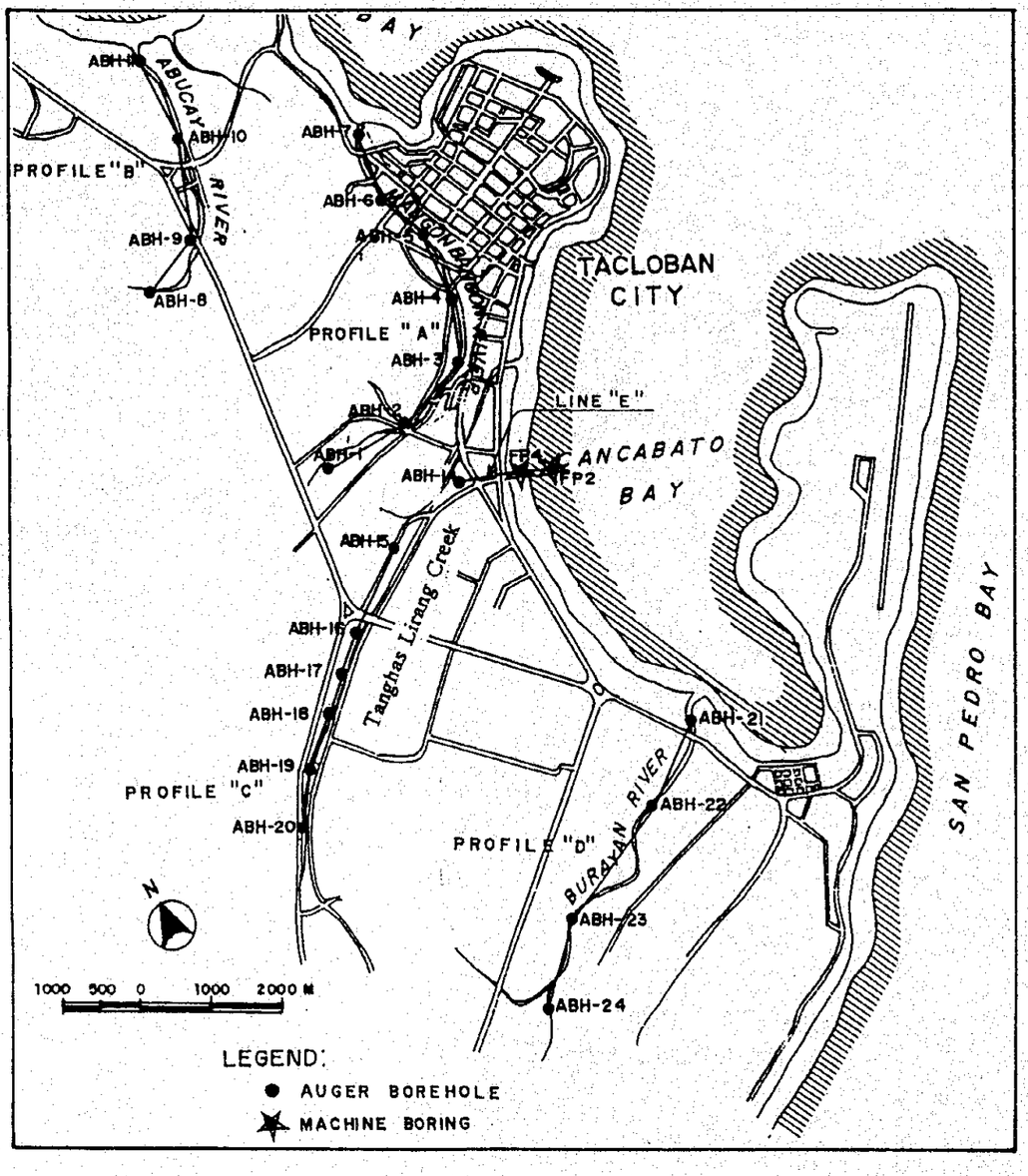
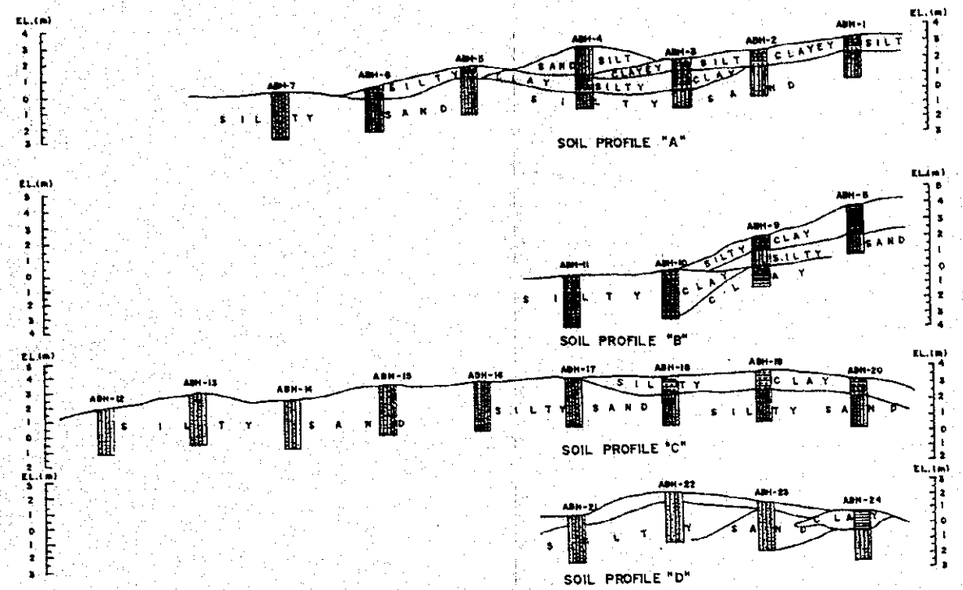
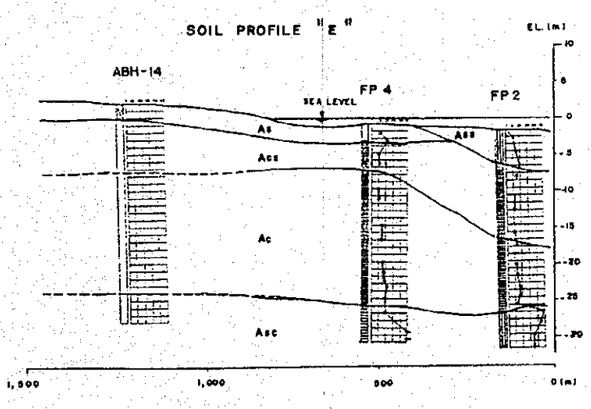
LOCATION OF EXISTING BOREHOLES



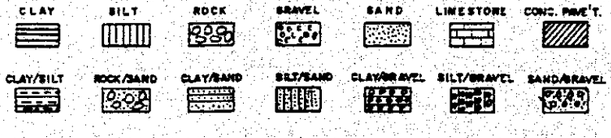




SOIL STRATA OF TACLOBAN CITY

Symbol	Soil Description	N - Value		Range of Thickness	No. of Sample
		Range	Average		
Ass	Silty Sand	10 - 20	14.7	1 - 5m	3
As	Sand	11 - 22	16.5	2 - 3m	2
Acs	Clay Silt	10 - 13	11.7	4 - 20m	6
Ac	Clay	10 - 22	15.4	10 - 20m	15
Asc	Sandy Clay	20 - >50	43.6	More than 5m	7

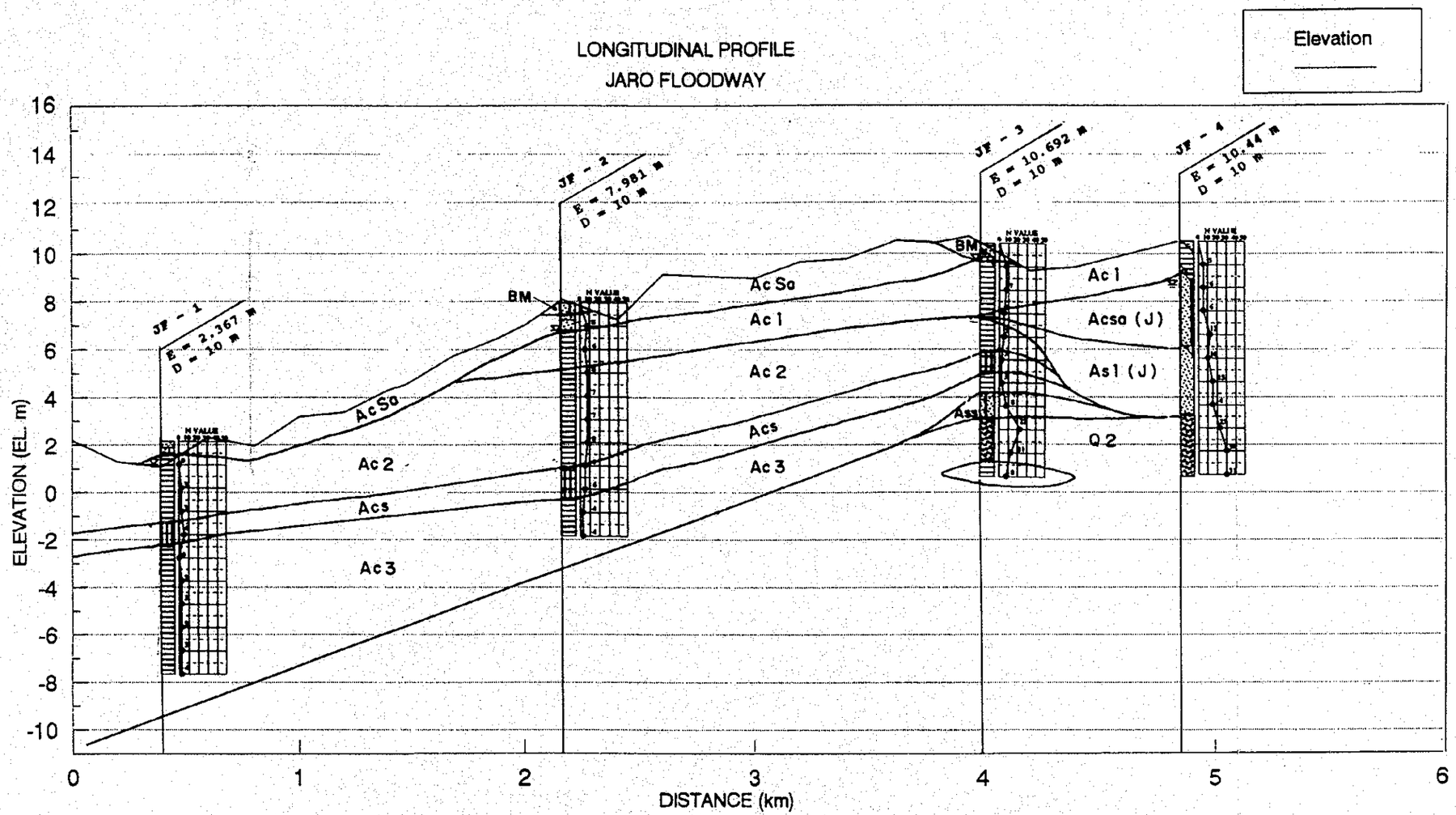
SYMBOLS:



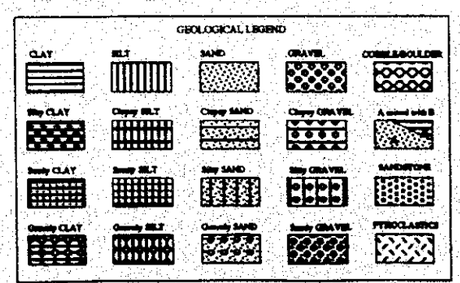
THE STUDY ON THE FLOOD CONTROL FOR RIVERS IN THE SELECTED URBAN CENTERS

JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 3.6
Soil Profiles of Tacloban City



Elevation	2.22	1.28	1.10	2.31	1.95	3.19	3.38	4.32	4.55	5.73	6.47	7.04	8.10	7.24	9.15	9.05	9.00	9.67	9.78	10.53	10.46	10.72	9.27	9.44	9.94	10.50
Station No.	0+000	0+200	0+400	0+600	0+800	1+000	1+200	1+400	1+465	1+680	1+880	2+000	2+155	2+400	2+600	2+800	3+000	3+200	3+400	3+620	3+800	3+935	4+200	4+400	4+600	4+827



SOIL STRATA OF JARO SEDIMENTARY BASIN

River	Symbol	Layer	N-Value min.	N-Value max.	N-Value average	Thickness (m) min.	Thickness (m) max.
JARO	Asc1	upper silty Clay	3	19	7.50	0	3.4
	Acss	clayey Sand	4	13	7.22	0	3.8
	Ac	Clay	7	14	10.75	0	4.4
	Ags	gravely Sand	3	20	6.20	0	4.2
	Asc2	middle silty Clay	2	13	4.54	0	3.8
	As1	upper sand	10	22	13.57	0	3.4
	As2	lower Sand	2	22	12.00	0	3.3
	Asc	Sandy Clay	2	13	5.50	0	3.3
	Acs	clayey Silt	2	8	3.70	0	5.2
	Asc3	lower silty clay	1	2	1.16	0	4.2
	Q2	Cabatuan Formation	11	44	25.53	>1	>4.2
JARO FLOODWAY	BM	Backfilled Materials	-	-	-	0	0.6
	Acss	clayey Sand	8	8	8.00	0	1.8
	Ac1	upper Clay	5	8	6.50	0	2.1
	Ac2	middle Clay	0	8	4.88	0	4.2
	Acs	clayey Silt	3	6	4.33	0	1.2
	Ac3	lower Clay	0	4	3.44	0	7.2
	Ass	silty Sand	8	8	8.00	0	1
	Q2	Cabatuan Formation	11	44	25.53	>1	>4.2

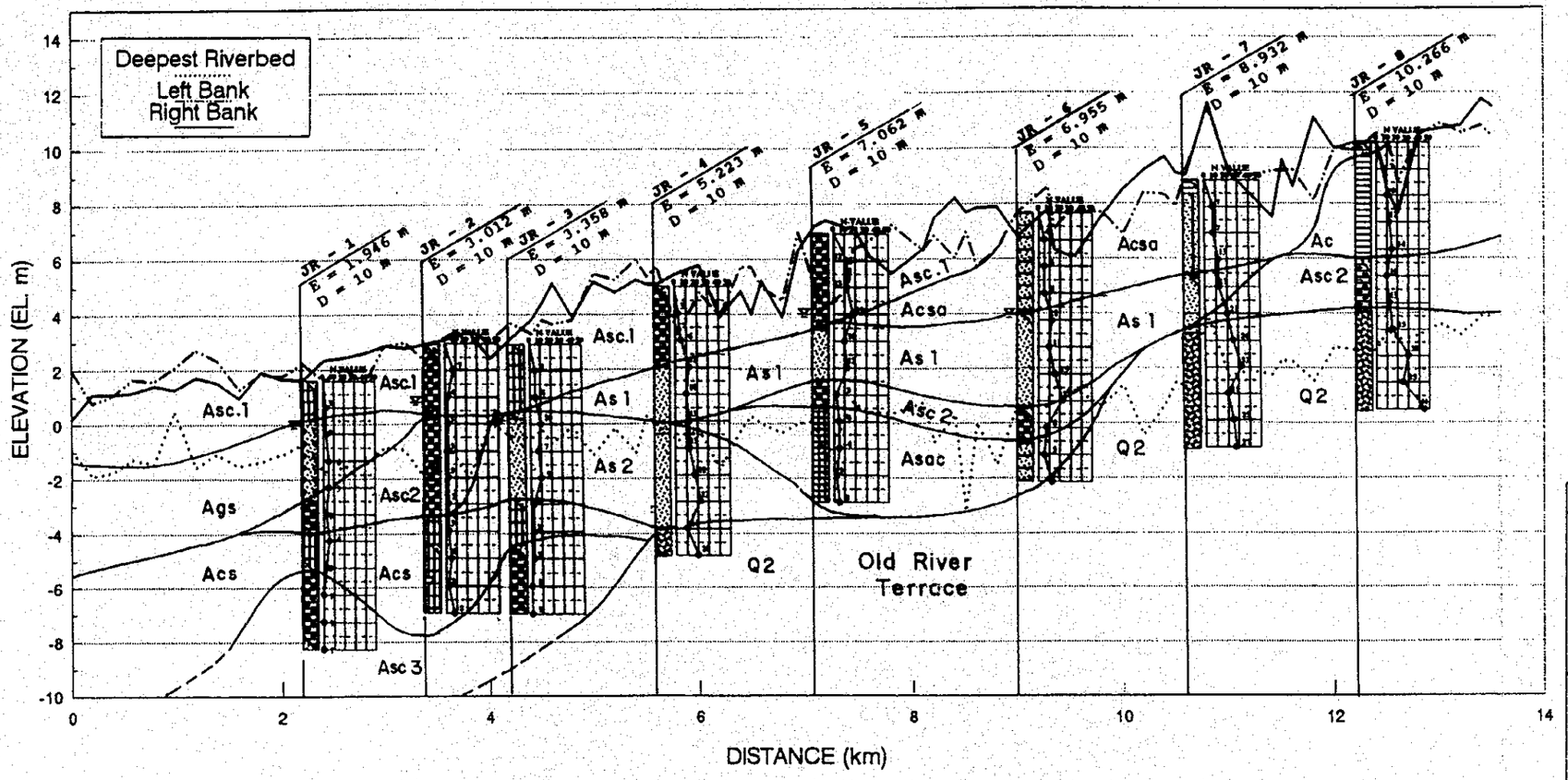
Remarks : (J) Jaro river deposit

THE STUDY ON THE FLOOD CONTROL FOR RIVERS IN THE SELECTED URBAN CENTERS

JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 4.1
Soil Profiles of Jaro Floodway

