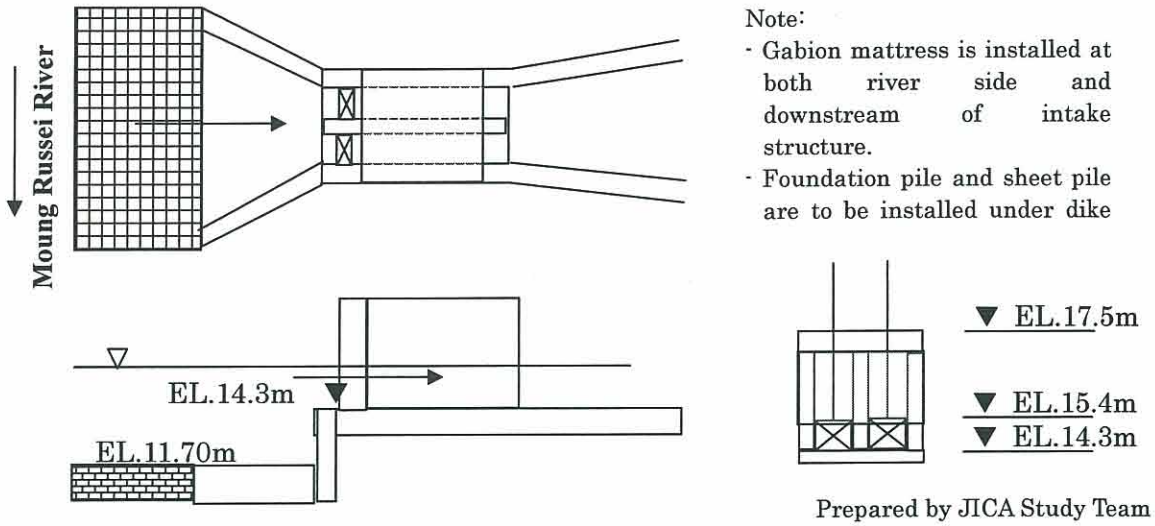
Summary for Design of Ream Kon Intake

Design Parameter	Condition	Remarks
Location	800 m upstream from the Diversion weir,	Right side of the Moung Russei River. same location as the existing intake
Design Intake Discharge rate:	Q: 2.66 m^3/s	Ream Kon Sub-project A=1,890 ha
Irrigation Water Level WL1:	WL. 15.50m	Top of Gate
Elevation at Inlet (River bed):	EL. 11.70m	
Elevation at Inlet (Intake):	EL. 14.30m	>14.00 (within upper 0.4 of water depth of the river (referring to Japanese design criteria for headworks))
Gate Sill Elevation:	EL. 14.30m	
Width, Height and Length	Width: 3.5m Height: 3.5m Length: 7.0m (+ Apron length)	Breast wall is installed between EL. 15.4 and EL.17.8 to prevent The entrance of flood water.
Gate Type and Gate Size, nos.	Slide gate, B:1.0 x H:1.2 x 2 nos.	
Bridge	Total width 4.0 m	



Prepared by JICA Study Team

Design Elevation of Intake Inlet:

Elevation of an intake is to be designed, considering the design water depth of the both river and intake at inlet, in order to reduce and minimize the entrance of suspended particle (sediment). Water depth at inlet of intake is desirable to be within upper 0.4 of that of river (referring to Japanese design criteria for headworks):

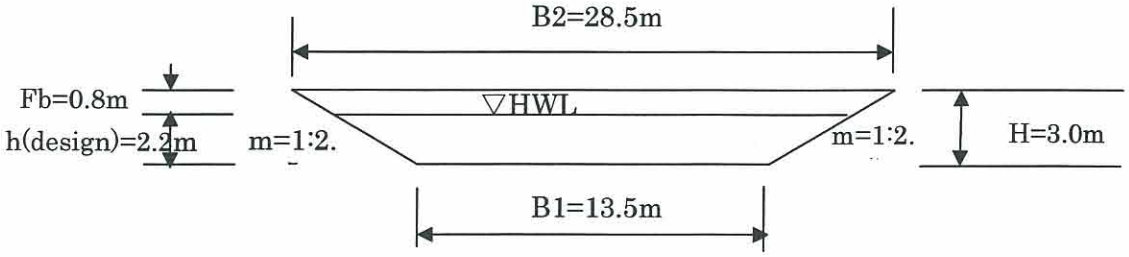
- Water depth at river, H: 3.8 m (= NWL .15.50m – EL.11.70 m)
  Elevation of intake inlet > NWL - 0.4 x H=15.50 –0.4 x 3.8 = 14.0
- Water depth at intake, h: 1.10 m (refer to "rehab. of irrigation and drainage facilities")
  Elevation of intake inlet = NWL- head loss – h = 15.50 –0.1 –1.1 = 14.3 > 14.0 OK

Prepared by JICA Study Team

Figure 5.2-7 Schematic Drawing of Ream Kon Intake

Summary for Design of Collector Drain-2 (CD-2)

Design Parameter	Condition	Remarks
Design Discharge rate:	Q1: 30.0 m^3/s	Maximum Diversion discharge
Design Temporary Discharge	Q2: 8.7 m^3/s	Max. during Mid-Nov. – End. May
Canal bed Inclination	1/ 3,000	Refer to landscape
Canal type	Earth canal having trapezoidal cross section	Considering land use
Canal Base width, top width	B1:13.5 m, B2:28.5 m	Considering land use
Canal Side Slope, Maning's n coefficient Freeboard	m : 1:2.5 n : 0.035 Fb: 0.8 m	MOWRAM design criteria for Irr. main canal class with sandy soil applied.
Canal Height,	H: 3.0m,	Present condition
Water Depth	H1: 2.2m (Q1=30 m^3/s) h2: 1.1m (Q2=8.7 m^3/s) hmax:3.0 m(Qmax=54 m^3/s)	hmax: Fb=0

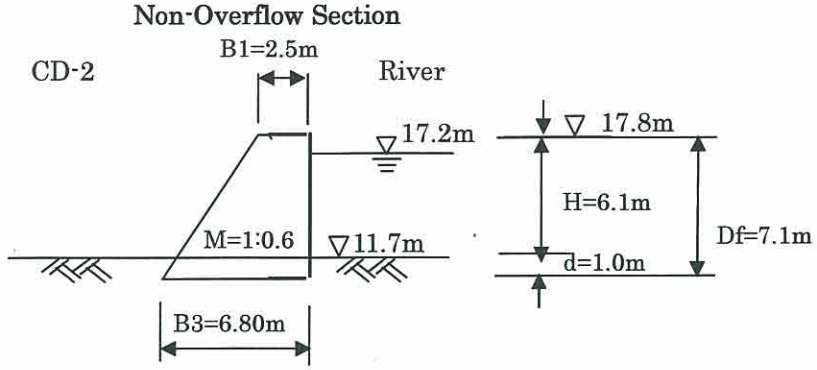


Prepared by JICA Study Team

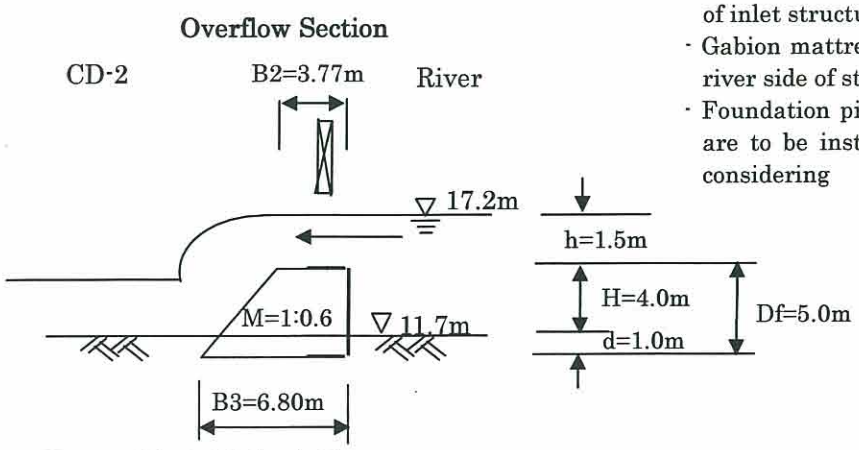
Figure 5.2-8 Schematic typical section of Collector Drain-2

