PART 2

TABLES AND FIGURES

Table 2-1 Properties of Deposited Soil (Ban Na San)

ANALYSIS RESULTS (Pedon NO. NS-1)

(OVEN DRY BASIS)

Horizon	Depth (cm)	Hydraulic Conductivity (cm/hr)	Particle size analysis (%)							Texture
			USDA Grading (mm)			Sand Fraction Grading (mm)				
			Sand 2-0.05	Silt 0.05-0.002	Clay 0.002>	Very Coarse 2.0-1.0	Coarse 1.0-0.5	Medium 0.5-0.25	Fine 0.25-0.1	Very Fine 0.1-0.05	
Ow1	0-40	Too rapid (Very high)	98.6	0.4	1.0	62.4	25.1	8.2	2.4	0.5	Sand
Ow2	40-60	Too rapid (Very high)	91.3	4.7	4.0	13.5	13.9	26.6	22.6	14.7	Sand
Ow3	60-80	Too rapid (Very high)	99.1	0.4	0.5	55.7	30.6	10.1	2.6	0.1	Sand
Ow4	80-100	15 (High)	79.3	11.1	9.6	3.8	3.5	7.8	16.7	47.5	Sandy Loam
Ab	100-110	20 (High)	85.2	8.8	6.0	16.3	27.2	23.3	13.6	4.8	Loamy Sand

Horizon	Moisture (%)	pH (1:1)		EC ds/m	T - C (%)	T - N (%)	C/N	Exchange Capacity and Cation (me/100g)					Base Saturation (%)	P_2O_5 (ppm)	K_2O (ppm)
		Water	KCl					Ca	Mg	K	Na	CEC			
Ow1	0.2	5.7	4.2	0.06	0.08	0.04	2	0.7	0.2	0.1	0.1	2.4	46	13.8	31.0
Ow2	0.7	5.1	3.8	0.08	0.18	0.02	9	0.8	0.1	0.2	0.1	5.6	21	20.1	58.0
Ow3	0.3	5.5	4.1	0.05	0.04	0	-	0.6	0.1	0.1	0.1	1.5	60	15.1	23.0
Ow4	1.4	4.8	3.8	0.12	0.45	0.04	11	0.9	0.1	0.3	0.2	4.8	31	27.2	56.0
Ab	0.6	4.3	3.7	0.12	0.48	0.05	10	0.5	0.1	0.1	0.1	3.1	26	21.4	48.0

Remarks: Ow indicated new term 'Overwash'.

Table 2-3 Properties of Deposited Soil (Lan Saka)

ANALYSIS RESULTS (Pedon NO. LS-1)

(OVEN DRY BASIS)

Horizon	Depth (cm)	Hydraulic Conductivity (cm/hr)	Particle size analysis (%)								Texture
			USDA Grading (mm)			Sand Fraction Grading (mm)					
			Sand 2-0.05	Silt 0.05-0.002	Clay 0.002>	Very Coarse 2.0-1.0	Coarse 1.0-0.5	Medium 0.5-0.25	Fine 0.25-0.1	Very Fine 0.1-0.05	
Ow1	0-20	37 (Very high)	96.8	1.7	1.5	0	1.0	46.7	42.5	6.6	Sand
Ow2	20-48	19 (High)	92.6	4.9	2.5	0.4	0.8	21.7	60.6	9.1	Sand
Ow3	48-77	29 (Very high)	88.8	7.7	3.5	0.2	0.5	26.9	44.9	16.3	Sand
Ow4	77-100	24 (High)	94.3	5.2	0.5	0.2	0.2	21.6	56.3	16.0	Sand

Horizon	Moisture (%)	pH (1:1)		EC ds/m	T - C (%)	T - N (%)	C/N	Exchange Capacity and Cation (me/100g)					Base Saturation (%)	P_2O_5 (ppm)	K_2O (ppm)
		Water	KCl					Ca	Mg	K	Na	CEC			
Ow1	0.3	5.8	4.4	0.14	0.17	0.01	17	1.5	0.2	0.2	0.1	4.4	45	28.0	50.0
Ow2	0.6	5.6	4.5	0.17	0.31	0.02	16	1.7	0.2	0.2	0.1	2.9	76	36.6	95.0
Ow3	0.9	5.5	4.2	0.11	0.32	0.03	11	1.5	0.2	0.1	0.2	4.2	48	32.4	32.0
Ow4	0.5	4.5	4.0	0.35	0.12	0.02	6	0.8	0.1	0.1	0.1	2.8	39	31.2	44.0

Remarks: Ow indicated new term 'Overwash'.

Table 2-5 Land Classification for Sediment Deposited Area (Ban Na San)

Class	Horizon	Depth (cm)	Structure	Gravel (%)	Mottling	Soil texture
I	Deposit	0 - 25	Massive	Non	Non	Fine sand
	Buried A	16 - 39	Blocky	Non	Non	Silty loam
II	Deposit	25 - 50	Massive	5 - 10	Non	Fine sand
	Buried A	17 - 20	Blocky	Non	Non	Sandy clay loam
III	Deposit	50 -100	Massive	Non	Non	Fine sand
	Buried A	8 - 27	Massive	Non	Present/Non	Sandy loam, Fine sand, Silty loam
IV	Deposit	100-150	Massive	Non	Non	Fine sand
	Buried A	8 - 27	Massive	Non	Present/Non	Sandy loam, Fine sand, Silty loam
V	Deposit	150<	Massive	Non	Non	Fine sand
	Buried A	Not survey				

Table 2-6 Soil/Soil Layer Improvement Method (Ban Na San)

Class	Land Use	Soil Improvement Method	Soil Layer Improvement Method
I	Orchard	- Input of compost or barnyard manure - Add chemical fertilizer - Grow soil cover crops	- Soil mixing with lower original soil - Soil dressing on farm land
	Upland crop/ grassland	- Input of compost or barnyard manure - Add chemical fertilizer - Mulch organic material residuum	- Soil mixing with lower original soil
II	Orchard	- Input of compost or barnyard manure - Add chemical fertilizer - Grow soil cover crops	- Soil mixing with lower original soil - Soil dressing on farm land
	Upland crop/ grassland	- Input of compost or barnyard manure - Add chemical fertilizer - Mulch organic material residuum	- Remove gravel - Soil dressing on farm land
III	Orchard	- Input of compost or barnyard manure - Add chemical fertilizer - Grow soil cover crops	- Remove gravel - Soil dressing on soil surface
	Upland crop/ grassland	- Input of compost or barnyard manure - Add chemical fertilizer - Mulch organic material residuum	- Remove gravel - Soil dressing on farm land
IV	Orchard	- Input of compost or barnyard manure - Add chemical fertilizer - Grow soil cover crops	- Remove gravel - Soil dressing on soil surface
	Upland crop/ grassland	- Input of compost or barnyard manure - Add chemical fertilizer - Mulch organic material residuum	- Remove gravel - Soil dressing on farm land
V	Orchard	- Input of compost or barnyard manure - Add chemical fertilizer - Grow soil cover crops	- Remove gravel - Soil dressing on soil surface
	Upland crop/ grassland	- Input of compost or barnyard manure - Add chemical fertilizer - Mulch organic material residuum	- Remove gravel - Mix deposited soil with new clayey soil, and soil dressing on soil surface

Table 2-7 Soil/Soil Layer Improvement Area (Ban Na San)

Land Use	Class	Improvement Method	Depth of Improved Soil (cm)	Improved Area(rai) Case 1	Improved Area(rai) Case 2
Orchard	I	- Input of organic and inorganic materials - Soil dressing on soil surface	20 30	35.1 35.1	35.1 35.1
	II	- Input of organic and inorganic materials - Soil dressing on soil surface	20 30	79.8 79.8	79.8 79.8
	III	- Input of organic and inorganic materials - Remove gravel - Soil dressing on soil surface	20 50 30	43.2 6.4 43.2	43.2 6.4 43.2
	IV	- Input of organic and inorganic materials - Remove gravel - Soil dressing on soil surface	20 50 30	21.8 — 21.8	21.8 — 21.8
	V	- Input of organic and inorganic materials - Remove gravel - Mix deposited soil with new clayey soil, and soil dressing on soil surface	20 50 50	277.9 175.2 277.9	231.5 128.8 231.5
Upland crop/ grassland	I	- Input of organic and inorganic materials - Soil mixing with lower original soil	20 30	— —	— —
	II	- Input of organic and inorganic materials - Remove gravel - Soil dressing on farm land	20 25 10	— — —	— — —
	III	- Input of organic and inorganic materials - Remove gravel - Soil dressing on farm land	20 25 10	— — —	— — —
	IV	- Input of organic and inorganic materials - Remove gravel - Soil dressing on farm land	20 25 10	— — —	— — —
	V	- Input of organic and inorganic materials - Remove gravel - Soil dressing on farm land	20 25 10	— — —	— — —

Table 2-9 Land Classification for Sediment Deposited Area (Lan Saka)

Class	Horizon	Depth (cm)	Structure	Gravel (%)	Mottling	Soil texture
I	Deposit	0 - 25	Massive	Non	Non	Fine sand
	Buried A	16 - 39	Blocky	Non	Non	Silty loam
II	Deposit	25 - 50	Massive	5 - 10	Non	Fine sand
	Buried A	17 - 20	Blocky	Non	Non	Sandy clay loam
III	Deposit	50 -100	Massive	Non	Non	Fine sand
	Buried A	8 - 27	Massive	Non	Present/Non	Sandy loam, Fine sand, Silty loam
IV	Deposit	100-150	Massive	Non	Non	Fine sand
	Buried A	8 - 27	Massive	Non	Present/Non	Sandy loam, Fine sand, Silty loam
V	Deposit	150<	Massive	Non	Non	Fine sand
	Buried A	Not survey				

Table 2-10 Soil/Soil Layer Improvement Method (Lan Saka)

Class	Land Use	Soil Improvement Method	Soil Layer Improvement Method
I	Orchard	- Input of compost or barnyard manure - Add chemical fertilizer - Grow soil cover crops	- Soil mixing with lower original soil
	Upland crop	- Input of compost or barnyard manure - Add chemical fertilizer - Mulch organic material residuum	- Soil mixing with lower original soil
II	Orchard	- Input of compost or barnyard manure - Add chemical fertilizer - Grow soil cover crops	- Soil mixing with lower original soil
	Upland crop	- Input of compost or barnyard manure - Add chemical fertilizer - Mulch organic material residuum	- Soil dressing on farm land
III	Orchard	- Input of compost or barnyard manure - Add chemical fertilizer - Grow soil cover crops	- Construction of raising bed - Soil dressing on soil surface
	Upland crop	- Input of compost or barnyard manure - Add chemical fertilizer - Mulch organic material residuum	- Soil dressing on farm land
IV	Orchard	- Input of compost or barnyard manure - Add chemical fertilizer - Grow soil cover crops	- Construction of raising bed - Soil dressing on soil surface
	Upland crop	- Input of compost or barnyard manure - Add chemical fertilizer - Mulch organic material residuum	- Soil dressing on farm land
V	Orchard	- Input of compost or barnyard manure - Add chemical fertilizer - Grow soil cover crops	- Construction of raising bed - Soil dressing on soil surface
	Upland crop	- Input of compost or barnyard manure - Add chemical fertilizer - Mulch organic material residuum	- Soil dressing on farm land

Table 2-11 Soil/Soil Layer Improvement Area (Lan Saka)

Land Use	Class	Improvement Method	Depth of Improved Soil (cm)	Improved Area(rai) Case 1	Case 2	Case 3	Case 4
Orchard	I	- Input of organic and inorganic materials	20	49.29	49.29	52.42	52.42
		- Soil mixing with lower original soil	50	31.83	31.83	31.83	31.83
	II	- Input of organic and inorganic materials	20	19.16	19.16	15.42	15.42
		- Soil mixing with lower original soil	50	19.16	19.16	15.42	15.42
	III	- Input of organic and inorganic materials	20	87.51	49.36	66.06	27.91
		- Construction of rasing bed	50	16.60	13.59	16.60	13.59
		- Soil dressing on soil surface	10	70.91	35.77	49.46	14.32
	IV	- Input of organic and inorganic materials	20	11.76	6.13	5.63	-
		- Construction of rasing bed	50	0.74	-	0.74	-
		- Soil dressing on soil surface	10	11.02	6.13	4.89	-
	V	- Input of organic and inorganic materials	20	148.10	69.65	130.06	51.61
		- Construction of rasing bed	50	27.77	38.04	27.77	38.04
		- Soil dressing on soil surface	10	120.33	31.61	102.29	13.57
Upland crop	I	- Input of organic and inorganic materials	20	-	-	-	-
		- Soil mixing with lower original soil	30	-	-	-	-
	II	- Input of organic and inorganic materials	20	-	-	4.54	4.54
		- Soil dressing on farm land	10	-	-	-	-
	III	- Input of organic and inorganic materials	20	5.43	43.58	31.61	69.76
		- Soil dressing on farm land	10	-	-	-	-
	IV	- Input of organic and inorganic materials	20	-	5.63	8.43	14.06
		- Soil dressing on farm land	10	-	-	-	-
	V	- Input of organic and inorganic materials	20	2.72	103.52	37.93	138.73
		- Soil dressing on farm land	10	-	-	-	-
Upland crop (Intercrop)	I	- Input of organic and inorganic materials	20	24.65	24.65	26.07	26.07
		- Soil mixing with lower original soil	30	-	-	-	-
	II	- Input of organic and inorganic materials	20	9.59	9.59	7.72	7.72
		- Soil dressing on farm land	10	-	-	-	-
	III	- Input of organic and inorganic materials	20	35.46	17.89	24.73	7.16
		- Soil dressing on farm land	10	-	-	-	-
	IV	- Input of organic and inorganic materials	20	5.52	3.07	2.45	-
		- Soil dressing on farm land	10	-	-	-	-
	V	- Input of organic and inorganic materials	20	60.17	15.70	51.15	6.68
		- Soil dressing on farm land	10	-	-	-	-

Remarks: Improved area is excepted from swamp and reclaimed land.