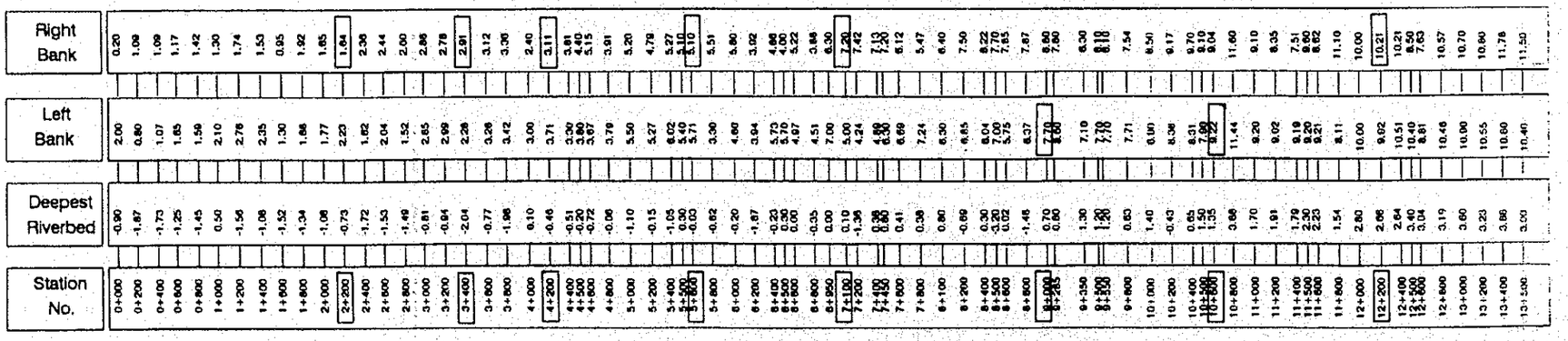
LONGITUDINAL PROFILE
JARO RIVER

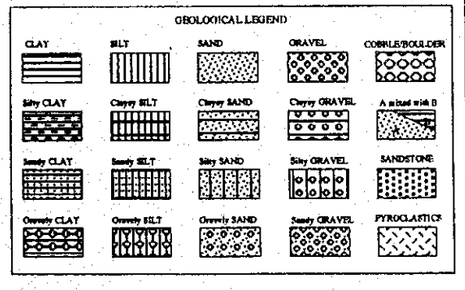


SOIL STRATA OF JARO SEDIMENTARY BASIN

River	Symbol	Layer	N-Value min.	N-Value max.	N-Value average	Thickness (m) min.	Thickness (m) max.
JARO	Asc1	upper silty Clay	3	19	7.50	0	3.4
	Acsa	clayey Sand	4	13	7.22	0	3.8
	Ac	Clay	7	14	10.75	0	4.4
	Ags	gravely Sand	3	20	6.20	0	4..2
	Asc2	middle silty Clay	2	13	4.54	0	3.8
	As1	upper sand	10	22	13.57	0	3.4
	As2	lower Sand	2	22	12.00	0	3.3
	Asac	Sandy Clay	2	13	5.50	0	3.3
	Acs	clayey Silt	2	8	3.70	0	5.2
	Asc3	lower silty clay	1	2	1.16	0	4.2
	Q2	Cabanuan Formation	11	44	25.53	>1	>4.2
JARO FLOODWAY	BM	Backfilled Material	-	-	-	0	0.6
	Acsa	clayey Sand	8	8	8.00	0	1.8
	Ac1	upper Clay	5	8	6.50	0	2.1
	Ac2	middle Clay	0	8	4.88	0	4.2
	Acs	clayey Silt	3	6	4.33	0	1.2
	Ac3	lower Clay	0	4	3.44	0	7.2
	Ass	silty Sand	8	8	8.00	0	1
	Q2	Cabanuan Formation	11	44	25.53	>1	>4.2

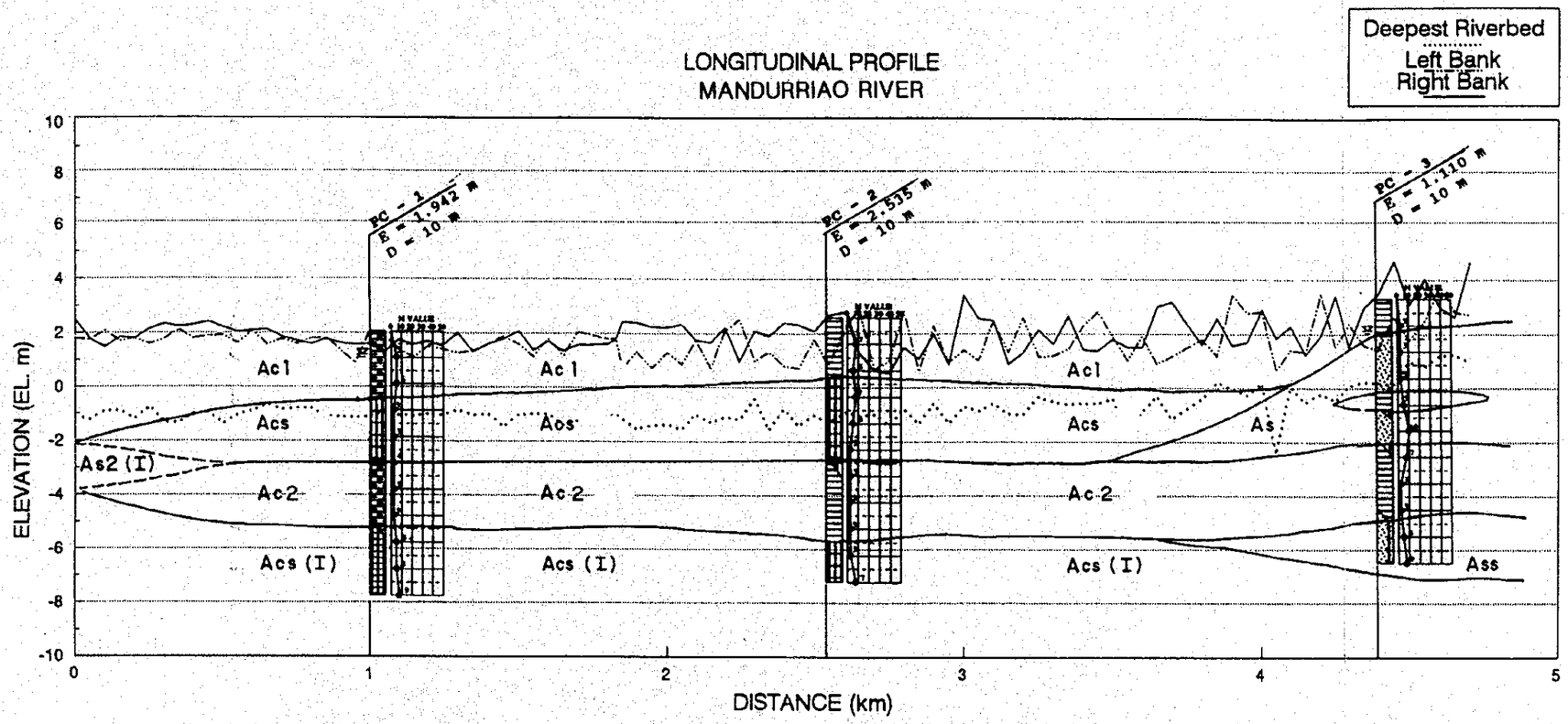
Remarks : (J) same as Jaro river layer

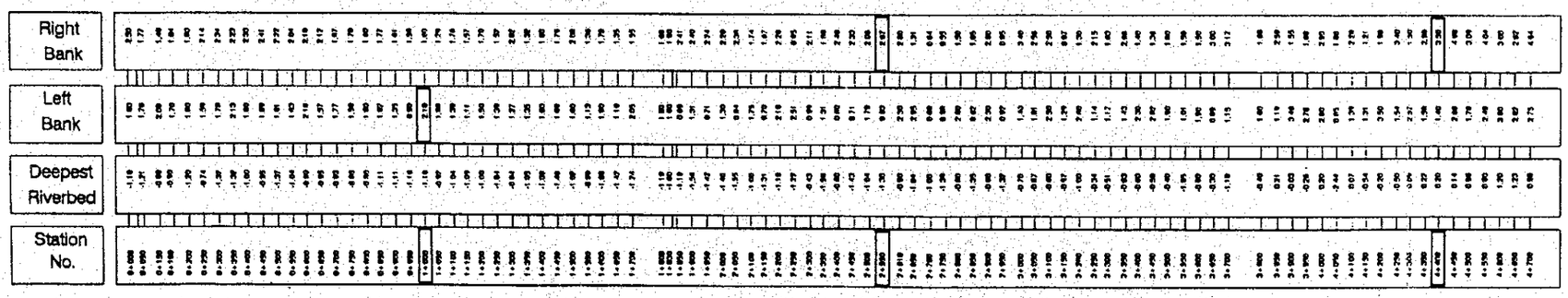




THE STUDY ON THE FLOOD CONTROL FOR RIVERS IN THE SELECTED URBAN CENTERS
JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 4.2
Soil Profiles of Jaro River

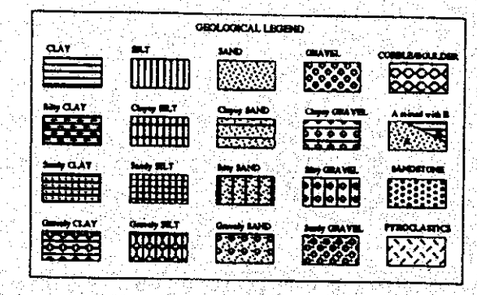




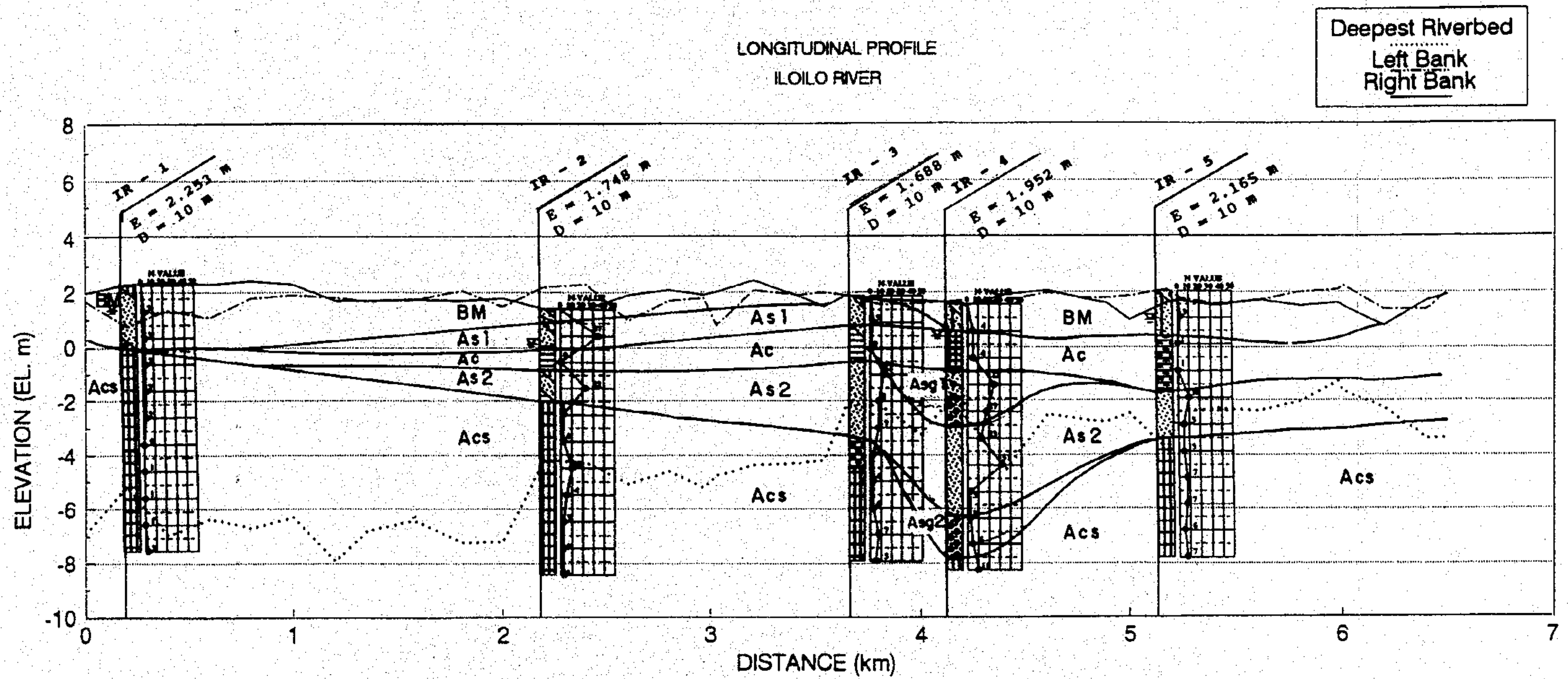
SOIL STRATA OF ILOILO SEDIMENTARY BASIN

River	Symbol	Layer	N-Value			Thickness (m)	
			min.	max.	average	min.	max.
Iloilo	BM	Backfill Materials	3	4	3.20	0	2.4
	As1	upper Sand	3	37	20.00	0	1.1
	Ac	Clay	0	9	2.88	0	2.1
	Asg1	upper sandy Gravel	17	25	21.00	0	2.1
	As2	lower Sand	3	31	14.69	0	7.5
	Asg2	lower sandy Gravel	3	6	4.50	0	1.7
	Acs	clayey Silt	0	11	4.57	>0.4	>7.5
Mandurriao	Ac1	upper Clay	3	13	6.50	0.5	4.6
	Aoc	clayey Silt	3	7	4.30	0	3.2
	As	Sand	3	10	5.25	0	4.4
	Ac2	lower Clay	2	7	3.38	0	2.8
	Ass	silty Sand	6	9	7.50	0	2.4

Remarks : (I) same as Iloilo river layer



THE STUDY ON THE FLOOD CONTROL FOR RIVERS IN THE SELECTED URBAN CENTERS	Fig. 4.3 Soil Profiles of Mandurriao River
JAPAN INTERNATIONAL COOPERATION AGENCY	