Summary for Design of Inlet Structure for CD-2

Design Parameter		Condition	Remarks
Location:		At the entrance of CD-2 from new Diversion weir	
Design Discharge rate:		Q1: 30.0 m^3/s	Maximum Diversion discharge
Type of Structure		Concrete Dyke with gate	
Elevation of Dyke	Non-overflow section	EL1.: 17.8m	> HWL_F1.= 17.20 m
	Overflow section	EL2.: 15.7m	(Design NWL+0.2m) > NWL.15.5 m
Elevation of River Bed		EL3.: 11.7m	30 m Upstream of Weir
Elevation of Dyke Bottom		EL4.: 10.7m	EL3. – 1.0 m
Height of Dyke	Non-overflow section	H1: 7.1 m (6.1 m)	Apparent height in ( )
	Overflow section	H2: 5.0 m (4.0 m)	
Width	Top of Non-overflow section	B1: 2.5 m	Slope M=1:0.6
	Top of Overflow section	B2: 3.77m	
	Bottom of section	B3: 6.8 m	
Length	Top of Non-overflow section	L1: 38.5 m	Actual length 32.5 m + 3.0 x both side
	Top of Overflow section	L2: 20.0 m	
	Bottom of section	L3: 38.5 m	
Gate Type, Dimension, nos.		Slide Gate H:1.5 m x B:4 m x 5 nos.	Pier width 0.7 m
Elevation of Operation Deck		EL5.: 19.0 m	



Note:
- Apron is installed at CD-2 side of inlet structure for protection.
- Gabion mattress is installed at river side of structure.
- Foundation pile and sheet pile are to be installed under dike considering geological



Prepared by JICA Study Team

Figure 5.2-9 Schematic Drawing of Inlet Structure of CD-2

Summary for Design of Drainage Gate for CD-2

Design Parameter	Condition	Remarks
Location:	At the end of CD-2	
Design Discharge rate:	Q1: 30.0 m^3/s	Maximum Diversion discharge
Design Elevation of Drain outlet base	EL. 11.20m	
Water Level WLD1:	WL. 13.40m	Maximum
Gate Sill Elevation:	WL. 11.20m	
Design Width, Height and Length	Width: 7.6m Height: 4.8m Length: 7.0m (+ Apron length)	Breast wall is installed between EL. 13.0m and EL.16.0m to prevent entrance of flood water.
Design Gate Type and Gate Size, nos.	Slide gate, B:1.8 x H:1.8 x 3 nos.	
Bridge	Total width 4.0 m	

Note:

The dimension of the above drainage gate is assuming free discharge condition. It is noted that the water level in the river may be risen under influence of Lake Tonle Sap, so that it is not insured that the design discharge of $30m^3/s$ flows out under such influence. Therefore, permanent river diversion measure should be studied as needs of protection of the Moung Russei Town and National Road No.5 from floods arises in future.

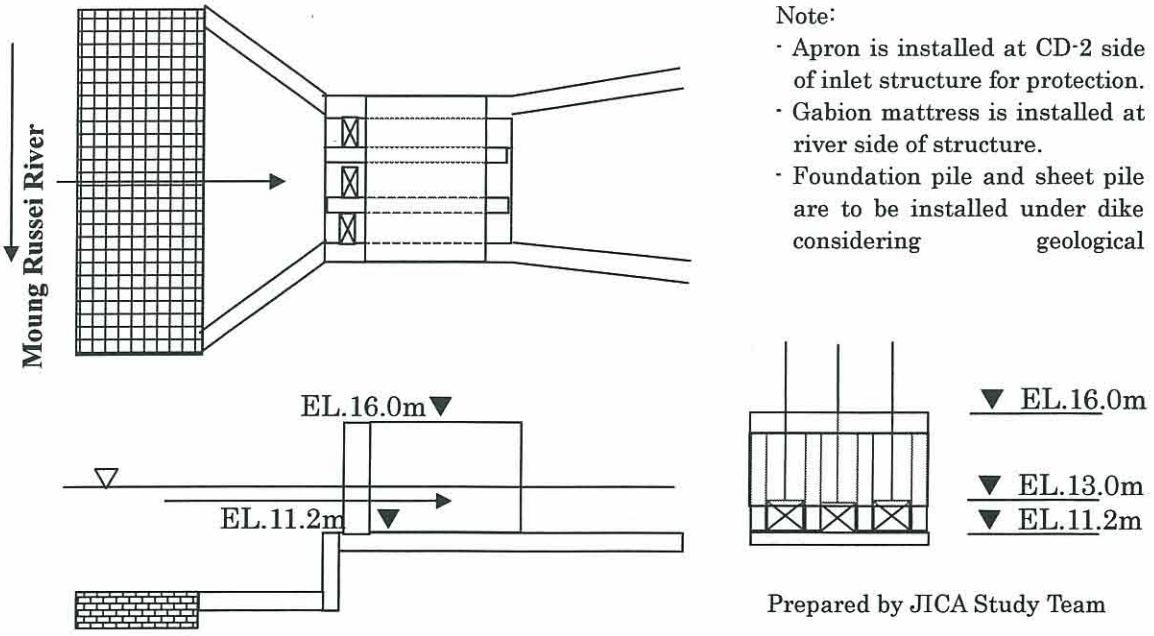
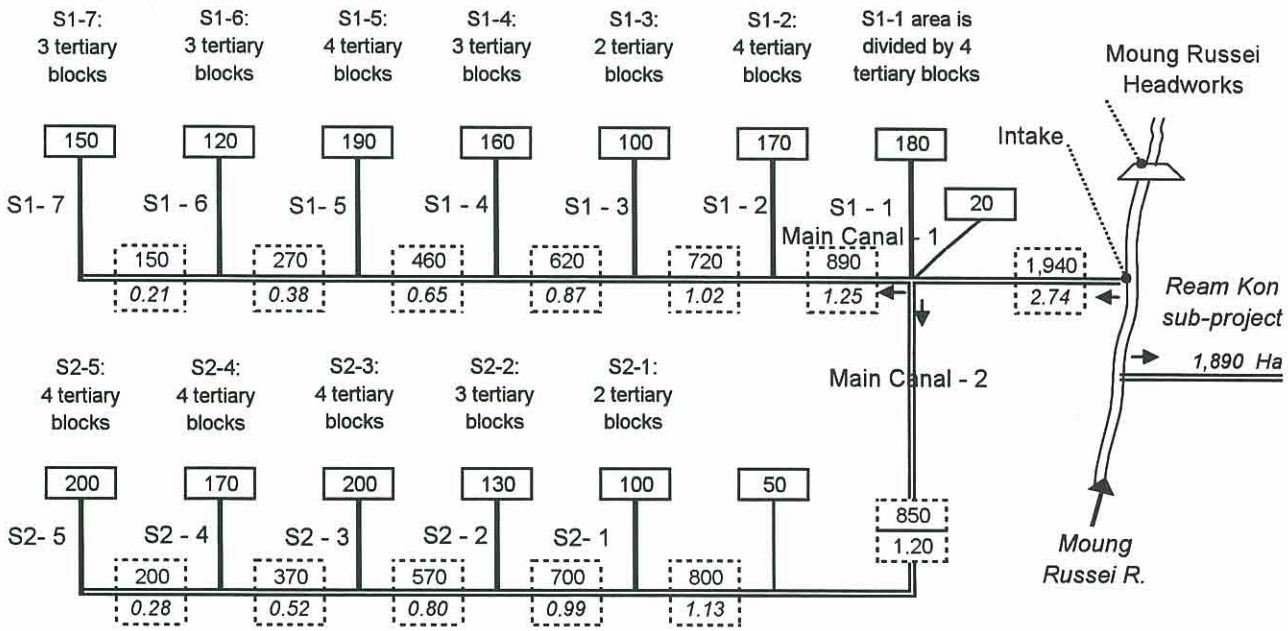