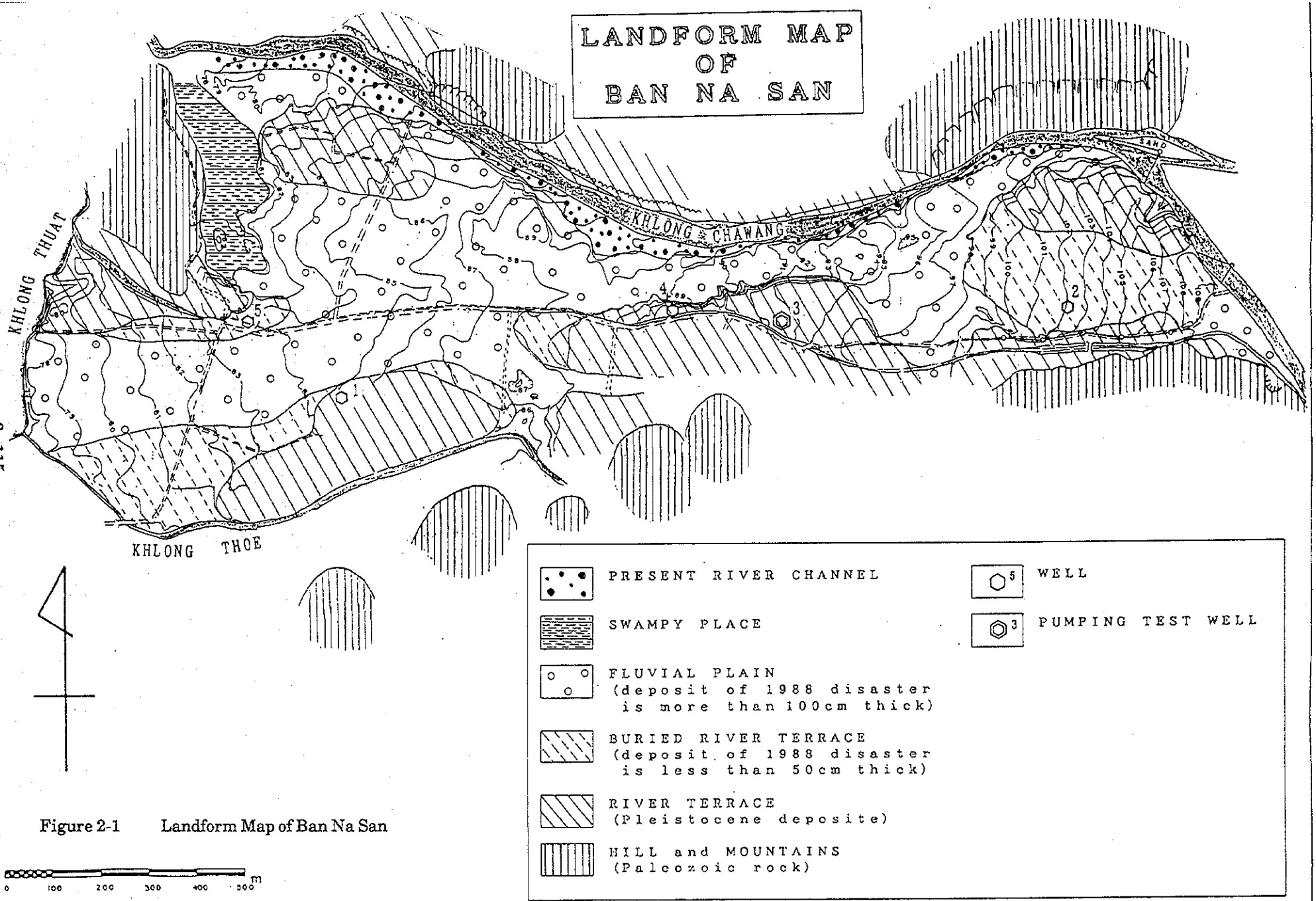


Figure 2-1 Landform Map of Ban Na San

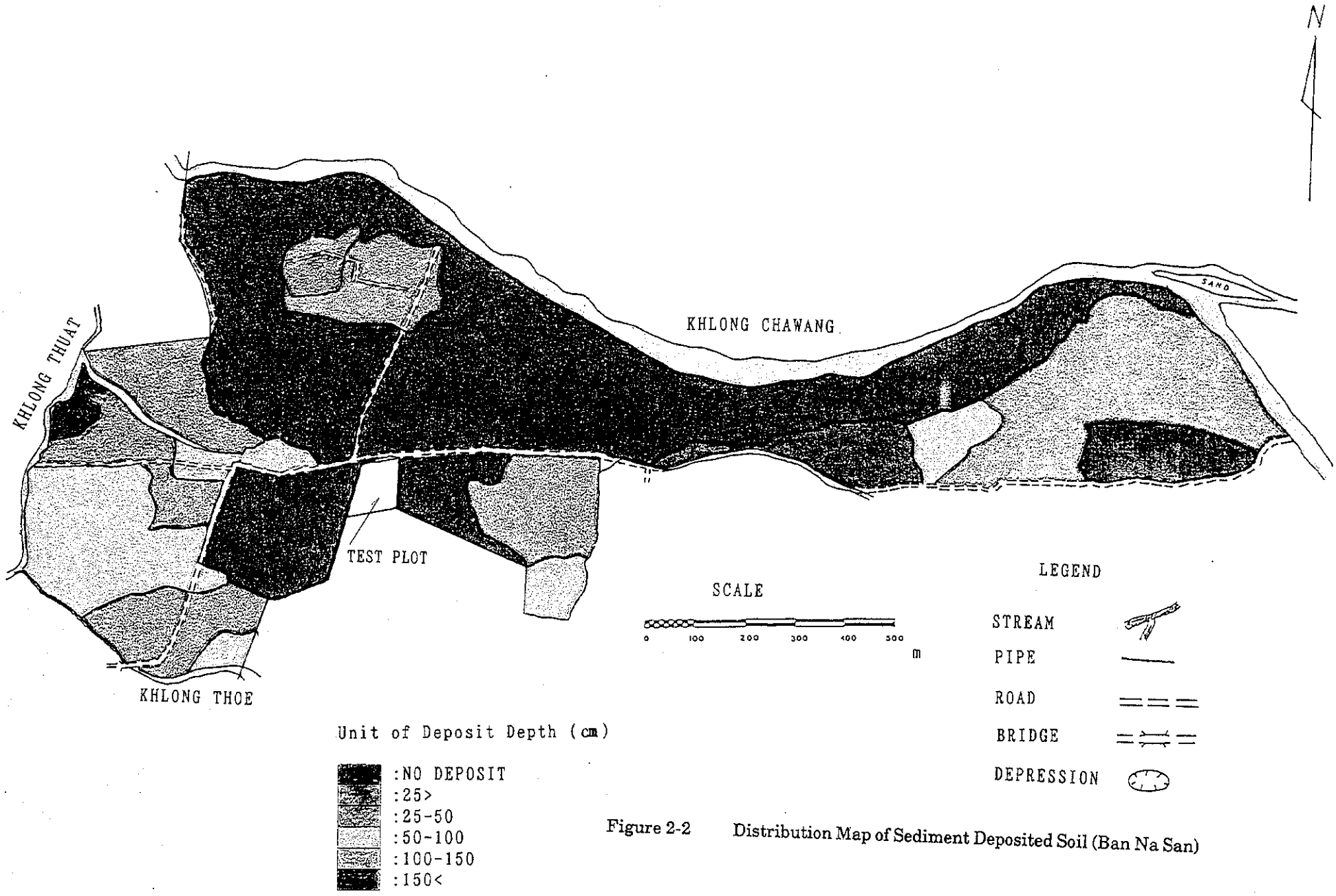


Figure 2-2 Distribution Map of Sediment Deposited Soil (Ban Na San)

Figure 2-3 Particle Size Analysis of Sand Fraction Grading (Lan Saka)

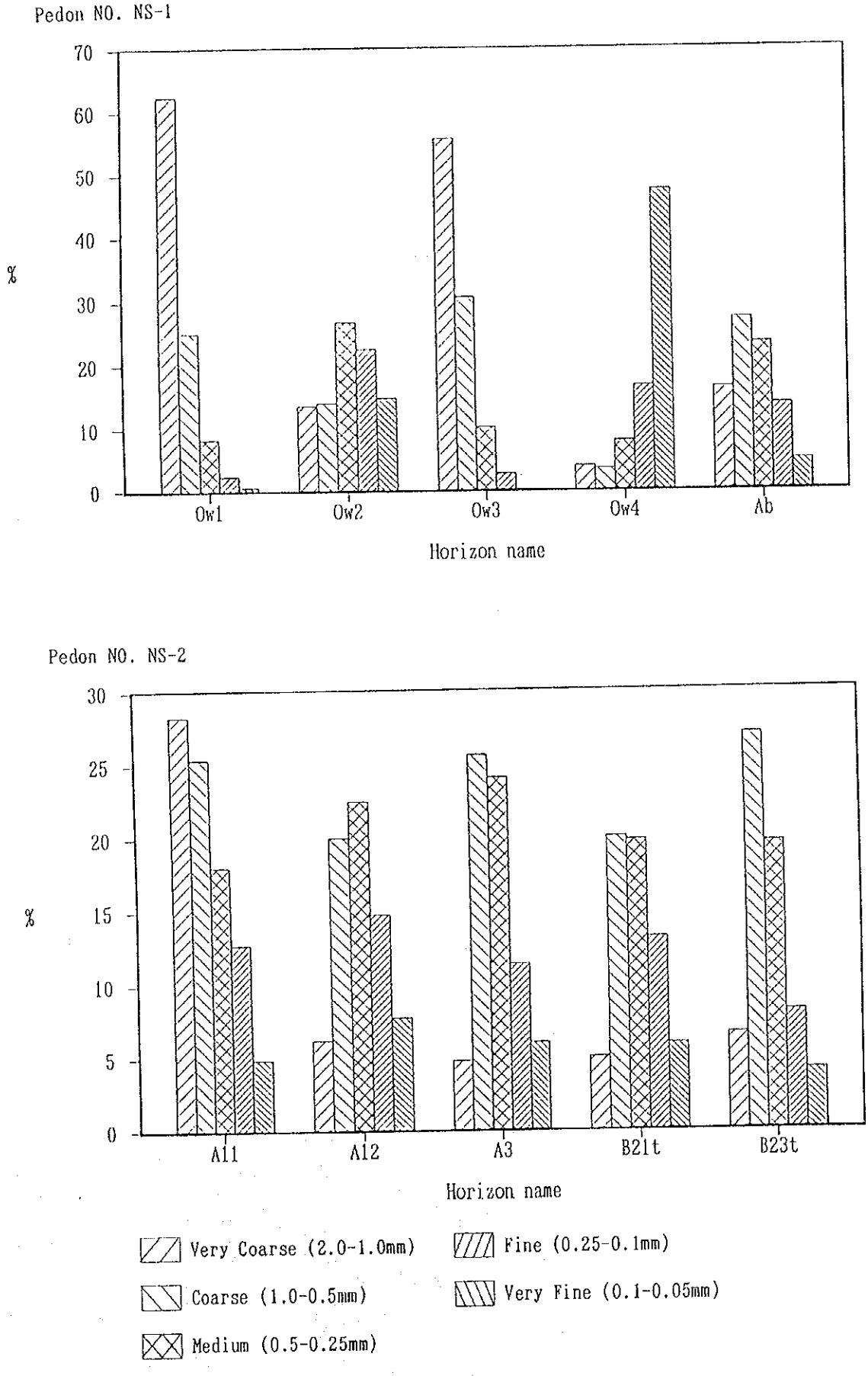
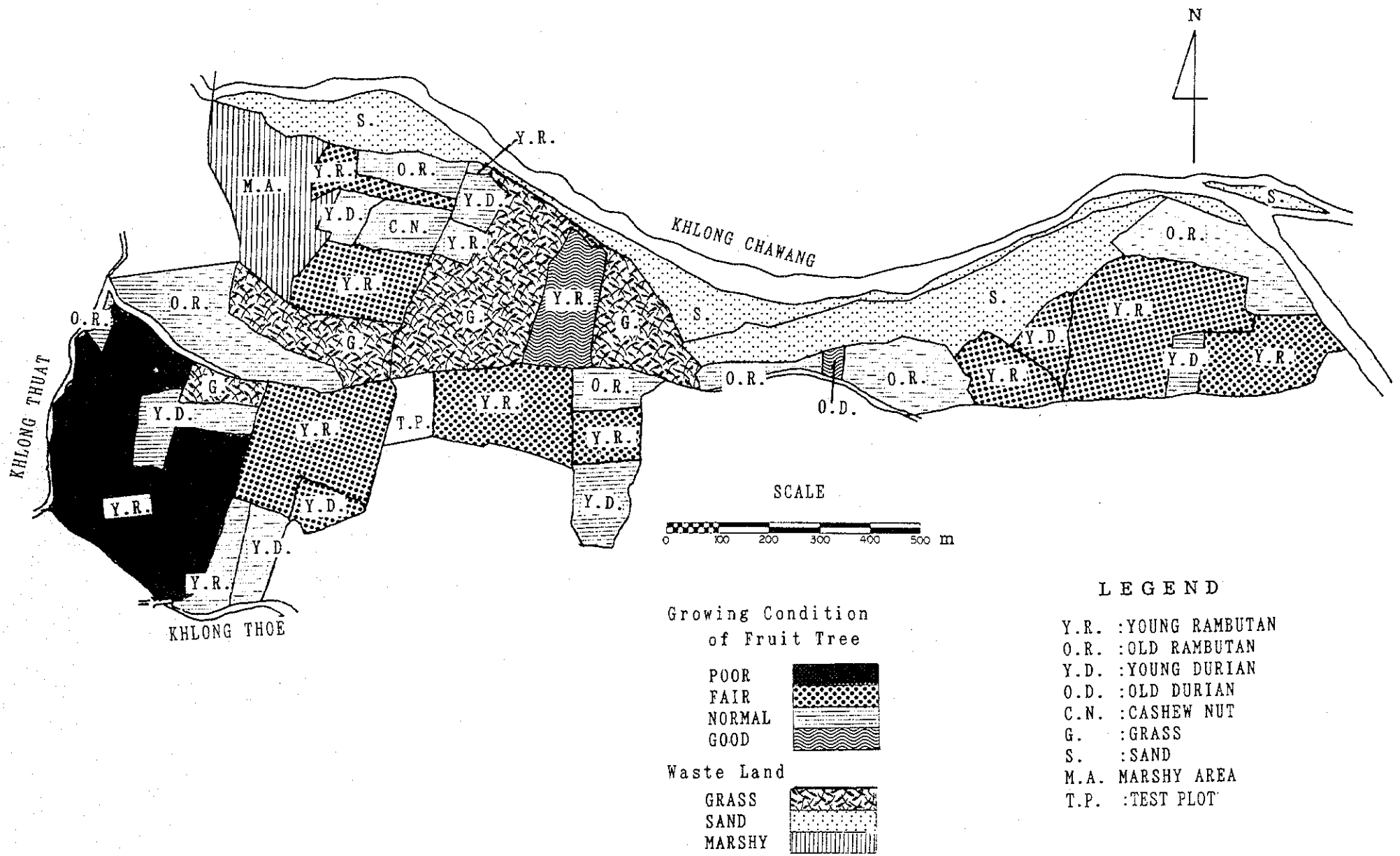


Figure 2-4 Present Land Use Classification (Ban Na San)



