.769	6.369	2.660	5.785	6.386	3.074	5.821	6.421	3.123	5.825	6.425	3.396	5.850	6.450	4.067	5.863	6.417	5.063	6.517	6.817	5.185	6.484	6.784					
	HIGH WATER LEVEL	1.245	5.665	6.265	1.732	5.707	6.307	1.853	5.717	6.317	2.147	5.742	6.342	2.415	5.769	6.369	2.660	5.785	6.386	3.074	5.821	6.421	3.123	5.825	6.425	3.396	5.850	6.450	4.067	5.863	6.417	5.063	6.517	6.817	5.185	6.484	6.784					
	CHANNEL BED	1.045	5.644	6.224	1.732	5.707	6.307	1.853	5.717	6.317	2.147	5.742	6.342	2.415	5.769	6.369	2.660	5.785	6.386	3.074	5.821	6.421	3.123	5.825	6.425	3.396	5.850	6.450	4.067	5.863	6.417	5.063	6.517	6.817	5.185	6.484	6.784					
	AVERAGE CHANNEL BED	1.78	2.12	3.28	2.98	3.51	3.79	4.27	4.61	4.82	5.00	5.07	5.02	5.19	5.29	5.48	5.67	5.86	6.05	6.24	6.43	6.62	6.81	7.00	7.19	7.38	7.57	7.76	7.95	8.14	8.33	8.52	8.71	8.90	9.09	9.28	9.47	9.66	9.85			
EXISTING	LOWEST CHANNEL BED	1.59	2.04	3.23	2.77	3.43	3.67	4.57	4.60	4.48	4.92	5.02	5.19	5.29	5.48	5.67	5.86	6.05	6.24	6.43	6.62	6.81	7.00	7.19	7.38	7.57	7.76	7.95	8.14	8.33	8.52	8.71	8.90	9.09	9.28	9.47	9.66	9.85				
	RIGHT BANK	4.04	5.41	8.50	6.59	8.60	7.21	9.21	8.49	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50	
	LEFT BANK	5.83	4.73	8.50	5.32	8.19	6.11	9.00	6.29	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.30
	DISTANCE (m)	0	160	200	50	120	130	80	170	20	60	80	140	40	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400	420	440	460	480	500	520	540	560	580			
	STATION NO.	SA-0.00	SA-0.16	SA-0.36	SA-0.41	SA-0.53	SA-0.66	SA-0.74	SA-0.91	SA-0.93	DM1-0.00	DM1-0.06	DM1-0.14	DM1-0.16	DM1-0.22	DM1-0.28	DM1-0.34	DM1-0.40	DM1-0.46	DM1-0.52	DM1-0.58	DM1-0.64	DM1-0.70	DM1-0.76	DM1-0.82	DM1-0.88	DM1-0.94	DM1-1.00	DM1-1.06	DM1-1.12	DM1-1.18	DM1-1.24	DM1-1.30	DM1-1.36	DM1-1.42	DM1-1.48	DM1-1.54	DM1-1.60	DM1-1.66	DM1-1.72		

THE STUDY ON SABO AND FLOOD CONTROL
IN THE LAOAG RIVER BASIN

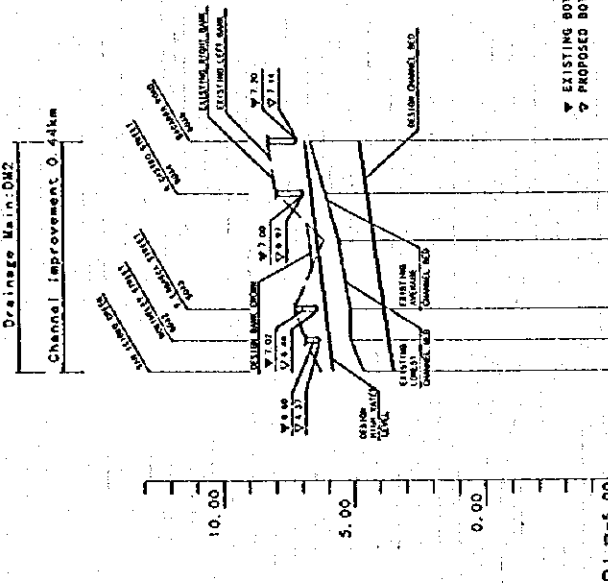
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Fig. A.4.7 (2)
Longitudinal Profile of Improved
Channels in the Master Plan

Drainage Main DM2 and DM3



DESIGN		EXISTING	
GRADIENT OF DESIGN CHANNEL BED	STATION NO.	DISTANCE (m)	STATION NO.
BANK CROWN	7.50	250	3+00
HIGH WATER LEVEL	8.30	50	3+00
CHANNEL BED	8.30	200	3+00
AVERAGE CHANNEL BED	8.30	150	3+00
LOWEST CHANNEL BED	8.30	100	3+00
RIGHT BANK	8.30	50	3+00
LEFT BANK	8.30	0	3+00
1/1000			

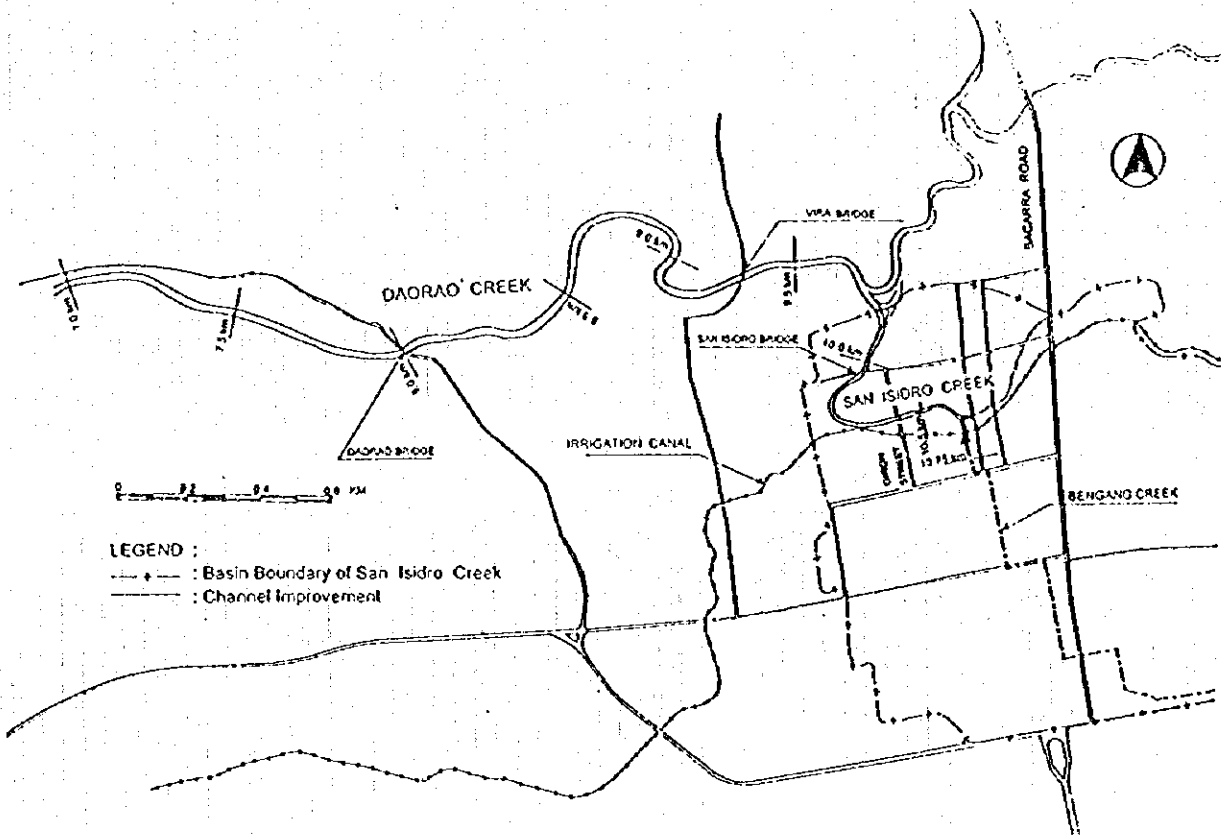
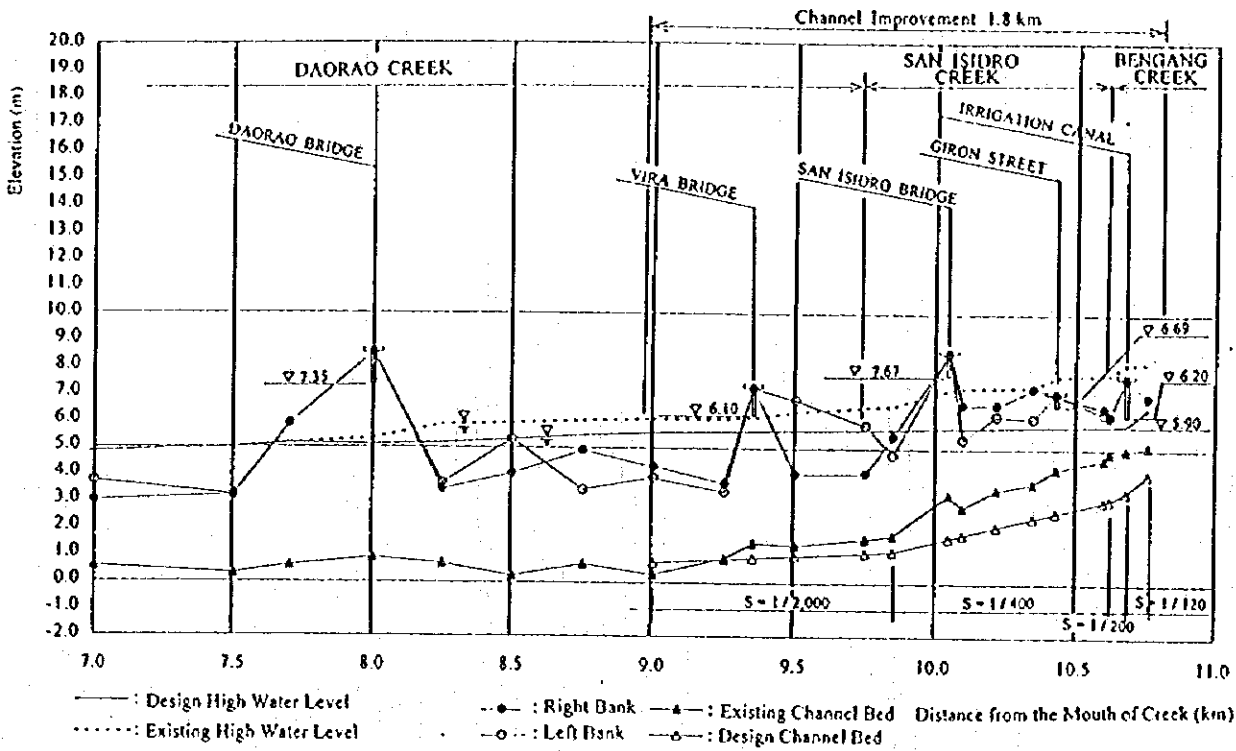