Figure 5.2-10 Schematic Drawing of Drainage Gate for CD-2

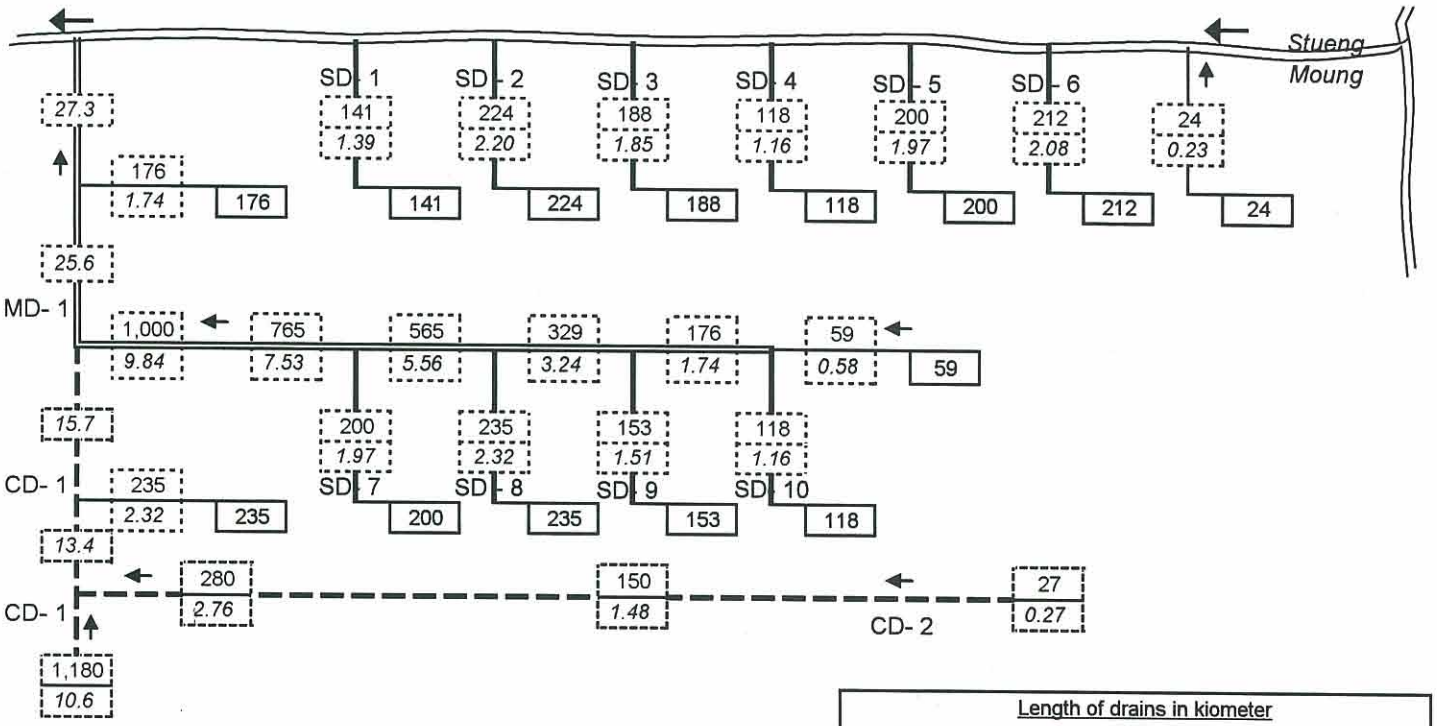


Unit irr. Req.= 1.41 lit/sec/ha

- Main canal
- Secondary/sub-secondary canals (S / SS)
- Tertiary canal(s)
- 130 — Secondary or tertiary blocks branch from main canal, Irrigation area in Ha
- 1,940 — Irrigation area in Ha
- *1.94* — Design discharge of canal in m3/sec

Length of Canals in kiometer					
Main Canal-1:	6.6				
Main Canal-2:	6.1				
Secondary canals (S1-xx or S2-xx)					
S1-1:	1.7	S1-5:	1.6	S2-2:	1.0
S1-2:	1.6	S1-6:	1.7	S2-3:	1.5
S1-3:	0.6	S1-7:	1.5	S2-4:	1.6
S1-4:	1.0	S2-1:	0.5	S2-5:	1.5
				Total Secondary Canals :	15.8
Number of tertiary blocks:	42				

Figure 5.3-1 Irrigation Area Diagram of Por Canal Rehabilitation Sub-project



Unit drain. Req.= 7.17 lit/sec/ha from paddy fields

Unit drain. Req.= 25~19 lit/sec/ha from other types of land

Main drain

Secondary drain (SD)

Collector drain (CD)