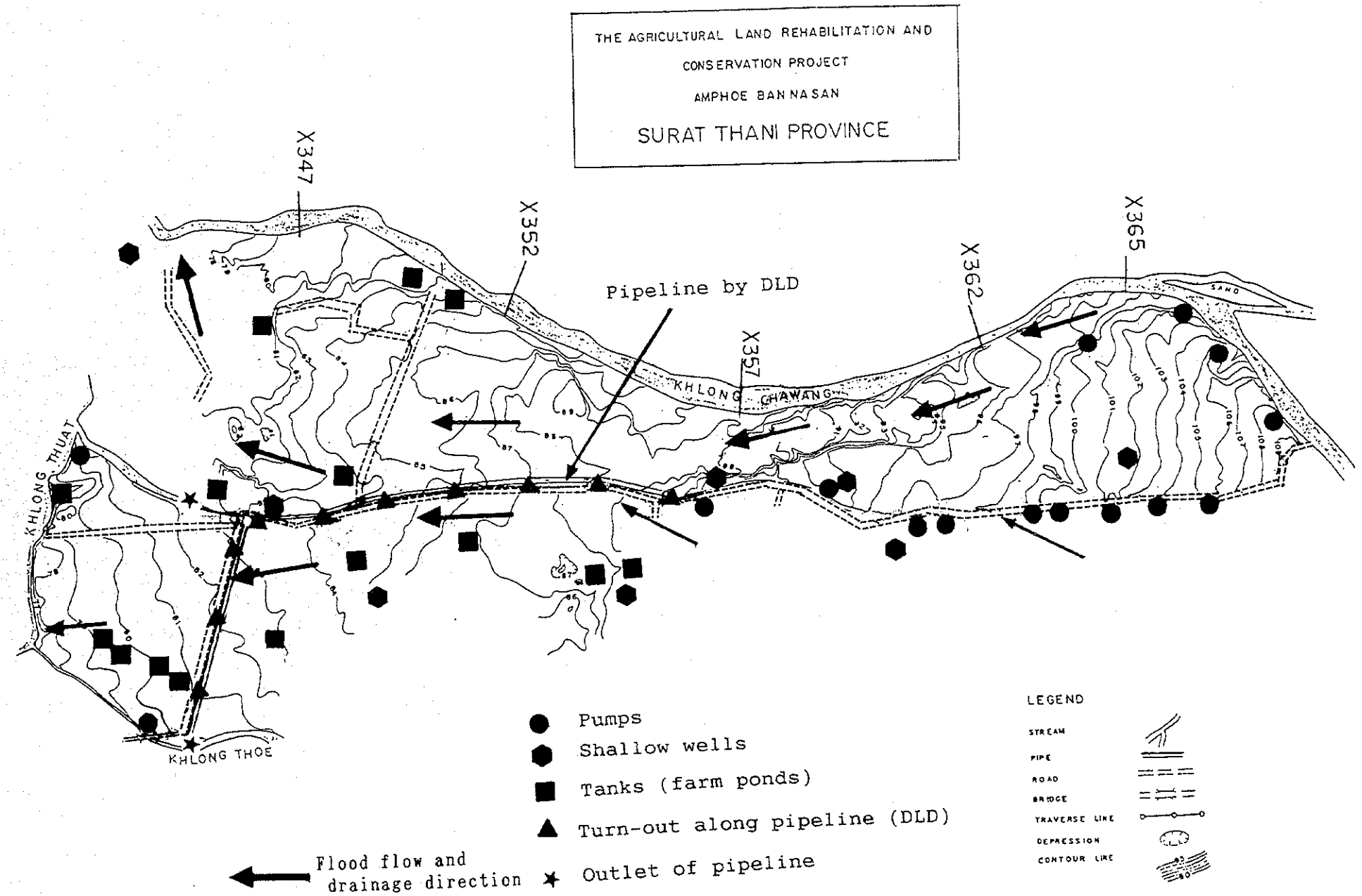


Figure 2-5 Existing Irrigation and Drainage Condition (Ban Na San)

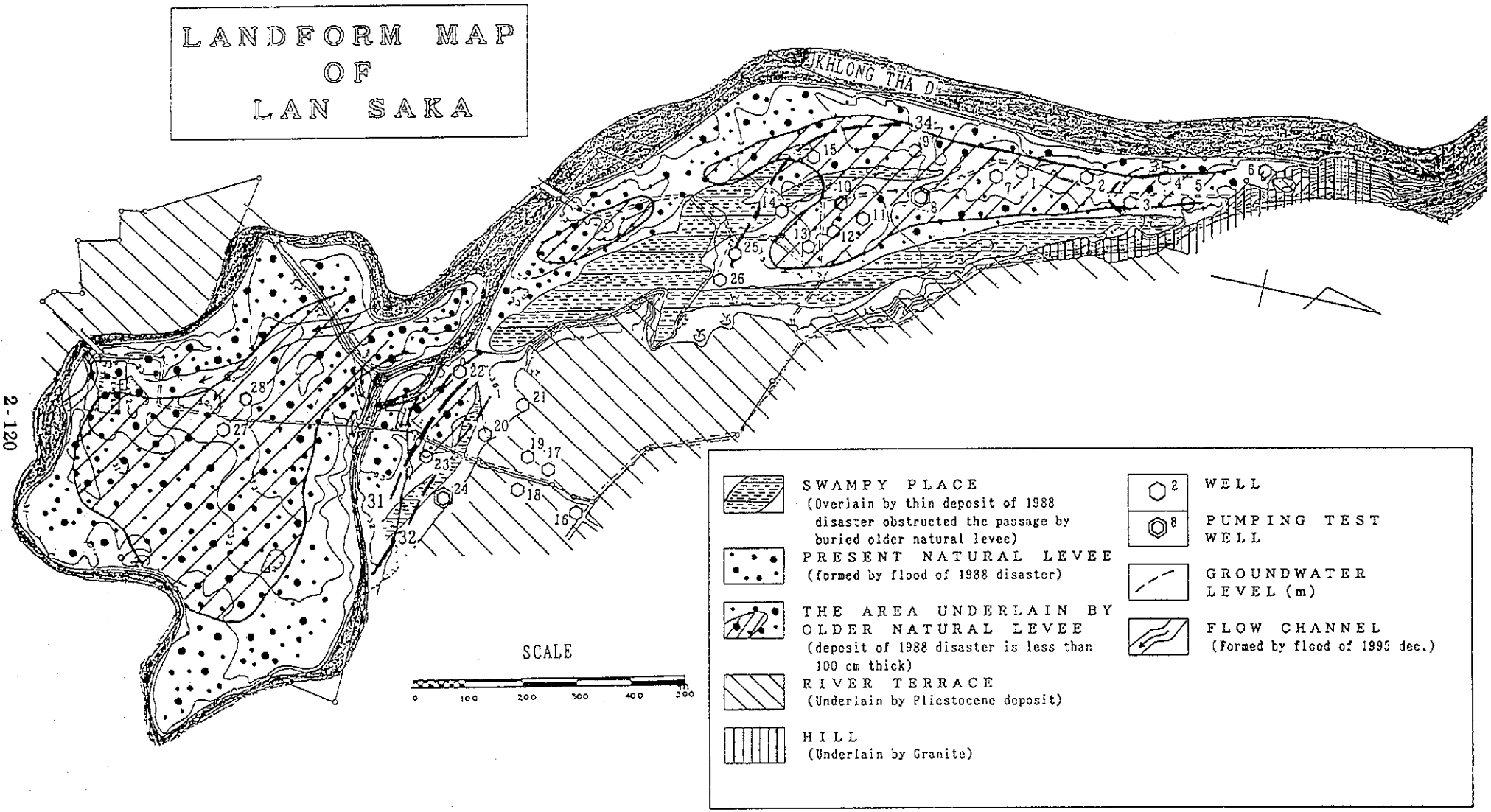


Figure 2-6 Landform Map of Lan Saka

Figure 2-7 Distribution Map of Sediment Deposited Soil (Lan Saka)

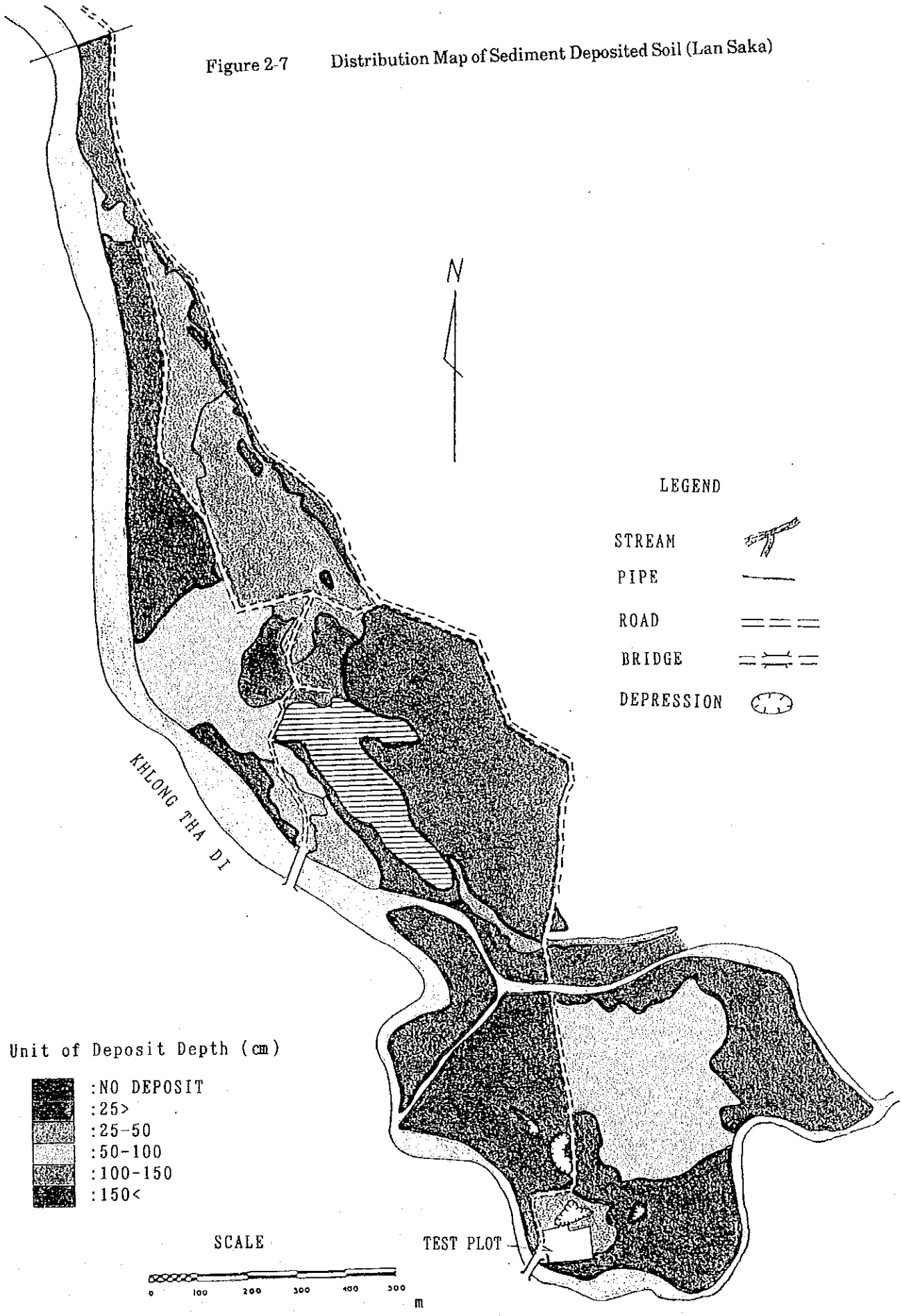
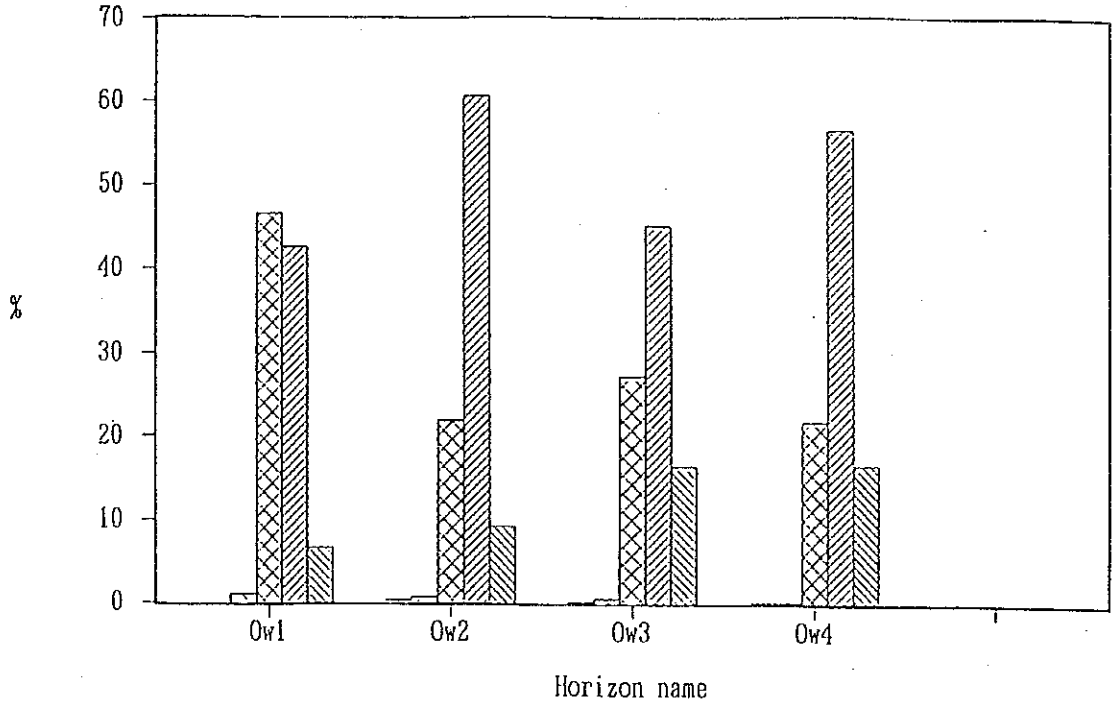
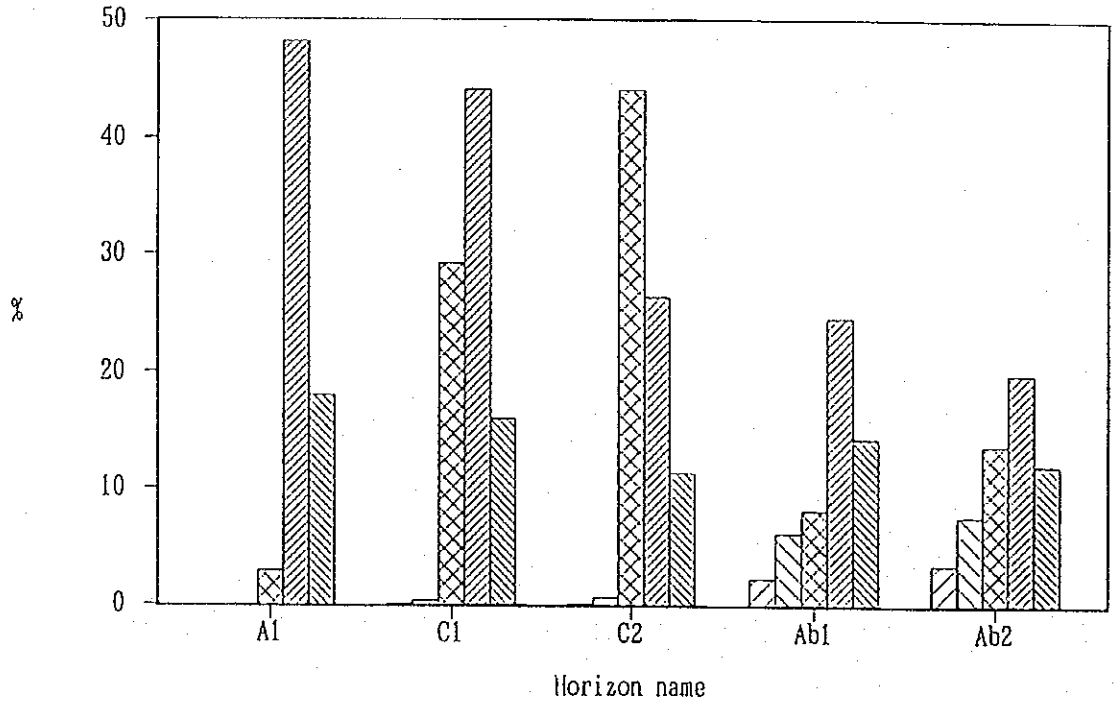


