

On the basis of the designed supply amount, 60 litre per person per day, annual water charge by village in the model project areas are estimated in Table I-3-7. Eventually, the expected benefit arising from the component could be estimated at 21.6 million baht for 411 villages under the overall plan, and 0.8 million bahts for 13 villages under the model projects.

#### I-3-4 Inland Fishery

In addition to the 4 reservoirs under the model projects, the existing swamps shall be developed as a fish pond under the overall plan, and then farmers will be able to promote inland fishery in these reservoirs and fish ponds, by which they can secure animal protein as well as cash income. In every reservoir and fish pond, about 30,000 fingerlings per hectare of water surface area be released once a year, and a half of them could be caught after 10 to 12 months with expected production of 1.5 tons per ha. Generally, no feed shall be provided to released fish and only cost of fingerlings and labour be required. Table I-3-8 summarizes a productivity of the inland fishery and resulted benefit. Eventually, 18.5 million bahts and 0.4 million bahts would be expected as fishery benefit under the overall plan and the model projects, respectively.

TABLE I-3-1 ECONOMIC BENEFIT OF CROPS (STORAGE PROJECT) (1)

Sub-Project:	HUAI SAM RU														
	Unit	Paddy	Maize	Soybean	Groundnut	Sugarcane	Cassava	Vegetables	Bamboo*	Upland Ric	Sesame	Mulberry	Feedgrass	Orchard*	Total
Without															
Yield	ton/ha	1.494	1.725	0.969	1.313	0.000	12.500	0.000	0.000	1.875	0.592	0.000	0.000	3.125	
Unit Price	Baht/ton	4.291	2.545	6.458	8.940	0	710	0	0	3.160	18.860	0	0	8.040	
G.P.V.	Baht/ha	6.411	4.389	6.258	11.738	0	8.873	0	0	5.925	11.165	0	0	25.125	
P.C.	Baht/ha	6.052	3.950	5.045	6.150	0	5.588	0	0	4.928	6.072	0	0	10.874	
N.P.V.	Baht/ha	359	440	1.213	5.588	0	3.337	0	0	997	5.093	0	0	14.451	
Crop Area	ha	107	393	139	35	0	100	0	0	20	40	0	0	50	
Total NPV	B1,000	38	173	169	196	0	334	0	0	20	204	0	0	723	
With															
Yield	ton/ha	4.000	2.500	1.875	1.875	62.500	0.000	15.160	8.200	0.000	0.000	0.300	25.000	15.625	
Unit Price	Baht/ton	4.291	2.545	6.458	8.940	360	0	1.340	0	0	0	73.290	322	0	
G.P.V.	Baht/ha	17.164	6.363	12.109	16.763	22.500	0	27.894	0	0	0	21.887	8.050	0	
P.C.	Baht/ha	8.249	3.950	5.552	7.584	11.464	0	5.808	0	0	0	13.381	3.552	0	
N.P.V.	Baht/ha	8.915	2.413	6.557	9.179	11.036	0	22.086	0	0	0	8.586	4.498	0	
Crop Area	ha	187	270	233	240	30	0	10	72	0	0	32	77	84	
Total NPV	B1,000	1.867	651	1.528	2.203	331	0	221	0	0	0	275	346	0	
Increment NPV	B1,000	1.629	478	1.359	2.007	331	-334	221	0	-20	-204	275	346	-723	5.365

Sub-Project: HUAI NONG KHO

	Unit	Paddy	Maize	Soybean	Groundnut	Sugarcane	Cassava	Vegetables	Bamboo*	Upland Ric	Sesame	Mulberry	Feedgrass	Orchard*	Total
Without															
Yield	ton/ha	1.838	1.638	0.850	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.125	
Unit Price	Baht/ton	4.291	2.545	6.458	0	0	0	0	0	0	0	0	0	8.040	
G.P.V.	Baht/ha	7.887	4.169	5.489	0	0	0	0	0	0	0	0	0	25.125	
P.C.	Baht/ha	6.052	3.950	5.045	0	0	0	0	0	0	0	0	0	10.874	
N.P.V.	Baht/ha	1.835	219	444	0	0	0	0	0	0	0	0	0	14.451	
Crop Area	ha	353	116	86	0	0	0	0	0	0	0	0	0	16	
Total NPV	B1,000	648	23	38	0	0	0	0	0	0	0	0	0	231	
With															
Yield	ton/ha	4.000	2.500	1.875	1.875	62.500	0.000	15.160	8.200	0.000	0.000	0.300	25.000	15.625	
Unit Price	Baht/ton	4.291	2.545	6.458	8.940	360	0	1.340	0	0	0	73.290	322	0	
G.P.V.	Baht/ha	17.164	6.363	12.109	16.763	22.500	0	27.894	0	0	0	21.887	8.050	0	
P.C.	Baht/ha	8.249	3.950	5.552	7.584	11.464	0	5.808	0	0	0	13.381	3.552	0	
N.P.V.	Baht/ha	8.915	2.413	6.557	9.179	11.036	0	22.086	0	0	0	8.586	4.498	0	
Crop Area	ha	355	20	94	31	37	0	8	31	0	0	24	37	45	
Total NPV	B1,000	3.165	48	616	295	408	0	177	0	0	0	206	166	5	
Increment NPV	B1,000	2.517	23	578	295	408	0	177	0	0	0	206	166	-231	4.128