DESIGN		EXISTING	
GRADIENT OF DESIGN CHANNEL BED	STATION NO.	DISTANCE (m)	STATION NO.
BANK CROWN	5.50	100	4+00
HIGH WATER LEVEL	6.42	50	4+00
CHANNEL BED	6.42	200	4+00
AVERAGE CHANNEL BED	6.42	150	4+00
LOWEST CHANNEL BED	6.42	100	4+00
RIGHT BANK	6.42	50	4+00
LEFT BANK	6.42	0	4+00
1/350			

THE STUDY ON SABO AND FLOOD CONTROL IN THE LAOAG RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. A.4.7 (3)
Longitudinal Profile of Improved Channels in the Master Plan



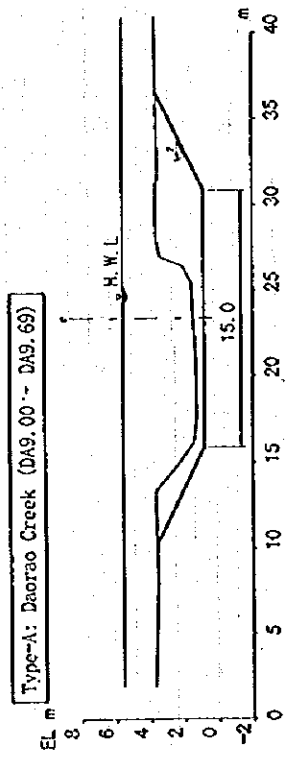
THE STUDY ON SABO AND FLOOD CONTROL
IN THE LAOAG RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

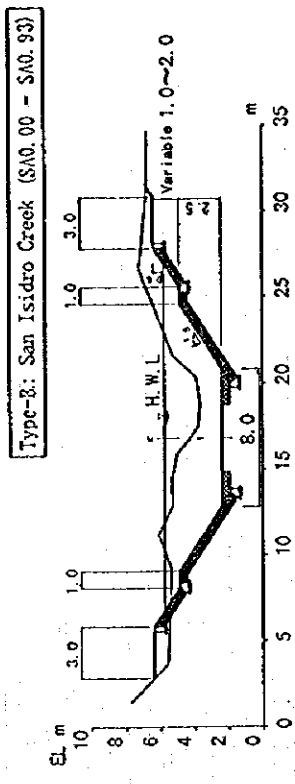
Fig. A.4.8

Comparison of Existing and Design High Water Level

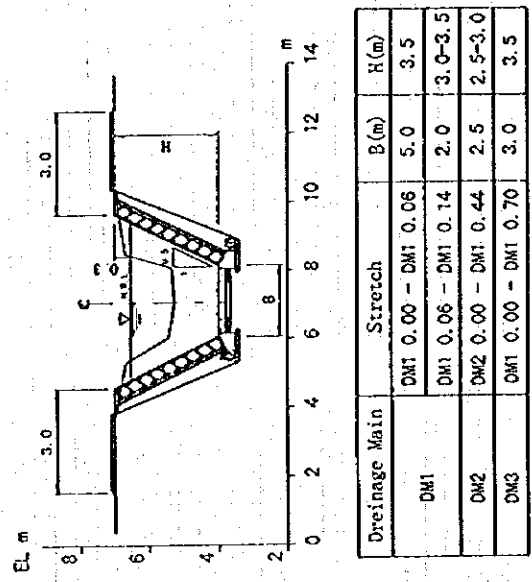
TYPE-A (DA-9.69)



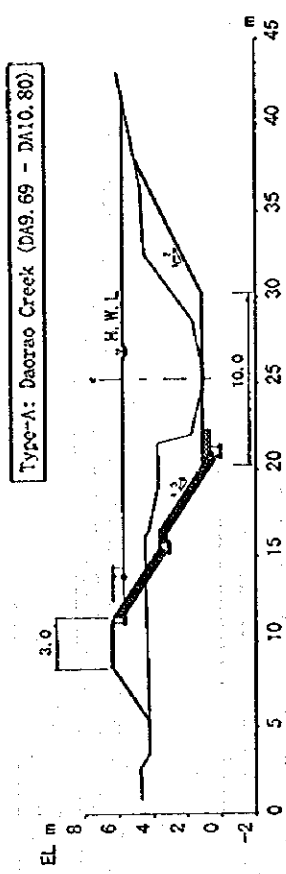
TYPE-B (SA-0.66)



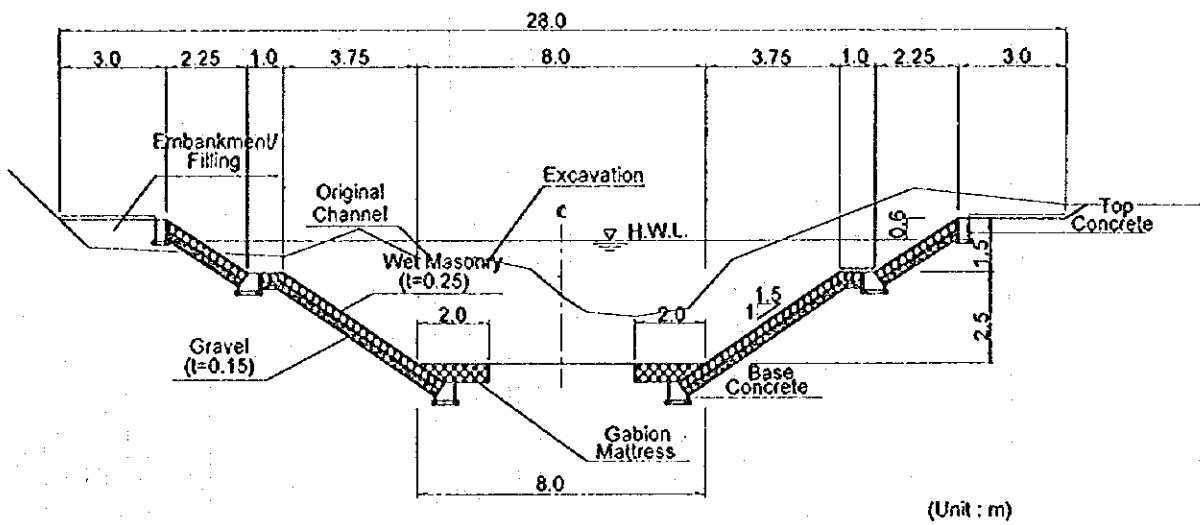
TYPE-C (DMI-0.14)



TYPE-D (DA-10.00)