80 Secondary or tertiary block in Ha

235 Drainage area in Ha (85% of paddy fields, 15% of other land types)

2.32 Design discharge of drain in m3/sec

Length of drains in kiometer

MD-1:	9.3	CD-1:	5.4
		CD-2:	4.6

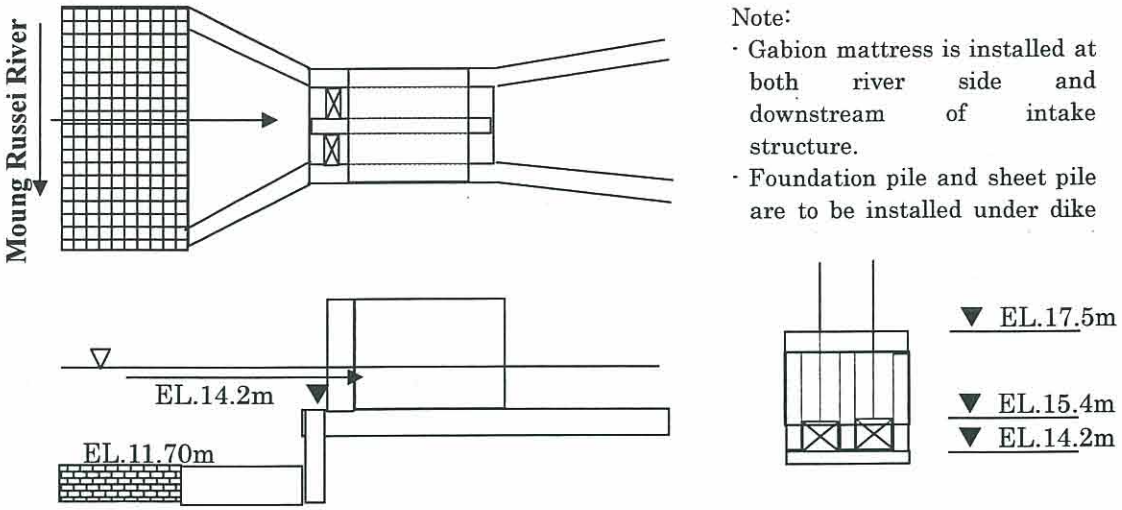
Secondary drains (SD-xx)

SD-1:	1.7	SD-7:	1.5
SD-2:	1.8	SD-8:	1.5
SD-3:	1.9	SD-9:	1.4
SD-4:	1.1	SD-10:	0.9
SD-5:	1.2		
SD-6:	1.8		
Total of Secondary Drains:			14.8

Figure 5.3-2 Drainage Area Diagram of Por Canal Rehabilitation Sub-project

Summary for Design of Por Canal Intake

Design Parameter	Condition	Remarks
Location:	600m upstream from the Diversion weir	Left side of the Moung Russei River. same location of the existing intake
Design Intake Discharge rate:	Q: 2.74 m^3/s	Por Canal Sub-project A=1,940 ha
Irrigation Water Level WL1:	WL. 15.50m	Top of Gate
Irrigation Water Level WL1':	WL. 15.70m	WL1+max. Overflow depth=0.2m
Elevation at Inlet (River bed):	EL. 11.70m	
Elevation at Inlet (Intake):	EL. 14.20m	>14.00 OK, (within upper 0.4 of water depth of the river (referring to Japanese design criteria for headworks))
Gate Sill Elevation:	EL. 14.20m	
Width, Height and Length	Width: 3.5m Height: 3.6m Length: 8.0m (+ Apron length)	Breast wall is installed between EL. 15.4 and EL.17.8 to prevent The entrance of flood water.
Gate Type and Gate Size, nos.	Slide gate, B:1.0 x H:1.2 x 2 nos.	
Bridge	Total width 4.0 m	



Design Elevation of Intake Inlet:

Elevation of an intake is to be designed, considering the design water depth of the both river and intake at inlet, in order to reduce and minimize the entrance of suspended particle (sediment). Water depth at inlet of intake is desirable to be within upper 0.4 of that of river (referring to Japanese design criteria for headworks):

- Water depth at river, H: 3.8 m (= NWL .15.50m – EL.11.70 m)
  Elevation of intake inlet > NWL - 0.4 x H=15.50 –0.4 x 3.8 = 14.0
- Water depth at intake, h: 1.20 m (refer to "rehab. of irrigation and drainage facilities")
  Elevation of intake inlet = NWL- head loss – h = 15.50 –0.1 –1.2 = 14.2 > 14.0 OK

Prepared by JICA Study Team

Figure 5.3-3 Schematic Drawing of Por Canal Intake

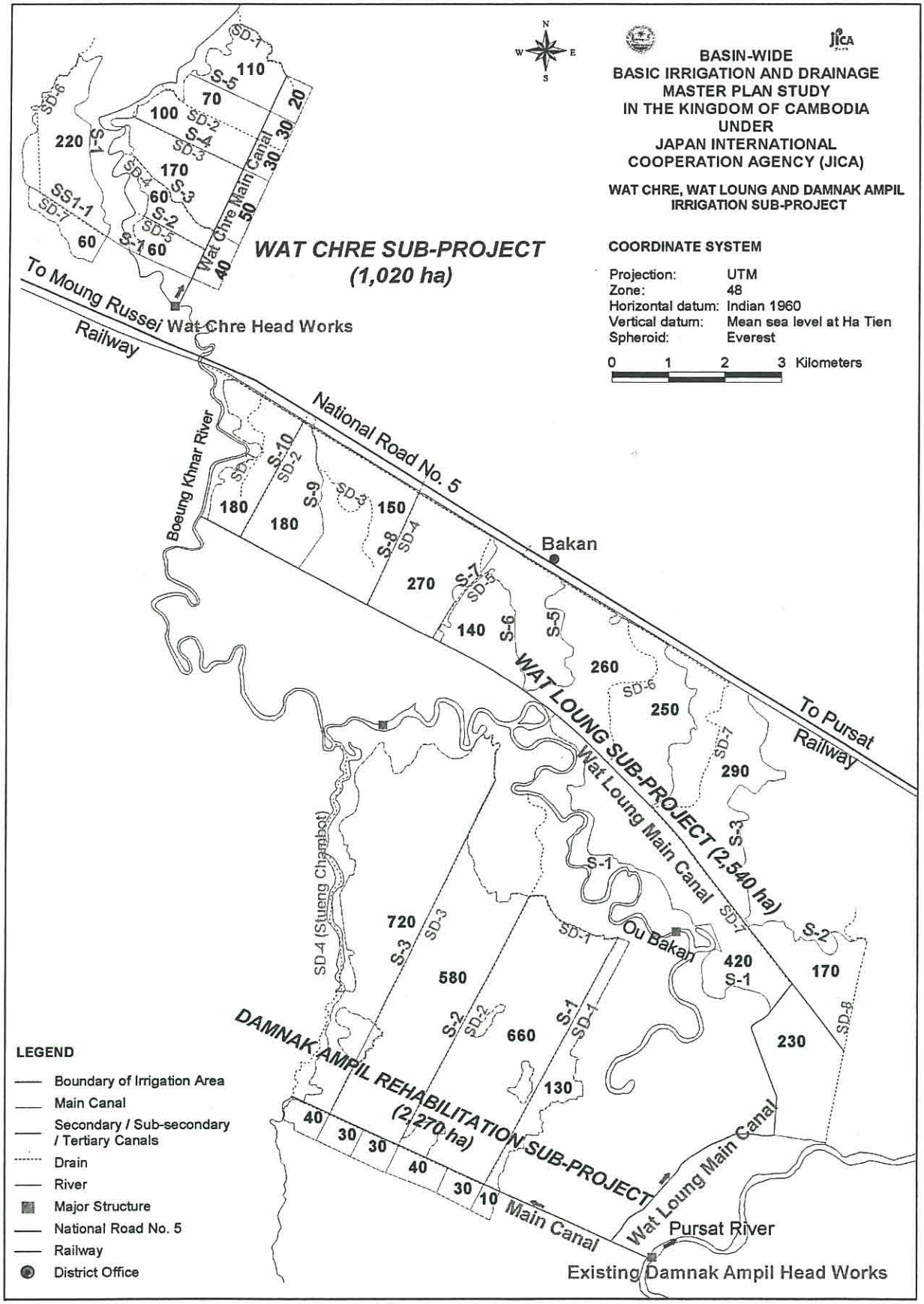


Figure 5.4-1
Irrigation and Drainage Canal Layout of Damnak Ampil, Wat Loung, and Wat Chre Rehabilitation Sub-projects