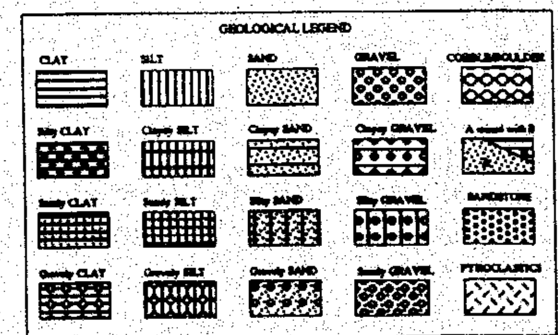


Station No.	Right Bank	Left Bank	Deepest Riverbed
0+000	2.00	1.70	-6.90
0+200	2.32	0.78	-5.14
0+400	2.37	1.36	-6.95
0+600	2.30	1.07	-6.34
0+800	2.40	1.79	-6.69
1+000	2.30	1.90	-6.30
1+120	1.70	1.83	-7.92
1+353	1.70	1.70	-6.79
1+574	1.74	1.71	-6.42
1+800	1.70	2.09	-7.22
2+000	1.80	1.50	-7.20
2+200	1.40	2.20	-4.17
2+400	1.40	2.30	-4.28
2+600	1.90	0.98	-5.05
2+800	2.10	1.70	-4.59
2+970	1.90	1.80	-5.20
3+030	2.03	0.80	-4.75
3+200	2.43	2.10	-4.36
3+400	1.90	1.90	-4.30
3+530	1.50	2.00	-4.20
3+640	1.90	1.91	-2.15
3+800	1.73	1.56	-2.14
4+000	1.70	1.62	-3.23
4+190	1.60	1.70	-1.40
4+200	1.48	1.55	-2.54
4+400	1.90	1.70	-4.54
4+600	2.07	1.98	-2.52
4+800	1.72	1.80	-2.73
4+890	1.60	1.80	-2.80
5+000	0.98	1.88	-2.49
5+180	1.63	2.10	-3.86
5+230	1.70	1.80	-2.40
5+400	1.53	1.58	-2.28
5+600	1.71	1.70	-2.36
5+800	1.50	2.00	-2.04
5+980	1.60	2.10	-1.30
6+000	1.50	2.27	-1.63
6+200	0.78	1.39	-2.24
6+400	1.69	1.39	-3.39
6+500	1.90	2.00	-3.40

SOIL STRATA OF ILOILO SEDIMENTARY BASIN

River	Symbol	Layer	N-Value			Thickness (m)	
			min.	max.	average	min.	max.
Iloilo	BM	Backfill Materials	3	4	3.20	0	2.4
	As1	upper Sand	3	37	20.00	0	1.1
	Ac	Clay	0	9	2.88	0	2.1
	Asg1	upper sandy Gravel	17	25	21.00	0	2.1
	As2	lower Sand	3	31	14.69	0	7.5
	Asg2	lower sandy Gravel	3	6	4.50	0	1.7
	Acs	clayey Silt	0	11	4.57	>0.4	>7.5
Mandurriao	Ac1	upper Clay	3	15	6.50	0.5	4.6
	Asc	clayey Silt	3	7	4.50	0	3.2
	As	Sand	3	10	5.25	0	4.4
	Ac2	lower Clay	2	7	3.38	0	2.8
	Ass	silty Sand	6	9	7.50	0	2.4

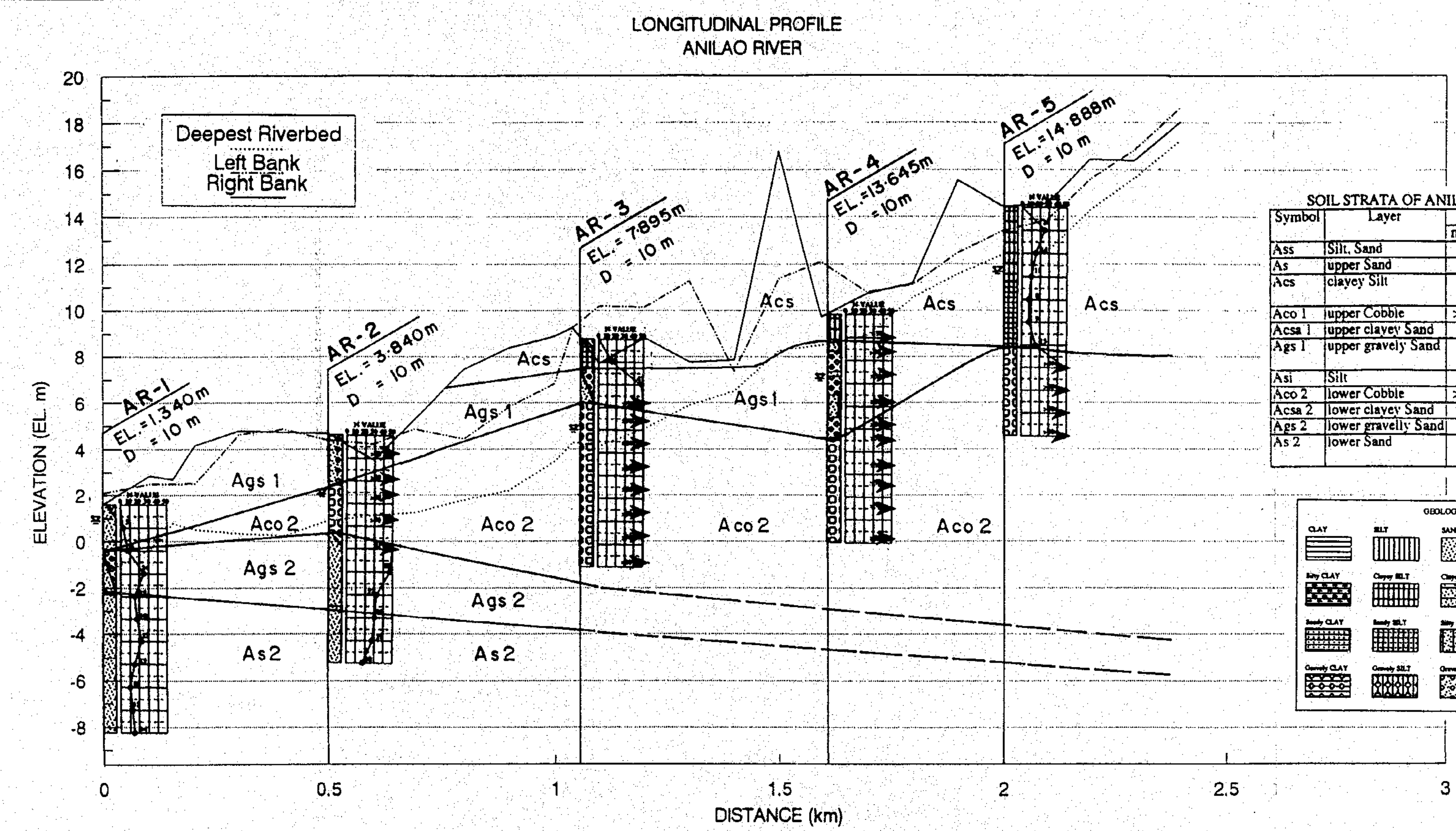
Remarks : (1) same as Iloilo river layer



THE STUDY ON THE FLOOD CONTROL FOR RIVERS IN THE SELECTED URBAN CENTERS

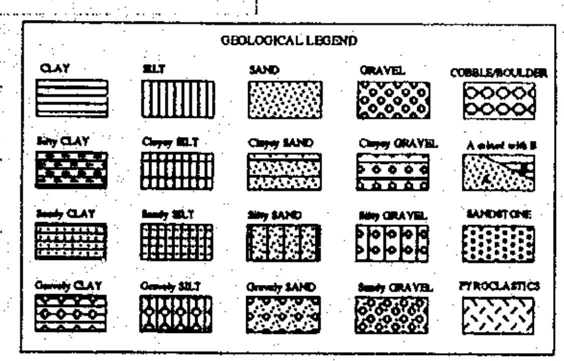
JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 4.4
Soil Profiles of Iloilo River



SOIL STRATA OF ANILAO / MALBASAG RIVER

Symbol	Layer	N-Value			Thickness (m)	
		min.	max.	average	min.	max.
Ass	Silt, Sand	10	10	10.00	0	2
As	upper Sand	18	18	18.00	0	6.4
Acs	clayey Silt	3	>50	16.90	0	8.2
Aco 1	upper Cobble	>50	>50	>50	0	2.4
Acsa 1	upper clayey Sand	5	5	5.00	0	2.4
Ags 1	upper gravely Sand	3	>50	>50	0	4.2
Asi	Silt	25	25	25.00	0	1.1
Aco 2	lower Cobble	>50	>50	>50	0	>8
Acsa 2	lower clayey Sand	41	48	44.00	0	4.6
Ags 2	lower gravelly Sand	9	72	40.70	1.4	>6.3
As 2	lower Sand	10	30	18.40	>2.2	>6.2



Station No.	0+000	0+100	0+153	0+200	0+300	0+400	0+500	0+602	0+695	0+800	0+900	1+000	1+040	1+100
Right Bank	1.60	2.86	2.70	4.19	4.80	4.74	4.70	3.54	5.27	7.46	8.38	8.90	9.30	7.73
Left Bank	2.10	2.48	2.50	2.51	4.65	4.88	4.40	4.22	4.87	4.43	5.81	6.84	9.30	10.20
Deepest Riverbed	-1.40	-0.32	0.80	0.51	0.35	0.26	0.90	1.14	1.24	1.79	2.22	3.47	4.30	4.16

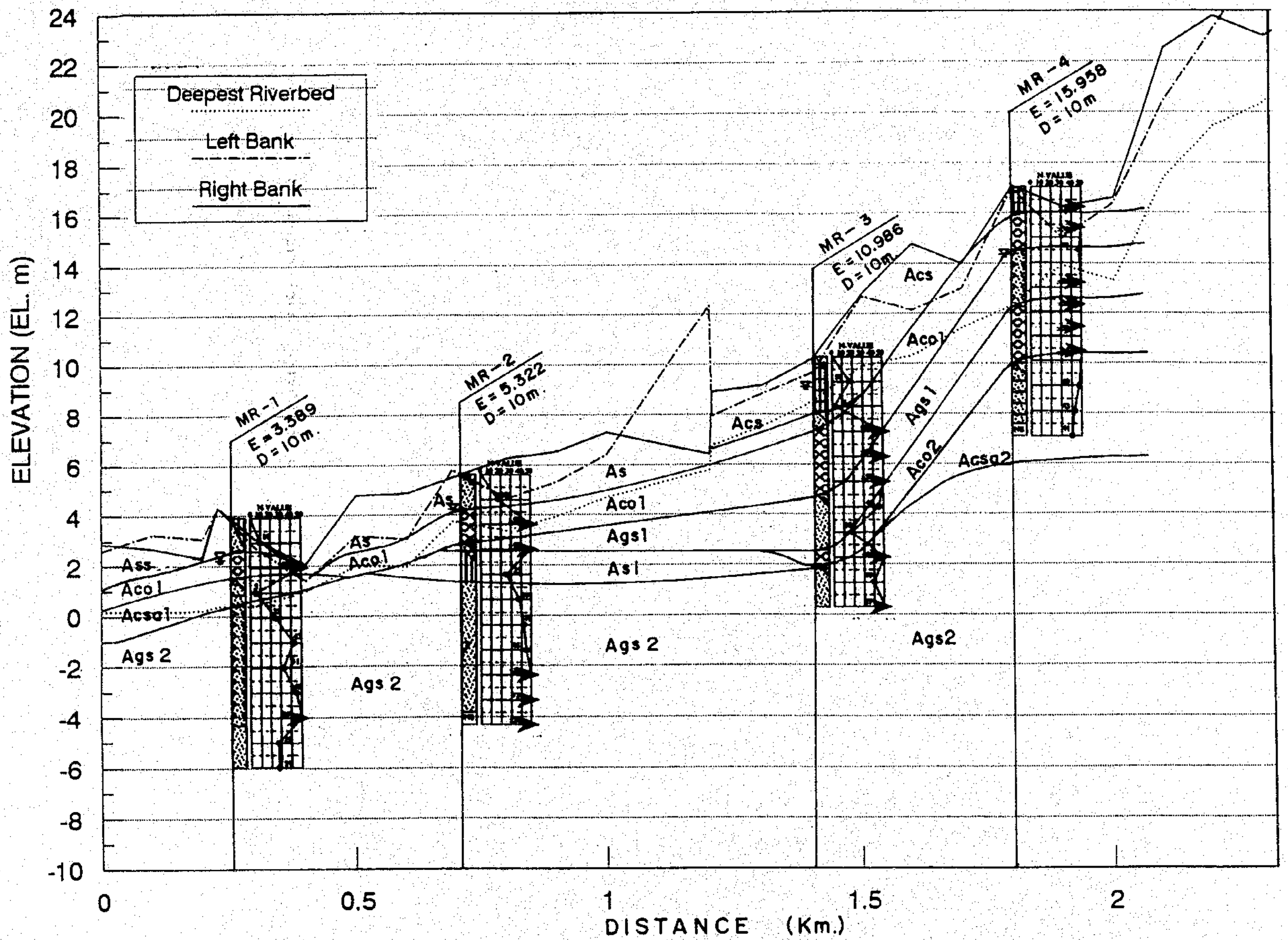
Station No.	1+200	1+300	1+400	1+500	1+600	1+700	1+800	1+900	2+000	2+100	2+200	2+300	2+400
Right Bank	8.84	7.79	7.87	16.80	9.72	10.74	11.20	15.58	14.46	14.57	16.45	16.39	18.04
Left Bank	10.17	11.27	7.38	11.40	12.10	10.81	11.11	12.49	13.40	13.87	15.60	16.84	18.67
Deepest Riverbed	4.90	5.93	6.53	8.30	8.52	8.94	10.56	11.61	12.41	12.51	14.29	15.66	17.30

THE STUDY ON THE FLOOD CONTROL FOR RIVERS IN THE SELECTED URBAN CENTERS

JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 4 5
Soil Profiles of Anilao River

LONGITUDINAL PROFILE
MALBASAG RIVER

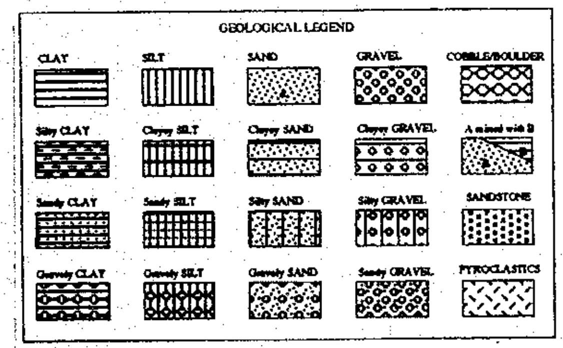


Right Bank	2.90	2.70	2.30	4.30	3.09	2.04	4.80	4.87	5.50	5.50	6.26	6.51	7.30
Left Bank	2.80	3.25	3.07	4.30	2.78	1.39	3.15	3.05	5.80	5.50	4.86	5.30	6.40
Deepest Riverbed	0.20	0.17	0.23	0.40	0.38	0.97	2.00	1.95	2.80	3.80	3.36	3.94	4.70
Station No.	0+000	0+100	0+200	0+230	0+300	0+400	0+500	0+600	0+690	0+700	0+800	0+900	1+000

Right Bank	6.41	8.89	9.15	10.28	12.80	14.76	14.00	17.11	16.26	16.60	22.54	23.82	23.04
Left Bank	12.34	7.93	8.84	9.69	12.70	12.14	12.99	17.01	15.01	16.40	20.45	23.29	26.08
Deepest Riverbed	5.77	6.76	7.54	8.52	9.90	10.32	11.42	12.33	13.95	13.30	17.41	19.46	20.35
Station No.	+200	+205	+300	+400	1+500	1+600	1+700	1+800	1+900	2+000	2+100	2+200	2+300