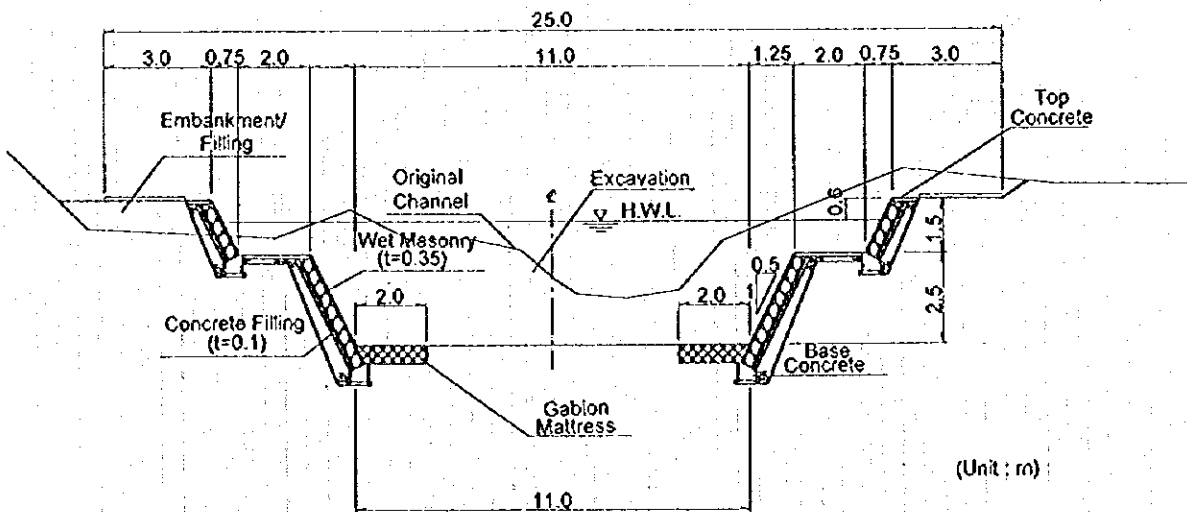


TYPE-A



(Unit : m)

TYPE-B



(Unit : m)

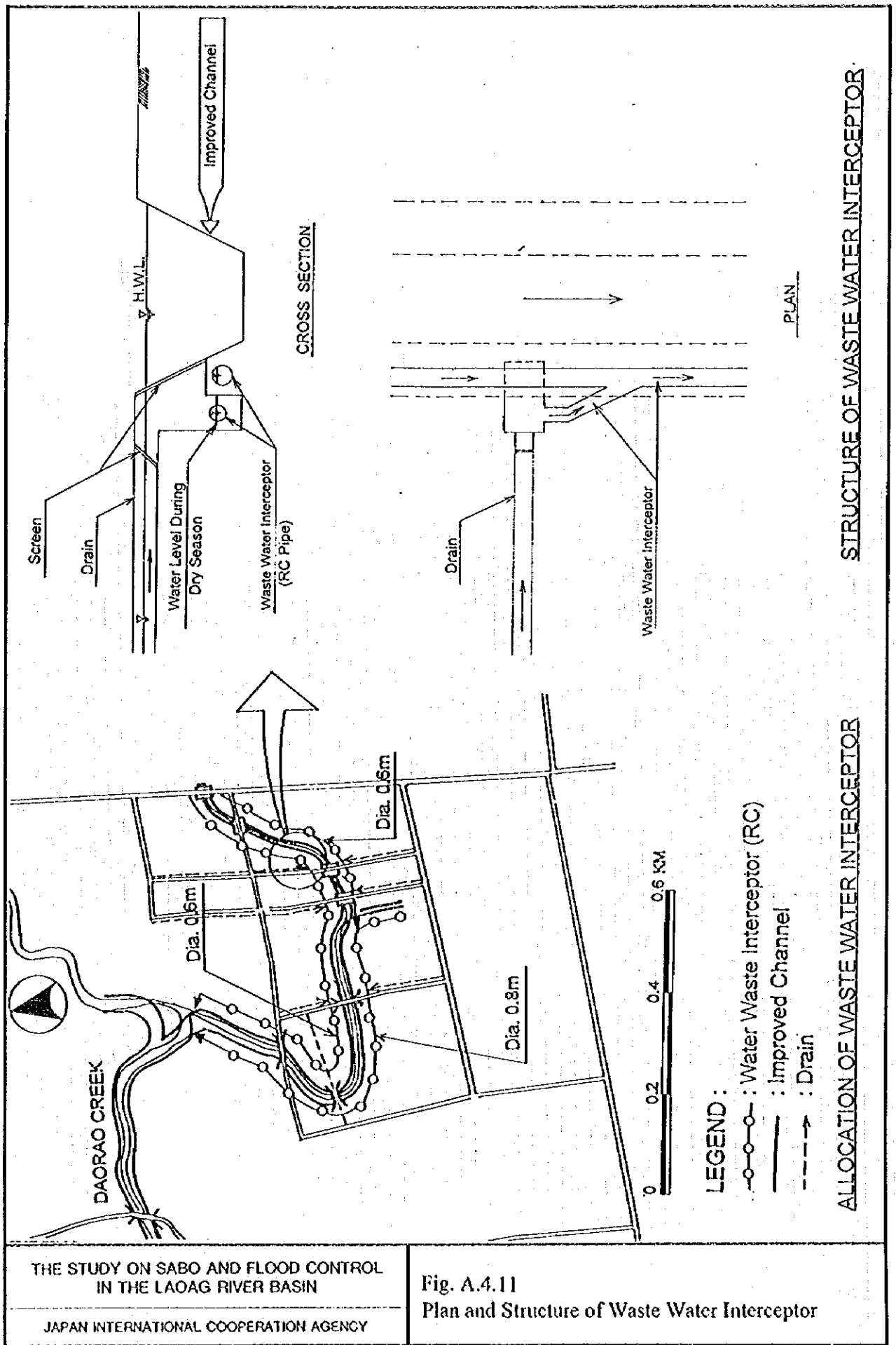
Work Items	Unit	Unit Cost (Pesos)	Revetment Type-A		Revetment Type-B	
			Quantity	Amount (Pesos)	Quantity	Amount (Pesos)
Excavation	(m ³)	115	50.41	5,797	45.67	5,597
Embankment/Filling	(m ³)	85	2.58	219	3.56	303
Gravel	(m ³)	510	4.02	2,050	2.20	1,122
Concrete Filling/Top Concrete	(m ³)	2,500	0.36	900	1.65	4,125
Base Concrete	(m ³)	3,500	0.94	3,290	1.15	4,060
Wet Masonry	(m ³)	1,550	4.28	8,346	3.62	7,059
Gabion Mattress	(m ³)	1,300	1.62	2,106	1.88	2,444
			Sub-total	22,708	Sub-total	24,710
Land Acquisition						
Farm/Open Space	m ²	170	10.00	1,700	8.66	1,472
Residential Area	m ²	1,500	10.00	15,000	8.66	12,990
Total						
Farm/Open Space				24,408		25,182
Residential Area				37,708		37,700

LOCATION : San Isidro Creek (SA 0.50)

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IN THE LAOAG RIVER BASIN

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Fig. A.4.10
Alternative Study of Revetment Type