Figure 2-8 Particle Size Analysis of Sand Fraction Grading (Lan Saka)

Pedon NO. LS-1



Pedon NO. LS-2



Very Coarse (2.0-1.0mm)
Fine (0.25-0.1mm)
Coarse (1.0-0.5mm)
Very Fine (0.1-0.05mm)
Medium (0.5-0.25mm)

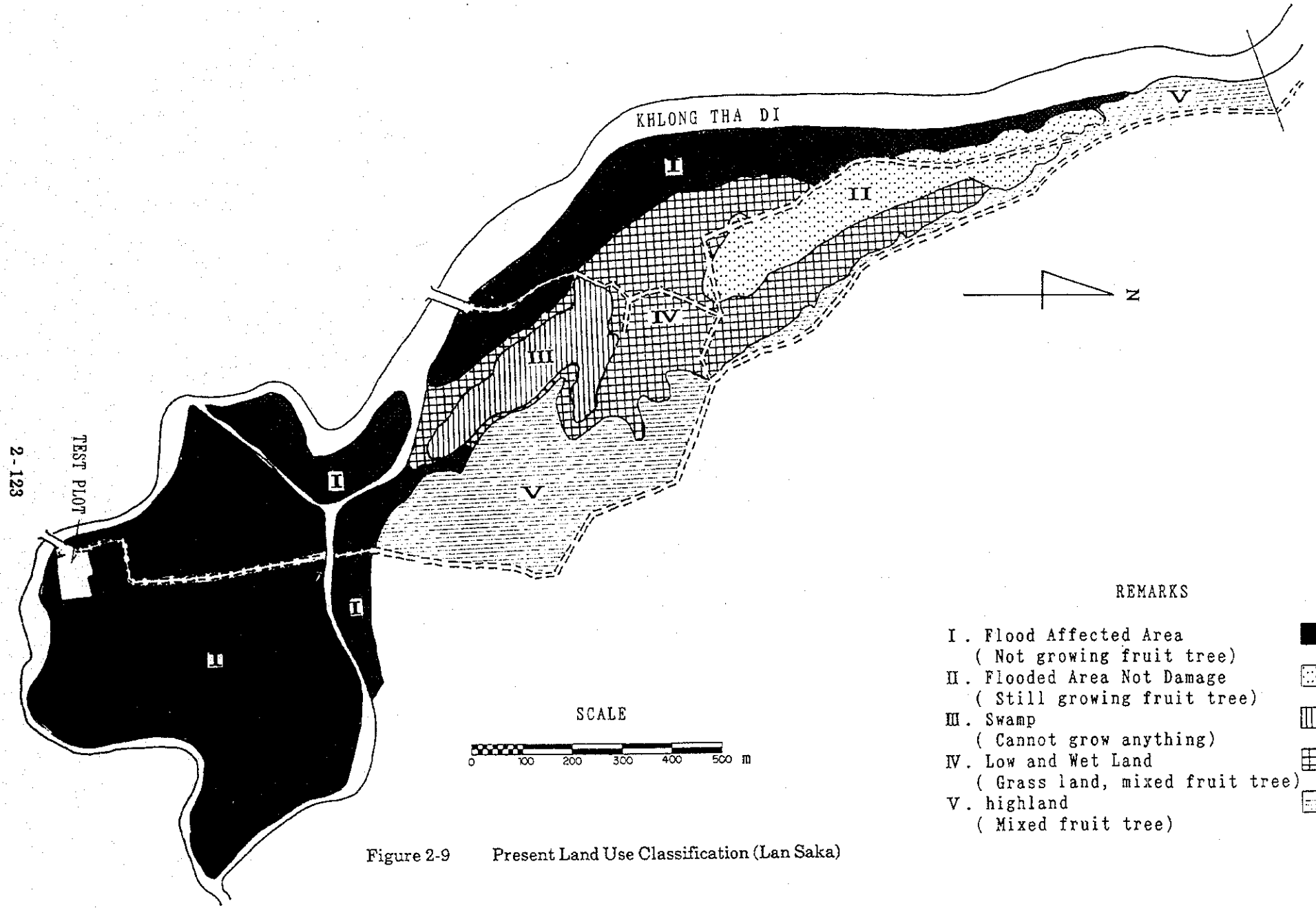


Figure 2-9 Present Land Use Classification (Lan Saka)

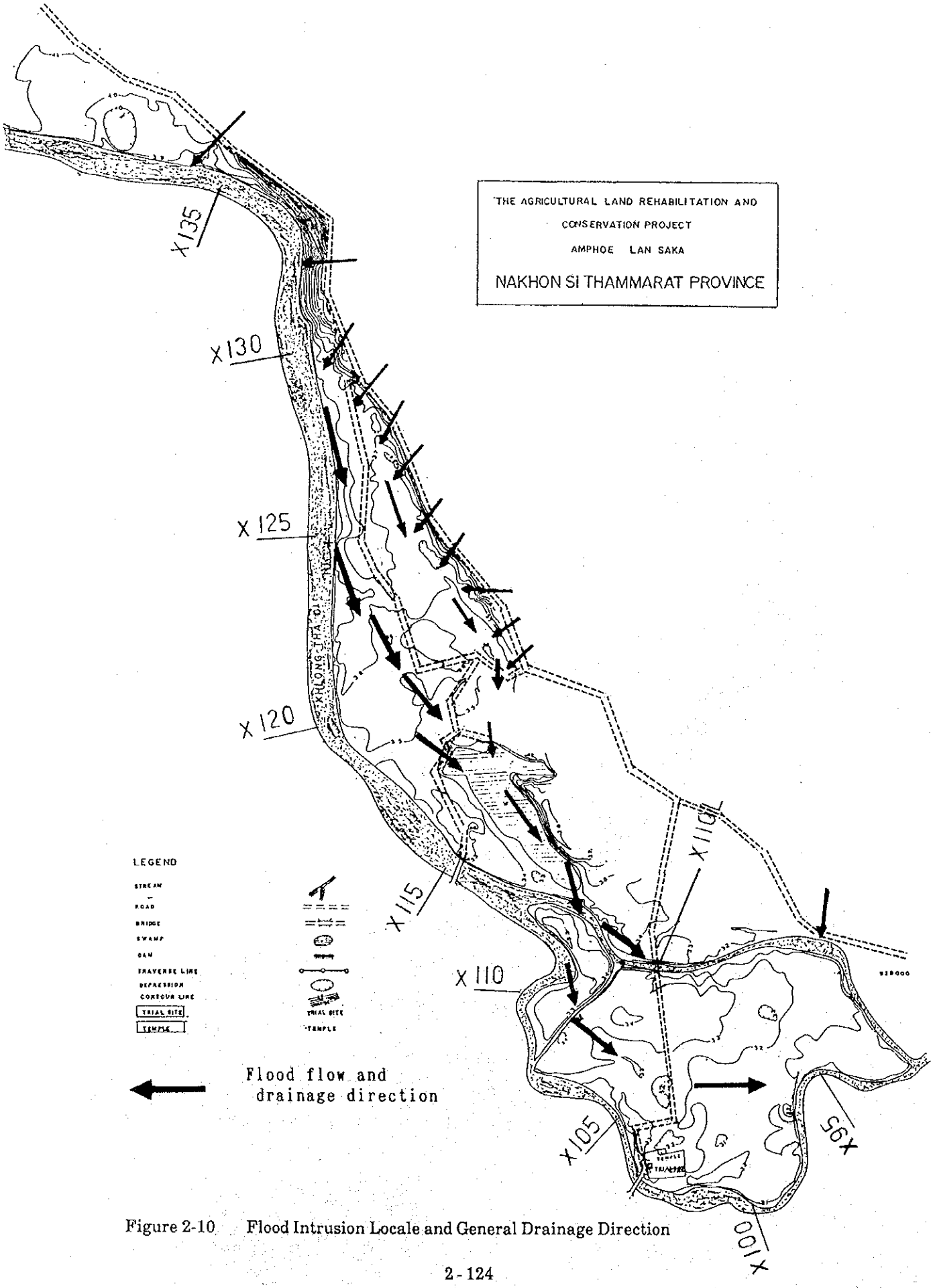


Figure 2-10 Flood Intrusion Locale and General Drainage Direction

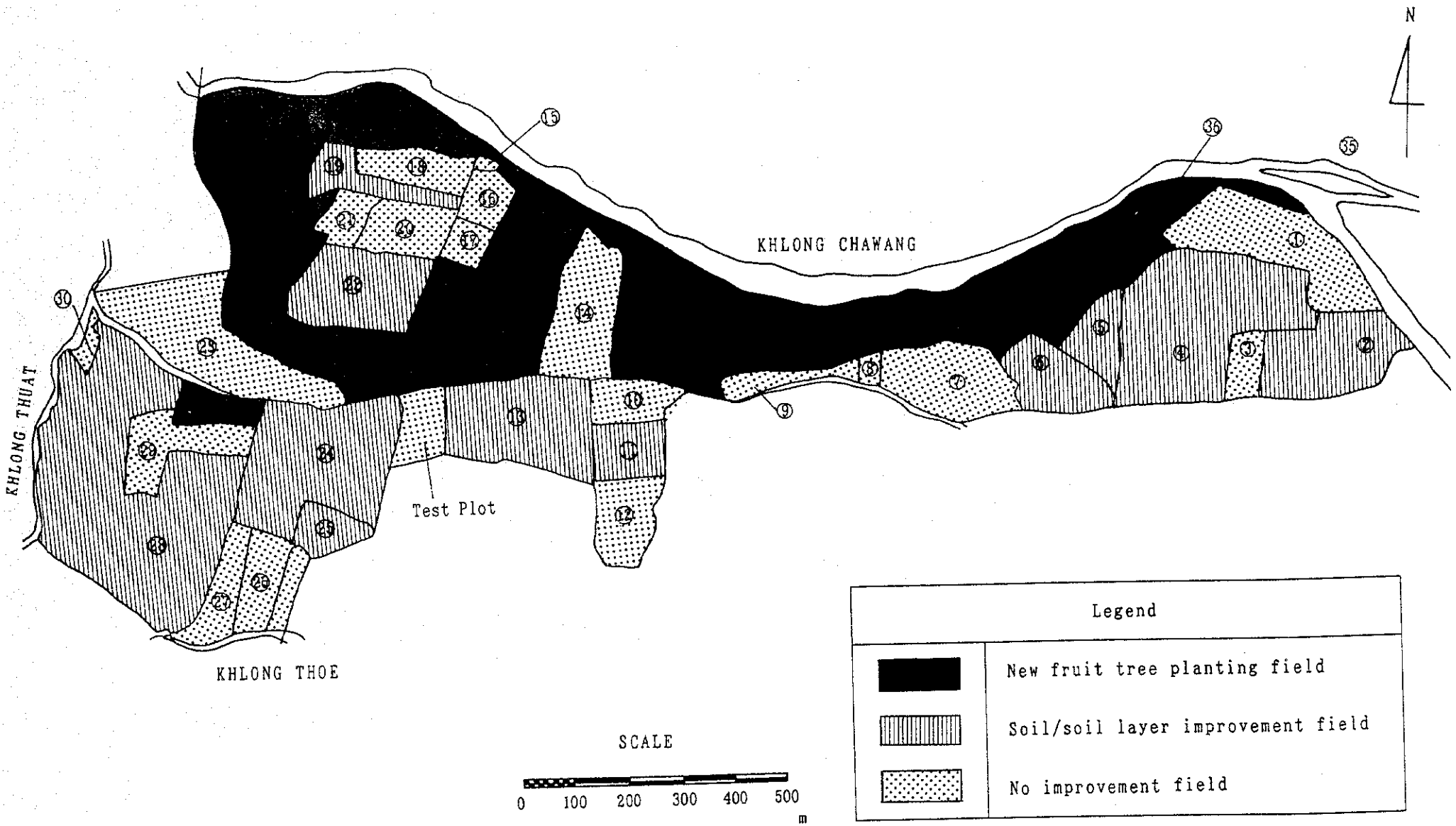
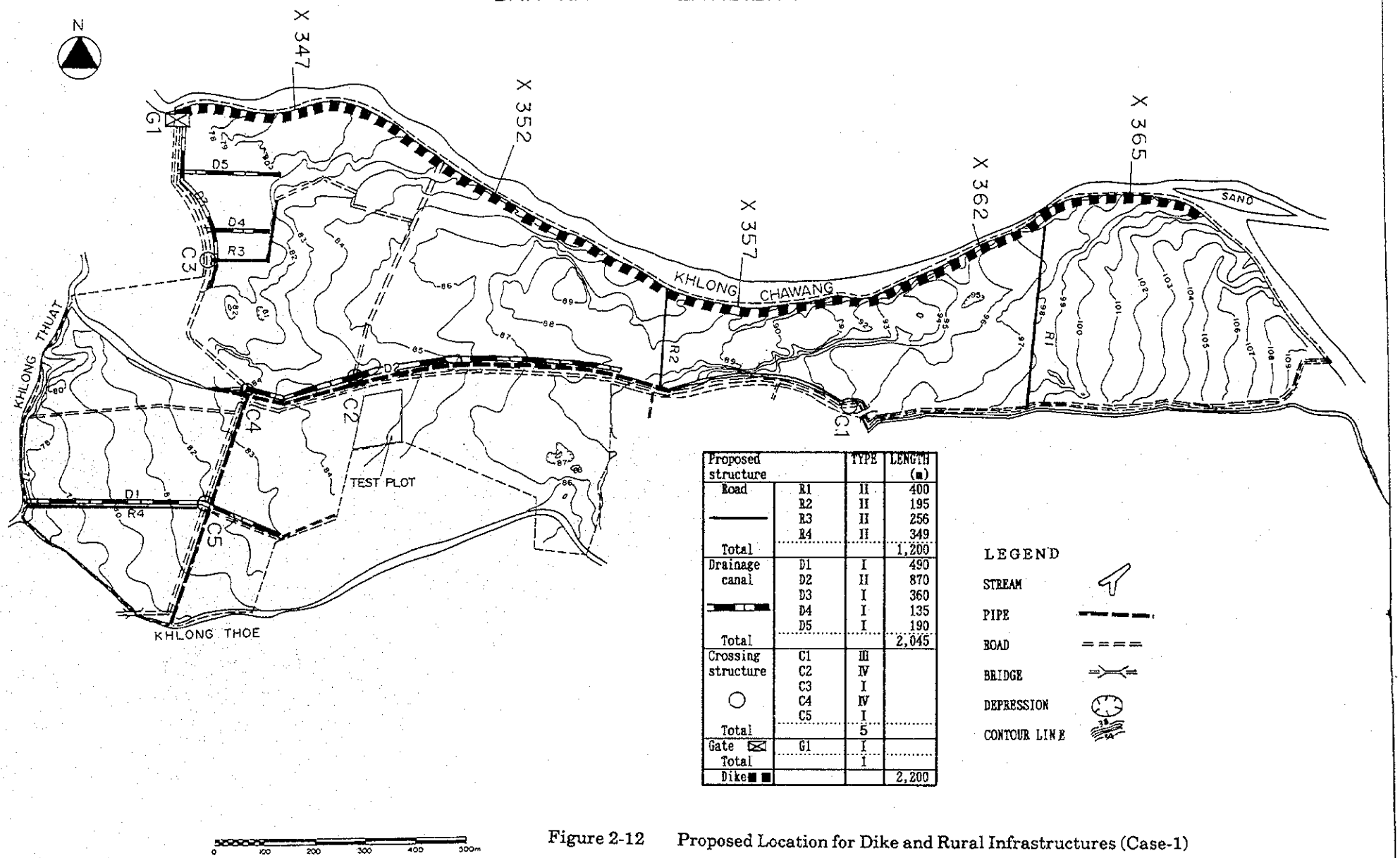