SOIL STRATA OF ANILAO / MALBASAG RIVER

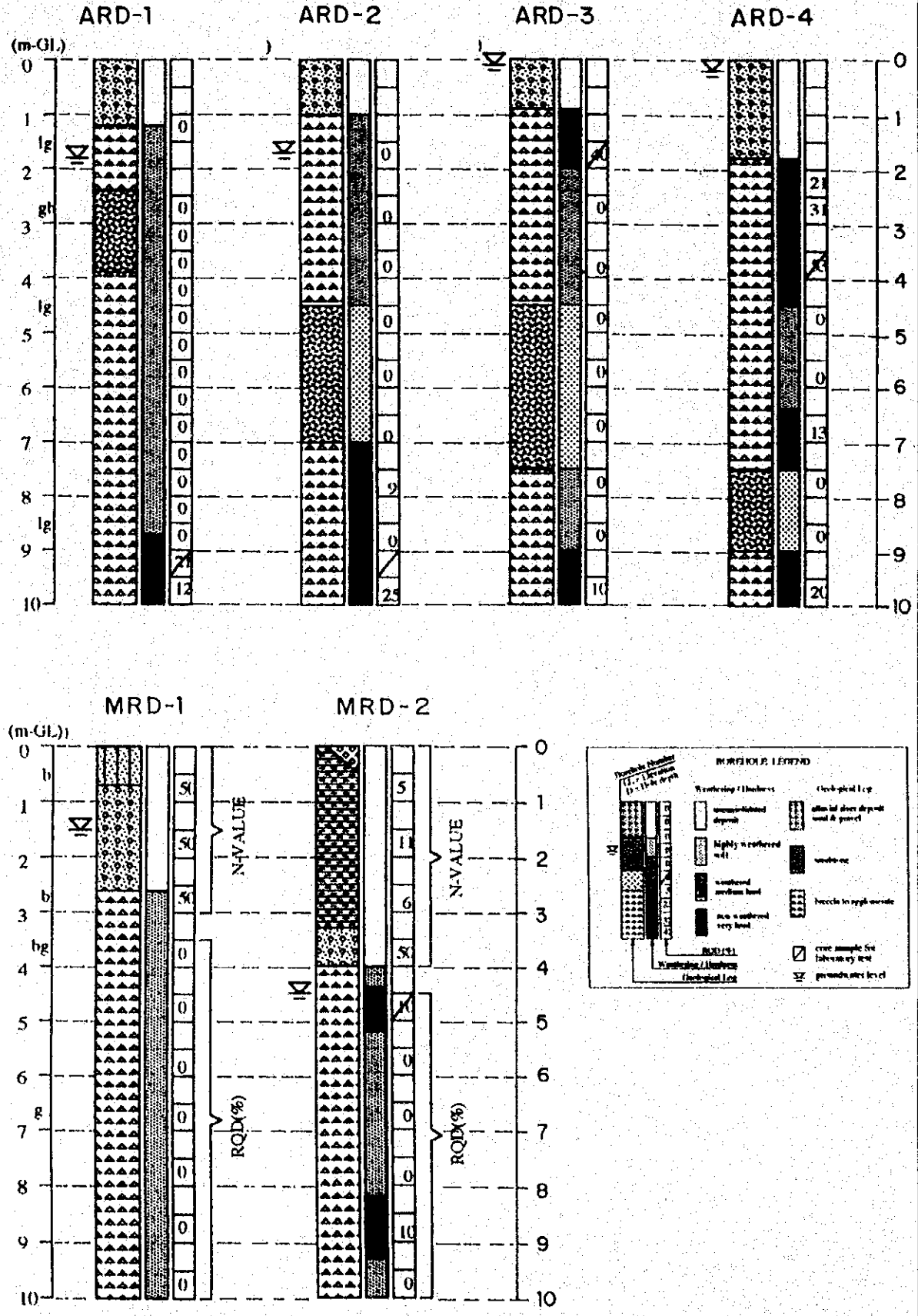
Symbol	Layer	N-Value			Thickness (m)	
		min.	max.	average	min.	max.
Ass	Silt, Sand	10	10	10.00	0	2
As	upper Sand	18	18	18.00	0	6.4
Acs	clayey Silt	3	>50	16.90	0	8.2
Aco 1	upper Cobble	>50	>50	>50	0	2.4
Acsa 1	upper clayey Sand	5	5	5.00	0	2.4
Ags 1	upper gravely Sand	3	>50	>50	0	4.2
Asi	Silt	25	25	25.00	0	1.1
Aco 2	lower Cobble	>50	>50	>50	0	>8
Acsa 2	lower clayey Sand	41	48	44.00	0	4.6
Ags 2	lower gravelly Sand	9	72	40.70	1.4	>6.3
As 2	lower Sand	10	30	18.40	>2.2	>6.2



THE STUDY ON THE FLOOD CONTROL FOR RIVERS
IN THE SELECTED URBAN CENTERS

JAPAN INTERNATIONAL COOPERATION AGENCY

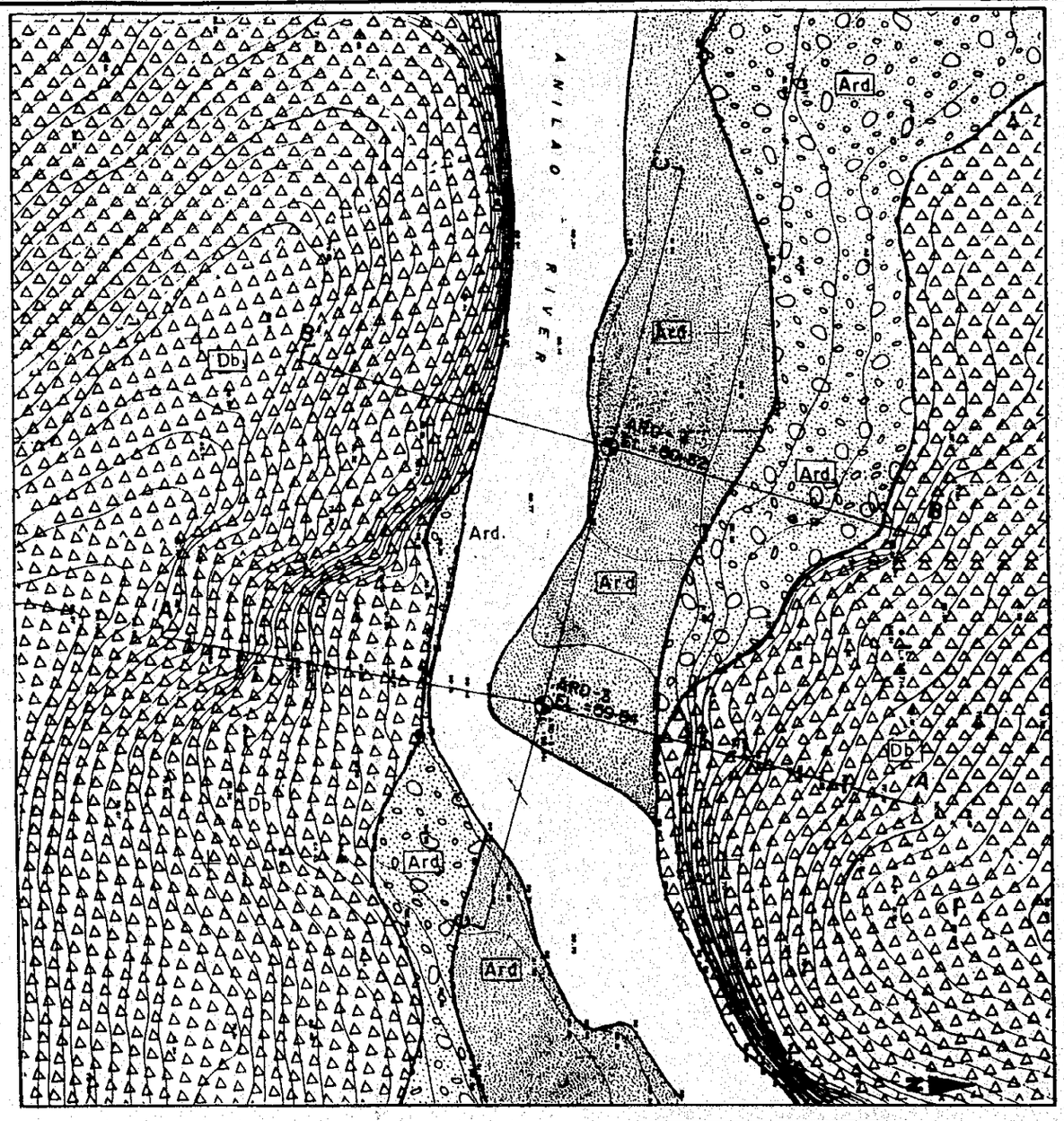
Fig. 4.6
Soil Profiles of Malbasag River



THE STUDY ON THE FLOOD CONTROL FOR RIVERS IN THE SELECTED URBAN CENTERS

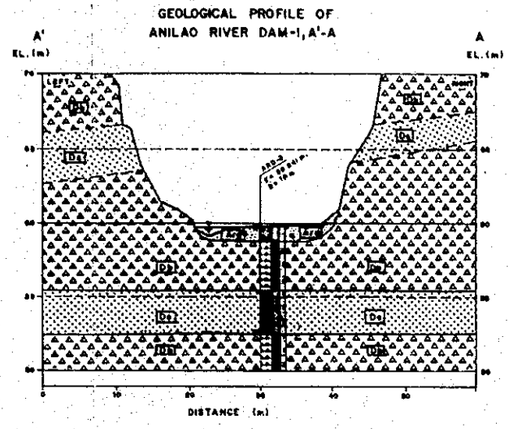
JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 4.7
Boring Log of Dam Site

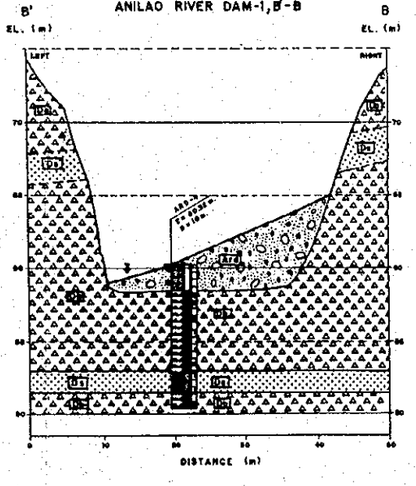


SCALE 1:400

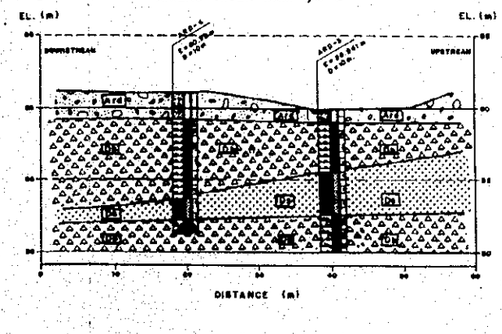
GEOLOGICAL PROFILE OF
ANILAO RIVER DAM-1, A'-A



GEOLOGICAL PROFILE OF
ANILAO RIVER DAM-1, B'-B

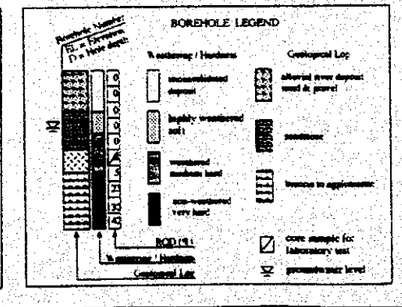


GEOLOGICAL PROFILE OF
ANILAO RIVER DAM-1, C' C

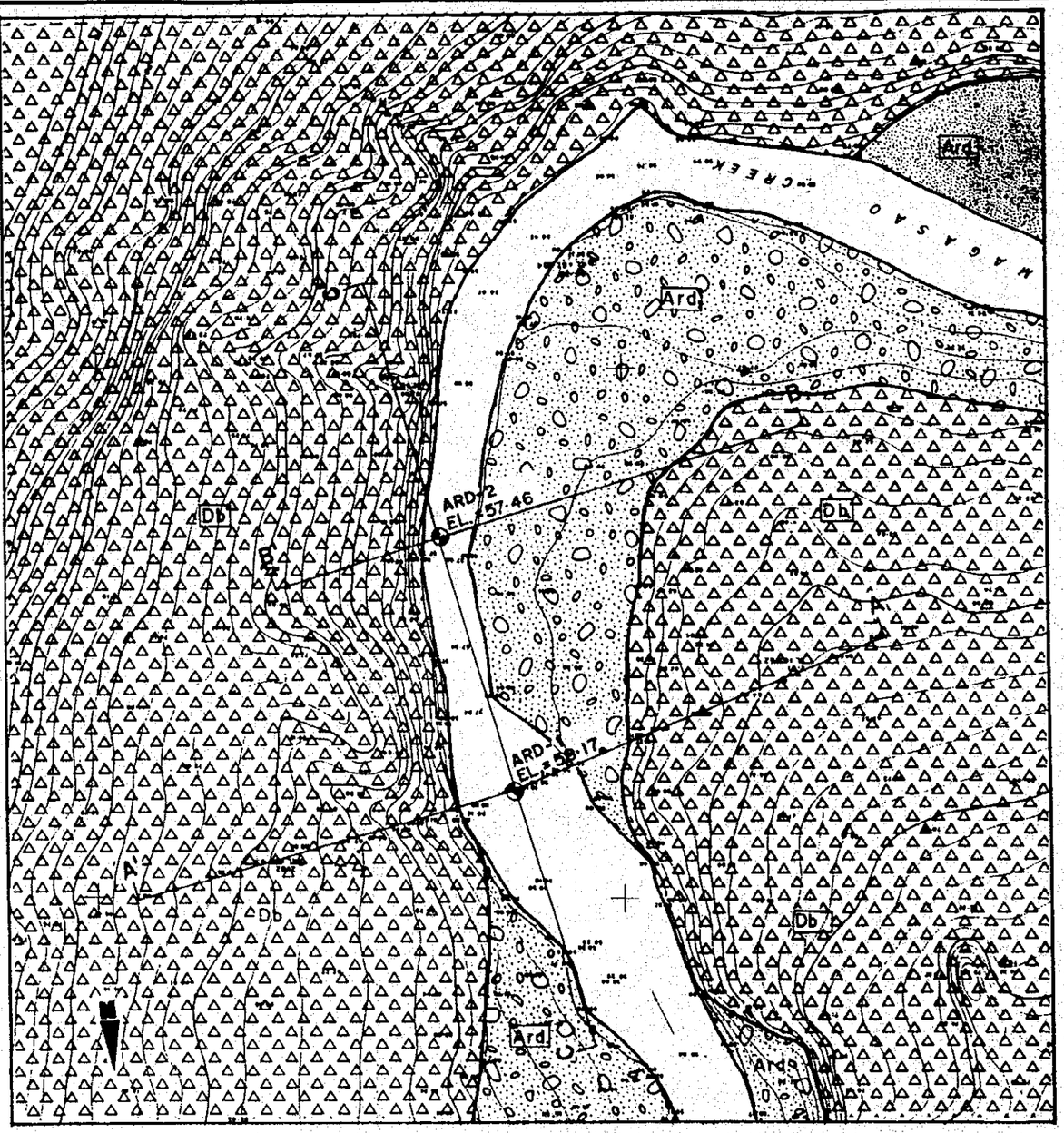


GEOLOGICAL LEGEND

SYMBOL	FORMATION	CONTENTS	FACIES	AGE	
(Qal)	Alluvium	alluvium deposit	clay, silt and sand	Holocene	Quaternary
(Ard)		recent river deposit	sand, gravel, cobble and boulder		
(Db)	Dolores Formation (Qtd)	andesitic Pyroclastics with alternation of low dipping sediments	volcanic breccia	pleistocene	
(Ds)			volcanic sandstone		



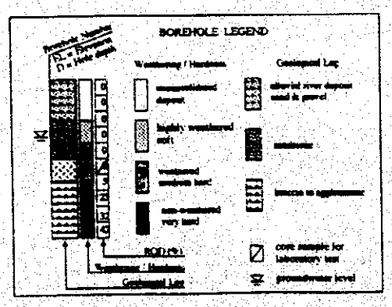
THE STUDY ON THE FLOOD CONTROL FOR RIVERS IN THE SELECTED URBAN CENTERS	Fig. 4.8 Geological Map of Anilao River Dam-1
JAPAN INTERNATIONAL COOPERATION AGENCY	