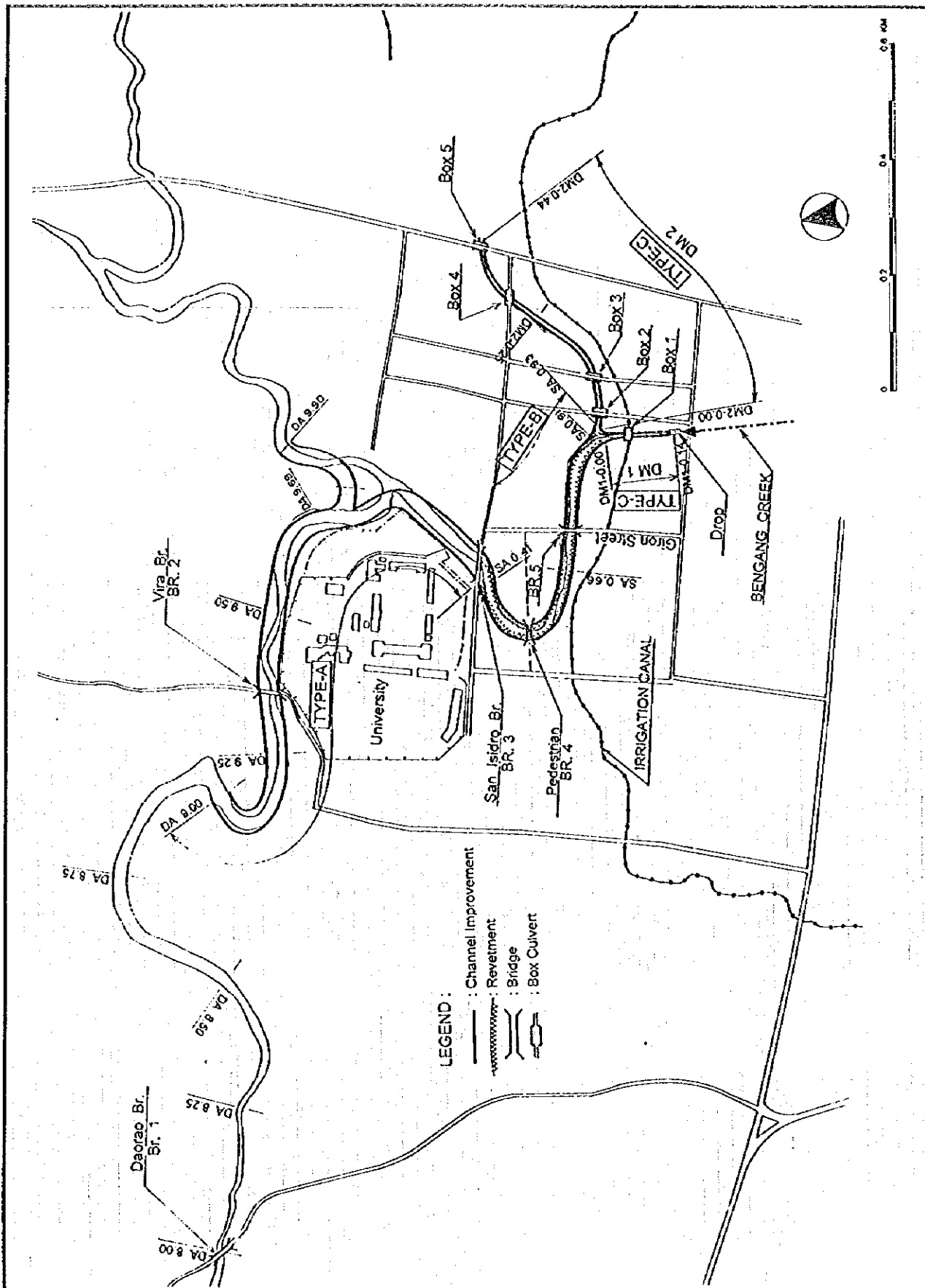


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Fig. A.4.11

Plan and Structure of Waste Water Interceptor

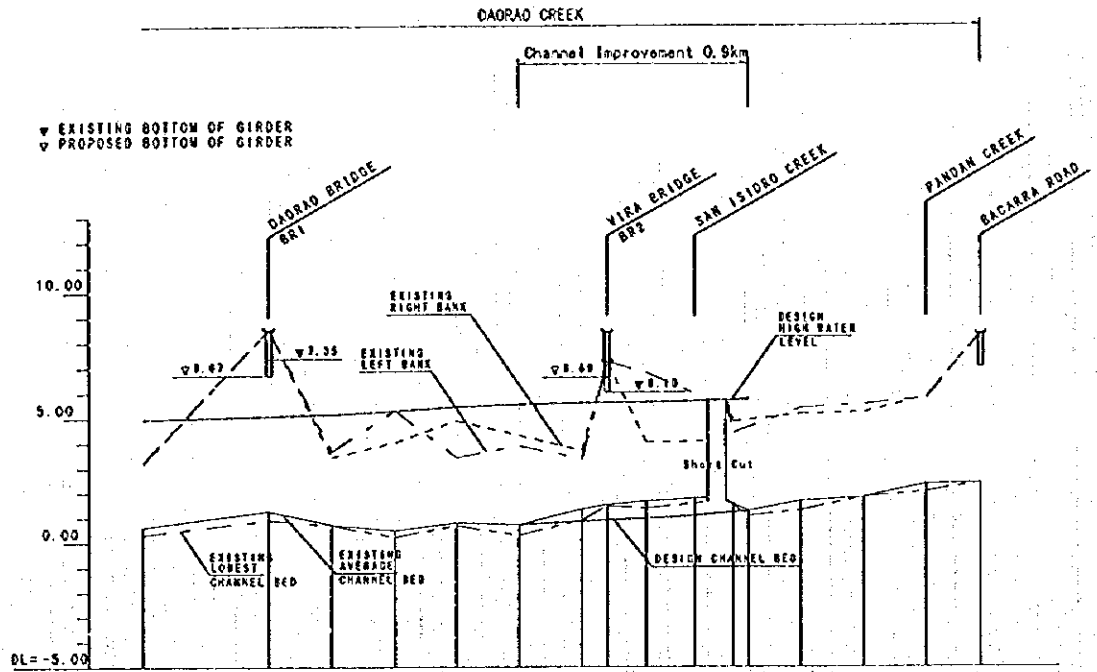


THE STUDY ON SABO AND FLOOD CONTROL
IN THE LAOAG RIVER BASIN

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Fig. A.4.12
Alignment of Improved Creeks and Drainage
Mains in the Urgent Plan

Daorao Creek



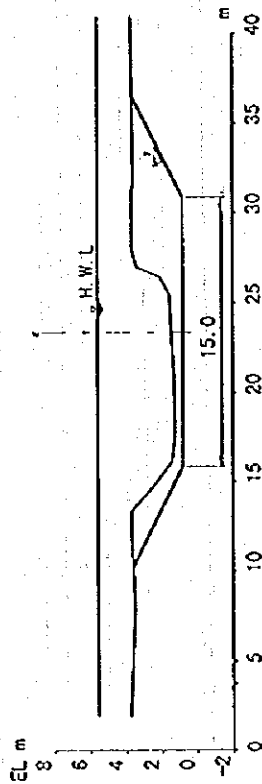
	GRADIENT OF DESIGN CHANNEL BED	
	1/2,000	1/1,000
DESIGN		
BANK CROWN		
HIGH WATER LEVEL	4.970	
CHANNEL BED		
EXISTING		
AVERAGE CHANNEL BED	0.30 - 0.82	
LOWEST CHANNEL BED	0.30 - 0.87	
RIGHT BANK	3.17 - 8.50	
LEFT BANK	0.22 - 8.50	
DISTANCE (m)	0 - 500	
STATION NO.	DA-1.50 - DA-5.00	

THE STUDY ON SABO AND FLOOD CONTROL
IN THE LAOAG RIVER BASIN

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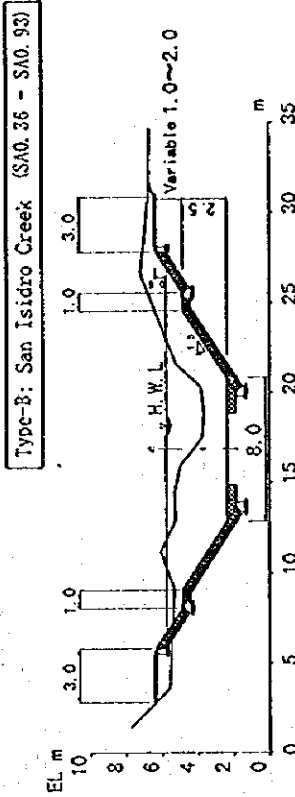
Fig. A.4.13 (1)
Longitudinal Profile of Improved
Channels in the Urgent Plan

TYPE-A (DA-9.69)



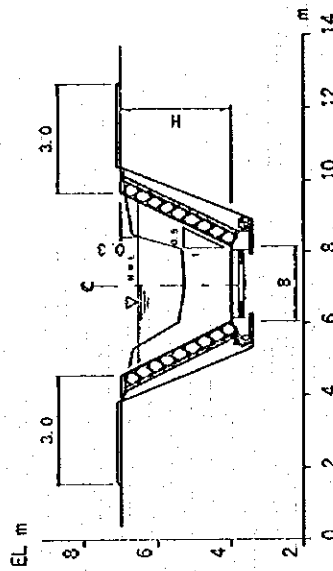
Type-A	Doozao Creek	(DA9.00 - DA9.90)
	San Isidro Creek	(SA0.00 - SA0.36)

TYPE-B (SA-0.66)



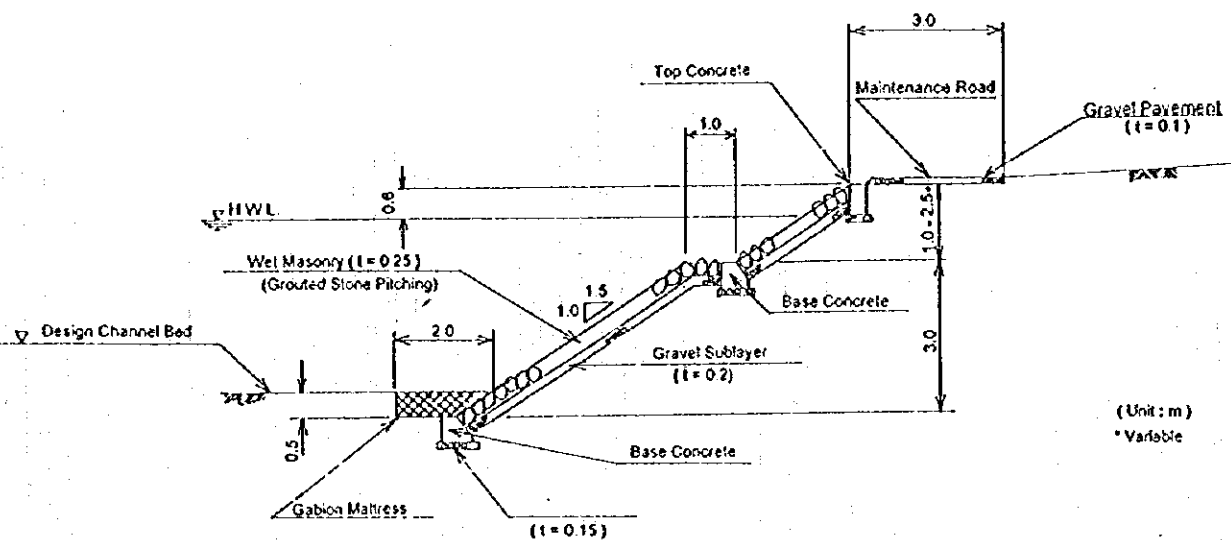
Type-B: San Isidro Creek (SA0.36 - SA0.93)

TYPE-C (DM1-0.14)

