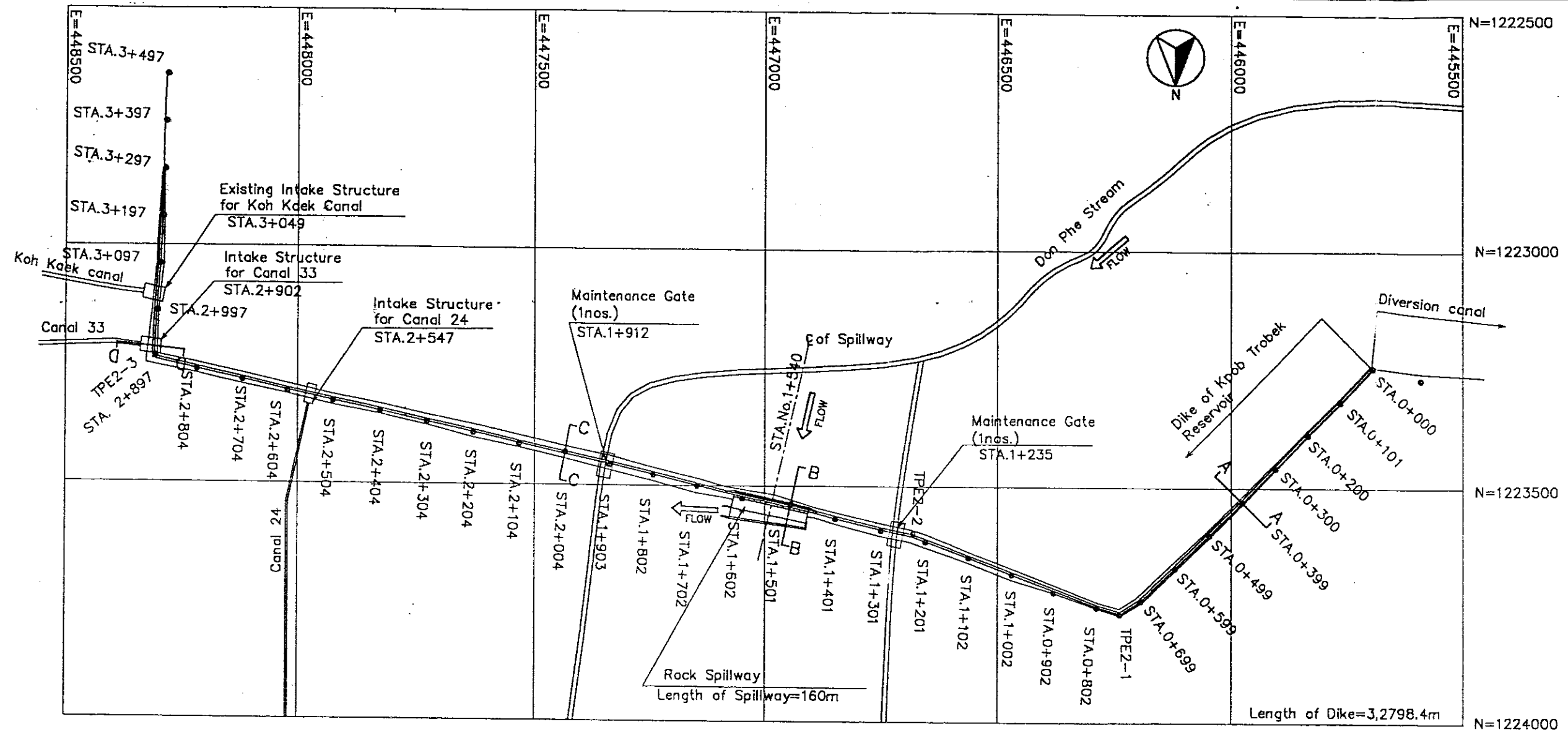


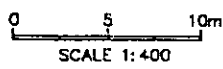
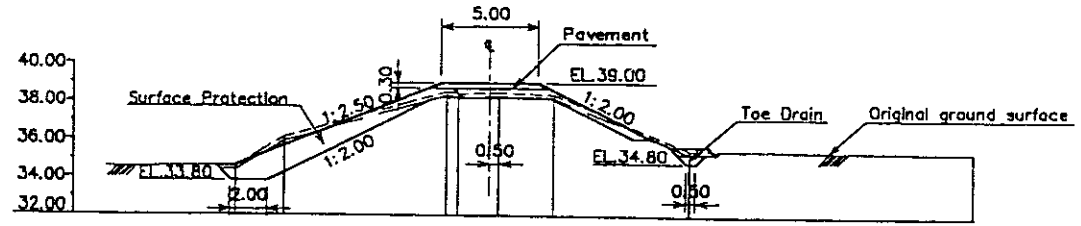
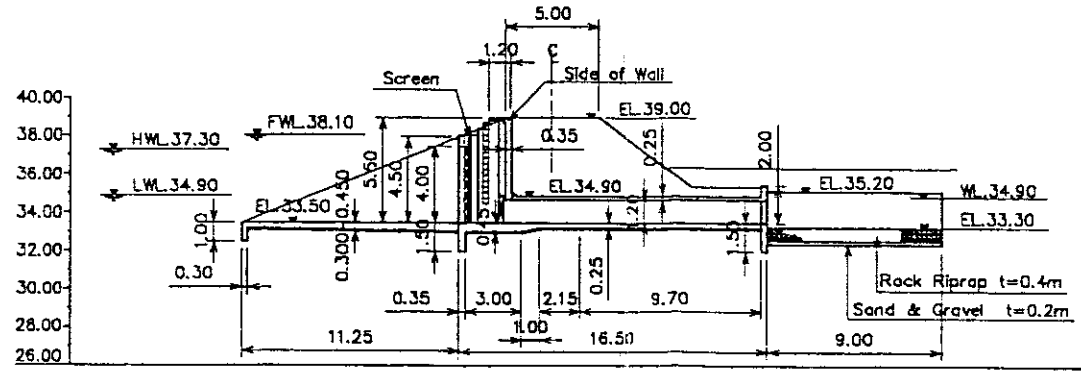
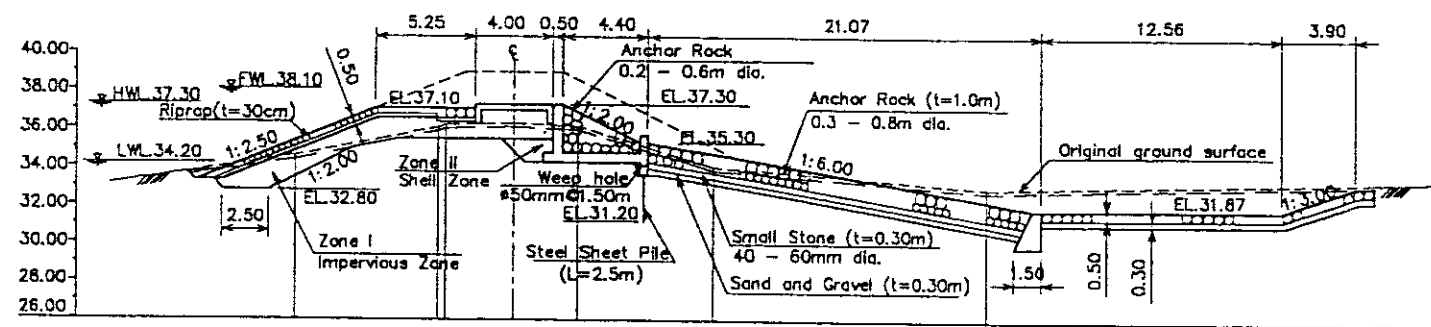
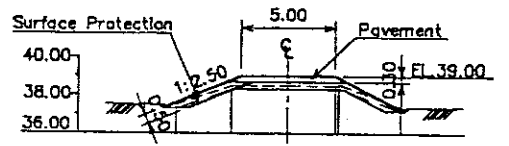
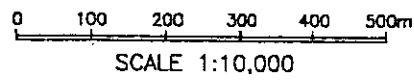
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Figure IV-2.3.1  
 ប្លង់ទូទៅនៃអាងទឹកចំណែក