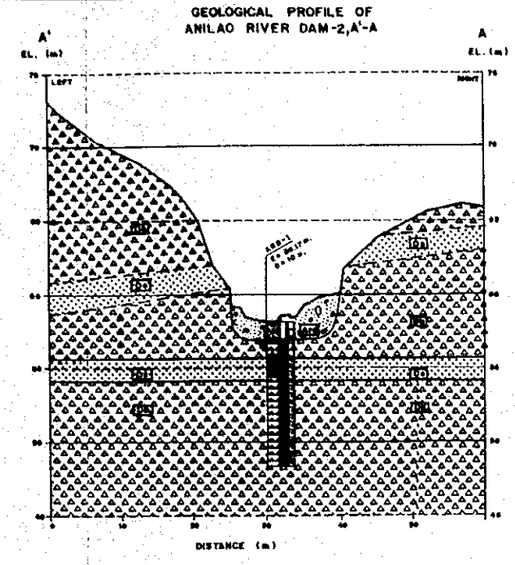
GEOLOGICAL LEGEND

SYMBOL	FORMATION	CONTENTS	FACIES	AGE	
(Qal)	Alluvium	alluvium deposit	clay, silt and sand	Holocene	Quaternary
(Ard)		recent river deposit	sand, gravel, cobble and boulder		
(Db)	Dolores Formation (Qd)	andesitic Pyroclastics with alternation of low dipping sediments	volcanic breccia	Pleistocene	
(Ds)			volcanic sandstone		

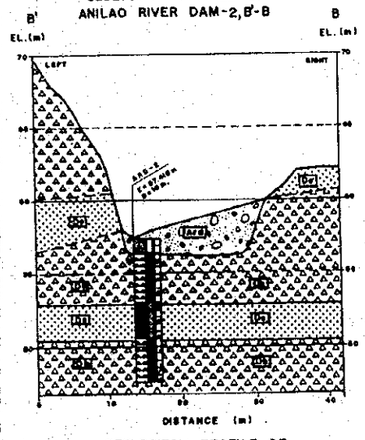
BOREHOLE LEGEND



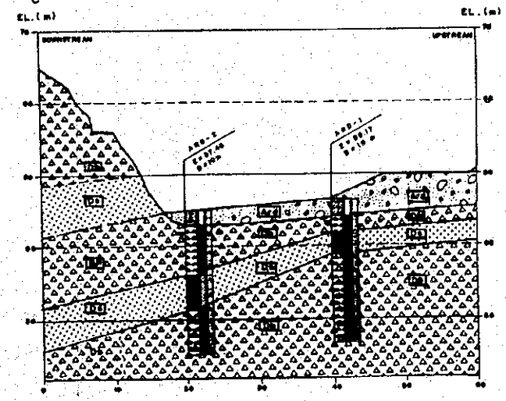
GEOLOGICAL PROFILE OF ANILAO RIVER DAM-2,A'-A



GEOLOGICAL PROFILE OF ANILAO RIVER DAM-2,B'-B



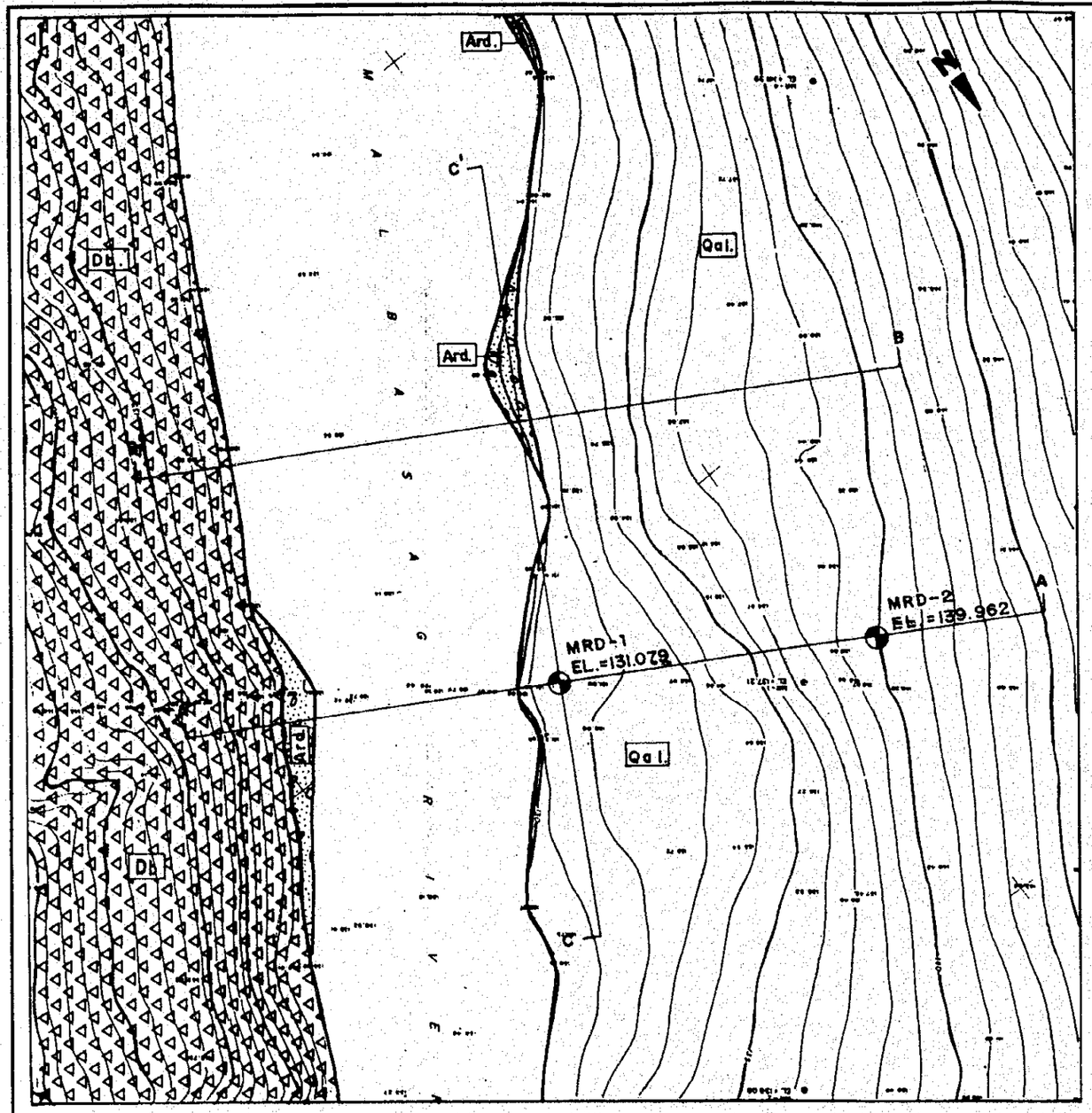
GEOLOGICAL PROFILE OF ANILAO RIVER DAM-2,C' C



THE STUDY ON THE FLOOD CONTROL FOR RIVERS IN THE SELECTED URBAN CENTERS

JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 4.9
Geological Map of Anilao River Dam-2



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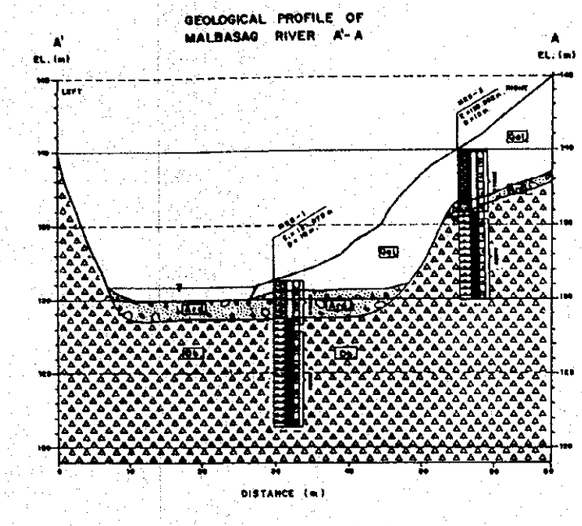
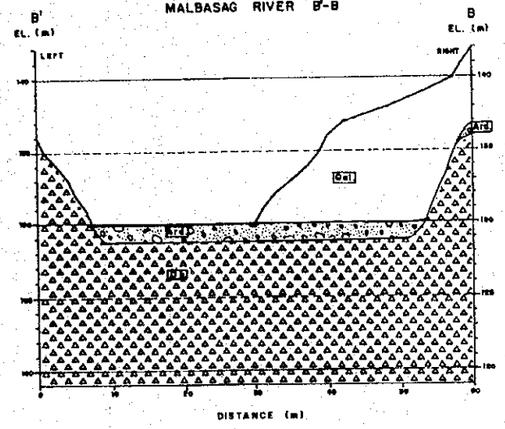
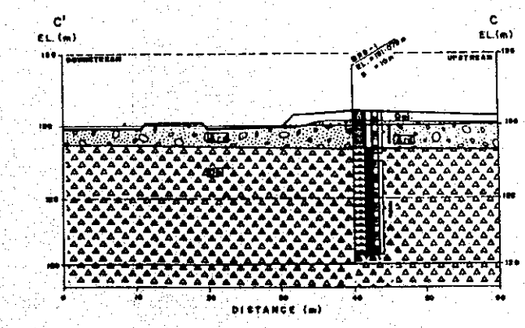
GEOLOGICAL PROFILE OF MALBASAG RIVER A'-A



GEOLOGICAL PROFILE OF MALBASAG RIVER B'-B



GEOLOGICAL PROFILE OF MALBASAG RIVER C'-C



GEOLOGICAL LEGEND

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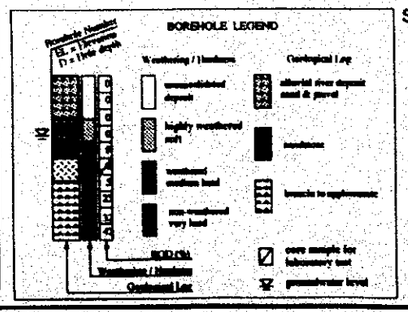
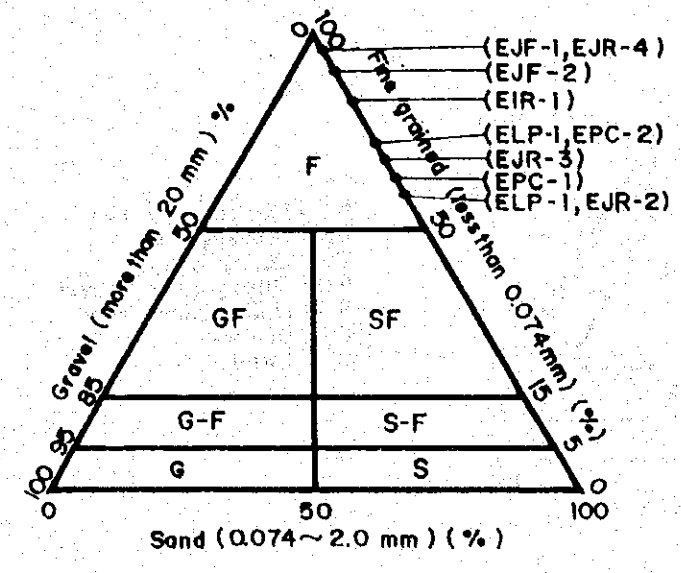
(Ds)			volcanic sandstone		



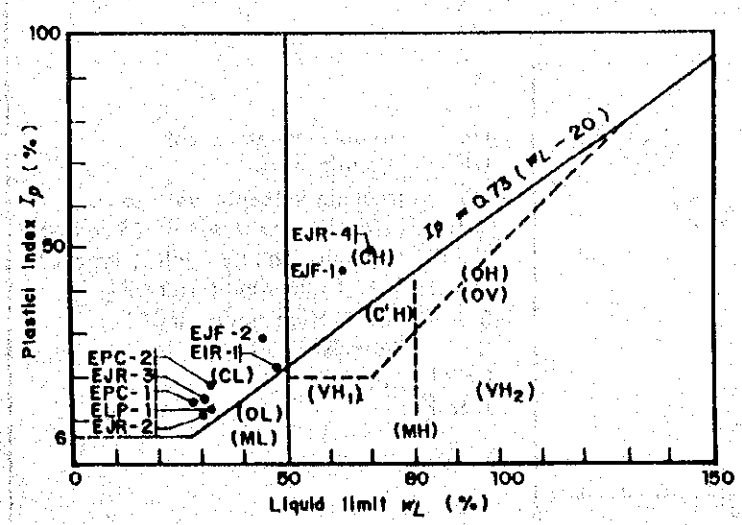
THE STUDY ON THE FLOOD CONTROL FOR RIVERS IN THE SELECTED URBAN CENTERS	Fig. 4.10 Geological Map of Malbasag River Dam
JAPAN INTERNATIONAL COOPERATION AGENCY	

TRIANGULAR SOIL CLASSIFICATION



F : Fine grained soil
GF : Gravelly soil
SF : Sandy soil
G-F : Fine grained gravel
S-F : Fine grained sand
G : Gravel
S : Sand

PLASTICITY CHART



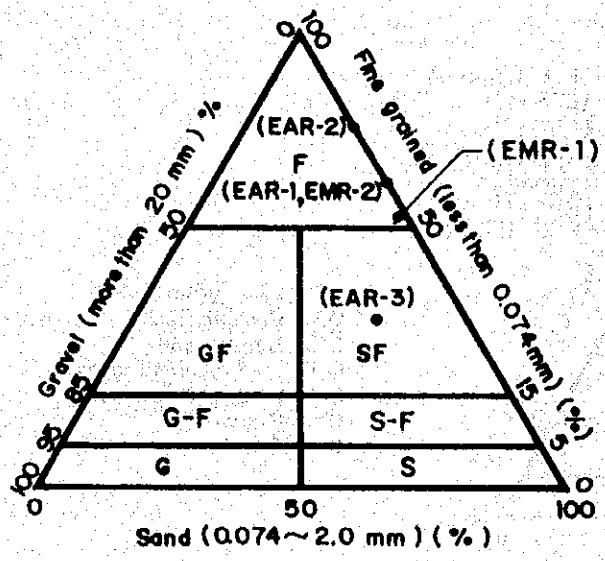
OL : Organic cohesive soil
OH : Organic clay
OV : Organic volcanic ash soil
VH1 : Volcanic cohesive soil (Type I)
VH2 : Volcanic cohesive soil (Type II)
ML : Silt (Low liquid limit)
MH : Silt (High liquid limit)
CL : Cohesive soil
CH, C'H : Clay

THE STUDY ON THE FLOOD CONTROL FOR RIVERS IN THE SELECTED URBAN CENTERS

JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 5.1
Soil Classification of Embankment Materials in Iloilo

TRIANGULAR SOIL CLASSIFICATION



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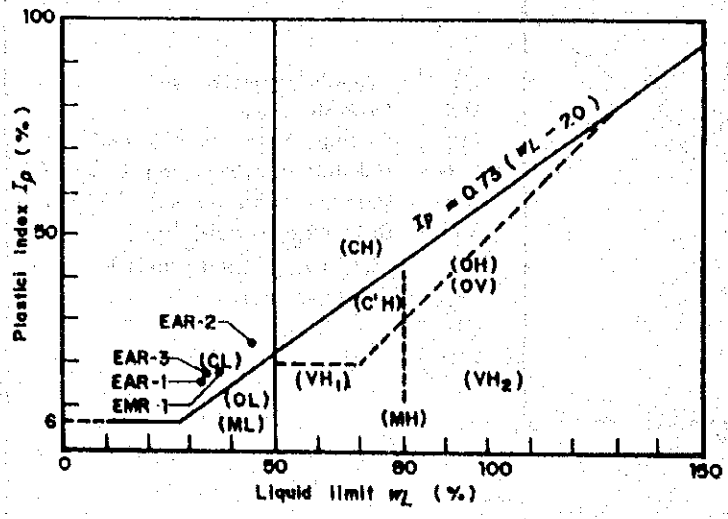
PLASTICITY CHART