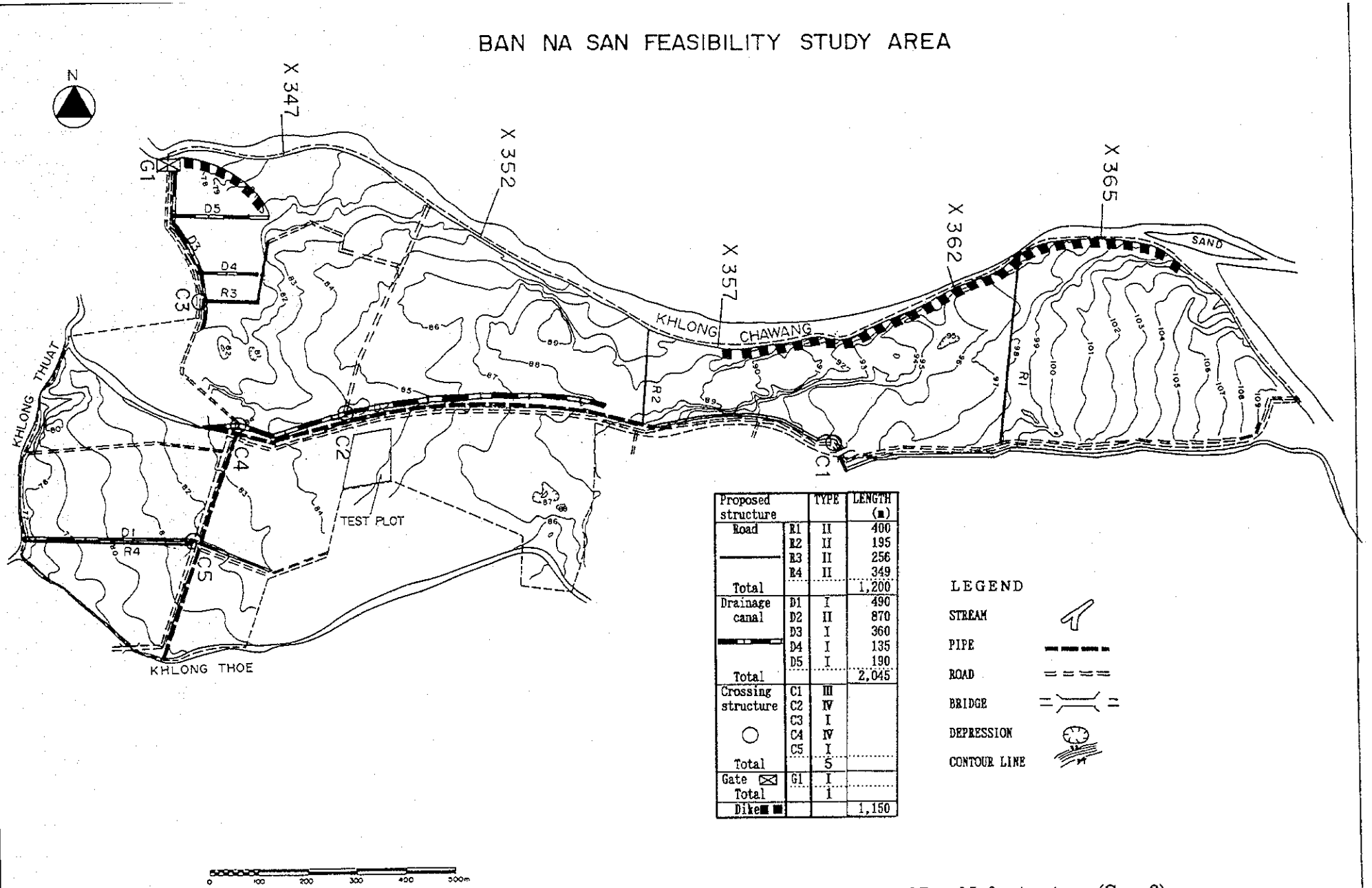
Figure 2-11 Land Use Plan in Ban Na San (Case-1)



Proposed structure		TYPE	LENGTH (m)
Road	R1	II	400
	R2	II	195
	R3	II	256
	R4	II	349
Total			1,200
Drainage canal	D1	I	490
	D2	II	870
	D3	I	360
	D4	I	135
	D5	I	190
Total			2,045
Crossing structure	C1	III	
	C2	IV	
	C3	I	
	C4	IV	
	C5	I	
Total		5	
Gate	G1	I	
Total		I	
Dike			2,200

LEGEND
STREAM
PIPE
ROAD
BRIDGE
DEPRESSION
CONTOUR LINE

Figure 2-12 Proposed Location for Dike and Rural Infrastructures (Case-1)



Proposed structure		TYPE	LENGTH (m)
Road	R1	II	400
	R2	II	195
	R3	II	256
	R4	II	349
Total			1,200
Drainage canal	D1	I	490
	D2	II	870
	D3	I	360
	D4	I	135
	D5	I	190
Total			2,045
Crossing structure	C1	III	
	C2	IV	
	C3	I	
	C4	IV	
	C5	I	
Total		5	
Gate	G1	I	
Total		1	
Dike			1,150

LEGEND

STREAM

PIPE

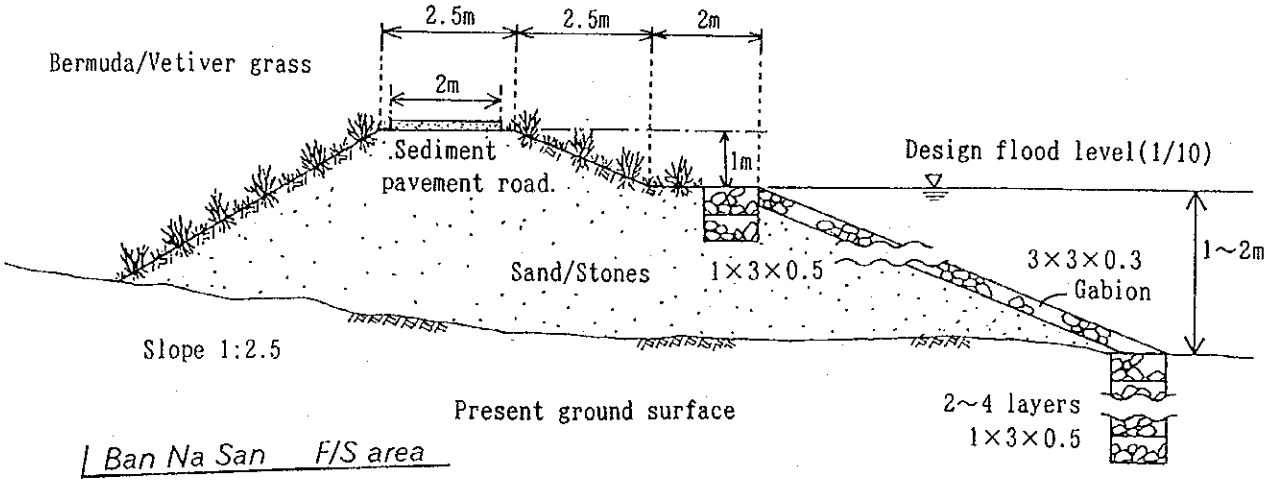
ROAD

BRIDGE

DEPRESSION

CONTOUR LINE

Figure 2-13 Proposed Location for Dike and Rural Infrastructures (Case-2)



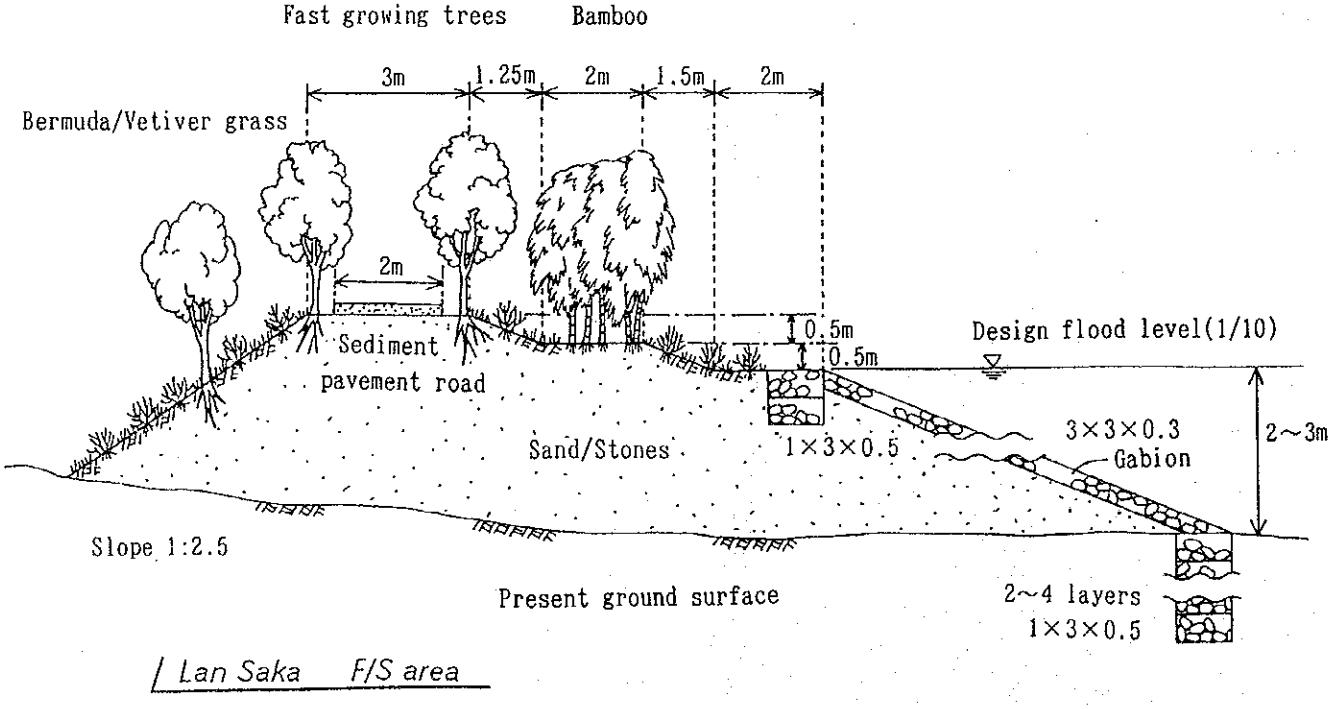
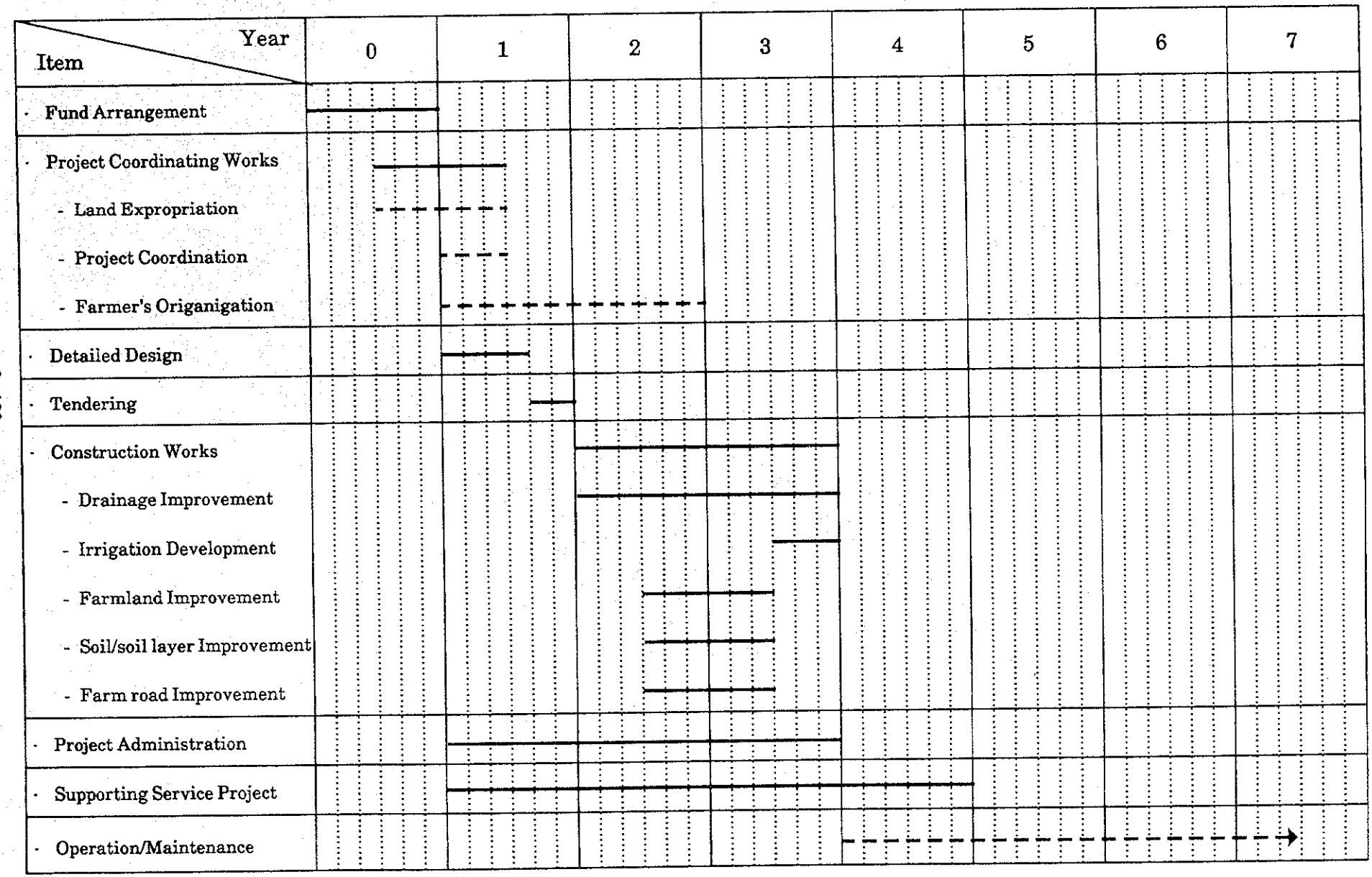