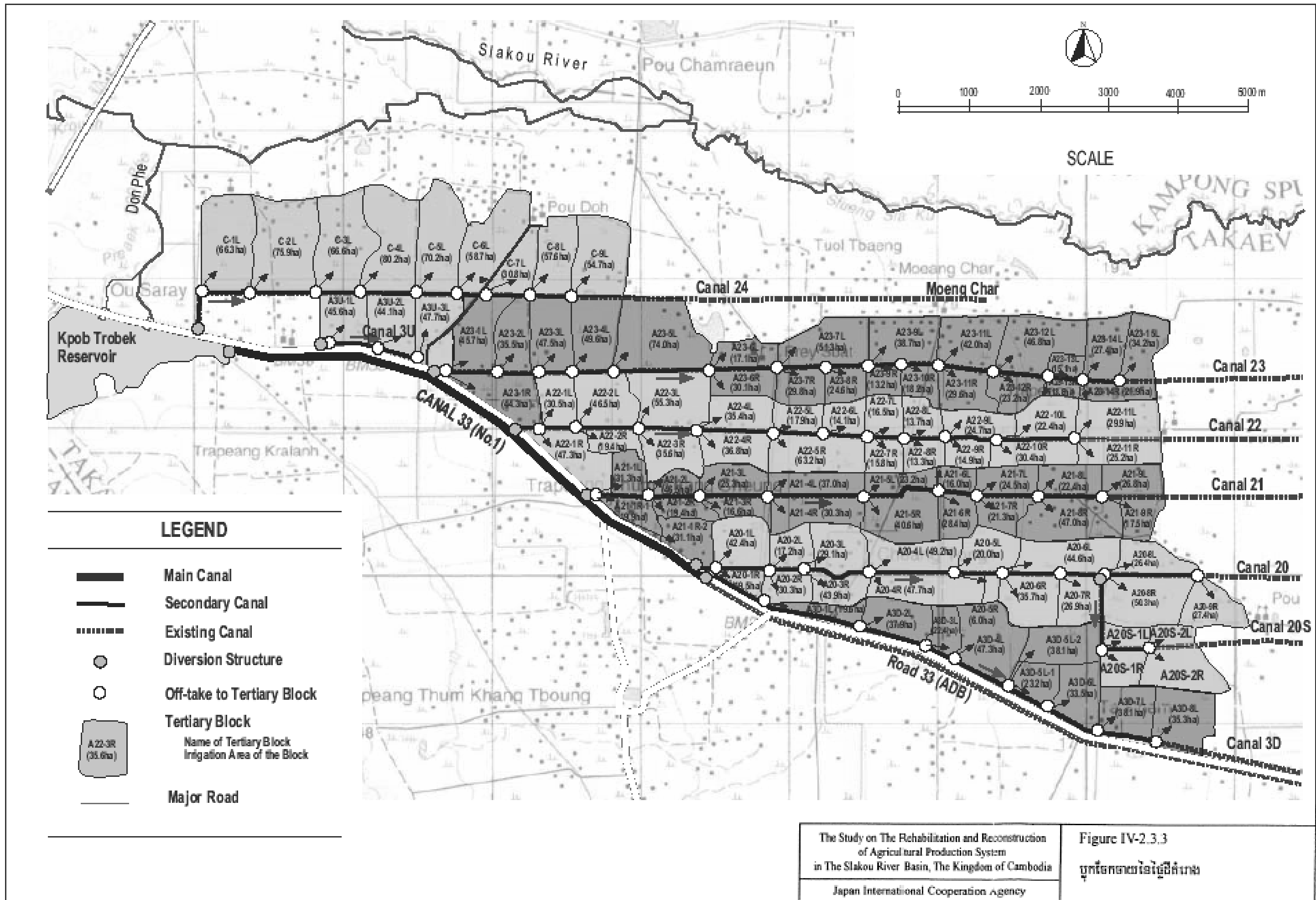


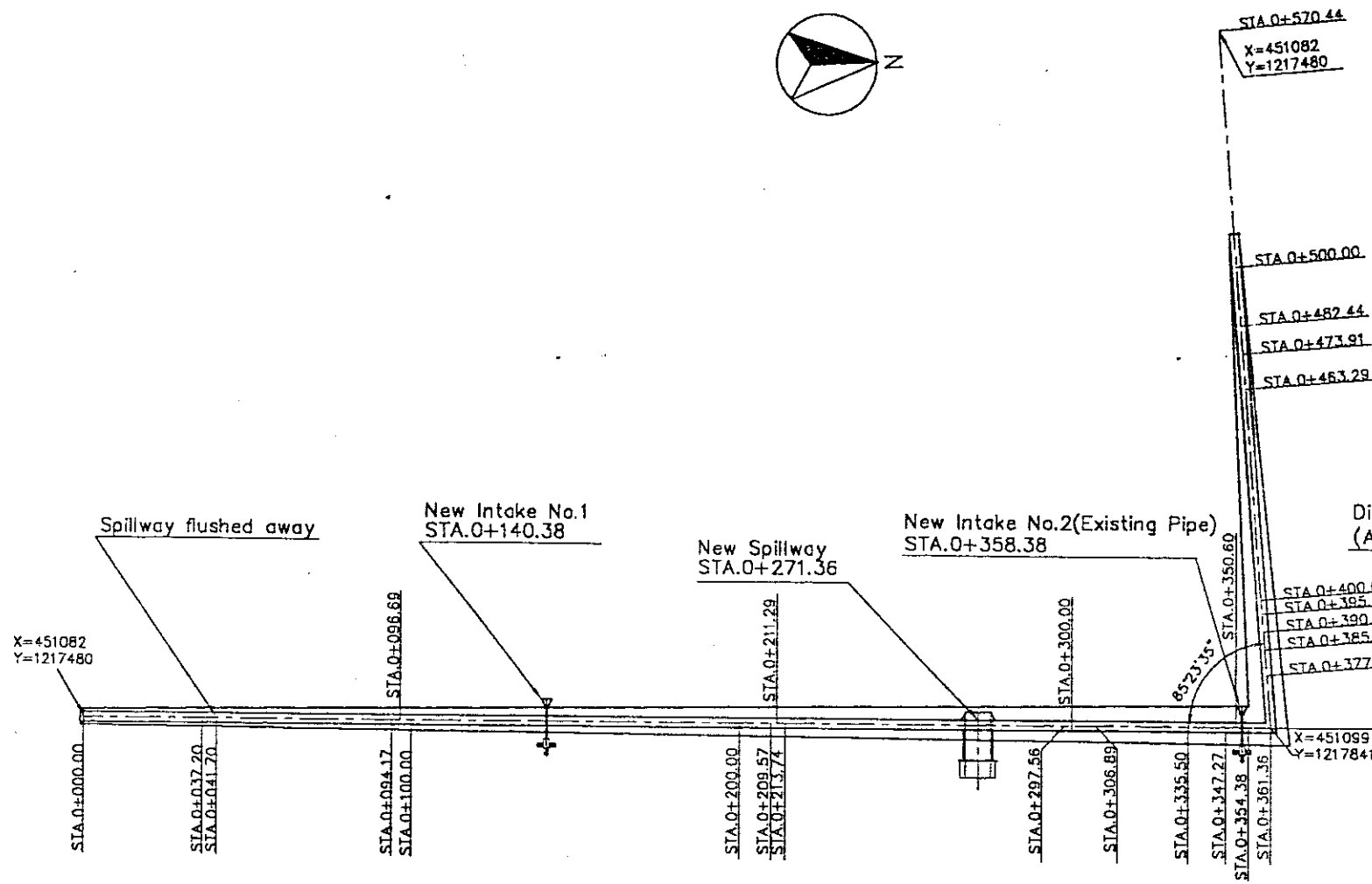
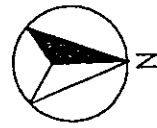
PLAN



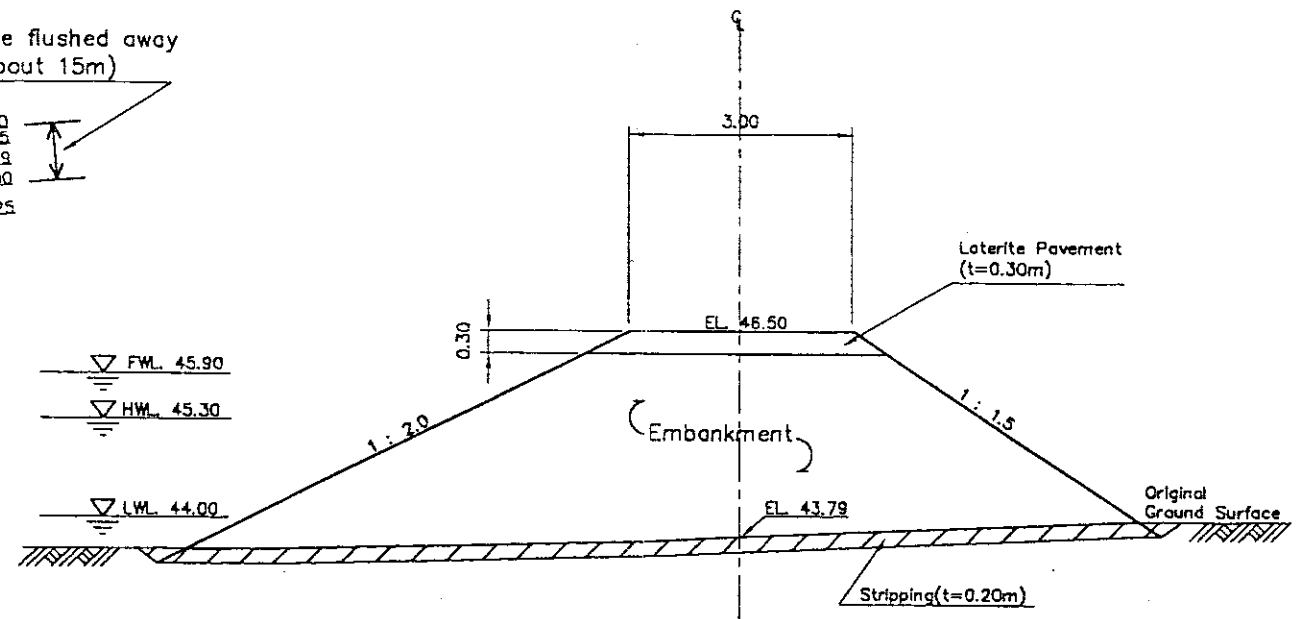
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Figure IV-2.3.2  
 ប្លង់ទូទៅនៃអាងទឹកក្នុងប្រព័ន្ធ