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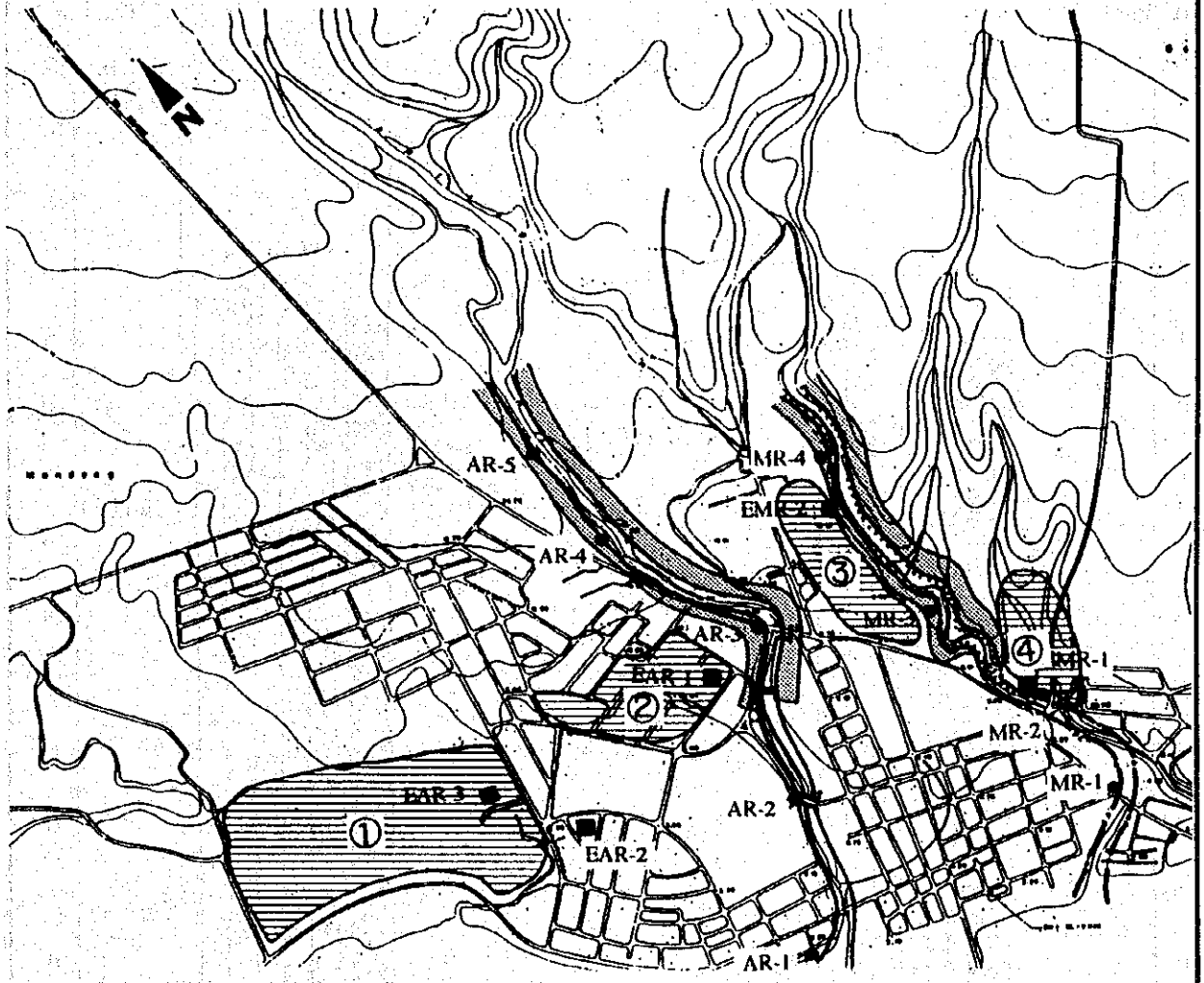
CH, C'H } Clay

THE STUDY ON THE FLOOD CONTROL FOR RIVERS IN THE SELECTED URBAN CENTERS	Fig. 5.2 Soil Classification of Embankment Materials in Ormoc
JAPAN INTERNATIONAL COOPERATION AGENCY	



Legend
- AR-1 : Boring test site
- EAR-1 : Sampling site for soil test for embankment materials

1000 750 500 250 0 500

SCALE 1 : 20,000 MTRS

PROPOSED BORROW LAND

AREA EXCAVATED SOIL CAN BE USED

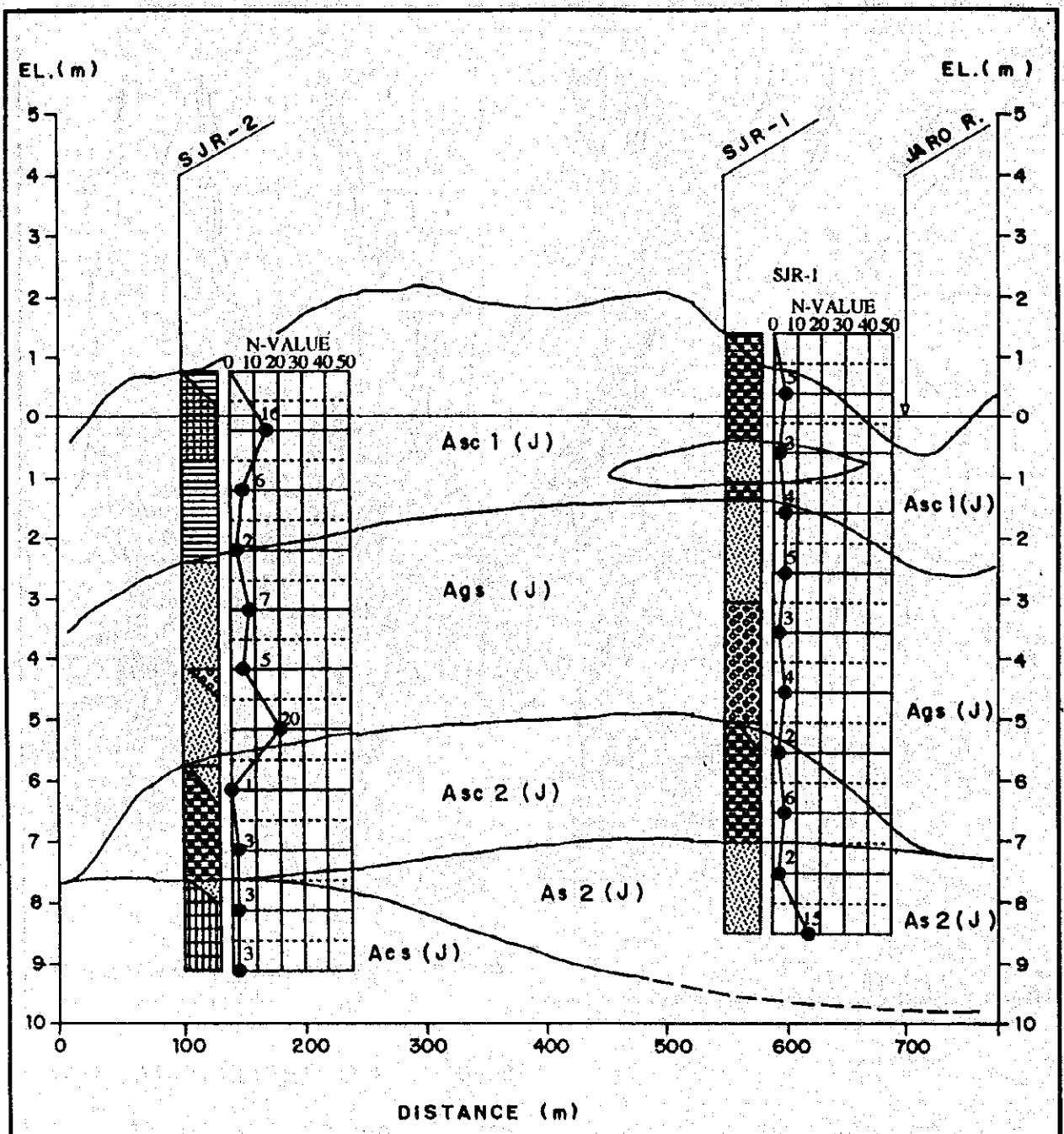
REPRESENTED GRAIN SIZE DISTRIBUTION

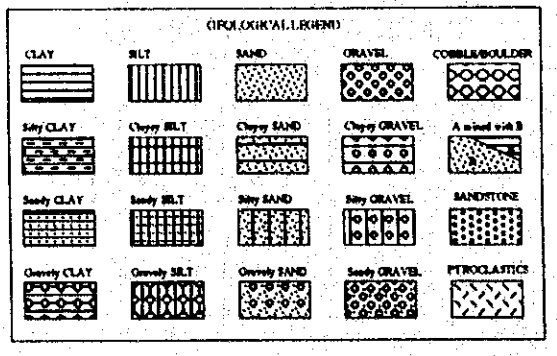
	GRAVEL	SAND	SILT	CLAY
①	17 %	46%	18 %	19%
②	0 %	33%	49%	18%
③	0 %	33%	67%	0%
④	1 %	47 %	26%	26%

THE STUDY ON THE FLOOD CONTROL FOR RIVERS IN THE SELECTED URBAN CENTERS

JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 5.3
Proposed Borrow Land for Embankment Materials in Ormoc





SOIL STRATA OF JARO SEDIMENTARY BASIN

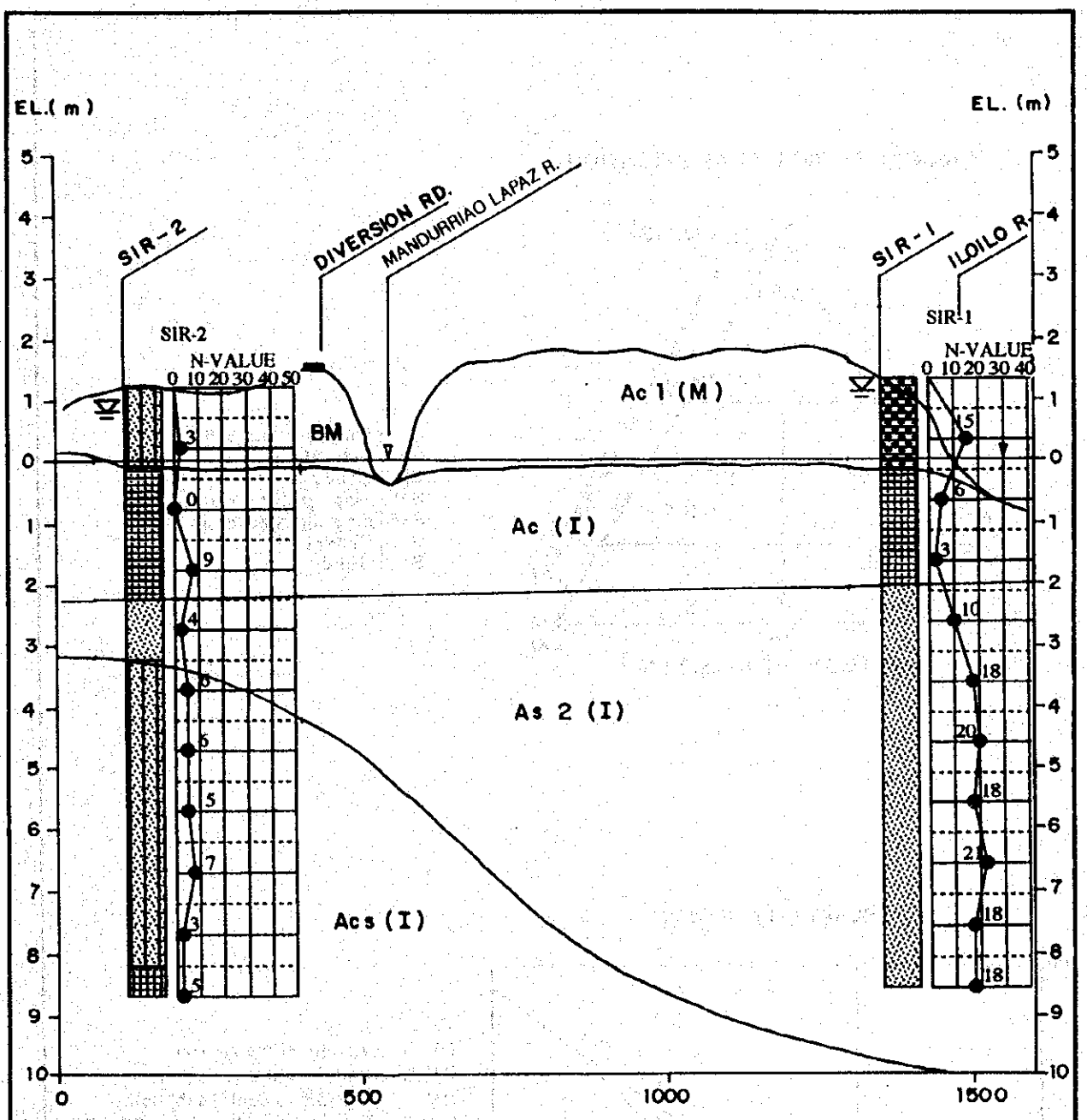
River	Symbol	Layer	N-Value			Thickness (m)	
			min.	max.	average	min.	max.
JARO	Asc1	upper silty Clay	3	19	7.50	0	3.4
	Acss	clayey Sand	4	13	7.22	0	3.8
	Ac	Clay	7	14	10.75	0	4.4
	Ags	gravely Sand	3	20	6.50	0	4.2
	Asc2	middle silty Clay	2	13	4.54	0	3.8
	As1	upper sand	10	22	13.57	0	3.4
	As2	lower Sand	2	22	12.00	0	3.3
	Asac	Sandy Clay	2	13	5.50	0	3.3
	Acs	clayey Silt	2	8	3.70	0	5.2
	Asc3	lower silty clay	1	2	1.16	0	4.2
	Q2	Cabetuan Formation	11	44	25.53	>1	>4.2
JARO FLOODWAY	Bbl	Backfilled Material	-	-	-	0	0.6
	Acss	clayey Sand	8	8	8.00	0	1.8
	Ac1	upper Clay	5	8	6.50	0	2.1
	Ac2	middle Clay	0	8	4.88	0	4.2
	Acs	clayey Silt	3	6	4.33	0	1.2
	Ac3	lower Clay	0	4	3.44	0	7.2
	Ass	silty Sand	8	8	8.00	0	1
	Q2	Cabetuan Formation	11	44	25.53	>1	>4.2

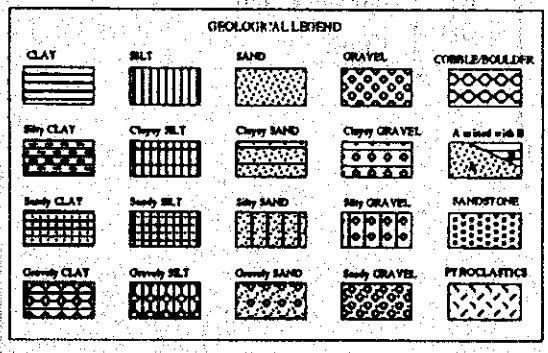
Remarks : (J) same as Jaro river layer

THE STUDY ON THE FLOOD CONTROL FOR RIVERS IN THE SELECTED URBAN CENTERS

JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 5.4
Soil Profile of Softground Area, Jaro River





SOIL STRATA OF ILOILO SEDIMENTARY BASIN

River	Symbol	Layer	N-Value			Thickness (m)	
			min.	max.	average	min.	max.
Iloilo	BM	Backfill Materials	3	4	3.20	0	2.4
	As1	upper Sand	3	37	20.00	0	1.1
	Ac	Clay	0	9	2.88	0	2.1
	Asg1	upper sandy Gravel	17	25	21.00	0	2.1
	As2	lower Sand	3	31	14.69	0	7.5
	Asg2	lower sandy Gravel	3	6	4.50	0	1.7
	Acs	clayey Silt	0	11	4.57	>0.4	>7.5
Mandurriao	Ac1	upper Clay	3	15	6.50	0.5	4.6
	Asc	clayey Silt	3	7	4.30	0	3.2
	As	Sand	3	10	5.25	0	4.4
	Ac2	lower Clay	2	7	3.38	0	2.8
	Ass	silty Sand	6	9	7.50	0	2.4