Figure 2-14 Typical Cross-Section of Dike in Ban Na San and Lan Saka

Figure 2-15 Implementation Schedule (Ban Na San)



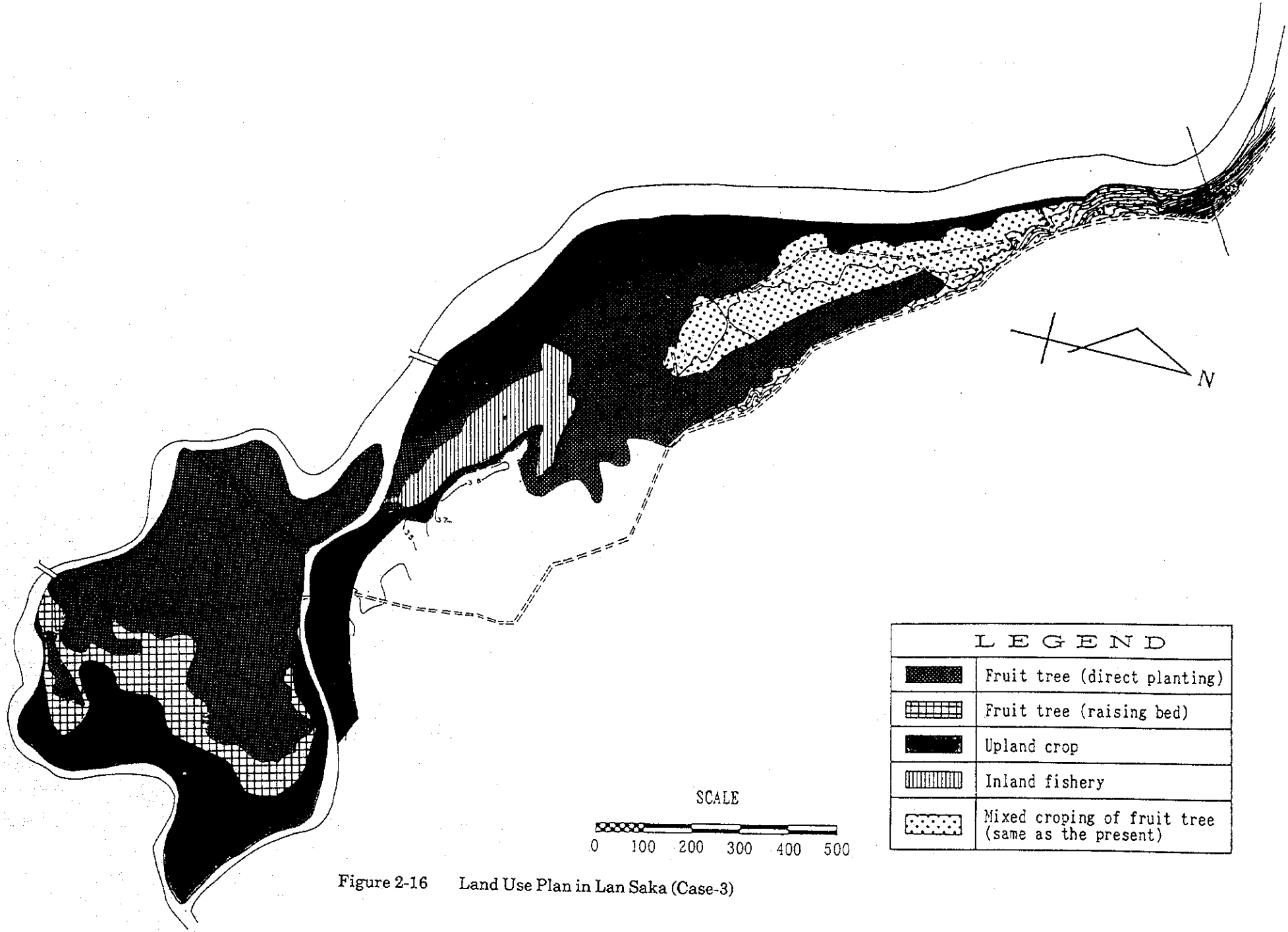
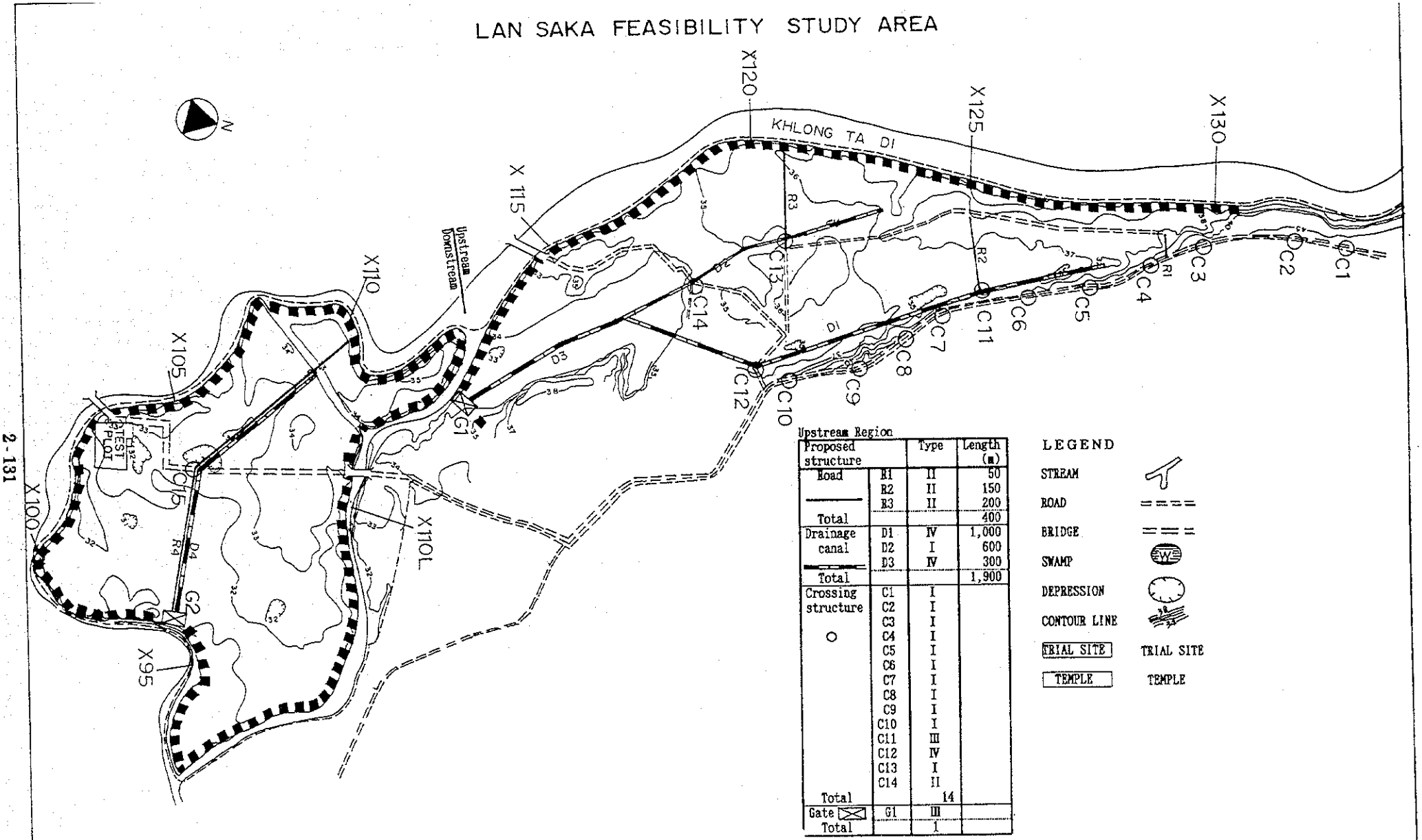


Figure 2-16 Land Use Plan in Lan Saka (Case-3)



Upstream Region

Proposed structure		Type	Length (m)
Road	R1	II	50
	R2	II	150
	R3	II	200
Total			400
Drainage canal	D1	IV	1,000
	D2	I	600
	D3	IV	300
Total			1,900
Crossing structure	C1	I	
	C2	I	
	C3	I	
	C4	I	
	C5	I	
	C6	I	
	C7	I	
	C8	I	
	C9	I	
	C10	I	
	C11	III	
	C12	IV	
	C13	I	
	C14	II	
Total		14	
Gate	G1	III	
Total		1	

LEGEND

STREAM
ROAD
BRIDGE
SWAMP
DEPRESSION
CONTOUR LINE
TRIAL SITE — TRIAL SITE
TEMPLE — TEMPLE

Figure 2-17 Proposed Location for Dike and Rural Infrastructures (Full Construction)

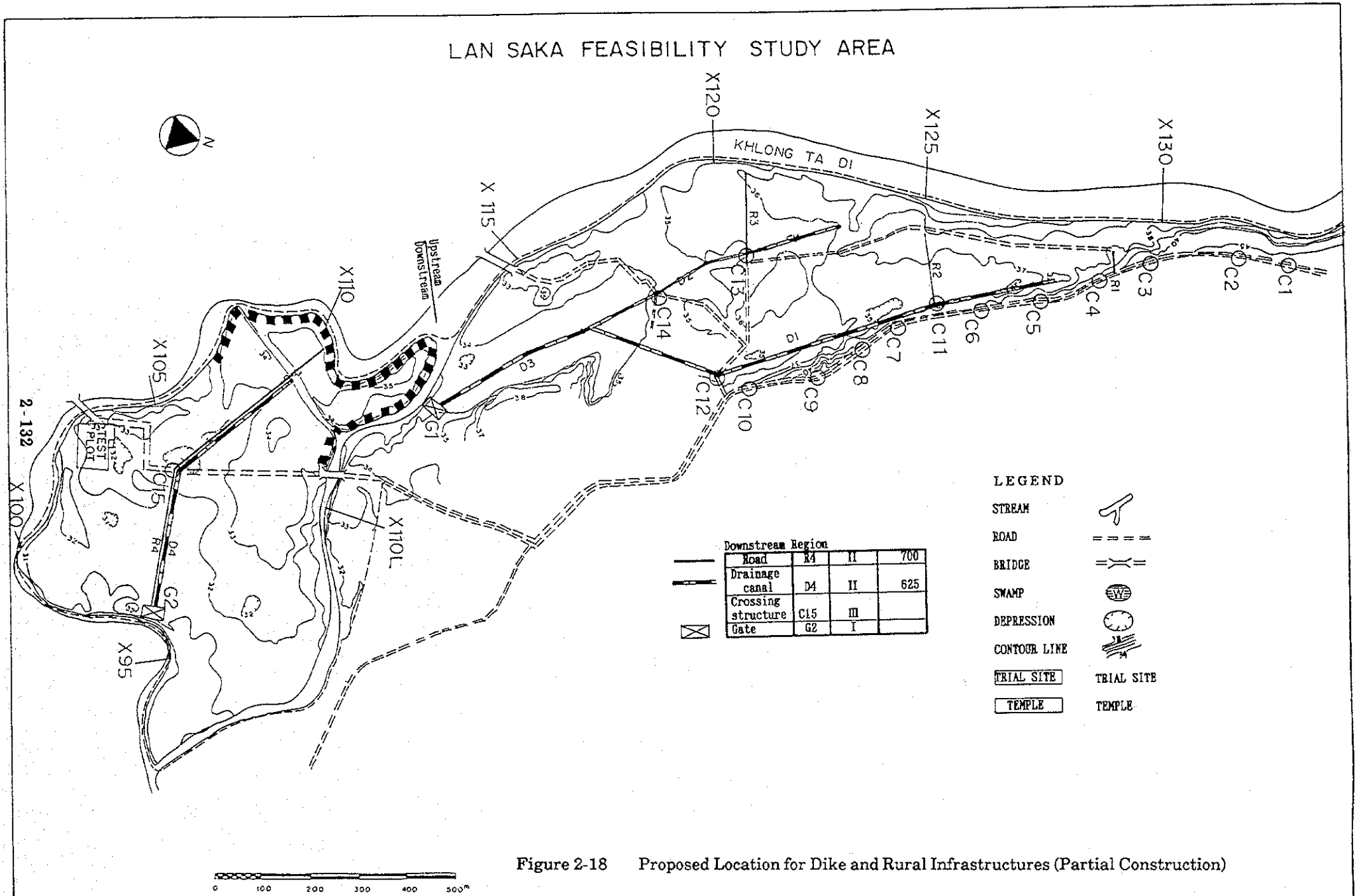


Figure 2-18 Proposed Location for Dike and Rural Infrastructures (Partial Construction)