Note: \* N.P.V. of Orchard (With) and Bamboo (With) are calculated separately.

TABLE I-3-1 ECONOMIC BENEFIT OF CROPS (STORAGE PROJECT) (2)

Sub-Project: KHLONG SAMO KHON

	Unit	Paddy	Maize	Soybean	Groundnut	Sugarcane	Cassava	Vegetables	Bamboo	Upland Ric	Sesame	Mulberry	Feedgrass	Orchard*	Total
Without															
Yield	ton/ha	1.681	1.480	0.956	0.000	43.750	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.125	
Unit Price	Baht/ton	4.291	2.545	6.458	0	360	0	0	0	0	0	0	0	8.040	
G.P.V.	Baht/ha	7.213	3.792	6.174	0	15.750	0	0	0	0	0	0	0	25.125	
P.C.	Baht/ha	6.052	3.950	5.045	0	8.346	0	0	0	0	0	0	0	10.674	
N.P.V.	Baht/ha	1.161	-158	1.129	0	6.404	0	0	0	0	0	0	0	14.451	
Crop Area	ha	144	13	5	0	6	0	0	0	0	0	0	0	5	173
Total NPV	Bt. 000	167	-1	6	0	38	0	0	0	0	0	0	0	12	282
With															
Yield	ton/ha	4.000	0.000	1.875	0.000	62.500	0.000	15.160	0.000	0.000	0.000	0.300	0.000	15.625	
Unit Price	Baht/ton	4.291	0	6.458	0	360	0	1.840	0	0	0	73.290	0	0	
G.P.V.	Baht/ha	17.164	0	12.109	0	22.500	0	27.394	0	0	0	21.987	0	0	
P.C.	Baht/ha	8.249	0	5.552	0	11.464	0	5.808	0	0	0	13.391	0	0	
N.P.V.	Baht/ha	8.915	0	6.557	0	11.036	0	22.086	0	0	0	8.596	0	0	
Crop Area	ha	131	0	37	0	10	0	16	0	0	0	16	0	6	216
Total NPV	Bt. 000	1.168	0	243	0	110	0	353	0	0	0	138	0	0	2,012
Increment NPV	Bt. 000	1,001	1	237	0	72	0	353	0	0	0	138	0	-72	1,730

Sub-Project: KHLONG SAI

	Unit	Paddy	Maize	Soybean	Groundnut	Sugarcane	Cassava	Vegetables	Bamboo	Upland Ric	Sesame	Mulberry	Feedgrass	Orchard*	Total
Without															
Yield	ton/ha	1.981	1.410	1.200	1.313	0.000	0.000	0.000	0.000	1.875	0.000	0.000	0.000	3.125	
Unit Price	Baht/ton	4.291	2.545	6.458	8.940	0	0	0	0	3.160	0	0	0	8.040	
G.P.V.	Baht/ha	8.500	3.588	7.750	11.738	0	0	0	0	5.925	0	0	0	25.125	
P.C.	Baht/ha	6.052	3.950	5.045	6.153	0	0	0	0	4.928	0	0	0	10.674	
N.P.V.	Baht/ha	2.448	-362	2.705	5.588	0	0	0	0	997	0	0	0	14.451	
Crop Area	ha	57	137	71	2	0	0	0	0	28	0	0	0	30	325
Total NPV	Bt. 000	140	-48	192	11	0	0	0	0	28	0	0	0	434	756
With															
Yield	ton/ha	4.000	2.500	1.875	0.000	62.500	0.000	15.160	0.000	0.000	0.000	0.300	25.000	15.625	
Unit Price	Baht/ton	4.291	2.545	6.458	0	360	0	1.840	0	0	0	73.290	322	0	
G.P.V.	Baht/ha	17.164	6.363	12.109	0	22.500	0	27.894	0	0	0	21.987	8.050	0	
P.C.	Baht/ha	8.249	3.950	5.552	0	11.464	0	5.808	0	0	0	13.391	3.552	0	
N.P.V.	Baht/ha	8.915	2.413	6.557	0	11.036	0	22.086	0	0	0	8.596	4.498	0	
Crop Area	ha	103	40	80	0	10	0	37	0	0	0	56	16	88	430
Total NPV	Bt. 000	918	97	525	0	110	0	817	0	0	0	481	72	0	3,029
Increment NPV	Bt. 000	778	146	333	-11	110	0	817	0	-28	0	481	72	-434	2,264