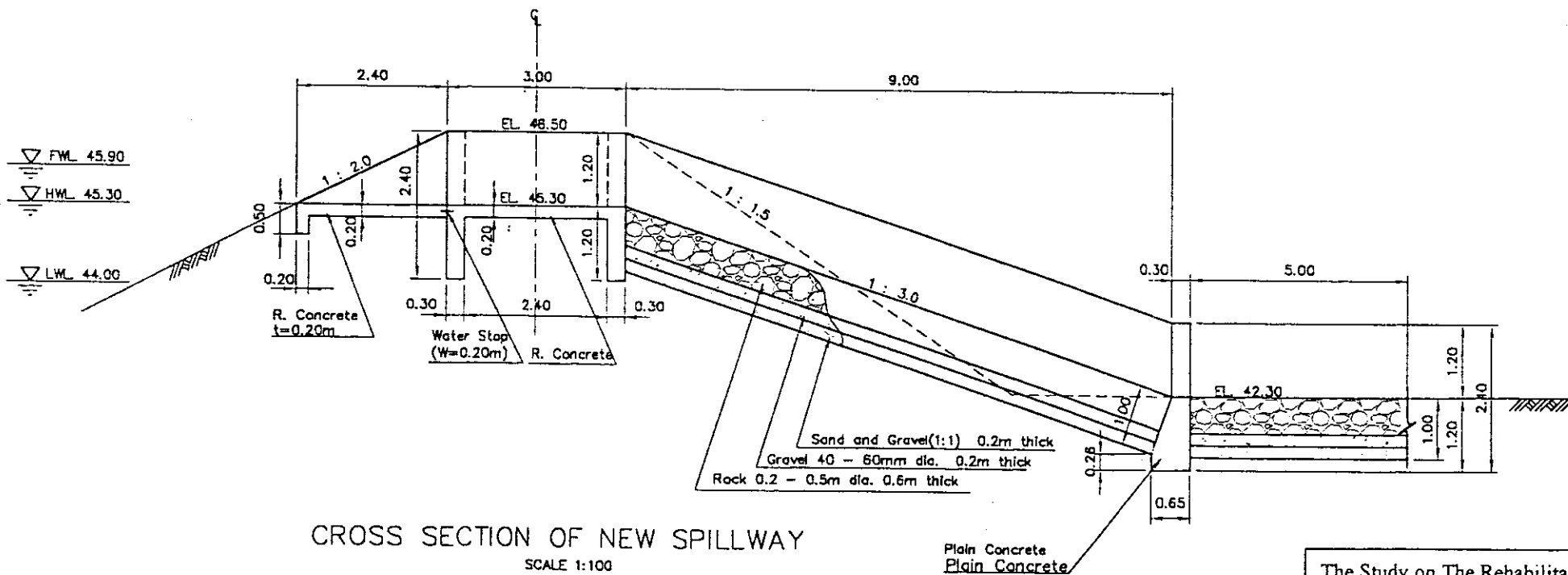




PLAN  
SCALE 1:2000



CROSS SECTION (STA. 0+390.39)  
SCALE 1:100

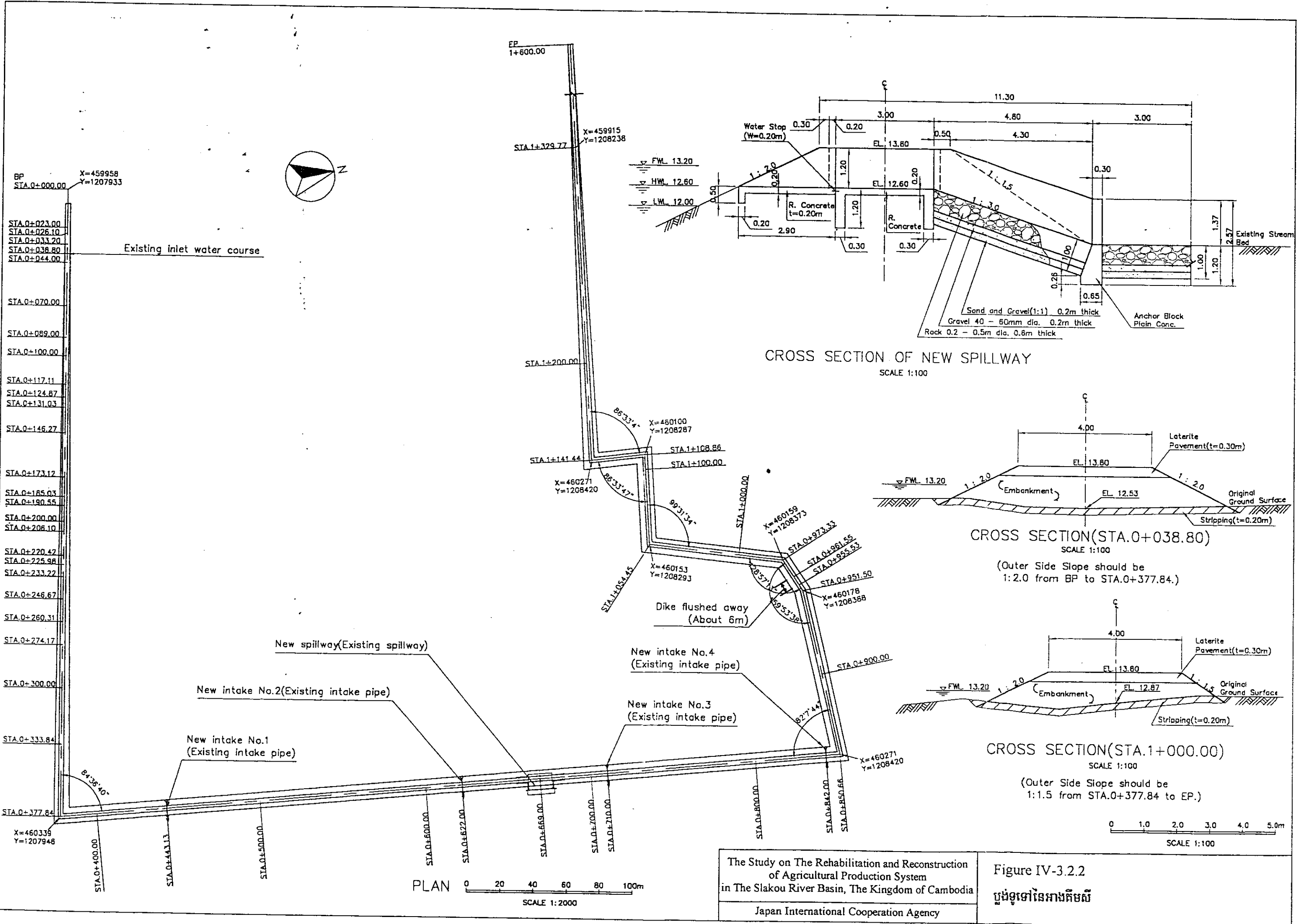


CROSS SECTION OF NEW SPILLWAY  
SCALE 1:100

SCALE 1:100

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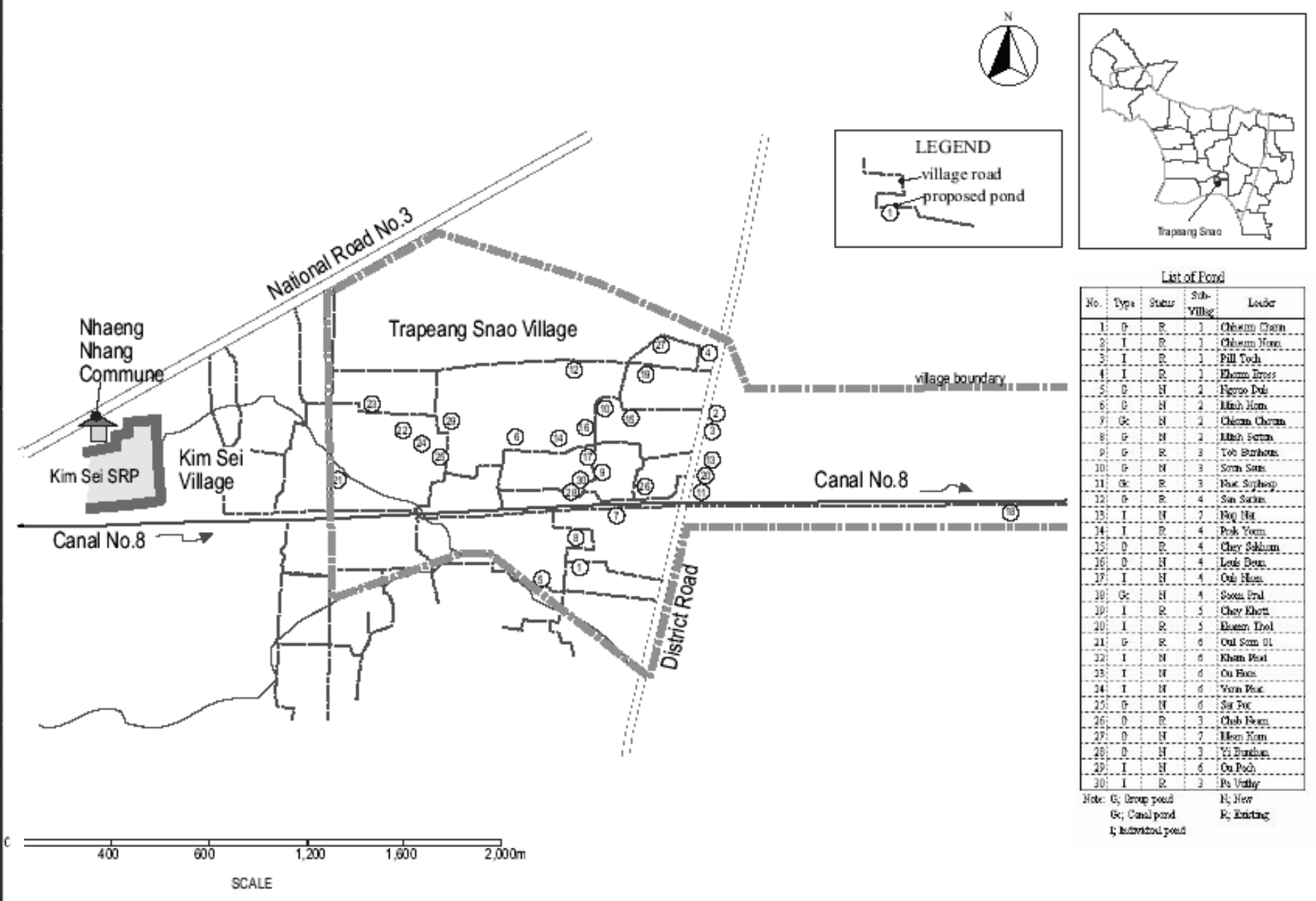
Figure IV-3.2.1  
រូបភាពទី 160