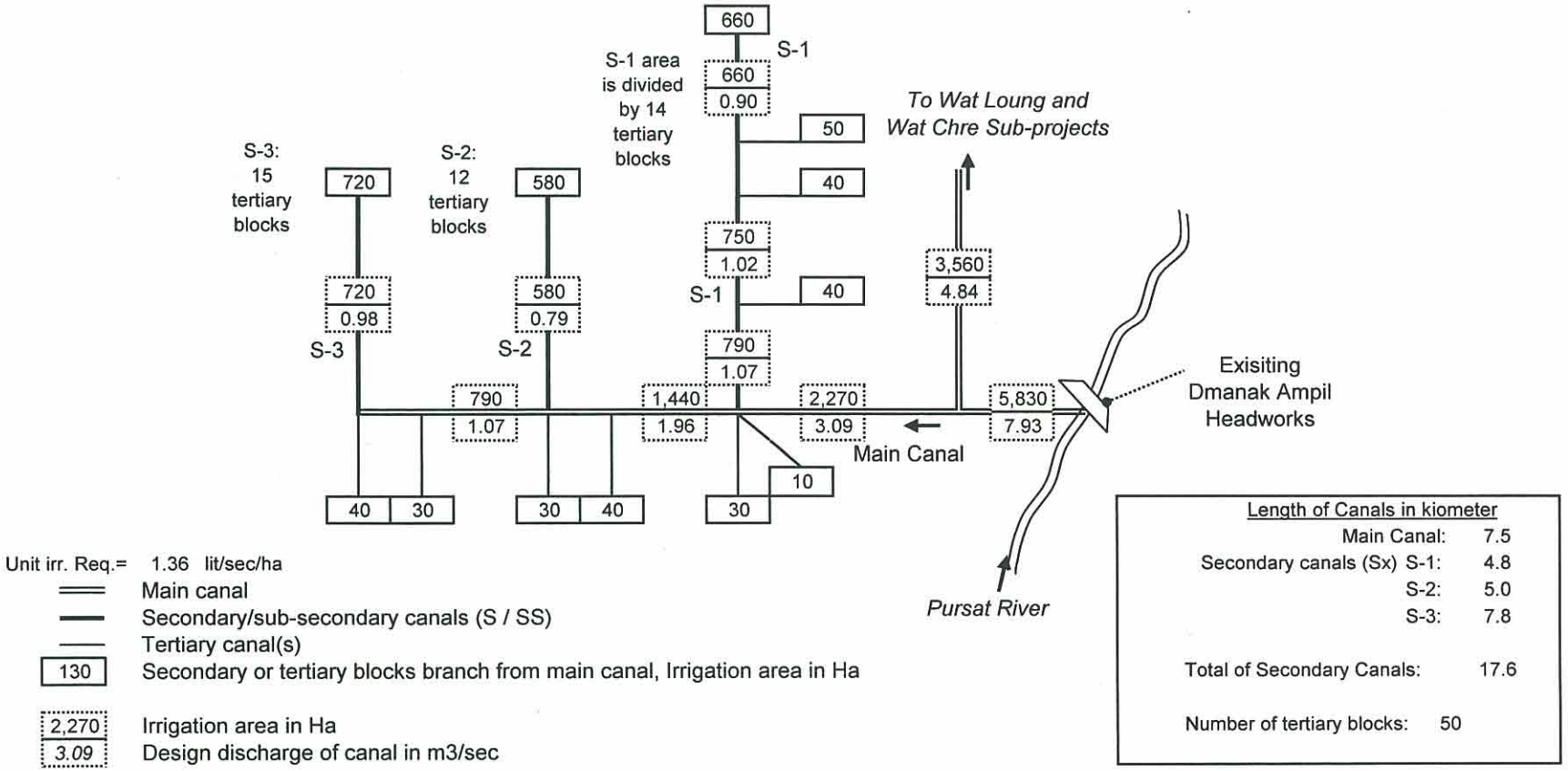
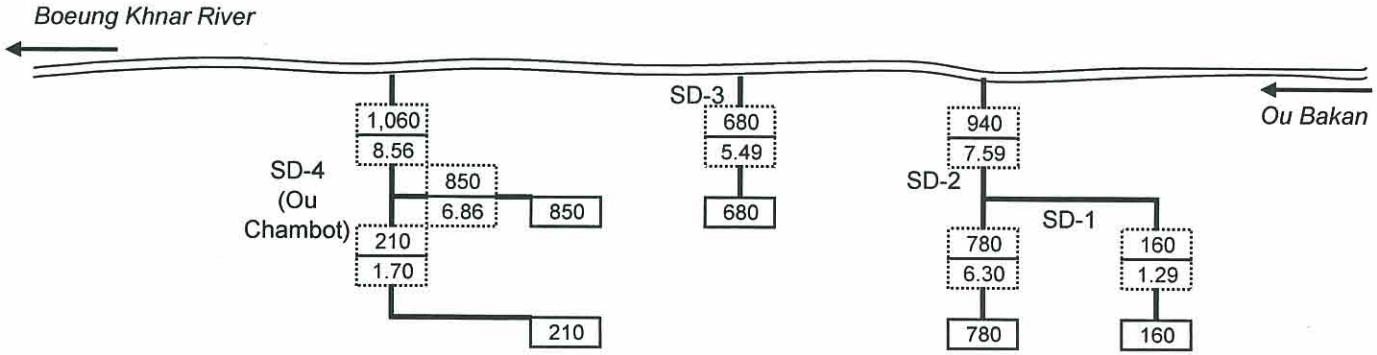