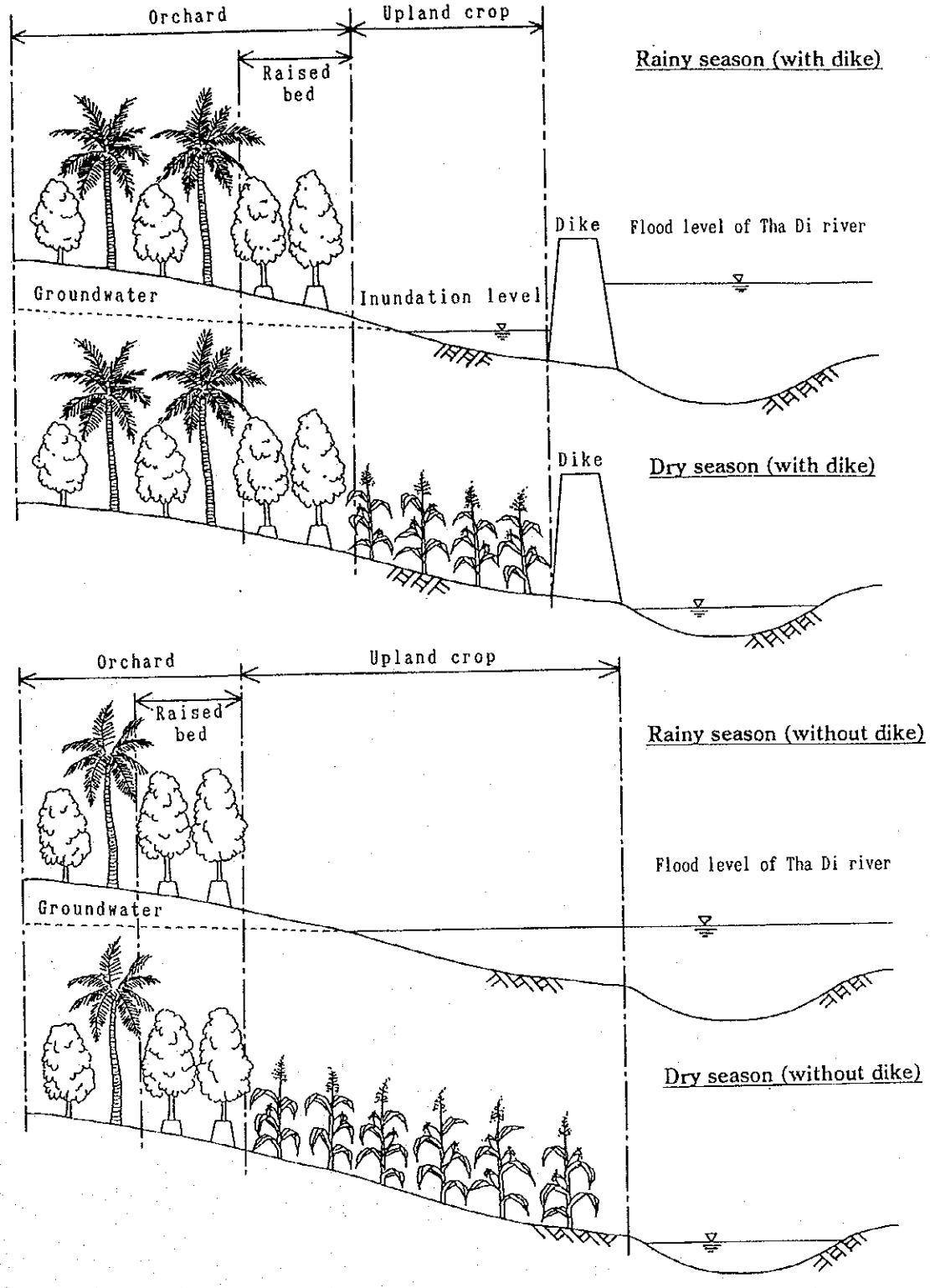
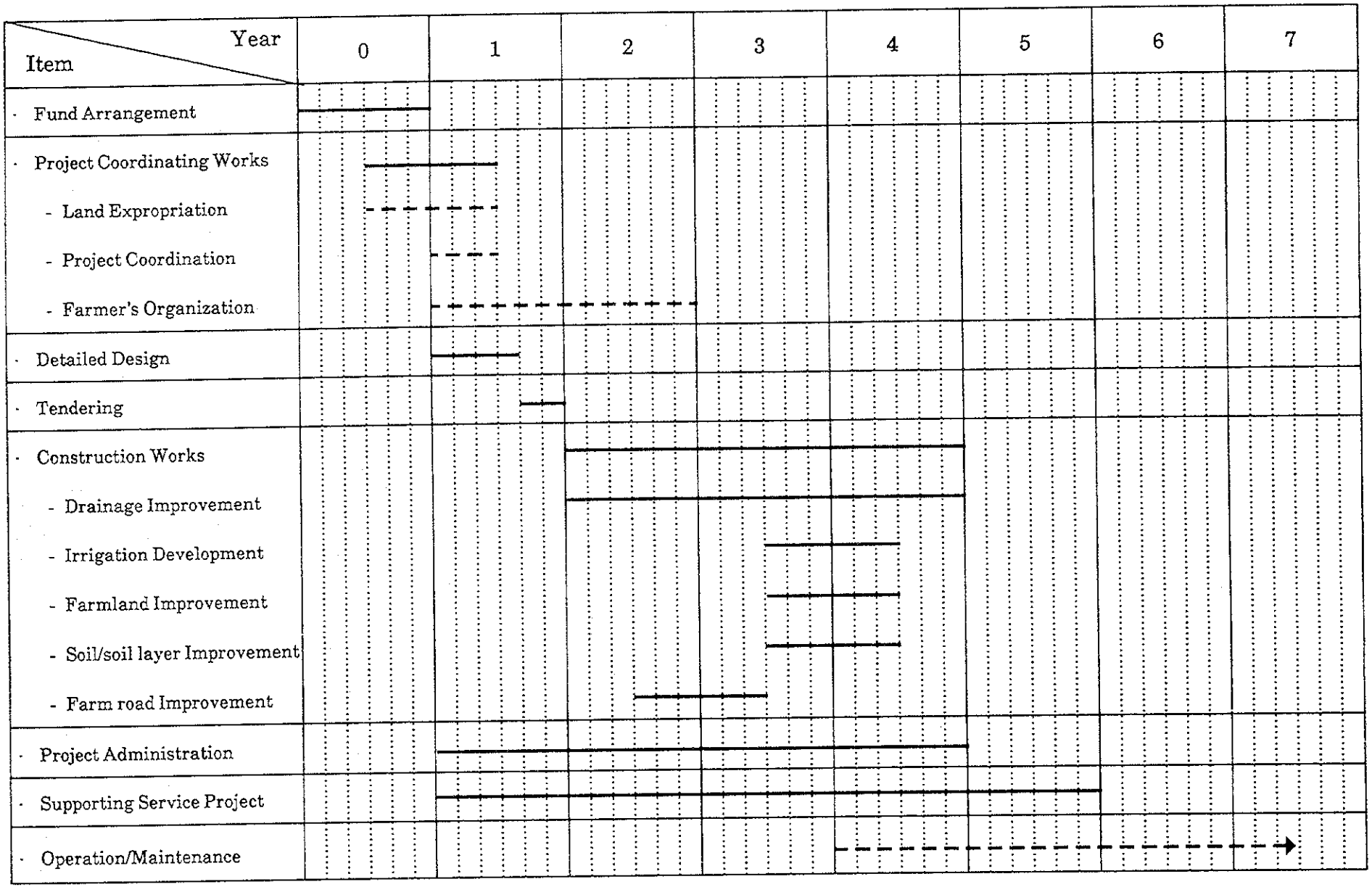
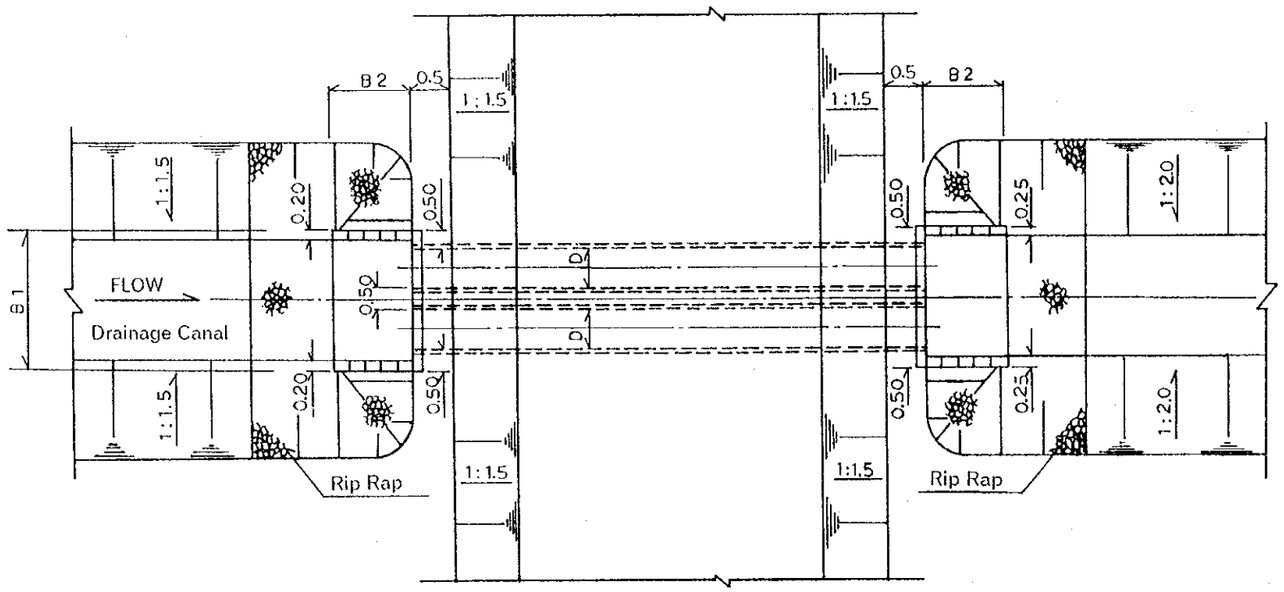


Figure 2-19 Schematic Map for Land Use Planning (Lan Saka)

Figure 2-20 Implementation Schedule (Lan Saka)



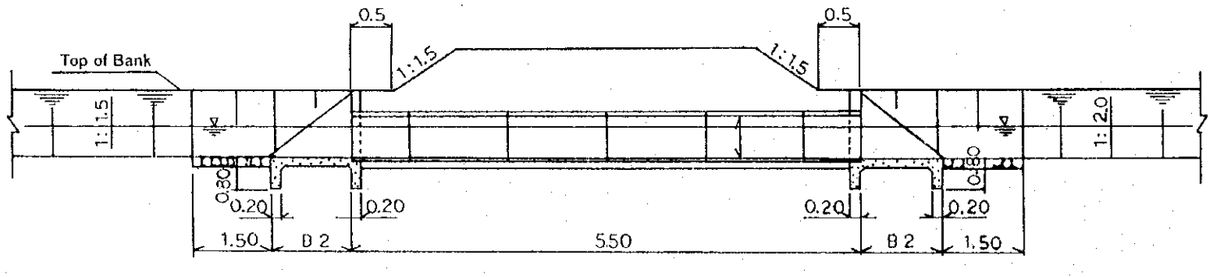
DRAWINGS



PLAN

Crossing Structure

Type	B1(m)	B2(m)	Pipe	
			D(mm)	Number
I	0.70	1.00	600	1
II	1.40	1.50	800	1
III	1.60	2.00	1000	1
IV	3.10	2.00	1000	2



PROFILE

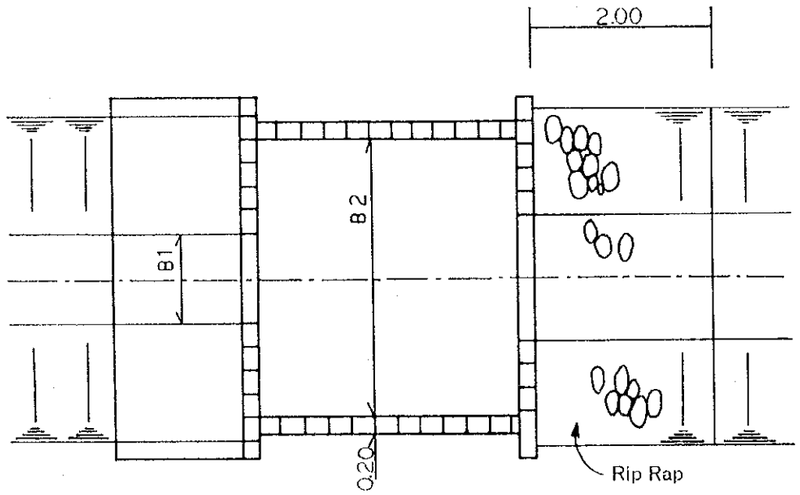
DRAIN CULVERT
Not to Scale

THE STUDY ON THE AGRICUTURAL LAND REHABILITATION AND CONSERVATION PROJECT IN SURAT THANI AND NAKHON SI THAMMARAT PROVINCES

ROAD CROSSING STRUCTURE

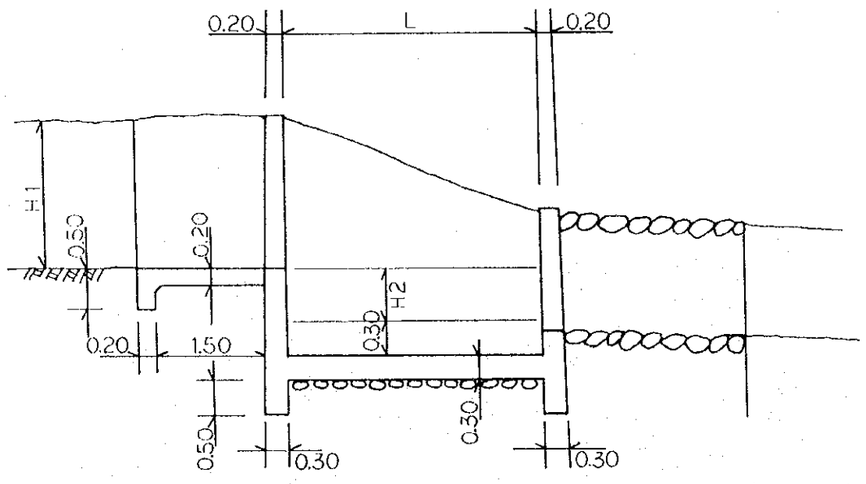
DRAWING NO.	1	DATE	

JAPAN INTERNATIONAL COOPERATION AGENCY



Drop Structure

Type	B1(m)	B2(m)	H1(m)	H2(m)
I	0.7	2.2	0.7	0.7
II	1.0	3.1	1.0	1.0
III	1.5	5.1	1.5	1.5

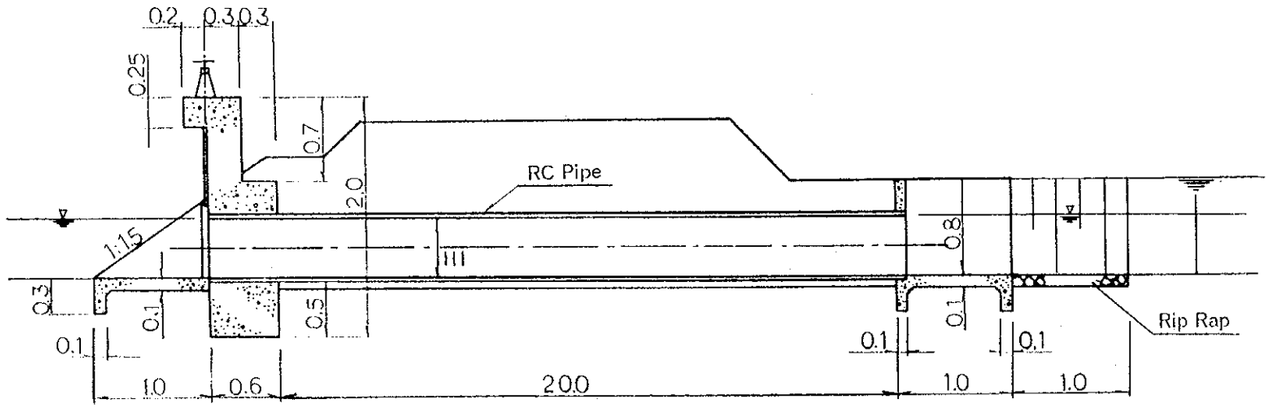


THE STUDY ON THE AGRICUTURAL LAND REHABILITATION AND CONSERVATION PROJECT IN SURAT THANI AND NAKHON SI THAMMARAT PROVINCES