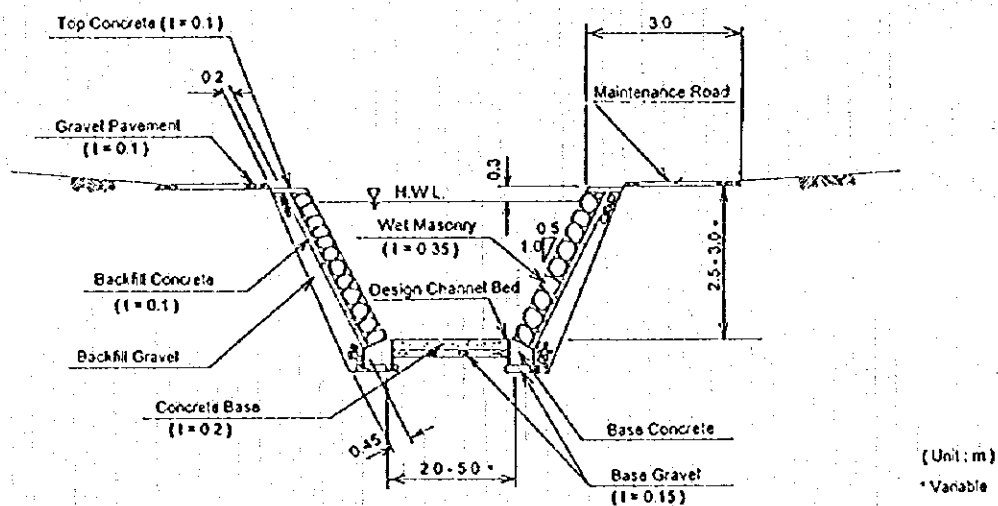


Drainage Main	Stretch	B(m)	H(m)
DM1	DM1 0.00 - DM1 0.06	5.0	2.5
	DM1 0.06 - DM1 0.14	2.0	3.0-3.5
DM2	DM2 0.00 - DM1 0.44	2.5	2.5-3.0

TYPE - RA



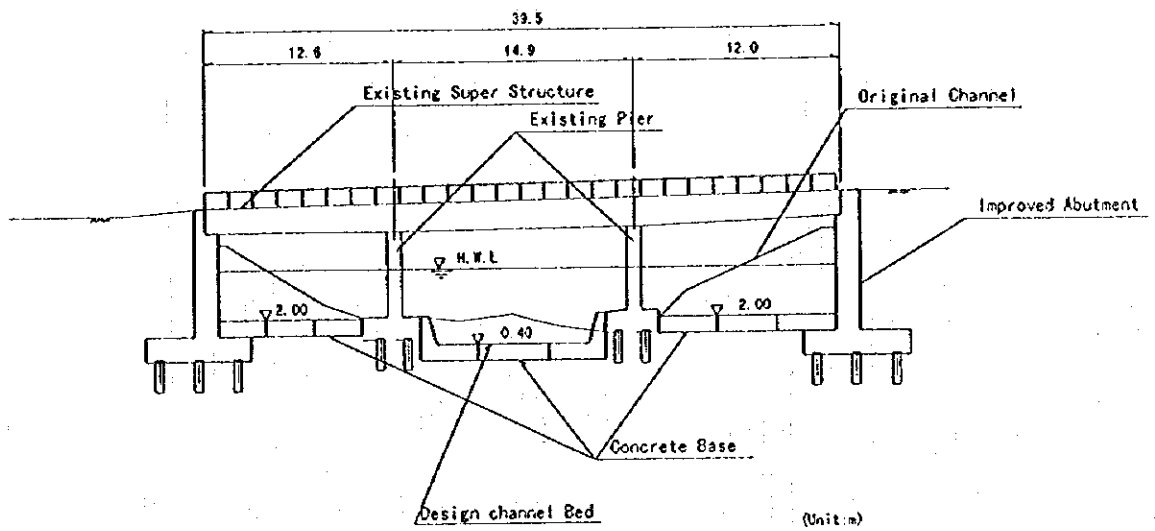
TYPE - RB



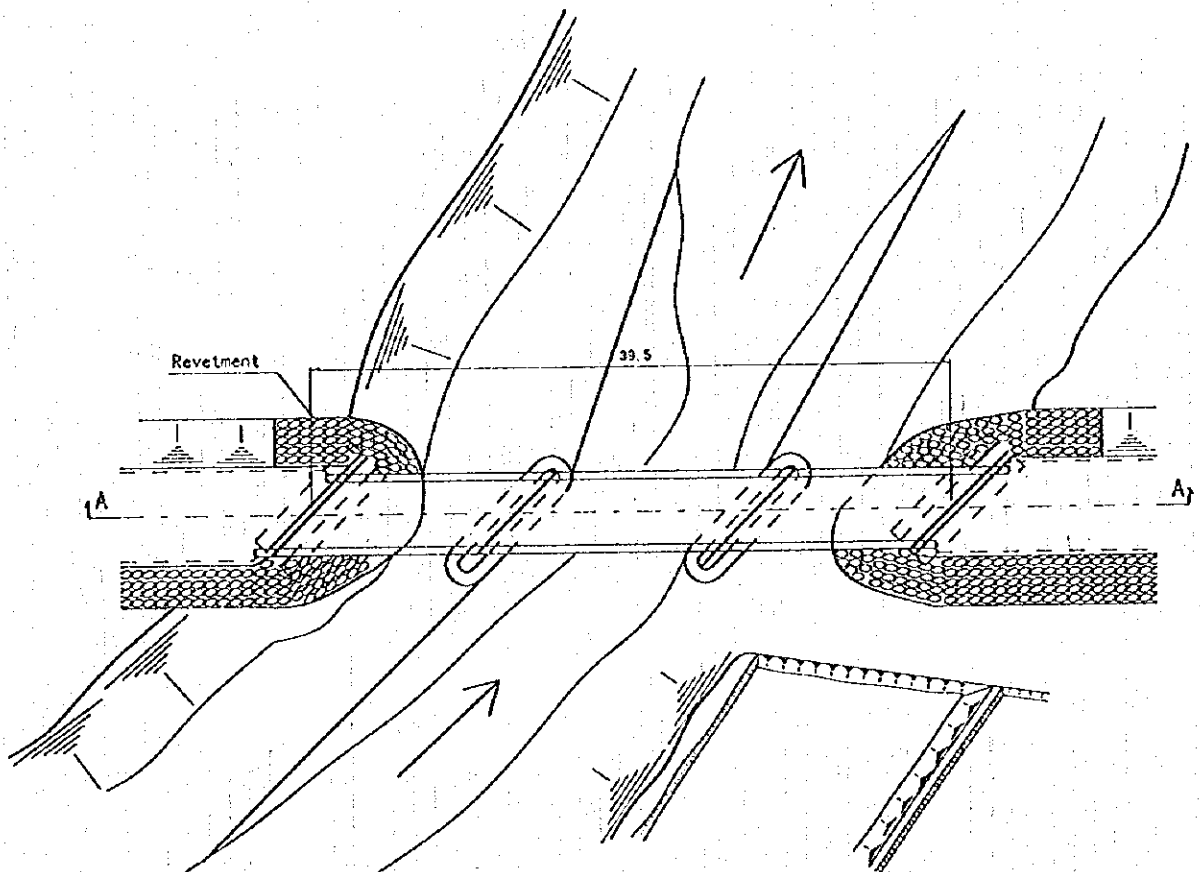
THE STUDY ON SABO AND FLOOD CONTROL
IN THE LAOAG RIVER BASIN

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Fig. A.4.15
Proposed Structure of Bank Slope Protection Works



SECTION A-A



PLAN

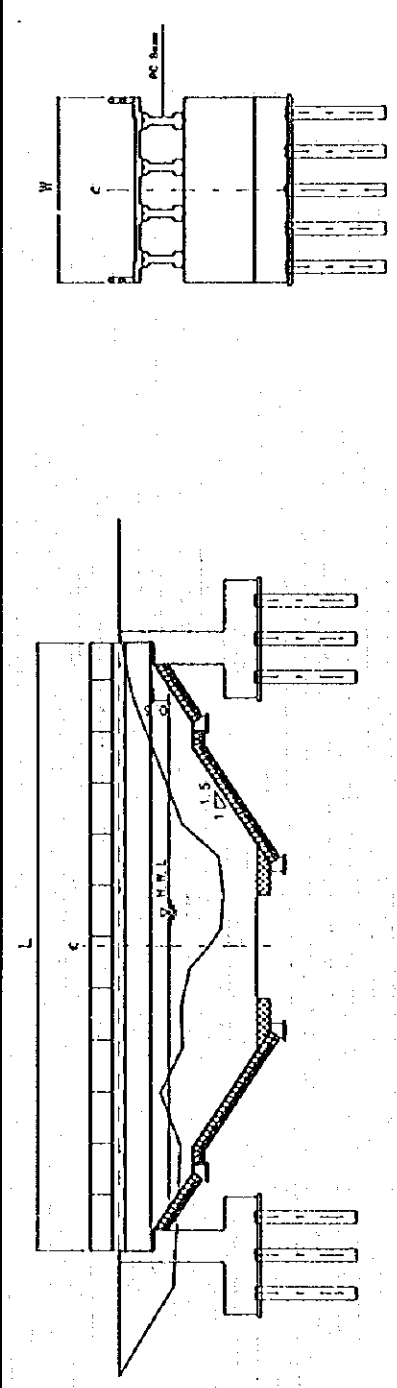
DAORAO BRIDGE BR1 (DA-8.00)