Figure 5.4-2 Irrigation Area Diagram of Damnak Ampil Rehabilitation Sub-project



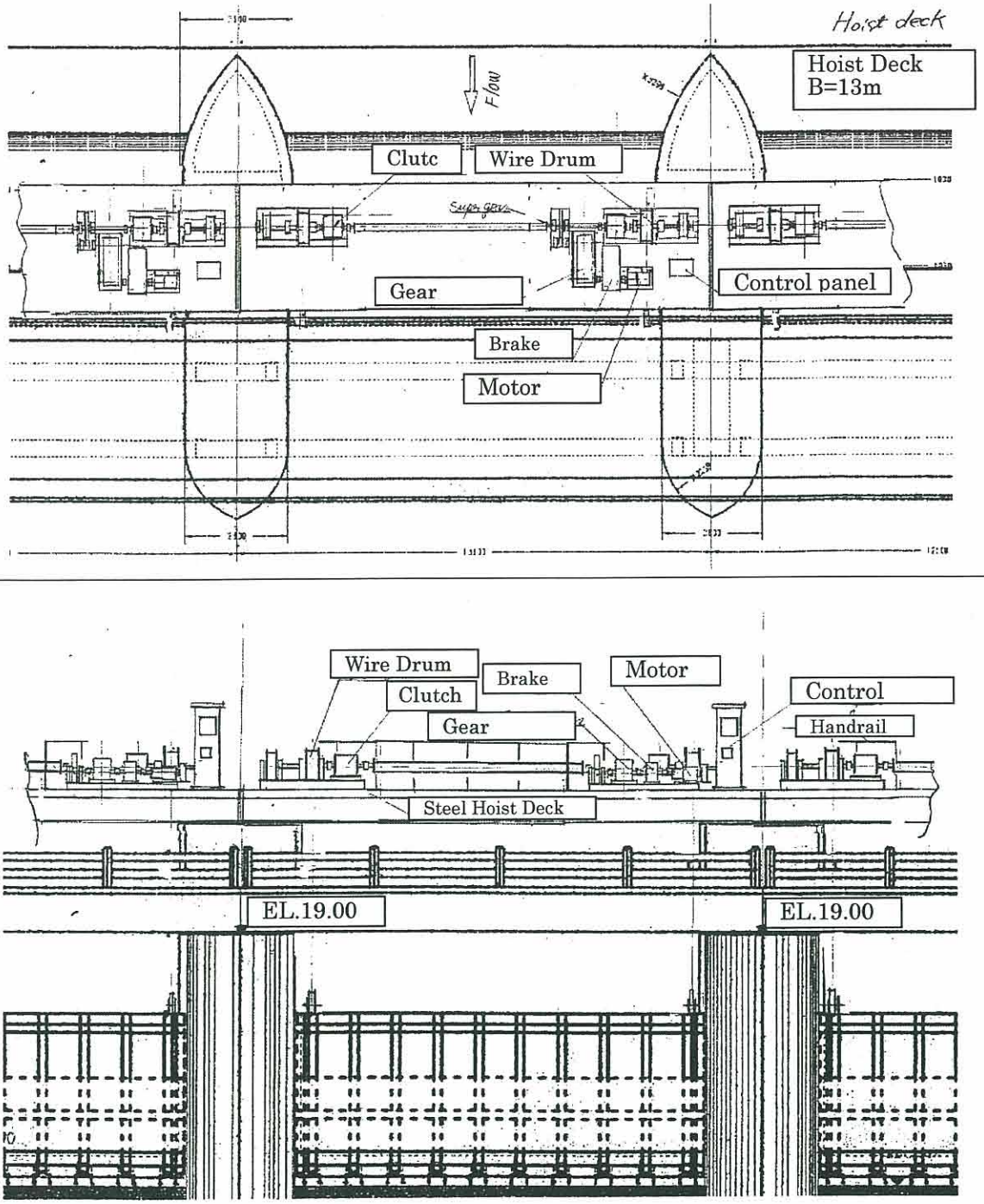
Unit drain. Req.= 6.32 lit/sec/ha from paddy fields
Unit drain. Req.= 25~18 lit/sec/ha from other types of land

Main drain
Secondary drain
Collector drain
80 Secondary or tertiary block in Ha

1,060 Drainage area in Ha (85% of paddy fields, 15% of other land types)
9.55 Design discharge of drain in m3/sec

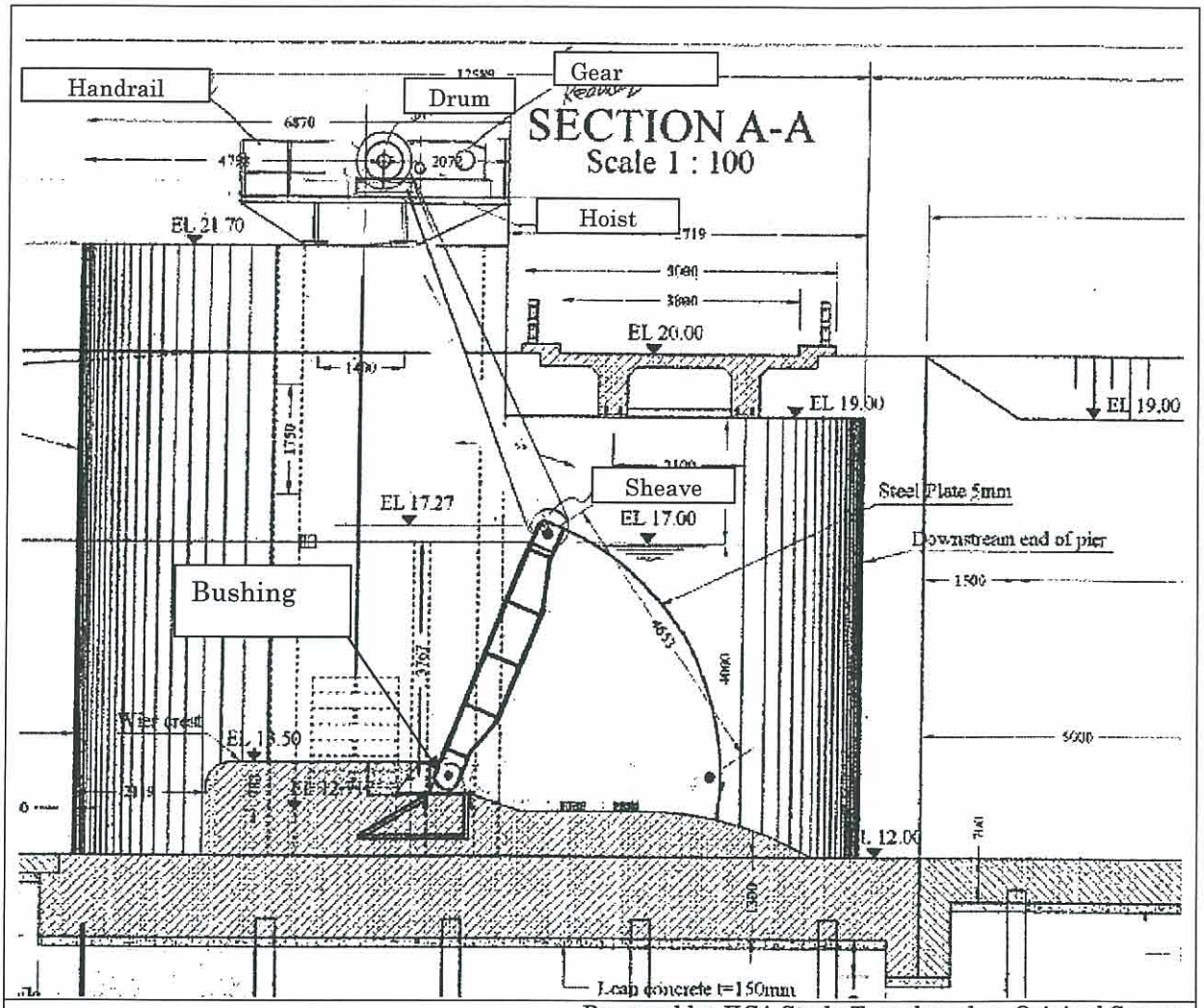
Length of Drains in kiometer	
Seondary Drains (SD-xx)	
SD-1:	6.4
SD-2:	6.8
SD-3:	7.8
SD-4:	7.2
Total of Secondary Drains:	28.2

Figure 5.4-3 Drainage Area Diagram of Damnak Ampil Rehabilitation Sub-project



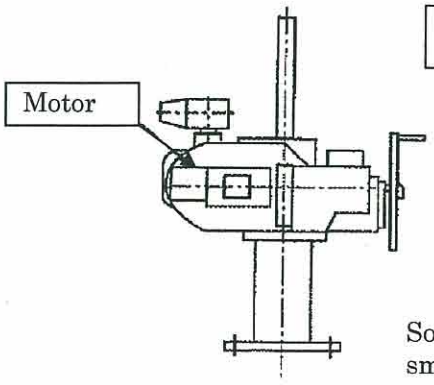
Prepared by JICA Study Team based on Original Source "Project Proposal for Rehabilitaion of Damnak Ampil Irrigtion Project in Pursat Province", MOWRAM, 2004