DROP STRUCTURE

DRAWING NO.	2	DATE	

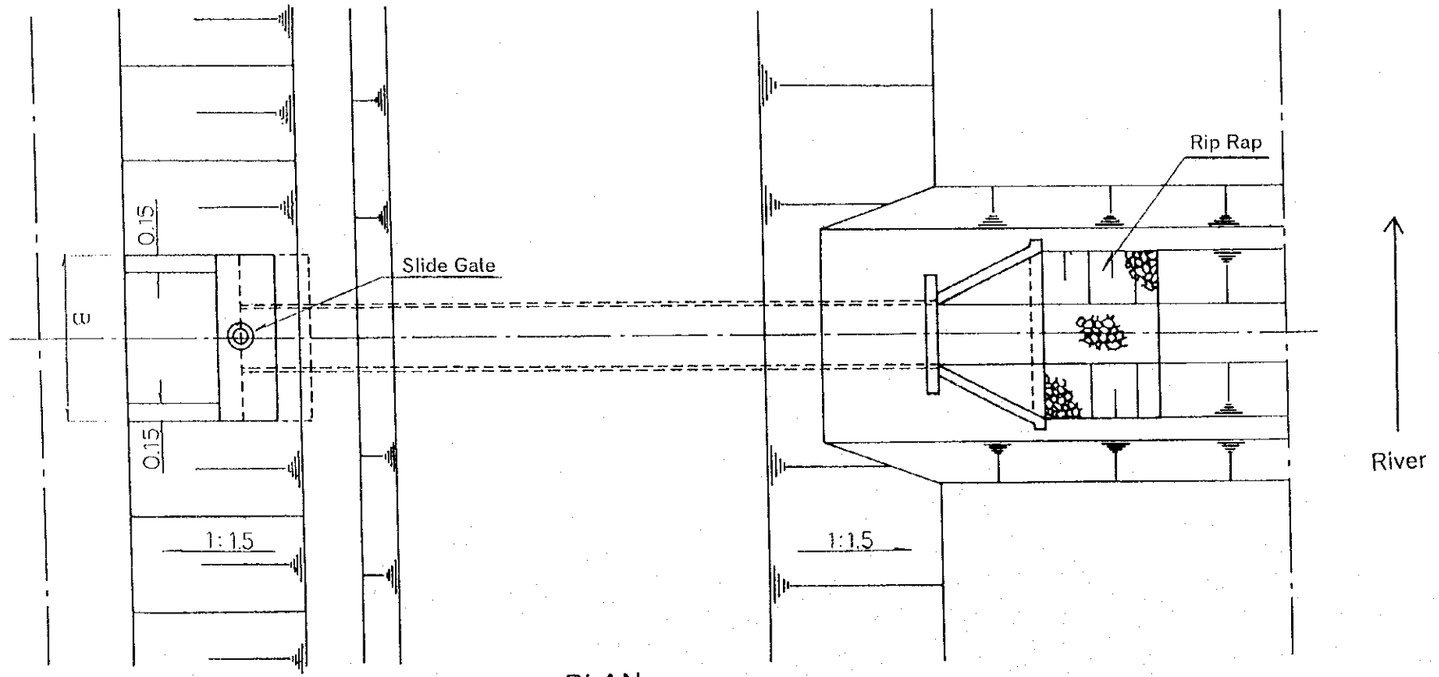
JAPAN INTERNATIONAL COOPERATION AGENCY



PROFILE

Drainage Gate

Type	H1(mm)	B(mm)
I	500	1,500
II	800	2,000
III	1,000	2,500



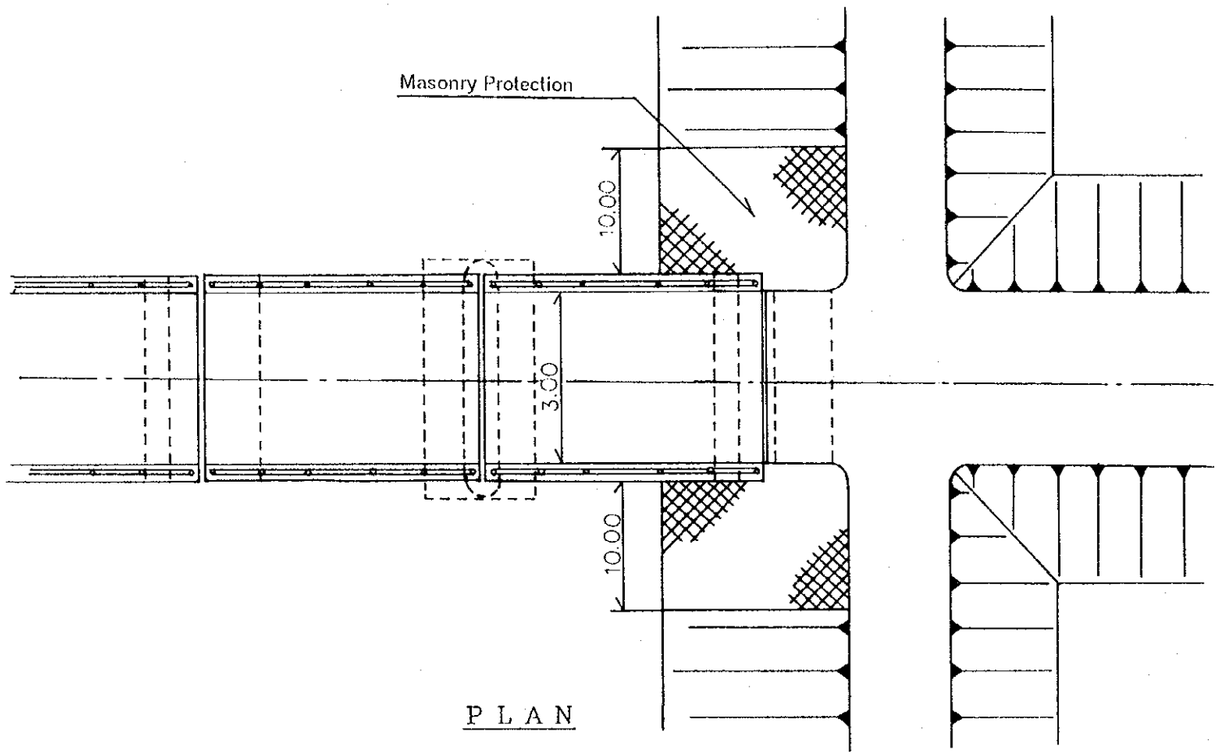
PLAN

THE STUDY ON THE AGRICUTURAL LAND REHABILITATION AND CONSERVATION PROJECT IN SURAT THANI AND NAKHON SI THAMMARAT PROVINCES

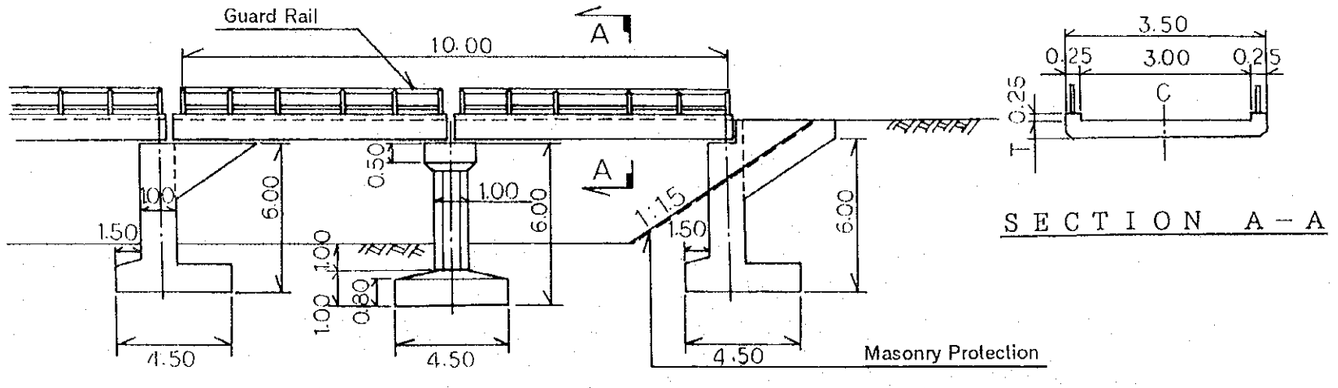
DRAINAGE GATE

DRAWING NO.	3	DATE	

JAPAN INTERNATIONAL COOPERATION AGENCY



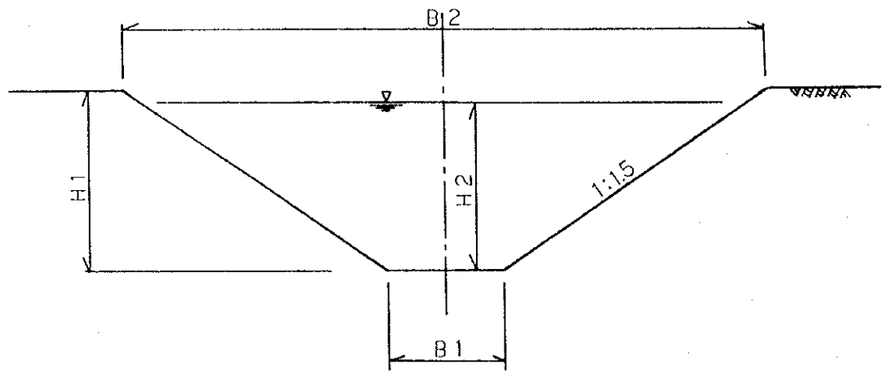
PLAN



PROFILE

SECTION A-A

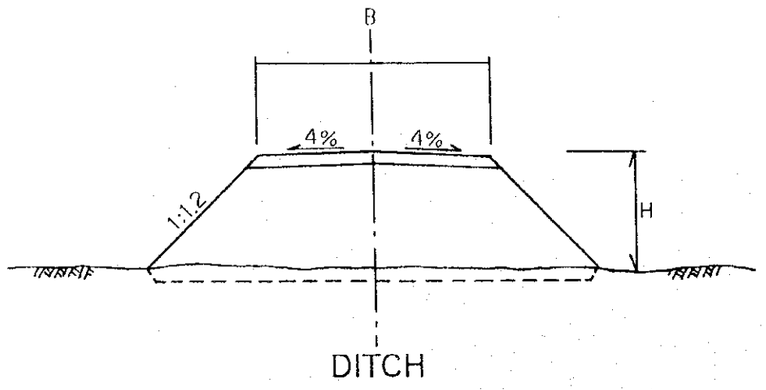
THE STUDY ON THE AGRICUTURAL LAND REHABILITATION AND CONSERVATION PROJECT IN SURAT THANI AND NAKHON SI THAMMARAT PROVINCES			
BRIDGE			
DRAWING NO.	4	DATE	
JAPAN INTERNATIONAL COOPERATION AGENCY			



DRAINAGE CANAL

Drainage Canal

Type	B1(m)	B2(m)	H1(m)	H2(m)
I	0.7	2.8	0.7	0.5
II	1.0	4.0	1.0	0.7
III	1.5	6.0	1.5	1.2
IV	2.0	8.0	2.0	1.7
V	2.5	10.0	2.5	2.2



DITCH

Farm Road

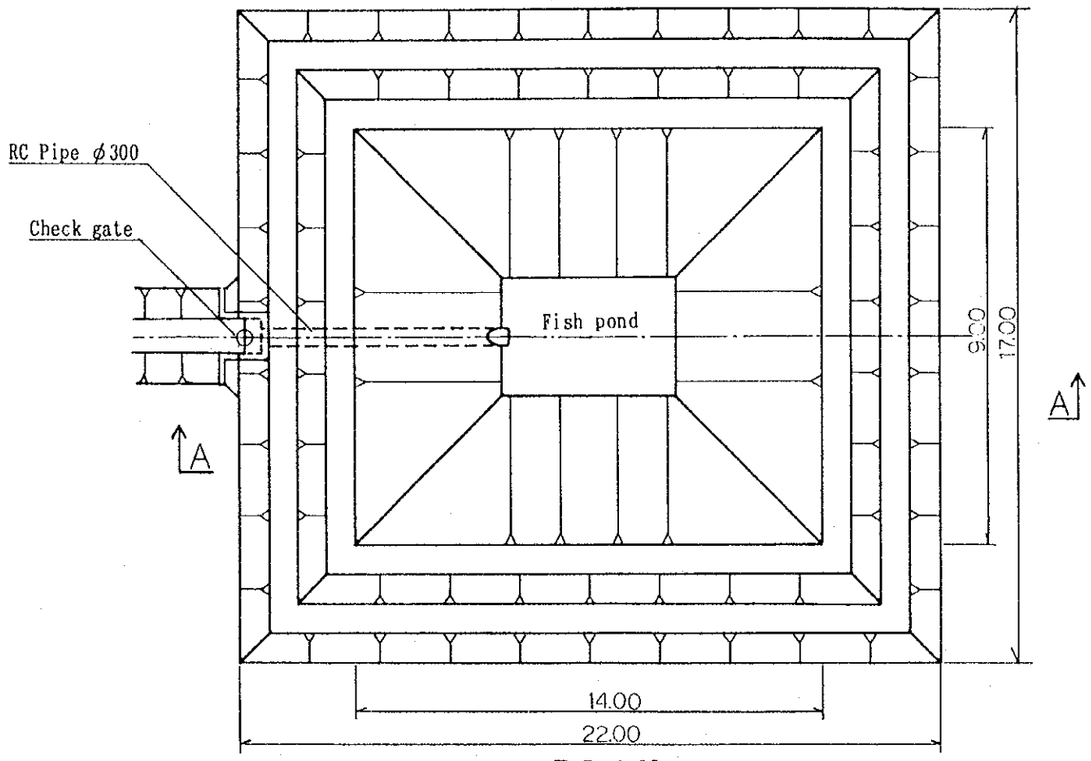
Type	B(m)	H(m)
I	3.0	0.5
II	2.0	0.5
III	2.0	0.1

THE STUDY ON THE AGRICUTURAL LAND REHABILITATION AND CONSERVATION PROJECT IN SURAT THANI AND NAKHON SI THAMMARAT PROVINCES

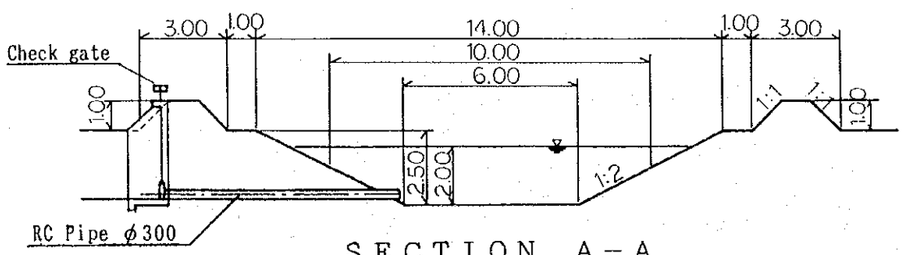
DRAINAGE CANAL AND FARM ROAD

DRAWING NO.	5	DATE	

JAPAN INTERNATIONAL COOPERATION AGENCY



PLAN



SECTION A–A

THE STUDY ON THE AGRICUTURAL LAND REHABILITATION AND CONSERVATION PROJECT IN SURAT THANI AND NAKHON SI THAMMARAT PROVINCES			
INLAND FISH POND			
DRAWING NO.	6	DATE	
JAPAN INTERNATIONAL COOPERATION AGENCY