THE STUDY ON SABO AND FLOOD CONTROL
IN THE LAOAG RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

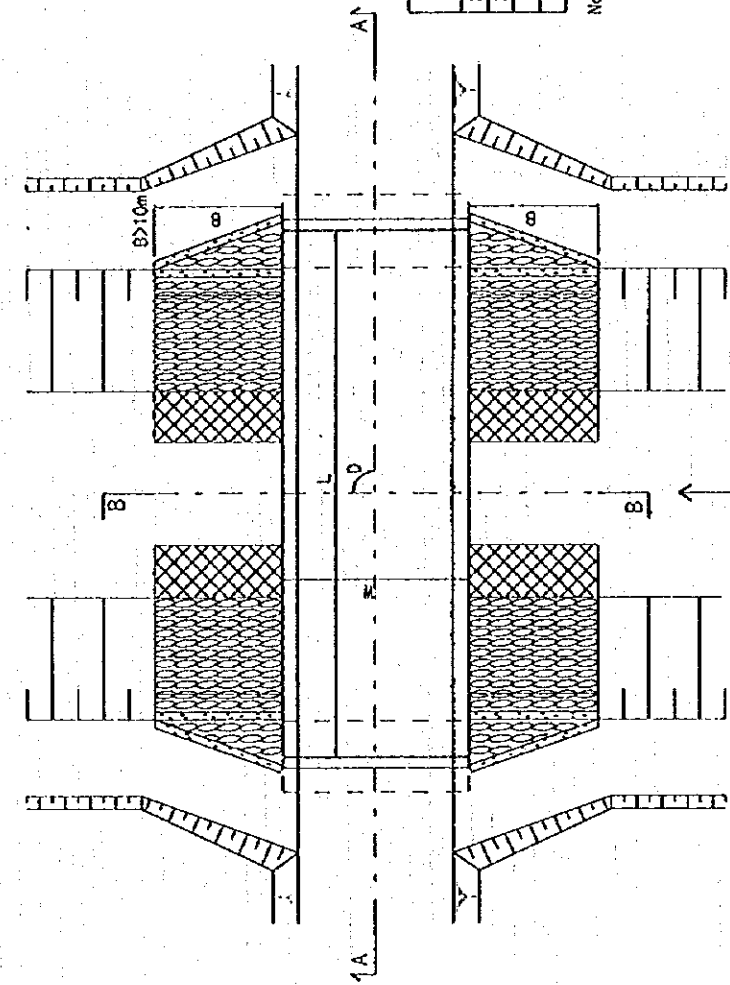
Fig. A.4.16 (1)

Proposed Plan and Section of Bridges



SECTION B-B

SECTION A-A

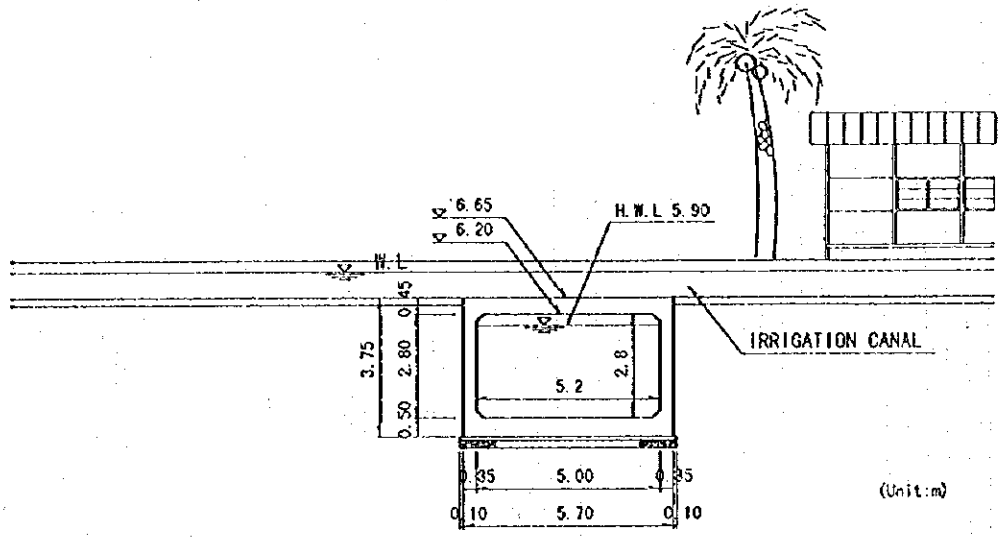


PLAN Bridge BR2~BR5

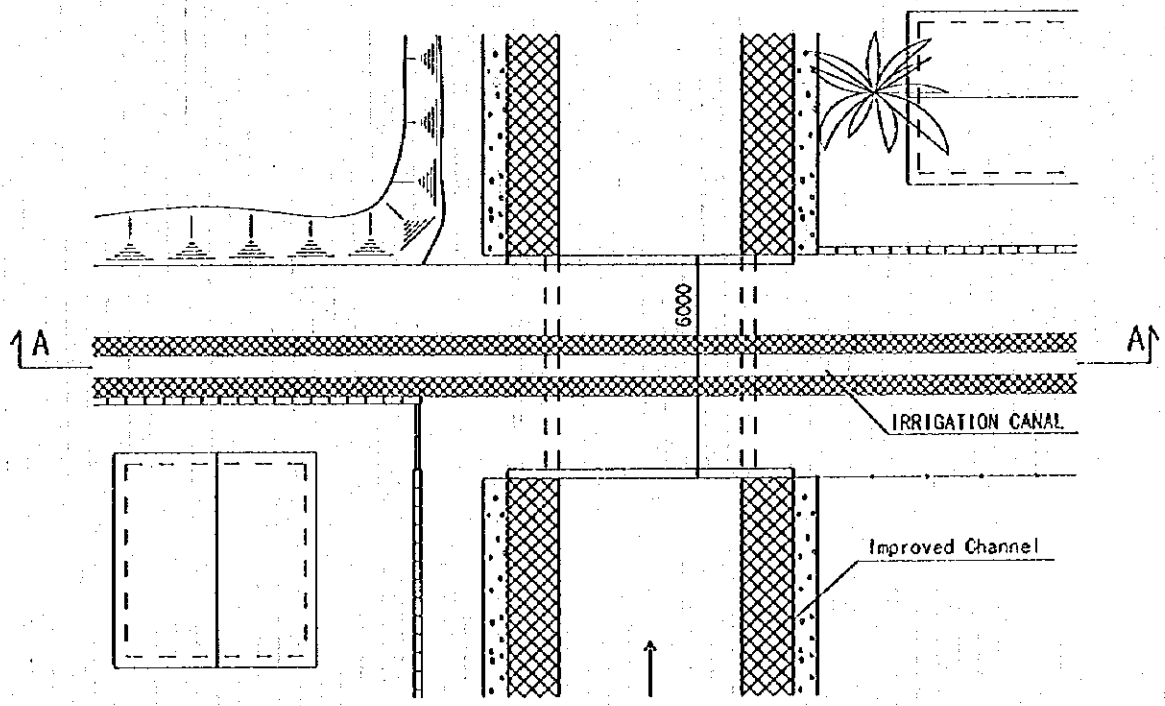
Name of Bridge	Station	Width L (m)	Length D (degree)	Skew Angle
BR2 Vira	DA-0.35	5.0	38.2	90
BR3 San Isidro	DA-0.36	8.6	29.7	60
BR4 Pedestrian	SA-0.53	2.0	24.5	90
BR5 Giron	SA-0.74	7.5	23.3	90

Note: Stretch of Revetment (B) should be more than 10 m

Fig. A.4.16 (2)
Proposed Plan and Section of Bridges



SECTION A-A



IRRIGATION CANAL BOX I (DMI-0.06)

PLAN

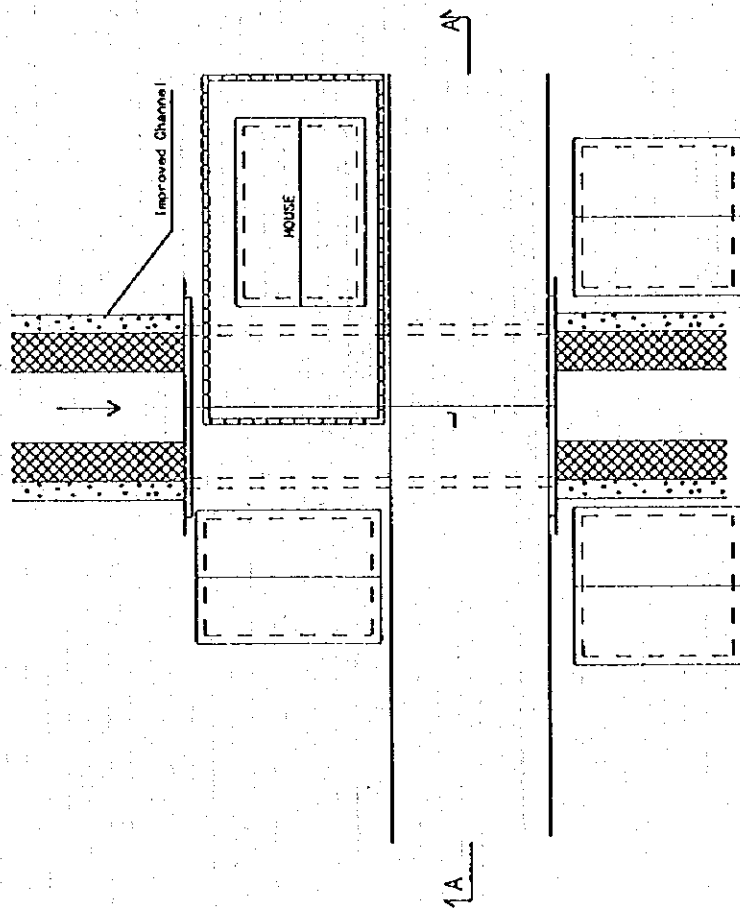
THE STUDY ON SABO AND FLOOD CONTROL
IN THE LAOAG RIVER BASIN

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Fig. A.4.17 (1)
Proposed Plan and Section of Box Culvert