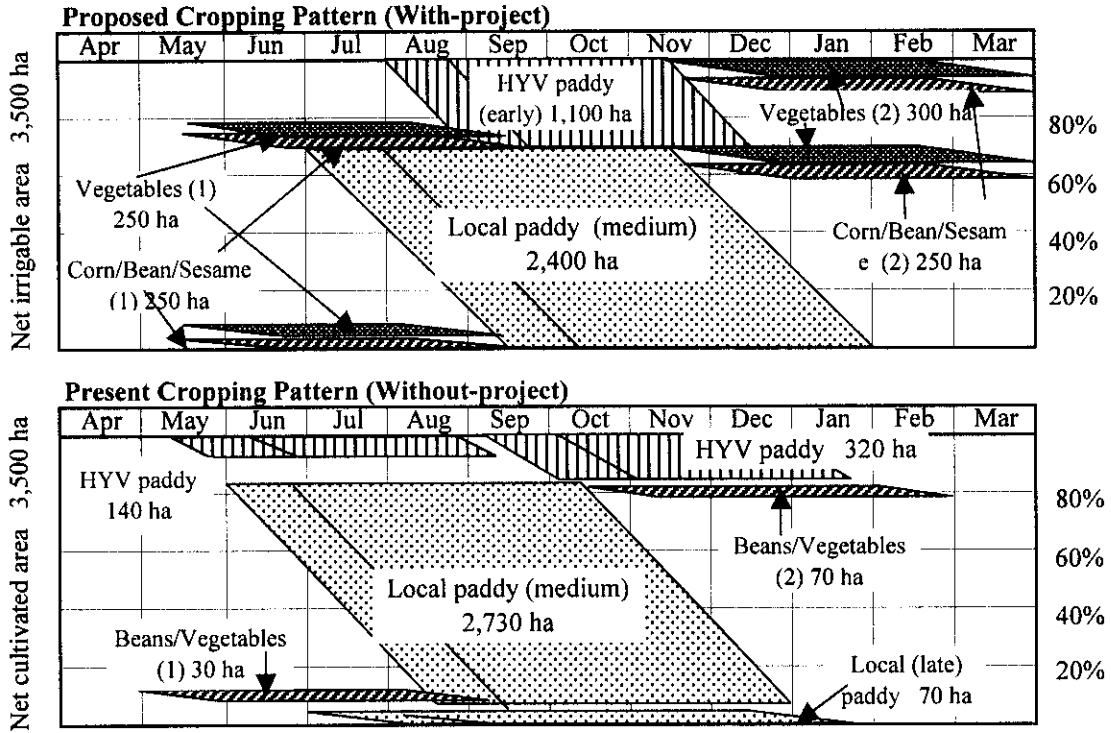
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Figure IV-3.2.2  
 ប្លង់ទូទៅនៃអាងតឹមស៊ី

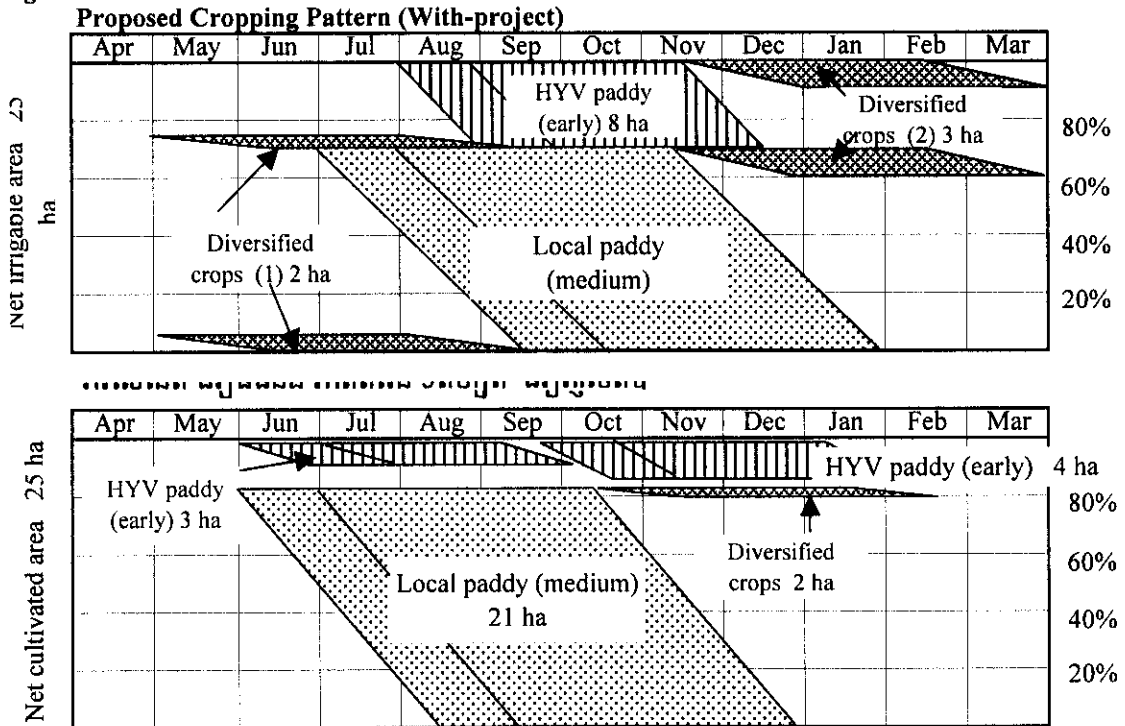
Figure IV-4.1.2



**1 USP**



**2 Ang160 SRP**



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of Agricultural Production System  
in The Slakou River Basin, The Kingdom of Cambodia

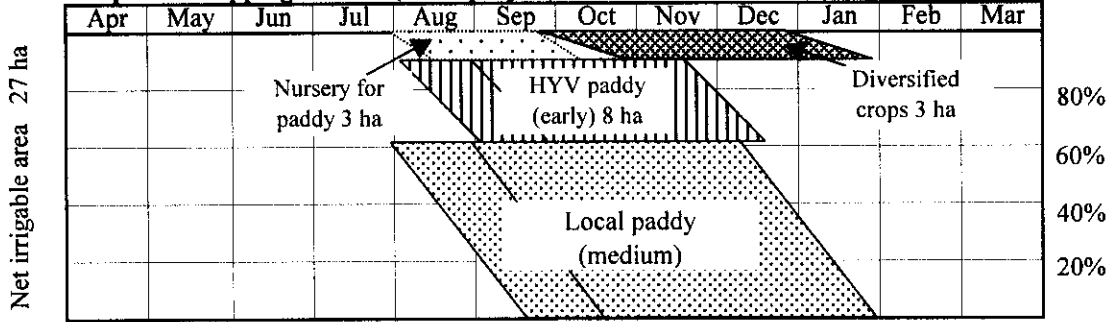
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Figure IV-5.1.1 តំរូវការផ្លូវការដាំដុះស្រូវស្ថានភាព  
មានតំរោង និង គ្មានតំរោង (1/2)