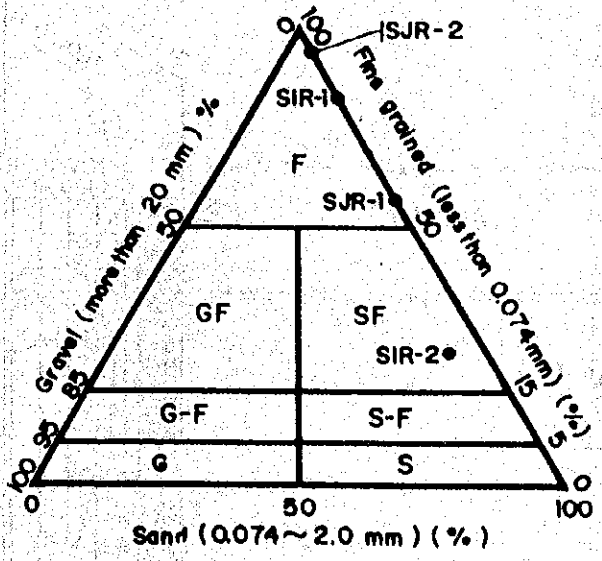
Remarks : (1) same as Iloilo river layer

THE STUDY ON THE FLOOD CONTROL FOR RIVERS IN THE SELECTED URBAN CENTERS

JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 5.5
Soil Profile of Softground Area, Iloilo River

TRIANGULAR SOIL CLASSIFICATION



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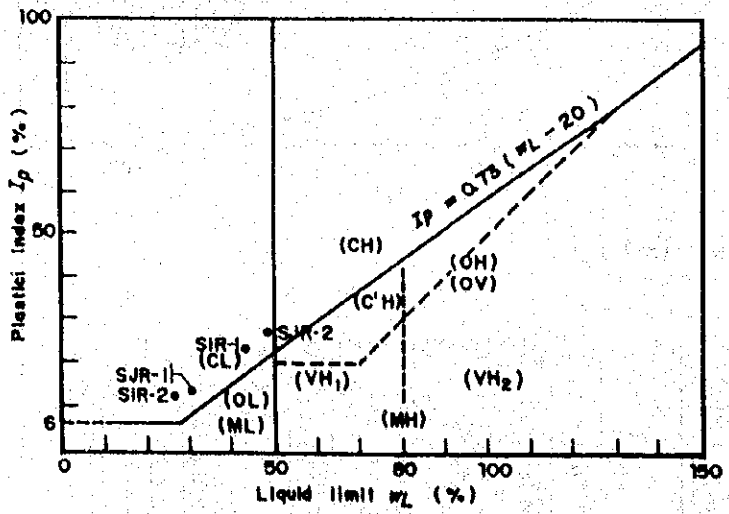
PLASTICITY CHART



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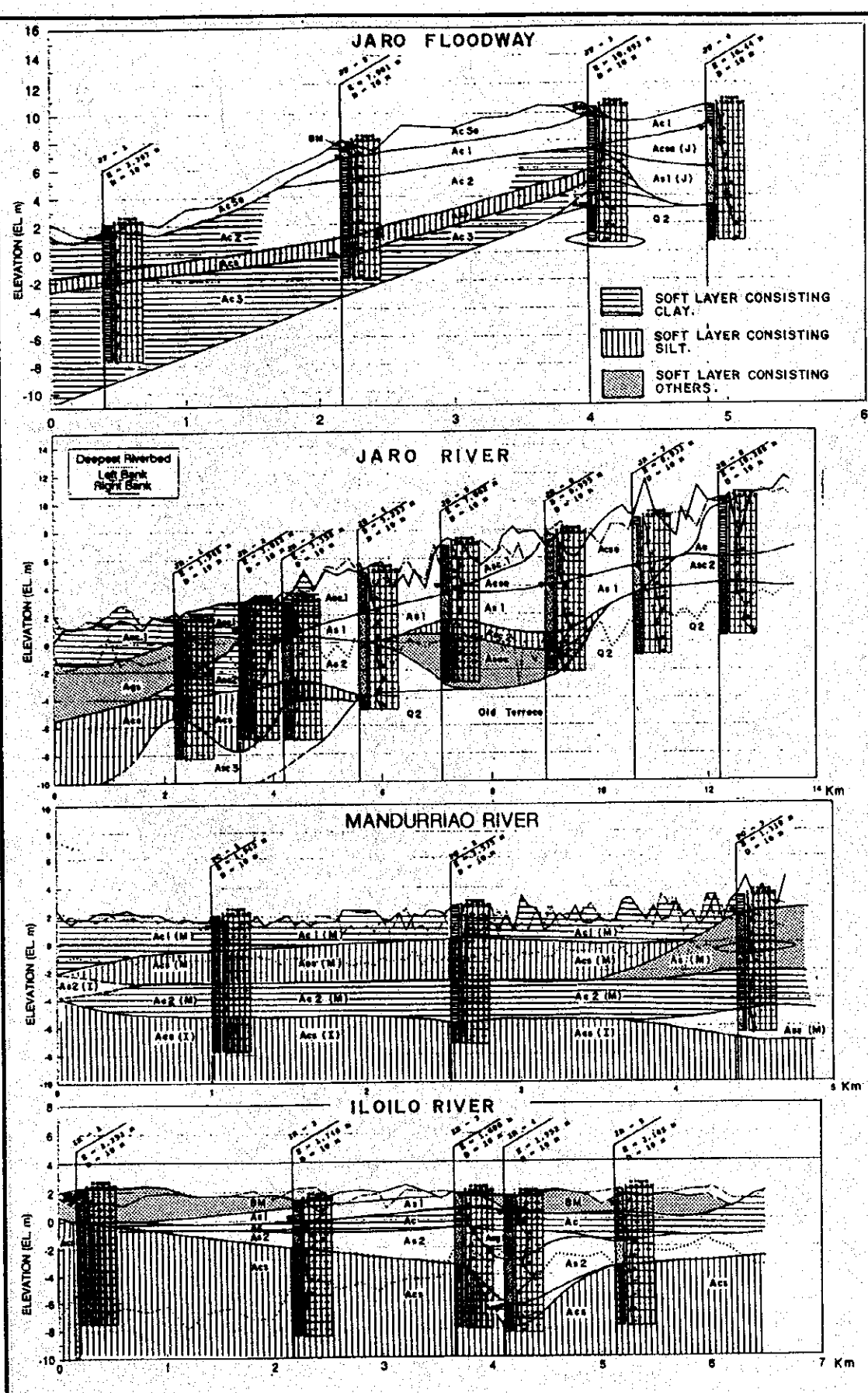
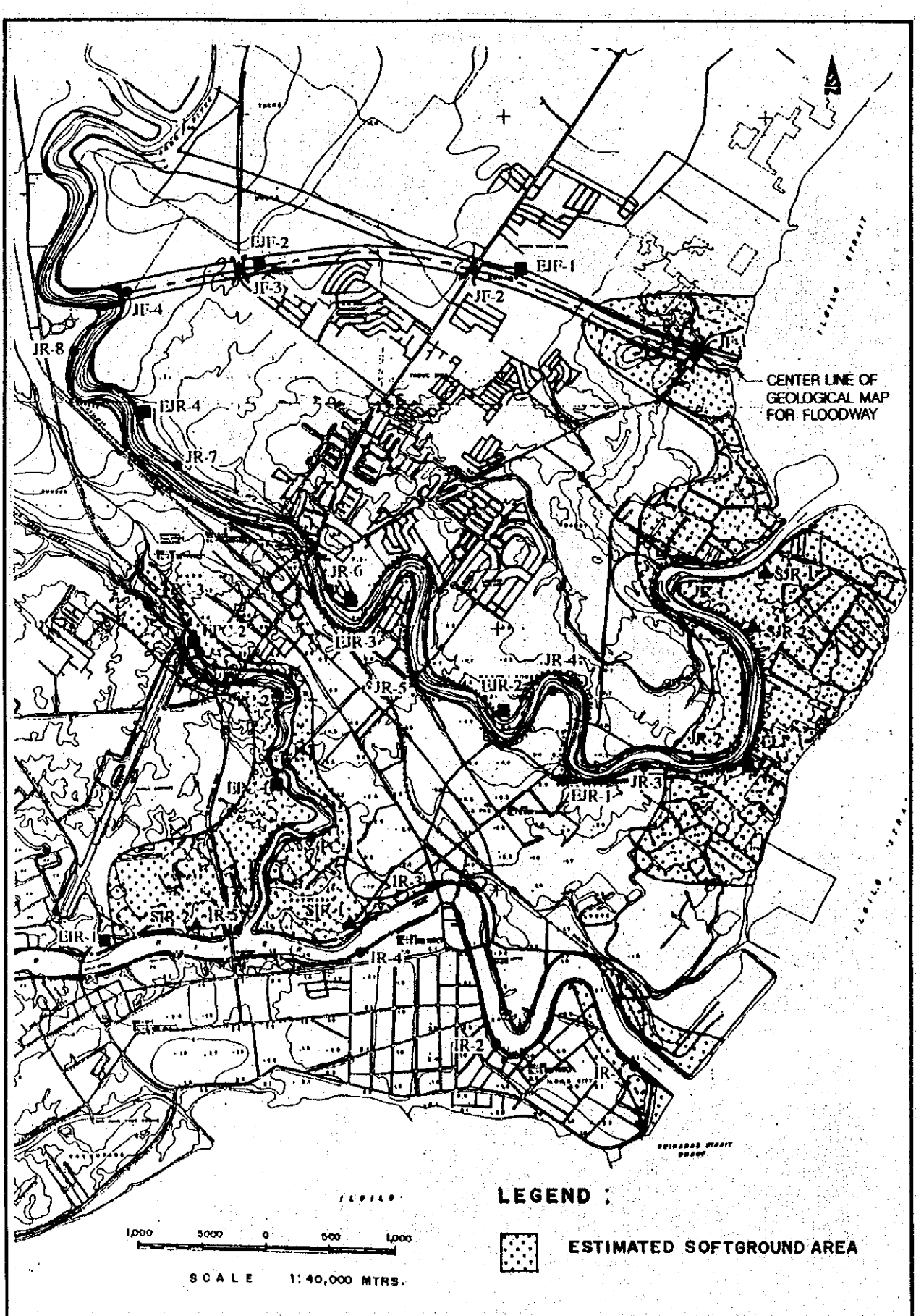
CH, C'H } Clay

THE STUDY ON THE FLOOD CONTROL FOR RIVERS IN THE SELECTED URBAN CENTERS JAPAN INTERNATIONAL COOPERATION AGENCY	Fig. 5.6 Soil Classification of Softground



THE STUDY ON THE FLOOD CONTROL FOR RIVERS IN THE SELECTED URBAN CENTERS	Fig. 5.7 Distribution of Softground
JAPAN INTERNATIONAL COOPERATION AGENCY	



THE STUDY ON THE FLOOD CONTROL FOR RIVERS IN THE SELECTED URBAN CENTERS JAPAN INTERNATIONAL COOPERATION AGENCY	Fig. 5.8 Estimated Softground Area,Iloilo

SUPPORTING REPORT

ON

SOCIO-ECONOMY

SUPPORTING REPORT
ON
SOCIOECONOMY

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1. PRESENT CONDITION

1.1 Administration

The Philippines administratively consists of 14 Regions; namely, National Capital Region (NCR), Cordillera Administrative Region (CAR), and Region 1 to Region 12. These regions are further divided into provinces, the provinces into cities/municipalities, and the cities/municipalities into barangays. As of 1988, there were 73 provinces, 60 cities, 1,532 municipalities and 40,904 barangays.

The four Selected Urban Centers (SUCs), Iloilo, Cebu, Ormoc and Tacloban, for the Master Plan Study and the two SUCs for the Feasibility Study, Iloilo and Ormoc, are administratively located as follows:

Item No.	Name of City	Region Number	Name of Province	Number of Barangay	Land Area (km^2)
1.	Iloilo	VI	Iloilo	180	56.0
2.	Cebu	VII	Cebu	80	280.9
3.	Ormoc	VIII	Leyte	110	464.3
4.	Tacloban	VIII	Leyte	138	100.9

(1) Iloilo City

Iloilo City administratively consists of 6 Districts, namely; Arevalo, City Proper, Jaro, La Paz, Mandurriao and Molo. These Districts are further divided into Barangays. As of 1994, there are 180 barangays in the City, distributed as follows: 13 barangays in Arevalo District; 45 in City Proper; 42 in Jaro; 37 in La Paz; 18 in Mandurriao; and 25 in Molo.

(2) Ormoc City

Ormoc City comprises 110 barangays. Thirty-eight (38) barangays of the total are located in urbanized areas of the City, of which 29 barangays are located in the city proper and the other 9 barangays are contiguous to the city proper as outskirts. The other 72 barangays are located in rural areas; however, 7 of these barangays have been reported as urbanized barangays in the 1990 census.

1.2 Population and Labor Force

1.2.1 Population

According to the 1990 census by the National Statistics Office (NSO), the Philippines had a population of 60.6 million. This population increased by 12 million compared with the 1980 census, as shown in Table 1.1. During the 1970's, the average growth rate was 2.79% per annum. However, during the 1980's, it slowed down to 2.28% per annum.

In the three provinces, the census population figures were 1.763 million or 2.9% of the national population in Iloilo, 2.638 million or 4.4% in Cebu and 1.484 million or 2.5% in Leyte. Their average growth rates during the 1980's were 2.09%, 2.35% and 1.31% per annum, respectively. All rates except Cebu Province were lower than the national growth rate.

In the four cities, the census population figures were 307,600 in Iloilo, 610,400 in Cebu, 129,200 in Ormoc and 136,400 in Tacloban, as shown in Table 1.2. Their growth rates in the

1980's were 2.31%, 2.22%, 2.10% and 2.90%, respectively. The growth rates of the cities except Cebu City exceeded their respective provincial rates.

The territorial areas of the four cities are given in Table 1.3. As shown in the table, their population density were 55 persons/ha in Iloilo, 22 persons/ha in Cebu, 3 persons/ha in Ormoc and 14 persons/ha in Tacloban. In the census report, Ormoc City's territory is classified into both urban and rural areas. The population is recorded at 14,833 in the urban area and 114,623 in the rural area. Having territories of 145 ha and 46,285 ha, respectively, population density is 102 persons/ha and 2 persons/ha. Likewise, the Cebu City Government classifies the barangays making up Cebu City into urban and rural areas. According to this classification, the population density is 113 persons/ha in urban and 3 persons/ha in rural areas.

In the four cities the average family size was 5.43 in Iloilo, 5.32 in Cebu, 5.20 in Ormoc and 5.50 in Tacloban. In total, the average family size for the four cities was 5.36, as shown in Table 1.3. This figure was slightly higher than the national average of 5.32.

(1) Iloilo City

As mentioned before, Iloilo City had a population of 309.5 thousand. It accounted for 17.4% of the total population (1,763 thousand) of Iloilo Province. This population increased by 62.8 thousand as compared to the 1980 census population, as shown in Table 1.2. During the 1970's, the average growth rate was 1.56% per annum. During the 1980's, however, it accelerated to 2.31% per annum.

The territorial area of Iloilo City is 56.0 km^2. The overall population density in the city, therefore, is 55 persons per ha in 1990, as shown in Table 1.3. The density was distributed for respective Districts as follows: 25.1 thousand people in Arevalo District with a population density of 61 persons per ha; 56.1 thousand in the City Proper with 237 persons per ha; 79.3 thousand in Jaro with 32 persons per ha; 66.2 thousand in La Paz with 71 persons per ha; 29.8 thousand in Mandurriao with 25 persons per ha; and 51.2 thousand in Molo with 139 persons per ha.

The average family size in the City was 5.43 persons, as shown in Table 1.3. The largest family size among the six Districts was 5.68 of Mandurriao and the smallest one was 5.21 of the City Proper. The City average size was smaller than the Provincial average of 5.50, but larger than the national one of 5.31.

(2) Ormoc City

In the census year of 1990, Ormoc City had a population of 129.2 thousand. It accounted for 8.7% of the population (1,483.6 thousand) of Leyte Province. The population increased by 24.2 thousand since the 1980 census, as shown in Table 1.2. During the 1970's, the average growth rate was 2.19%. During the 1980's, it slowed down to 2.10% per annum. Urban population of the census are broken down as follows: 14,761 in City Proper, 27,851 in adjacent areas of the City Proper and 15,992 in urbanized core of rural areas.