Box Culvert

NO.	Station	Name	Dimensions		
			B	H	L
Box2	DM2-0, 00	Grossing Street	5.2	2.7	30.0
Box3	DM2-0, 12	McKinley Street	5.1	2.6	7.0
Box4	DM2-0, 34	V. Lagasca Street	5.0	2.5	25.0
Box5	DM2-0, 44	A. Castro Street	5.0	2.5	10.0



PLAN

SECTION A-A

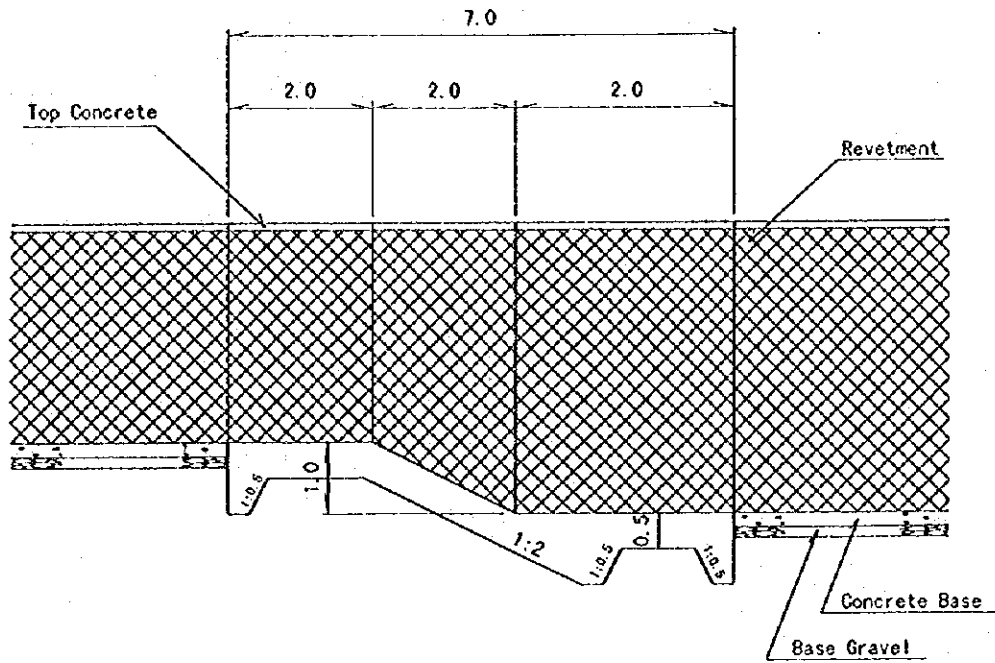
(Unit:m)

Box Culvert Box2~Box5

THE STUDY ON SABO AND FLOOD CONTROL
IN THE LAOAG RIVER BASIN

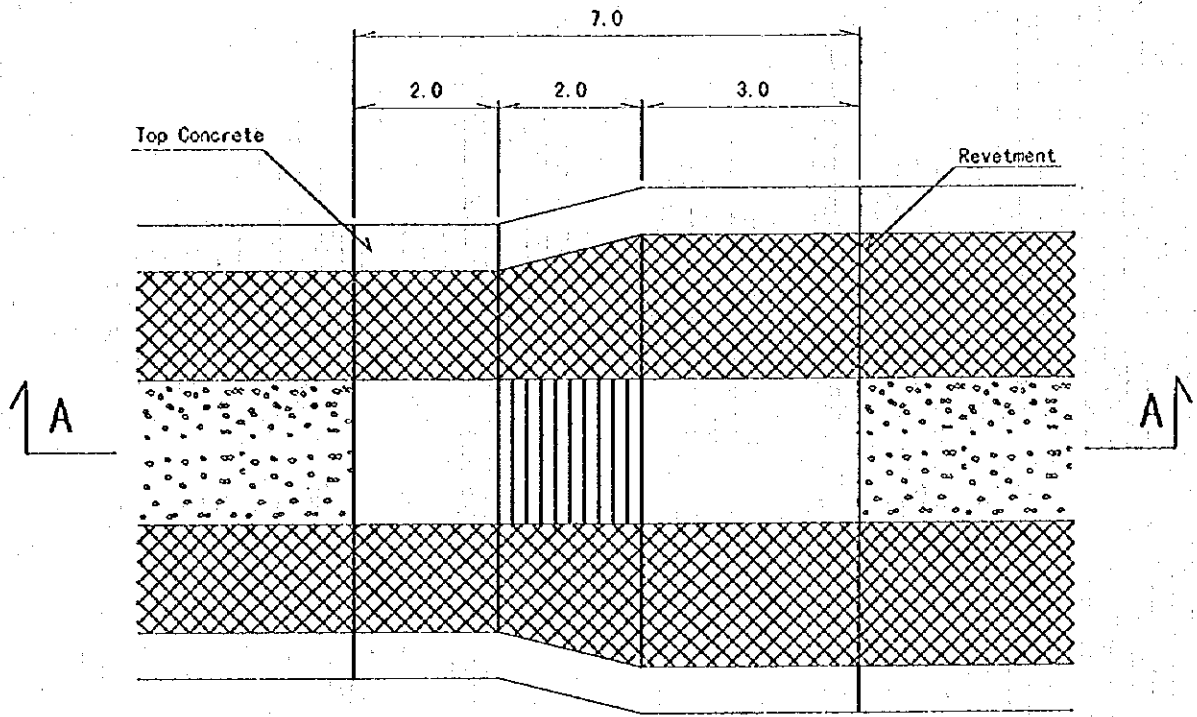
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Fig. A.4.17 (2)
Proposed Plan and Section of Box Culvert



SECTION A-A DROP
(End Structure of DM1 Improvement)

(Unit:m)



PLAN

THE STUDY ON SABO AND FLOOD CONTROL
IN THE LAOAG RIVER BASIN

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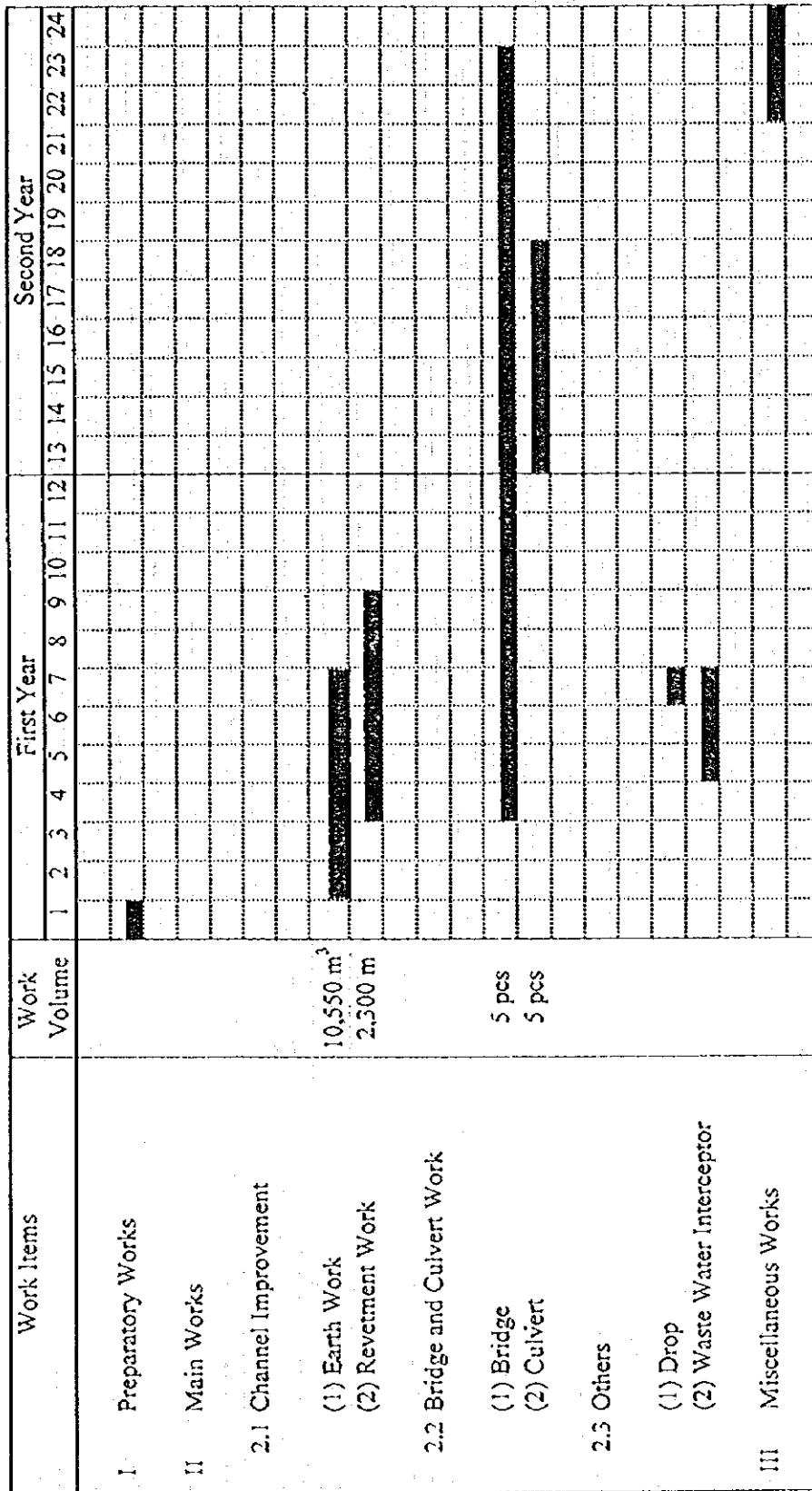
Fig. A.4.18
Proposed Structure of Drop