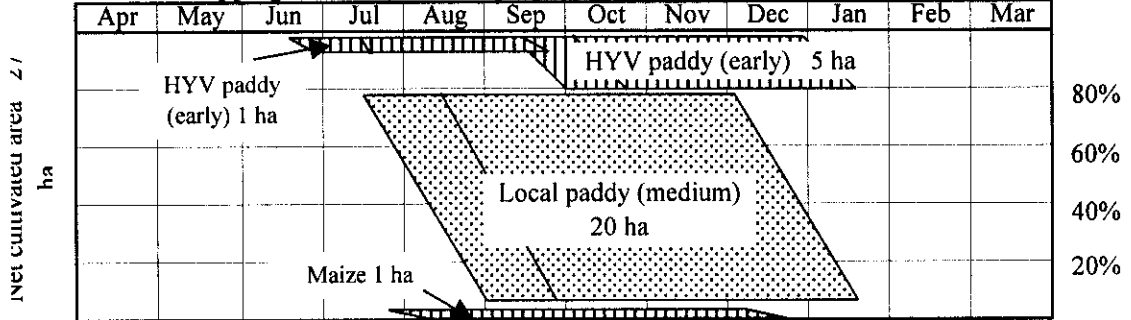


**3 Kim Sei SRP**

**Proposed Cropping Pattern (With-project)**

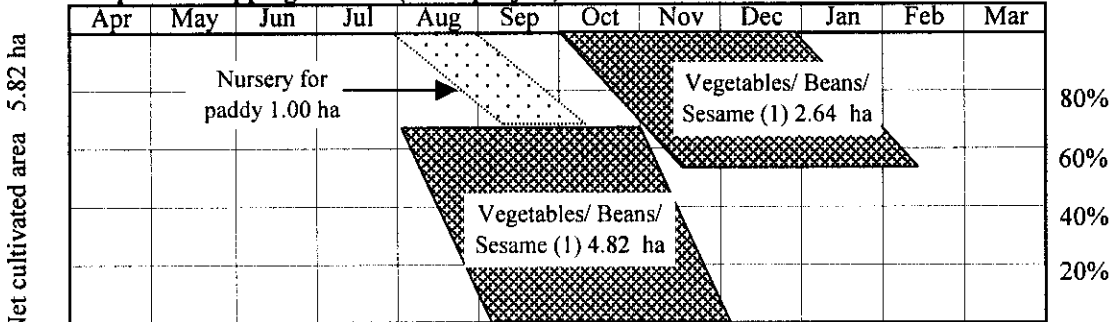


**Present Cropping Pattern (Without-project)**

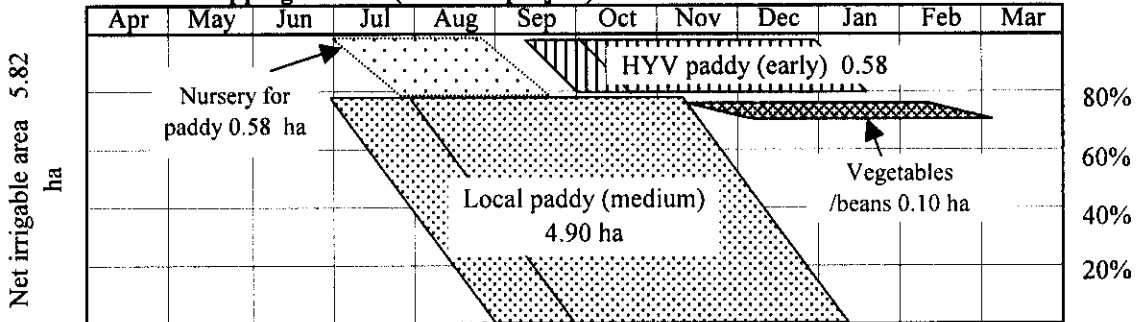


**4 Trapeang Snao PDP**

**Proposed Cropping Pattern (With-project)**



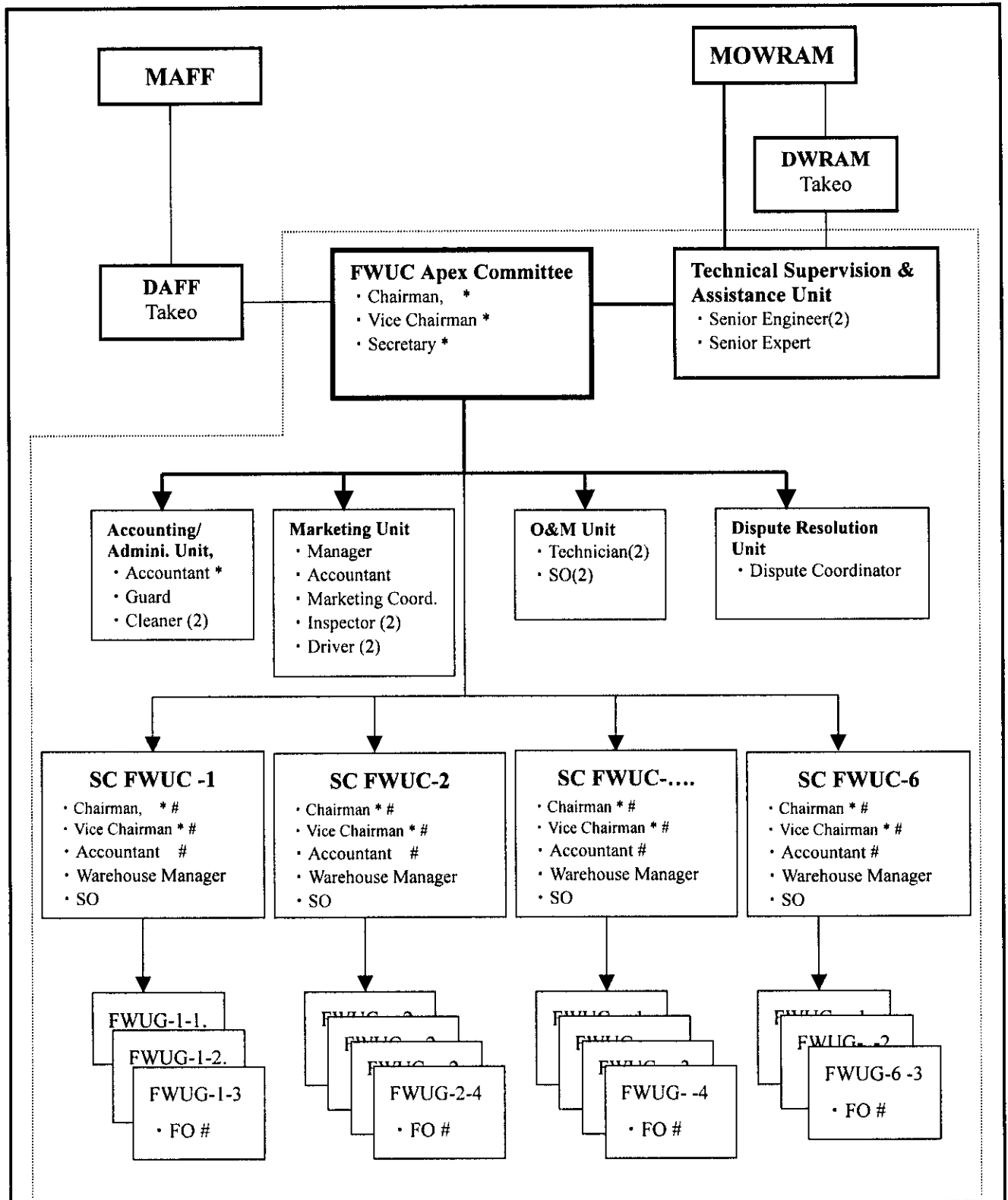
**Present Cropping Pattern (Without-project)**



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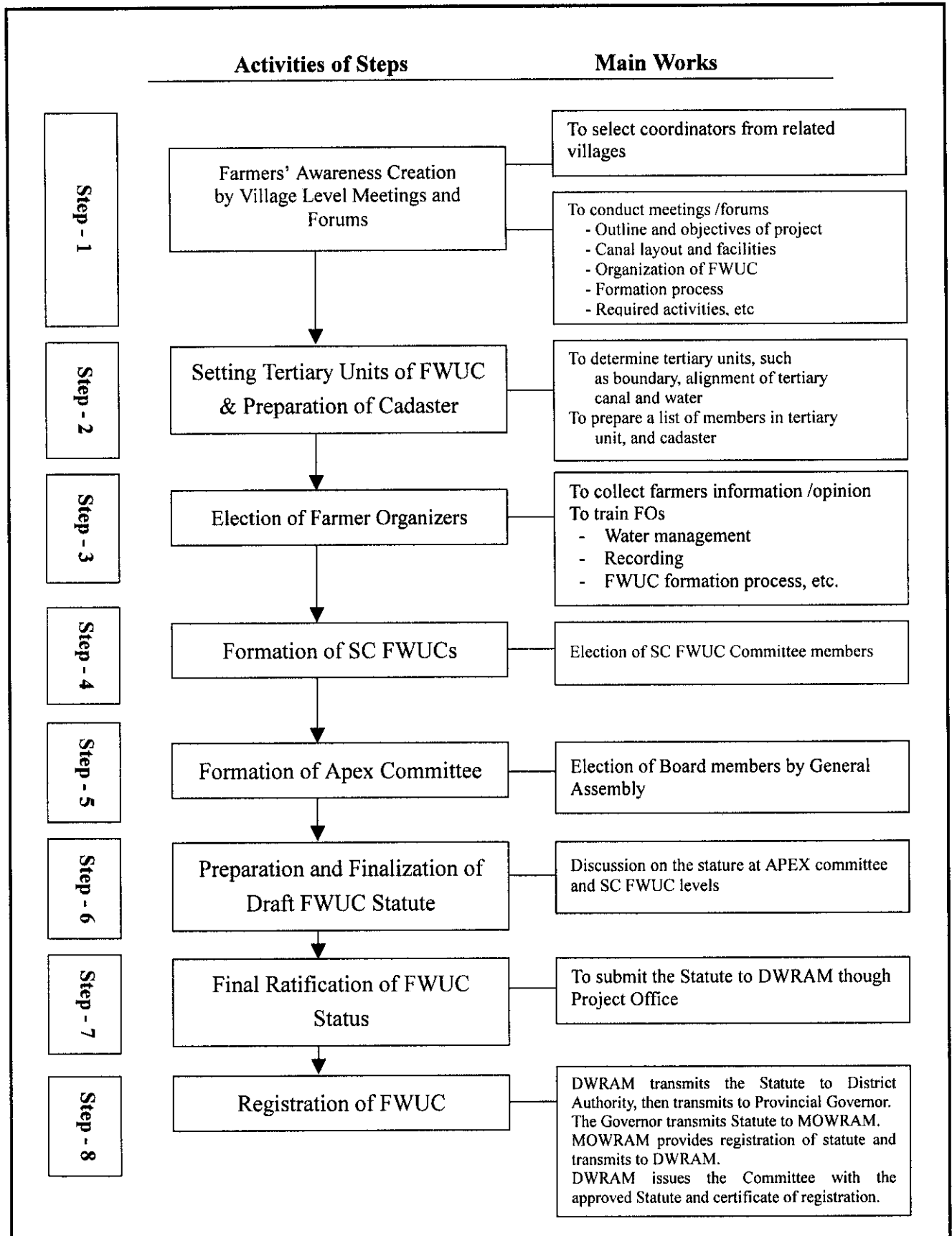
Figure IV-5.1.1 តំរូវការកម្មសិក្ខាស្រាវជ្រាវស្រូវស្រែកម្រិតខ្ពស់  
មានតំរូវការ និង គ្មានតំរូវការ (2/2)



Note: \* shows the Apex Board members.  
 # shows the SC FWUC Committee members.  
 Drivers in Marketing Unit will be assigned from the 5th year.