Figure 5.4-4 (1/2) Schematic Drawing of New Hoisting System for Damnak Ampil Diversion Weir (Flood gate)



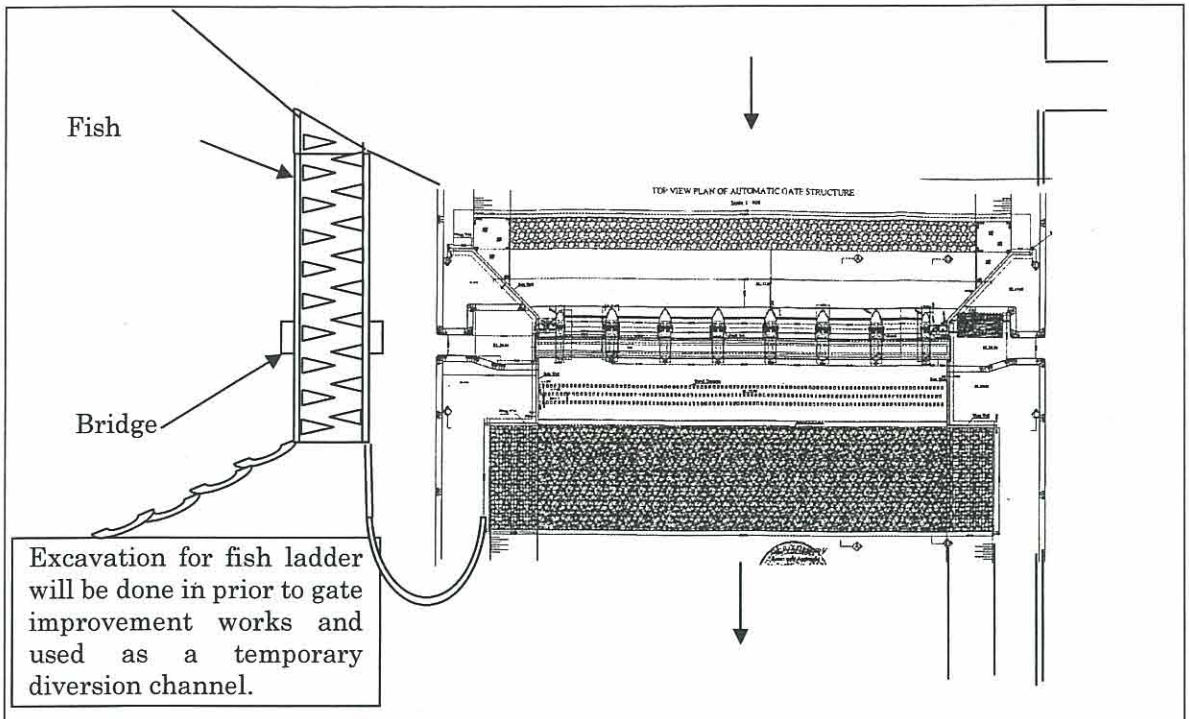
Prepared by JICA Study Team based on Original Source "Project Proposal for Rehabilitaion of Damnak Ampil Irrigtion Project in Pursat Province", MOWRAM, 2004

Figure 5.4-4 (2/2) Schematic Drawing of New Hoisting System for Damnak Ampil Diversion Weir (Flood gate)



Source: Standard drawings for small scale gate, MAFF of Japan

Figure 5.4-5 Schematic Drawing of New Hoisting System for Scouring sluice gate



Prepared by JICA Study Team based on Original Source "Project Proposal for Rehabilitaion of Damnak Ampil Irrigtion Project in Pursat Province", MOWRAM, 2004

Figure 5.4-6 Schematic Drawing of Installation of Fish ladder

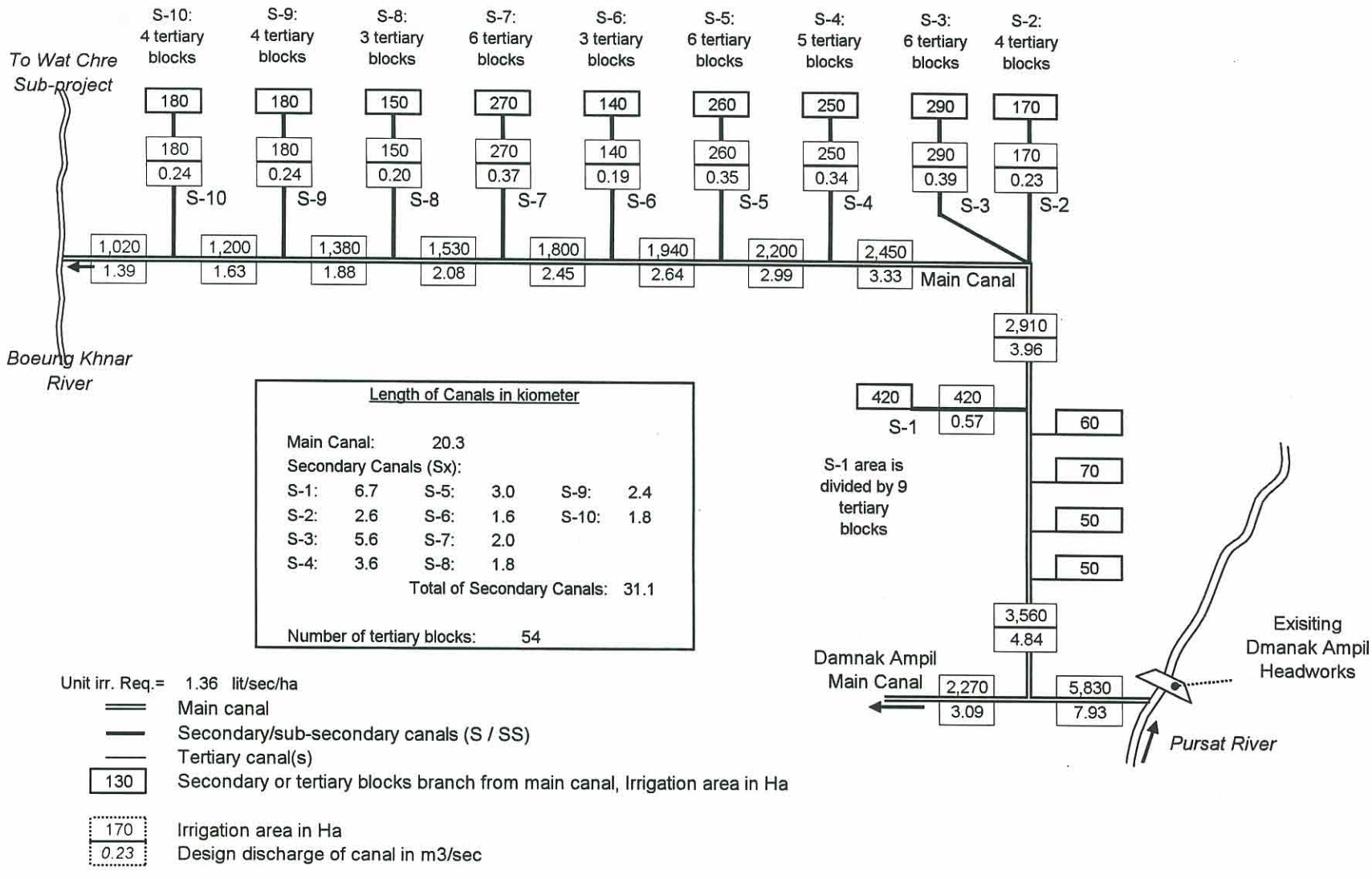
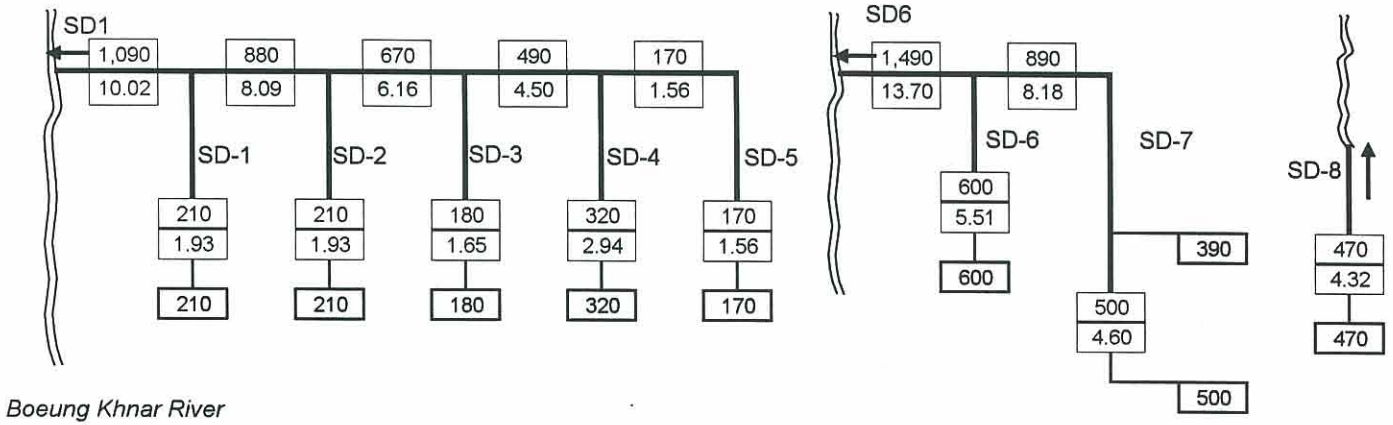