THE STUDY ON SABO AND FLOOD CONTROL
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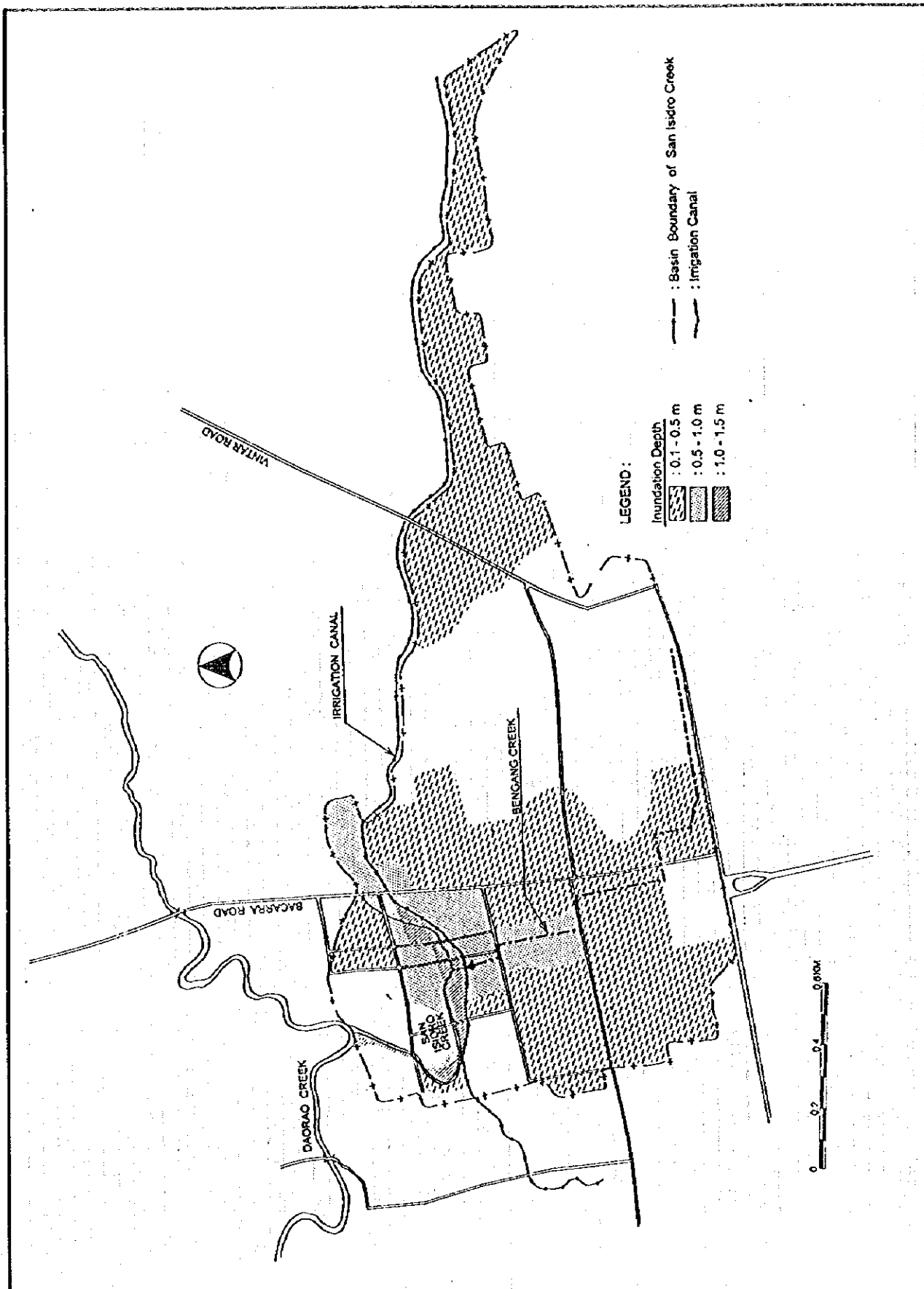
Fig. A.5.1
Potential Dumping Site of Excavated Material



THE STUDY ON SABO AND FLOOD CONTROL
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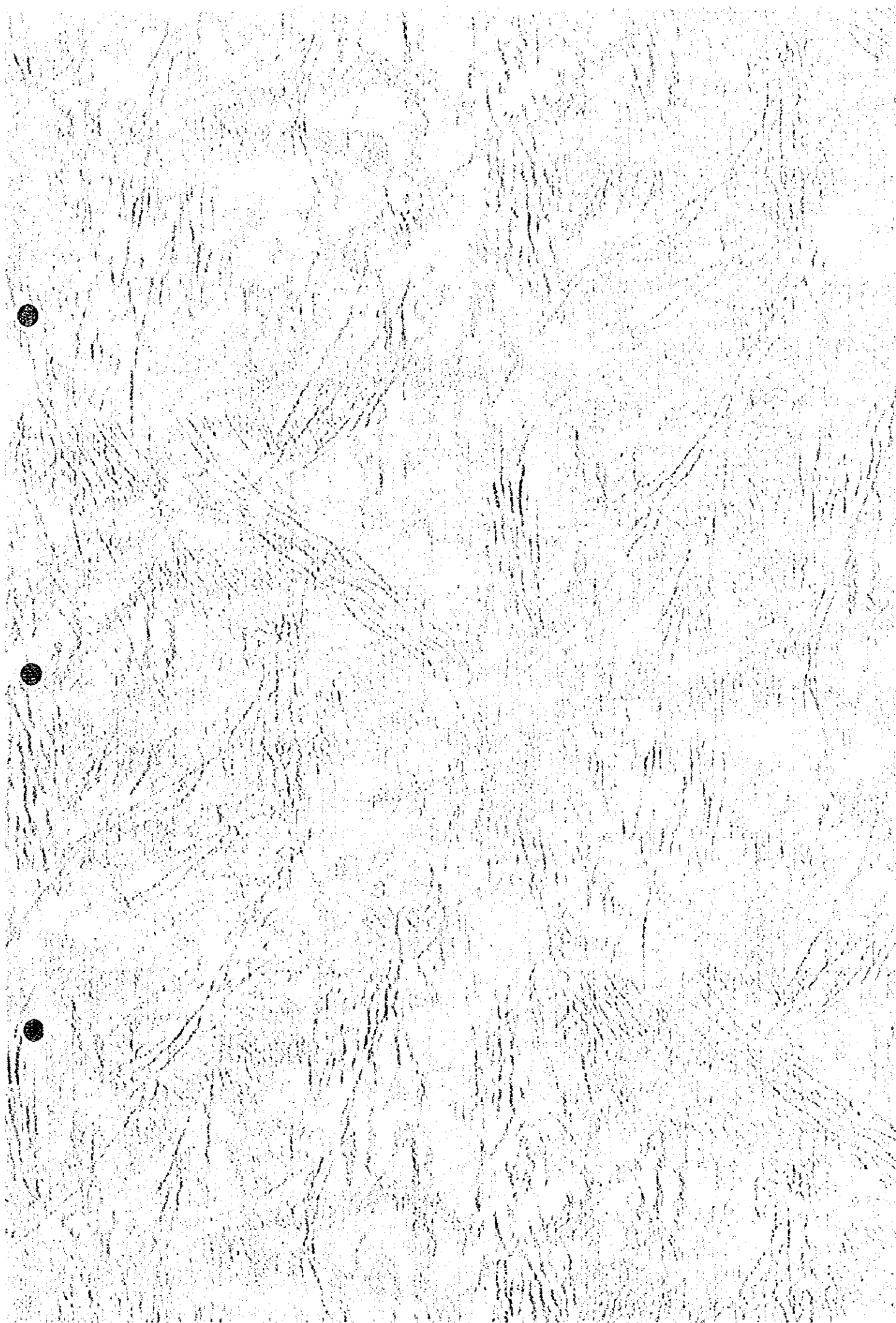
Fig. A.5.2
Construction Schedule



THE STUDY ON SABO AND FLOOD CONTROL
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Fig A.6.1
Flood Inundation Area and Depth
with a 5-year Return Period



JICA