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Figure IV-5.4.1 រចនាសម្ព័ន្ធរូបសំ ស.ក.ប.ទ  
 (ដំណាក់កាល O & M)



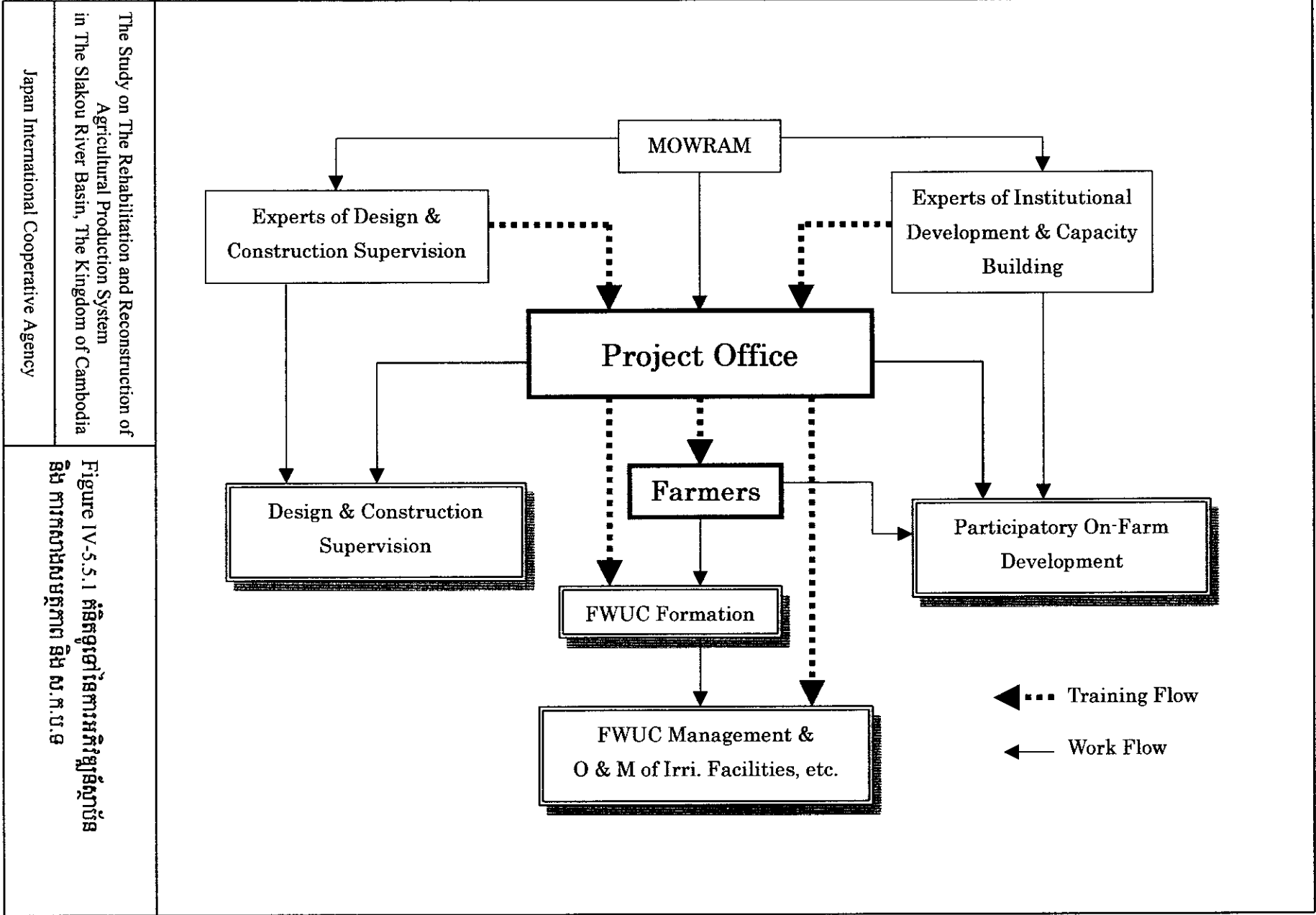
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Figure IV-5.4.2

ដំណាក់កាលសំរាប់ការបង្កើត ស.ក.ប.ខ





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Figure IV-5.5.1 គំនិតទូទៅនៃការអភិវឌ្ឍន៍ស្ថាប័ន និង ការកសាងសមត្ថភាព និង ស.ក.ប.ទ

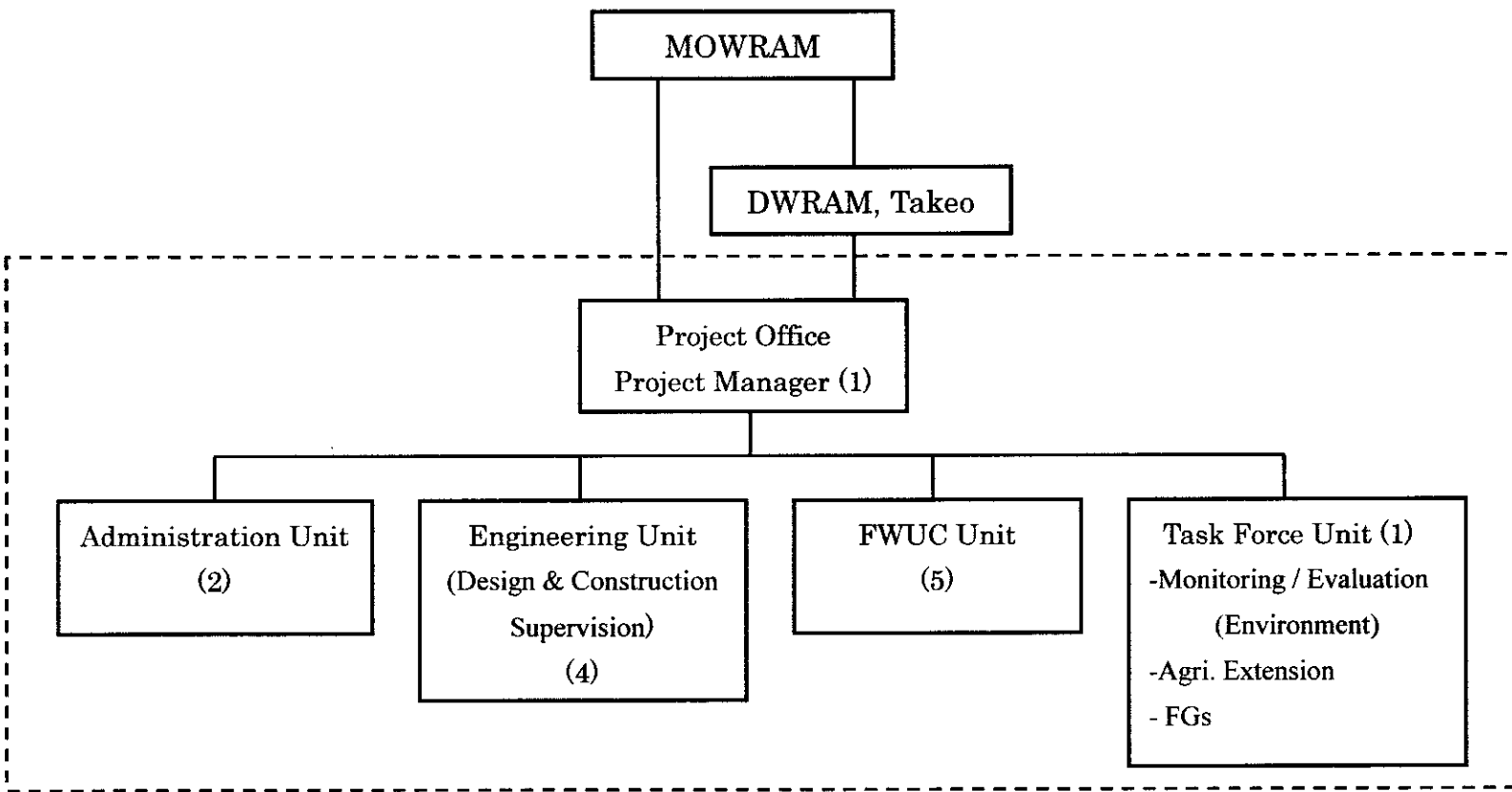
Subject	1st Year												2nd Year												3rd Year												4th Year												5th year												6th Year															
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12				
Training to Project Office by Experts																																																																												
Planning / Design and Bid																																																																												
Construction Supervision																																																																												
Training to Project Office by Experts																																																																												
FWUC & Its Formation																																																																												
On-farm Development																																																																												
FWUC Operation & Management																																																																												
O & M of Irrigation Facilities																																																																												
Marketing																																																																												
Farming Practice																																																																												
Training to FWUC by Project Office																																																																												
FWUC formation																																																																												
On-farm development																																																																												
Management Course																																																																												
O & M Irrigation Facilities																																																																												
Marketing																																																																												
Farmer training																																																																												