Figure 5.5-1 Irrigation Area Diagram of Wat Loung Rehabilitation Sub-project



Length of Drains in kiometer			
Secondary drains (SD-xx)			
SD-1:	2.7	SD-6:	6.1
SD-2:	3.3	SD-7:	9.5
SD-3:	4.2	SD-8:	3.7
SD-4:	4.5		
SD-5:	3.7		
Total of Secondary Drains:			37.7

Unit drain. Req.= 6.32 lit/sec/ha from paddy fields
Unit drain. Req.= 25~18 lit/sec/ha from other types of land

Main drain

Secondary drain

80 Secondary or tertiary block in Ha

210 Drainage area in Ha (85% of paddy fields, 15% of other land types)
1.93 Design discharge of drain in m3/sec

Figure 5.5-2 Drainage Area Diagram of Wat Loung Rehabilitation Sub-project

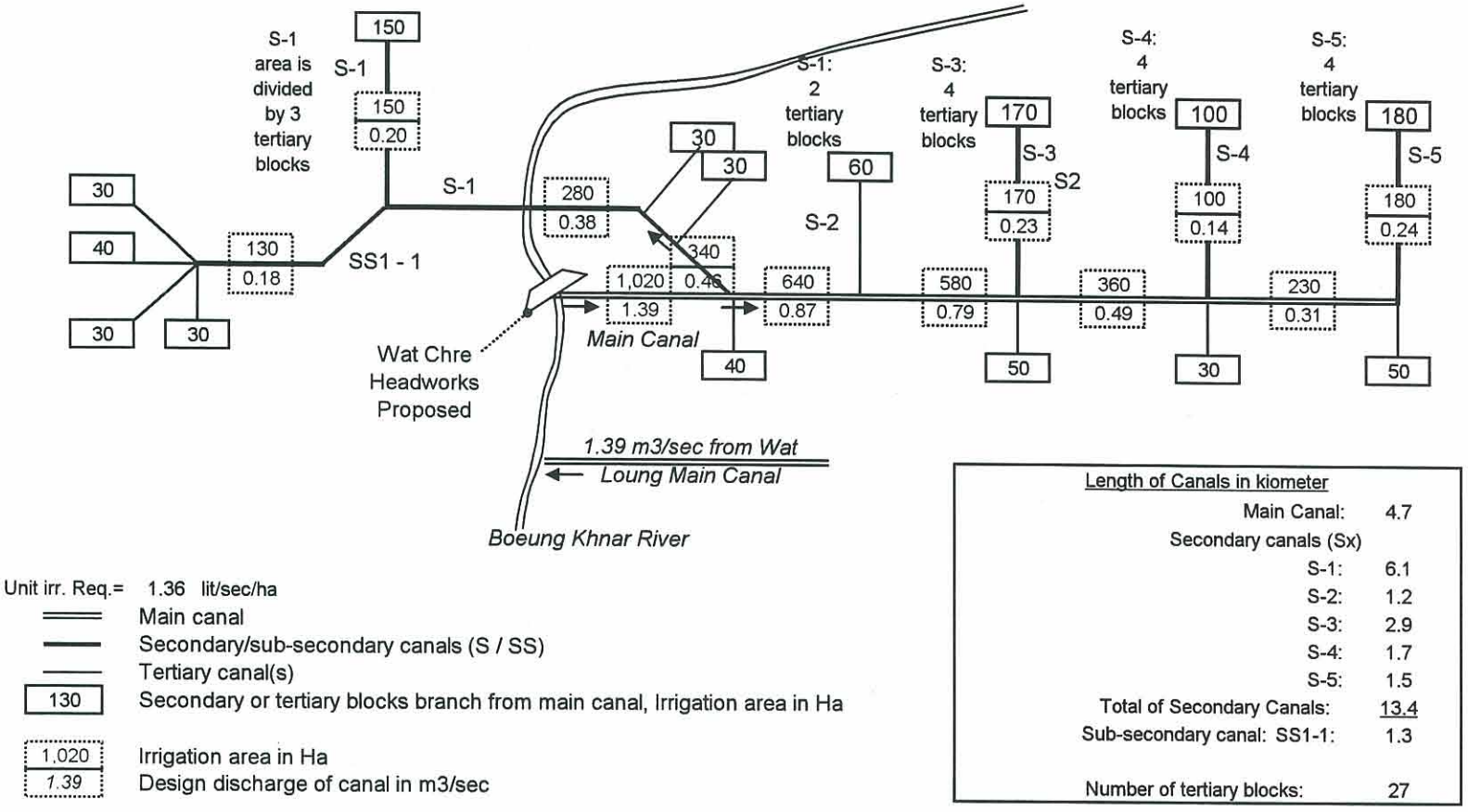


Figure 5.6-1 Irrigation Area Diagram of Wat Chre Rehabilitation Sub-project