The territorial area of Ormoc City is 464.3 km^2. The population density in the entire city was 2.8 persons per ha in 1990, as shown in Table 1.3. In urban areas, the density was 113 persons per ha. In the city proper alone, population density increased to 154 persons per ha.

An average family size in the city was 5.19 persons, as shown in Table 1.3. In the urban areas, the family size was 5.29, larger than that (5.14) in the rural areas. On the other hand, the size in the city proper was 5.18, which was almost the same as the city average. However, the difference of family size in urban and rural areas was not bigger than the difference in Iloilo City.

1.2.2 Labor Force

In 1990, the labor force in the Philippines registered 21.1 million. This accounted for 57.7% of the total working age population (36.6 million), i.e., 15 years old and over. Of this number, 19.3 million or 91.5% were employed. Thus, unemployment rate was 8.5% nationwide. In the provinces, the unemployment rates were 13.4% in Iloilo, 8.1% in Cebu and 9.2% in Leyte, as shown in Table 1.1. Likewise, the rates in the four cities were 9.3% in Iloilo, 6.8% in Cebu, 6.5% in Ormoc and 6.7% in Tacloban. Thus, unemployment rates in the cities were fairly smaller than the ones in their respective provinces.

In the past, the agricultural sector, being the primary sector, used to absorb the greatest portion of manpower resources in the country. In the 1990 census this sector accounted for only 7.95 million or 37.7% of the total labor force, a drastic decrease from the 1980 census figure of 51.5%, as shown in Table 1.4.

This decrease phenomenon was seen especially in the provinces. In Cebu Province, the share of the primary sector dropped down to 28.4% in 1990, a figure lower than one-third of the total labor force. In Iloilo Province, the primary sector still absorbed the greatest portion of manpower, but its share decreased from 58.6% in 1980 to 45.6% in 1990. On the other hand, although the rate in Leyte Province decreased from 68.0% in 1980 to 52.2% in 1990, it still kept more than half of the total labor force within the sector.

The industrial sector, the secondary sector, employed the smallest share of the labor force among the three major economic sectors. In the three provinces, Cebu recorded the largest percentage (19.7%) in the industrial sector. As such, Cebu Province was considered the most industrialized province among the three.

1.3 Land Use

The present land use in the four cities was not clear. Thus, the JICA Study Team and the Local Counterpart Team tried to identify the land use by referring to available maps such as topographical maps and aerophotographs. The land use map of Iloilo City was delineated by using the topographic map drawn as the survey results of JICA in 1994. Regarding Cebu City, the topographic map on the scale of 1:50,000 was used to identify the land use in its territory. Land use in the two cities are illustrated in Figs. 1.1 and 1.2. The land use map of Tacloban City does not identify the whole territory, as seen in Fig. 1.3, although the city government has a present land use map. Ormoc City shows a present land use map as seen in Fig. 1.4, covering only the urban core.

Thus, it is quite difficult to identify the present land use in the study area. Moreover, even if in some cases the land use maps were available, their land use categories do not always use standard map legends, thereby making the identified land use areas vague. The covering areas for land use mapping are not unified, as seen in the figures. Therefore, urban and environmental issues could not be discussed from the uniform standpoint in the four cities.

Table 1.5 shows the present land use in the four cities, which was identified using the above identification procedure. Iloilo and Ormoc cities seem to include fairly ample green space covering the entire administrative territory. On the contrary, Cebu and Tacloban cities appear to be moderately urbanized compared to the other two cities, but this may be due to the mapped area covering only the urban Barangay classes designated by the city governments or the urban core.

(1) Iloilo City

The present land use was identified using the topographic map which was drawn by the JICA Study Team in 1994. Even in the city, agricultural land occupies the largest areas of 28.9 km^2 or 52% of the total territory. Of the agricultural land, palay fields

are the most dominant category, 18.5 km^2 or 33%. Following the agricultural land, residential area accounted for 17.1 km^2 or 31% in the city. Since the city is estimated to have a population of 315 thousand in 1994, the net population density is 184 persons per ha. This figure means that the residential area in the city is densely inhabited.

(2) Ormoc City

In Ormoc City, no new map that will help identify land use was prepared during the study period. The residential area of 3.3 km^2 is considered as a part of the Ormoc urban area (3.8 km^2) in Table 1.3. Thus, if the urban population in Table 1.3 is assumed to live in the residential area, the net population density is estimated at 128 persons per ha. This density is smaller than that of Iloilo City of 184 persons per ha.

1.4 GDP and GRDP

Gross Domestic Product (GDP) in the Philippines was 1,466 billion pesos in 1993, as shown in Table 1.6, broken down into 318 billion pesos in the agricultural sector, 483 billion pesos in the industrial sector and 666 billion pesos in the service sector. Per capita GDP was 22,596 pesos, equivalent to approximately US$829.

Gross Regional Domestic Product (GRDP) of the respective regions in 1993 was 104.7 billion pesos or 7.1% of the GDP in Region VI, 94.3 billion pesos or 6.4% in Region VII, and 36.9 billion pesos or 2.5% in Region VIII, as shown in the table. Value Added (VA) rates of major economic sectors to GRDP in their respective regions were summarized as follows, with details shown in Table 1.7.

Item	Philippines	Region VI	Region VII	Region VIII
Agriculture	21.7%	33.2%	15.3%	34.9%
Industry	32.9%	23.3%	30.6%	30.5%
Services	45.4%	43.5%	54.1%	34.6%
Total	100.0%	100.0%	100.0%	100.0%

Per capita GRDPs in 1993 were 18,459 pesos (approximately US$678) in Region VI, 19,436 pesos (US$713) in Region VII and 11,806 pesos (US$433) in Region VIII, as shown in Table 1.8. Region VII recorded the highest per capita GRDP among the three, accounting for 86% of the national per capita GDP.

Table 1.9 shows the GDP by economic sector at 1985 constant prices between 1985 and 1993. For nine years, GDP increased from 572 billion pesos to 733 billion pesos in real terms, i.e., average growth rate of 3.15% per annum. The annual real growth is calculated in Table 1.10. In the same manner, per capita GDP grew at 0.80% per annum on average. The detailed annual growth of per capita GDP is shown in Table 1.11.

Average annual growth of both GRDPs and per capita GRDPs of the regions is summarized as follows, the details of which are shown in Table 1.9 to 1.11:

Item	Philippines	Region VI	Region VII	Region VIII
Agriculture	2.17%	3.26%	3.41%	-0.24%
Industry	2.89%	1.60%	2.17%	0.59%
Services	3.94%	4.21%	4.63%	2.09%
GRDP	3.15%	3.25%	4.66%	2.05%
Per capita GRDP	0.80%	1.47%	1.71%	-0.08%

Region VI and VII grew at a rate higher than the entire country. Region VIII, on the other hand, recorded negative and much lower growth rates compared to the national figure, with the disparity increasing in recent years.

1.5 Economic Profiles

1.5.1 Agricultural Sector

The production of major crops in the Philippines and in the three provinces are given in Table 1.12. Based on the table, the major crops in the country in order of production value are palay (rice), coconut, corn, sugar cane, banana and pineapple.

Considering only cultivated areas, the salient features of crop production in the three provinces are summarized as follows:

(1) Iloilo Province mainly produces palay, utilizing 216,800 ha in 1993 crop year for palay production. This land area is notably more than the combined areas for palay production in the other two provinces.

(2) Cebu Province mainly produces corn, devoting 120,200 ha in 1991 and 73,000 ha in 1993 for corn production. Although this production area is now smaller than that of Leyte Province, the areas used in corn production indicate that corn is still one of the most important crops in the province.

(3) In Leyte Province, the cultivated areas are evenly utilized not only for palay production but also for various crops such as corn, coconut and pineapple.

In the fishing industry, brackish water fishpond is one of the most vulnerable facilities to flood disaster. In 1993, the Philippines produced 234,700 tons of fish from brackish water fishponds, as shown in Table 1.13. Of the national production figure, 16,700 tons or 7.1% is produced in Iloilo Province. Prawn and milkfish accounted for the bulk of brackish water products. The other two provinces do not yield as much brackish water fishpond products, as seen in the table.

The livestock and poultry industry has received an important position in the agricultural sector of the national economy in recent years. In fact, its value added (VA) share increased from 3.1% in 1985 to 4.5% in 1993. In the three regions, the same trend was observed during the same period. VAs of the industry were 6.2% of GRDP in Region VI, 5.8% in Region VII and 5.8% in Region VIII in 1993. Table 1.14 shows an inventory of livestock in the country and the provinces for the recent three years from 1991 to 1993. In particular, Cebu and Leyte provinces appear to have more pigs than other areas.

1.5.2 Industrial Sector

Within the industrial sector, the manufacturing subsector contributes the largest share to the national economy, accounting for 23.8% of GDP in 1993. It played an important role in the regional economy in the three regions as well. The manufacturing subsector accounts for 17.6% in Region VI, 22.0% in Region VII and 25.1% in Region VIII, as shown in Table 1.7. In particular, Cebu City in Region VII is promoting foreign industries as a major part of its industrialization policy. Manufacturing establishments have recently increased not only in industrial complexes such as the Export Processing Zone but also within Cebu City itself.

Table 1.15 shows the management conditions and internal assets holdings of manufacturing establishments in the country as well as in the three regions concerned. Since the table includes both large scale and small scale manufacturing establishments, the data show management characteristics of respective scale establishments. The following table summarizes the management indices in the country and in the regions:

Particulars	Philippines	Region VI	Region VII	Region VIII
Large Scale Establishments				
Average Output (Billion Pesos)	463.05	12.53	23.49	15.68
Average VA (Billion Pesos)	160.02	3.98	10.22	1.88
VA Rate (%)	34.56	31.76	43.50	12.02
Ratio of Fixed Assets to VA	0.69	0.73	0.38	10.86
Ratio of Inventory to VA	0.49	0.29	0.25	2.83
Small Scale Establishments				
Average Output (Billion Pesos)	19.87	0.88	0.55	0.27
Average VA (Billion Pesos)	7.75	0.35	0.23	0.10
VA Rate (%)	38.98	39.74	41.80	37.89
Ratio of Fixed Assets to VA	0.94	1.54	0.88	1.77
Ratio of Inventory to VA	0.28	0.47	0.45	0.19

VA stands for value added.

(1) Iloilo City

In Iloilo City, there were 525 manufacturing establishments as of 1992, according to the socio-economic profile of the City. Since management characteristics of manufacturing establishments in the city are not available, the regional one in Table 1.15 is applied to the city, the assets holding conditions as of the end of 1989. The following table summarizes the conditions for large scale and small scale manufacturers as average asset holdings.

Particulars	Large Scale*	Small Scale & Cottage**
Value Added Rate (%)	31.8%	39.7%
Ratio of Fixed Assets to Value Added	0.73	1.54
Ratio of Inventory Stock to Value Added	0.29	0.47

* Establishments with average total employment of 10 and more.
** Establishments with average total employment of less than 10.

(2) Ormoc City

In Ormoc City, there are three large scale establishments: geothermal power plant, OSCO (sugar) and AA Alcohol. However, they are not located in the city proper and vicinity. Besides the large scale industry, there are 107 small scale establishments in the City as of 1991 according to the City Development Plan. Of the total, 78 establishments are in the City Proper and vicinity, on the assumption that the manufacturing establishments are distributed in proportion to urban population. The data of Region VIII in Table 1.15 are also applied to the city conditions because of data availability.. The following table summarizes the conditions for large scale and small scale manufacturers as average holdings.

Particulars	Large Scale*	Small Scale & Cottage**
Value Added Rate (%)	12.0%	37.9%
Ratio of Fixed Assets to Value Added	10.86	1.77
Ratio of Inventory Stock to Value Added	2.83	0.19

* Establishments with average total employment of 10 and more.
** Establishments with average total employment of less than 10.

1.5.3 Services Sector

Within the services sector, the trading (or commercial) subsector is considered the most popular and plentiful industry in the national economy, accounting for 14.2% of GDP in 1993. In the three regions, shops and stores perform an important role and are scattered all over the territories. The trading subsector accounted for 18.6% in Region VI, 26.6% in Region VII and 5.7% in Region VIII in 1993, as shown in Table 1.7.

Table 1.16 shows the management conditions of trading establishments involved in both wholesale and retail trading in the country and the three regions concerned. As in the previous case, only large scale trading establishments were chosen as samples for analysis. The management indices of retail trading establishments are summarized in the table below:

Particulars	Philippines	Region VI	Region VII	Region VIII
Wholesale				
Average Annual Sales (Billion Pesos)	144.81	10.653	6.69	0.57
Average VA (Billion Pesos)	21.08	0.92	0.49	0.12
VA Rate (%)	14.56	8.61	7.37	13.94
Ratio of Fixed Assets to VA	0.50	0.18	0.61	0.44
Ratio of Inventory to VA	1.02	0.62	2.24	0.86
Retail Trade				
Average Annual Sales (Billion Pesos)	73.69	4.05	6.42	0.51
Average VA (Billion Pesos)	9.13	0.50	0.48	0.06
VA Rate (%)	12.38	12.39	7.52	11.41
Ratio of Fixed Assets to VA	0.53	0.50	0.71	0.45
Ratio of Inventory to VA	1.48	2.33	2.70	2.48

(1) Iloilo City

In Iloilo City, there were 4,500 wholesale and retail trading establishments as of 1992. Since management characteristics of trading establishments in the city are not available, the regional data in Table 1.16, the assets holding conditions as of the end of 1989, was applied to the city.. The following table summarizes the conditions for wholesale and retail trading establishments as average asset holdings.

Particulars	Wholesale Trade	Retail Trade
Value Added Rate (%)	8.6%	12.4%
Ratio of Fixed Assets to Value Added	0.18	0.50
Ratio of Inventory Stock to Value Added	0.62	2.33

(2) Ormoc City

Ormoc City is functioning as trade center of the west coast areas of Leyte Province. However, there is no detailed information regarding existing establishments of wholesale and retail trading sector. The data of Region VIII in Table 1.16 are also applied to the city conditions because of data availability. The following table summarizes the conditions for wholesale and retail trading establishments as average holdings.

Particulars	Wholesale Trade	Retail Trade
Value Added Rate (%)	13.9%	11.4%
Ratio of Fixed Assets to Value Added	0.44	0.45
Ratio of Inventory Stock to Value Added	0.86	2.48

1.5.4 Price Indices

Table 1.17 shows price indices in the metropolitan area from the year 1985 to 1994 covering not only retail prices but also wholesale prices. The retail price index of construction materials increased from 350.4 (base: 1978 = 100) in 1985 to 754.9 in April 1994, up by about 115% in the past nine years.

Table 1.18 shows the foreign exchange rate of Philippine Peso per US$ from 1985 to 1994 at the end of each period. The value of the peso dropped down from 18.40 pesos at the beginning of 1985 to 26.91 pesos in April 1994.

1.6 Infrastructure

Infrastructures in the study area are as described below.

(1) Educational Facility

As of school year 1990-91, educational facilities were distributed as follows:

Level	Philippines	Region VI	Region VII	Region VIII
Pre-school	3,783	89	228	89
Elementary	34,010	3,061	2,635	3,061
Secondary	5,387	358	373	358
Tertiary	2,016	113	112	113

Table 1.19 shows both the detailed distribution of these facilities and enrollment. On the average, the rate of elementary schools to population is 5.6 facilities per 10,000 people in the country.

(2) Medical Facility

Table 1.20 shows the distribution of medical facilities such as hospitals, barangay health stations and rural health units in the Philippines and regions concerned. In terms of bed capacity of hospitals, only Region VII among the three areas exceeded the national average of 1.30 beds per 1,000 people, indicating that the medical facilities available in Iloilo and Leyte provinces appeared backward as compared to the national average.

(3) Road System

As of 1991, the existing road network was 154,300 km in the country. In regions, there were 13,400 km of roads in Region VI, 9,400 km in Region VII and 8,700 km in Region VIII, as shown in Table 1.21. The road density in the regions, i.e., the total length of road to the total land area, were 953 m/km^2, 887 m/km^2 and 1,038 m/km^2, respectively, all of which were more dense than the national average of 514 m/km^2.

(4) Water Supply System

The system of waterworks is classified into three levels, namely; (a) Level 1, indicating a service level by a point source such as protected well and spring with an