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Agricultural Production System  
in The Slakou River Basin, The Kingdom of Cambodia

Japan International Cooperative Agency

Figure IV-5.5.2  
ការងារពេញវេលានៃការអភិវឌ្ឍន៍ស្តារឡើង និង ការកសាងសមត្ថភាព

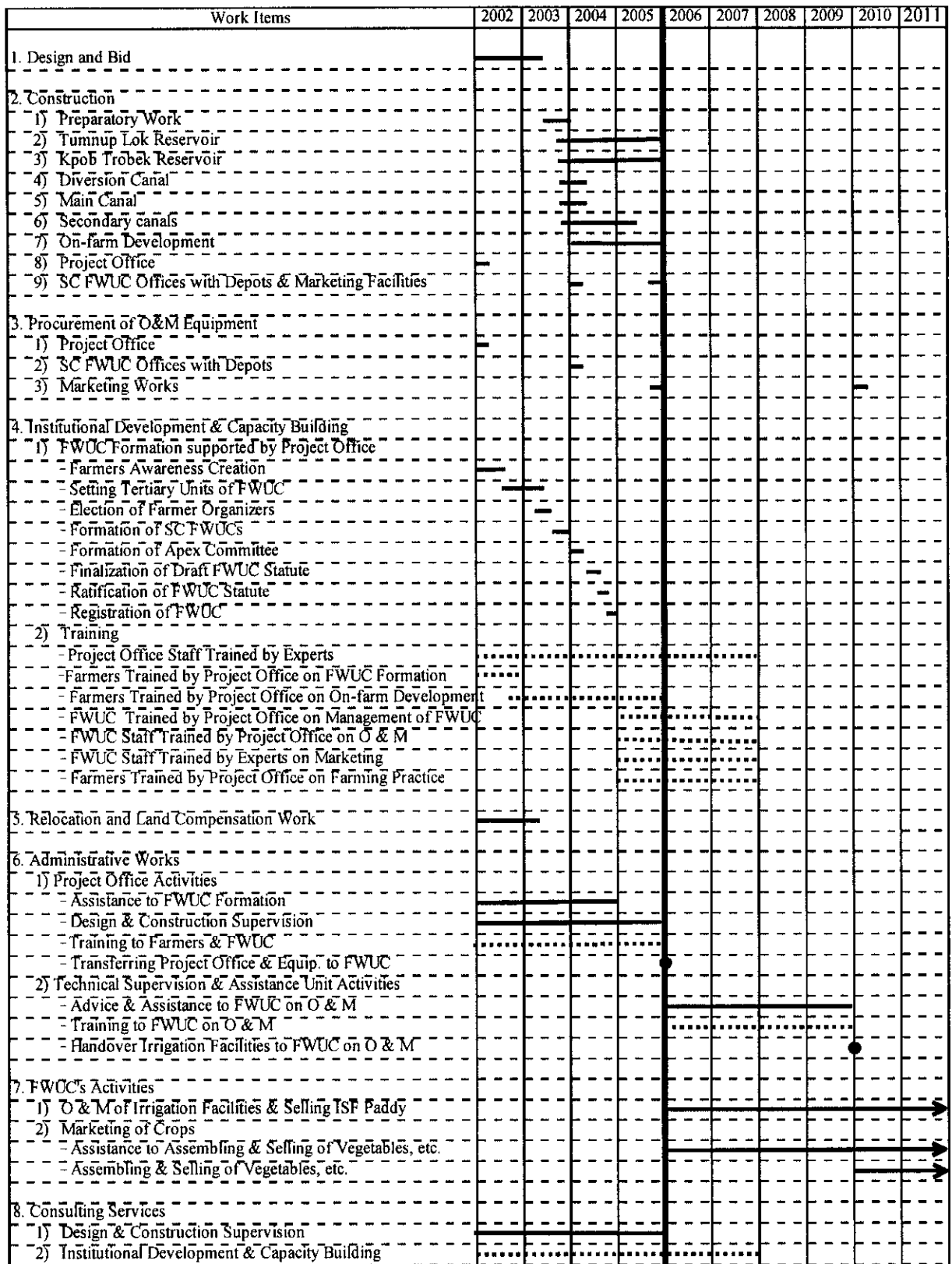
### Organization of the Project Office (Design & Construction Stage)



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 Agricultural Production System  
 in The Slakou River Basin, The Kingdom of Cambodia

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Figure IV-6.1.1 ការរៀបចំការងារគ្រប់គ្រងគម្រោង



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Figure IV-6.2.1

ផែនការអនុវត្តសំរាប់គម្រោងកែលម្អផ្នែកកសិកម្មខាងលើស្នាគូ



**Overall Implementation Plan for SRP**

Work Items	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
1. Review of Design and Bidding	—									
2. Construction										
1) Preparatory Work (Access road of Ang 160)	—	—								
2) Ang 160 Reservoir		—								
3) Kim Sei Reservoir			—							
3. Institutional Development										
1) FWUG Formation supported by DWRAM	—	—								
2) Training										
① FWUG Staff Trained by DWRAM on Management of FWUC		—	—							
② FWUG Staff Trained by DWRAM on O & M		—	—	—	—	—	—	—	—	—
③ Farmers Trained by DAFF on Farming Practice		—	—	—	—	—	—	—	—	—
4. Administrative Works										
1) DWRAM Activities										
① Assistance to FWUG Formation	—	—								
② Design Review & Construction Supervision	—	—	—	—	—	—	—	—	—	—
③ Training to FWUG	—	—	—	—	—	—	—	—	—	—
2) DAFF Activities										
① Advice & Assistance to FWUG on diversified crop farming		—	—	—	—	—	—	—	—	—
② Advice & Assistance to FWUG on paddy rice farming		—	—	—	—	—	—	—	—	—
3) Handover Irrigation Facilities to FWUG on O & M				●						
7. FWUG's Activities										
1) O & M of Irrigation Facilities			—	—	—	—	—	—	—	—
8. Engineering Services										
1) Design & Construction Supervision	—	—	—	—	—	—	—	—	—	—
2) Institutional Development		—	—	—	—	—	—	—	—	—

**Overall Implementation Plan for PDP**

Work Items	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
1. Design and Bidding	—	—	—	—	—	—	—	—	—	—
2. Construction										
1) Stage-1 (Pilot Stage: 6 ponds)	—	—	—	—	—	—	—	—	—	—
2) Stage-2 (Intensive Development Stage: 9 ponds)			—	—	—	—	—	—	—	—
3) Stage-3 (Self-supportive Development Stage: 15 ponds)						—	—	—	—	—
3. Institutional Development										
1) PUG Formation supported by DWRAM	—	—								
2) Training										
① PUG Staff Trained by DWRAM on accounting		—	—							
② Training of Village Extension Workers		—	—	—	—	—	—	—	—	—
4. Administrative Works										
1) DWRAM Activities										
① Assistance to PUG Formation	—	—								
② Design & Construction Arrangement, Support	—	—	—	—	—	—	—	—	—	—
③ Training to PUG		—	—	—	—	—	—	—	—	—
④ PDP Fund Management	—	—	—	—	—	—	—	—	—	—
2) DAFF Activities										
① Advice & Support to Village Extension Workers		—	—	—	—	—	—	—	—	—
② Agricultural Extension Services		—	—	—	—	—	—	—	—	—
7. PUG's Activities										
1) Refunding to Pond Development Fund		—	—	—	—	—	—	—	—	—
2) Arrangement and Coordination on Development		—	—	—	—	—	—	—	—	—
3) Agricultural Extension to PUG Members		—	—	—	—	—	—	—	—	—
8. Engineering Services										
1) Support on Design & Construction	—	—	—	—	—	—	—	—	—	—
2) Institutional Development		—	—	—	—	—	—	—	—	—

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Japan International Cooperative Agency

Figure IV-6.2.2

ផែនការអនុវត្តសម្រាប់គម្រោងអាងទឹកតូច និង អភិវឌ្ឍន៍

# *Tables*

Table II-4.3.3 ផែនការស្តារអាងតូចតាមដំណាក់កាល

No.	Name	Commune	Related Village	Total Evaluation	Stage	Estimated Irrigable Area (ha)
5	Tumnup Kim Sei	Nhaeng Nhang	Kim Sei	A	Stage-1	21
26	Ang 160	Trapeang Thum Khang Tboung	Trapeang Chhuk	A		21
13	Ang Kol Korm	Tram Kak	Kol Korm	B	Stage-2	13
22	Prey Kdouch(North)	Trapeang Kranhung	Prey Kdouch	B		12
23	Prey Kdouch(South)	Trapeang Kranhung	Trapeang Robang	B		17
29	Tumnup Ta Ses	Kus	Trapeang Lean	B		10
2	Tumnup Ta Oum	Kus	Leak Khang Tboung, Trapeang Thmor, Leak Khang Cheung	B		15
9	Sdok Sap	Samraong	Pen Meas, Ta Sman	B		21
15	Ou Romdoul	Tram Kak	Trapeang Russei	B	57	
31	160 Reservoir	Tram Kak	Trapeang Russei, Kol Korm	C	Stage-3	10
10	Ang Srei Ronoung	Srae Ronoung	Thmei, Samaki	C		20
14	Trapeang Lean	Kus	Trapeang Lean	C		10
28	Toul Khcheay	Basedth, Kompong Spueu		C		36
19	Prey Dok Por	Trapeang Thum Khang Cheung		C		10
24	Ang Prey Preal	Trapeang Thum Khang Tboung	Prey Preal, Prakeab	C		15
				Estimated Irrigable	Stage-1	42
					Stage-2	144
					Stage-3	101
					Total	286

Table IV-5.4.2 តម្លៃ O&M ប្រចាំឆ្នាំរបស់ស.ក.ប.ទ សំរាប់ផ្នែកខាងលើស្ពាន

Annual Personnel Expenses of FWUC

Designation		Unit	Quantity		Unit rate		Amount		Remarks
			M/M	R. 1,000	R. 1,000	R. 1,000			
Apex. Commi.	Chairman	Person	1	1	120	120	1	1 month / Year	
	Vice Chairman	Person	1	2	120	240	2	2 months / Year	
	Secretary	Person	1	12	120	1,440			
	Accountant	Person	1	12	120	1,440			
	Technician	Person	2	24	100	2,400			
	Dispute Coordinator	Person	1	3	100	300	3	3 months/Year	
	Scheme Operator(SO)	Person	2	24	80	1,920			
	Driver	Person	1	12	80	960			
	Guard	Person	1	12	80	960			
	Cleaner	Person	1	12	40	480			
	<b>Sub-total</b>			<b>12</b>	<b>114</b>		<b>10,260</b>		
6 SC FWUCs	Chairman	Person	5	5	120	600	1	1 month / Year	
	Vice Chairman	Person	5	10	120	1,200	2	2 months / Year	
	Accountant	Person	6	72	120	8,640			
	Scheme Operator(SO)	Person	6	72	80	5,760			
	Farmer Organizers(FO)	Person	72	864	80	69,120			
	Warehouse Manager	Person	6	36	60	2,160			
	Cleaner	Person	6	36	40	1,440		Part time services	
<b>Sub-total</b>			<b>106</b>	<b>1095</b>		<b>88,920</b>			
<b>Total</b>						<b>99,180</b>			
Marketing Unit	Manager (Marketing Unit)	Person	1	12	120	1,440			
	Marketing Coordinator	Person	1	12	100	1,200			
	Accountant	Person	1	12	120	1,440			
	Inspectors	Person	2	24	100	2,400			
	Driver	Person	2	24	80	1,920		First 4years:0	
	Cleaner	Person	2	24	40	960		Part time services	
	<b>Sub-total</b>						<b>9,360</b>		
<b>Grand Total</b>						<b>108,540</b>			

Annual Running Costs of

Designation		Unit	Q'ty	Unit rate		Amount		Remarks
				R. 1,000	R. 1,000			
Apex. Commi.	Office Expenses							
	Stationaries	LS/month	12	40	480			
	Meeting	LS/month	4	200	800	4	4 times / Year	
	Consumsibles	LS/month	12	40	480			
	Fuel for Equipment							
	Generator(Diesel)	Day	280	16	4,480	10	10 l/day	
	Car ( Diesel)	Car/Day	280	8	2,240	5	5 l/day	
	Motor Bike (Gasoline)	Car/Day	560	6.6	3,696	3	3 l/day/Unit	
	Spare Parts							2 % of Equip. Cost
	Generator	2 %/year	1	200	200			
	Car (Pick-up)	2 %/year	1	1,600	1,600			
Motor Bike	2 %/year	2	96	192				
Maintenance Cost of Reservoirs and Main Canal								
	Ha	3,500	4	14,000				
<b>Sub-total</b>						<b>28,168</b>		
6 SC FWUCs	Office Expenses							
	Stationaries	LS/month	72	40	2,880			
	Meeting	LS/month	24	200	4,800	4	4 times/year	
	Consumsibles	LS/month	72	40	2,880			
	Fuel for Equipment							
	Motor Bike (Gasoline)	Car/Day	1,680	6.6	11,088	3	3 l/day/Unit	
	Spare Parts							2% of Equip. Cost
Motor Bike	2 %/year	6	96	576				
Maintenance Cost of Secondary to On-farm canals								
	Ha	3,500	4	14,000				
<b>Sub-total</b>						<b>36,224</b>		
<b>Total</b>						<b>64,392</b>		
Marketing Unit	Office Expenses/Consumables				1,440			
	Fuel for Equipment							
	Generator(Diesel)	Day	280	16	4,480			
	Truck				12,000			
	Repair/spare parts				1,200			
	Entrance charge				920			
<b>Sub-total</b>					<b>20,040</b>			
<b>Grand Total</b>						<b>84,432</b>	(R. 1,000)	

T - 2

Notes: Chairman and Vice-chairman for Apex Committee are selected from among 6 FWUCs. Annual personnel expenses of marketing unit for stage 1 is Riel 7.44 million, and that for stage 2 is Riel 9.36 million.

Note: O&M costs of marketing unit for stage 1 and stage 2 are Riel 5.92 million and Riel 20.04 million ,respectively.

**Table IV-6.3.1 គំរូលទិសយោគដំបូងសំរាប់គំរោងស្ថាបនាស្ទឹងទឹកស្រាបស្រពផ្នែកខាងលើស្ទឹងស្នាគ**

Work Item	Financial Cost			(Unit : Million Riel)	
	F/C	L/C	Total	Cost of US\$*	Per ha Cost (US\$/ha)
I. Preparatory Works	2,484.9	846.3	3,331.2	828,000	237
II. Direct Construction Cost					
1) Turnup Lok Reservoir	5,000.8	2,216.2	7,217.0	1,794,000	513
2) Diversion Canal	5,401.4	2,120.6	7,522.0	1,870,000	534
3) Kpob Trobek Reservoir	4,976.3	2,196.6	7,172.9	1,783,000	509
4) Main Canal	2,203.0	1,002.3	3,205.3	797,000	228
5) Secondary Canal	11,300.8	5,789.6	17,090.4	4,249,000	1,214
6) Tertiary Development	1,452.0	687.1	2,139.1	532,000	152
7) Building Works	299.2	225.6	524.8	130,000	37
Sub-total	30,633.5	14,238.0	44,871.5	11,156,000	3,187
III. O&M Equipment					
1) Project Office	151.6	3.6	155.2	39,000	11
2) FWUCs	2.2	6.7	8.9	2,000	1
3) Building Works	2.9	0.0	2.9	1,000	0
Sub-total	156.7	10.3	167.0	42,000	12
IV. Institutional Development	666.9	1,760.8	2,427.7	604,000	173
V. Relocation and Land Compensation Cost					
1) Land Compensation	0.0	92.5	92.5	23,000	7
2) House Relocation	3.3	104.5	107.8	27,000	8
Sub-total	3.3	197.0	200.3	50,000	15
VI. Administration Cost	155.7	824.3	980.0	244,000	70
VII. Consulting Services					
1) Design & Construction Supervision	4,256.2	563.9	4,820.1	1,198,000	342
2) Institutional Development & Capacity Building	7,665.5	59.6	7,725.1	1,921,000	549
Sub-total	11,921.7	623.5	12,545.2	3,119,000	891
Total ( I - VII)	46,022.7	18,500.2	64,522.9	16,042,000	4,583
VIII. Contingencies					
1) Physical Contingency 10% of (I - VII)	4,602.3	1,850.0	6,452.3	1,604,000	458
2) Price Escalation**	3,755.7	1,893.7	5,649.4	1,405,000	401
Sub-total	8,358.0	3,743.7	12,101.7	3,009,000	859
IX. Grand Total	54,380.7	22,243.9	76,624.6	19,050,000	5,443

Note \* : Exchange rate ; Riel 4,022.20/US\$  
 \*\* : Price escalation rate; 2.5% per annum for foreign currency portion and 3.0% per annum for local currency portion.

**Table IV-6.3.3 តំលៃវិនិយោគដំបូងនៃការស្តារពោតក្នុង**

(Unit : Thousand Riel)

Description	Ang 160 SRP			Kim Sei SRP			Total
	F/C	L/C	Sub-total	F/C	L/C	Sub-total	
1) Preparatory Works	43,613	12,698	56,311	1,560	451	2,011	58,322
2) Direct Construction Cost	78,606	38,629	117,235	128,775	60,522	189,297	306,532
3) Institutional Development	754	3,680	4,434	599	2,923	3,522	7,956
4) Administration Cost	672	2,385	3,057	672	2,385	3,057	6,114
5) Engineering Services	3,524	13,833	17,357	3,885	15,244	19,129	36,486
Sub-total	127,169	71,225	198,394	135,491	81,525	217,016	415,410
6) Contingencies	15,919	9,393	25,312	20,426	13,219	33,645	58,957
Total	143,088	80,618	223,706	155,917	94,744	250,661	474,367

**Table IV-6.3.5 តំលៃវិនិយោគដំបូងលើគំរោងព័ត៌មានរូបភាព**

(Unit : Thousand Riel)

Description	F/C	L/C	Sub-total
1) Direct Construction Cost	78,618	48,102	126,720
2) Institutional Development	337	1,645	1,982
3) Administration Cost	362	40	402
4) Engineering Services	2,575	10,104	12,679
Sub-total	81,892	59,891	141,783
5) Contingencies	21,259	17,507	38,766
Total	103,151	77,398	180,549

**Table IV-6.3.7 តំលៃវិនិយោគដំបូងលើកម្មវិធីស្តាររដ្ឋបាល**

(Unit : Thousand Riel)

Description	F/C	L/C	Total
1) Preparatory Works	107,000	45,800	152,800
2) Direct Construction Cost	1,863,545	1,210,706	3,074,251
3) Administration Cost	7,535	26,715	34,250
4) Engineering Services	65,514	257,199	322,713
Sub-total	2,043,594	1,540,420	3,584,014
5) Contingencies	329,161	261,987	591,148
Total	2,372,755	1,802,407	4,175,162