Note: \* N.P.V. of Orchard (With) is calculated separately.

TABLE 1-3-2 ECONOMIC BENEFIT OF ORCHARD (MANGO)  
- WITH PROJECT -

Year after Planting	Yield (Kg/ha)	Price (B/Kg)	G. P. V. (B/ha)	P. C. (B/ha)	N. P. V. (B/ha)
1	0	8.04	0	15,321	-15,321
2	0	8.04	0	10,939	-10,939
3	0	8.04	0	11,478	-11,478
4	1,563	8.04	12,567	14,242	-1,675
5	2,344	8.04	18,846	18,043	803
6	4,688	8.04	37,692	20,228	17,464
7	9,375	8.04	75,375	23,490	51,885
8	13,281	8.04	106,779	23,490	83,289
9	14,844	8.04	119,346	23,490	95,856
10 and over	15,625	8.04	125,625	23,490	102,135

TABLE 1-3-3 ECONOMIC BENEFIT OF BAMBOO  
- WITH PROJECT -

Year after Planting	Yield (Kg/ha)	Price (B/Kg)	G. P. V. (B/ha)	P. C. (B/ha)	N. P. V. (B/ha)
1	0	5.50	0	22,546	-22,546
2	0	5.50	0	15,088	-15,088
3	3,200	5.50	17,600	15,088	2,512
4	5,900	5.50	32,450	15,088	17,362
5 and over	8,200	5.50	45,100	15,088	30,012

TABLE I-3-4 ECONOMIC BENEFIT OF CROPS (DIVERSION PROJECT) (1)

Province: Phitsanulok

	Unit	Paddy	Soybean	Total
<b>Without Project</b>				
Yield	ton/ha	1.494	0.000	
Unit Price	Baht/ton	4,291	0	
G. P. V.	Baht/ha	6,411	0	
P. C.	Baht/ha	6,052	0	
N. P. V.	Baht/ha	359	0	
Crop Area	ha	1,130	0	1,130
Total NPV	B1,000	405	0	405
<b>With Project</b>				
Yield	ton/ha	3.200	1.500	
Unit Price	Baht/ton	4,291	6,458	
G. P. V.	Baht/ha	13,731	9,687	
P. C.	Baht/ha	8,249	5,552	
N. P. V.	Baht/ha	5,482	4,135	
Crop Area	ha	1,080	108	1,188
Total NPV	B1,000	5,921	447	6,368
Increment NPV	B1,000	5,516	447	5,963

Province: Sukhothai

	Unit	Paddy	Soybean	Total
<b>Without</b>				
Yield	ton/ha	1.838	0.000	
Unit Price	Baht/ton	4,291	0	
G. P. V.	Baht/ha	7,887	0	
P. C.	Baht/ha	6,052	0	
N. P. V.	Baht/ha	1,835	0	
Crop Area	ha	1,270	0	1,270
Total NPV	B1,000	2,330	0	2,330
<b>With</b>				
Yield	ton/ha	3.200	1.500	
Unit Price	Baht/ton	4,291	6,458	
G. P. V.	Baht/ha	13,731	9,687	
P. C.	Baht/ha	8,249	5,552	
N. P. V.	Baht/ha	5,482	4,135	
Crop Area	ha	1,210	121	1,331
Total NPV	B1,000	6,633	500	7,133
Increment NPV	B1,000	4,303	500	4,803

TABLE I-3-4 ECONOMIC BENEFIT OF CROPS (DIVERSION PROJECT) (2)

Province: Kamphaeng Phet

	Unit	Paddy	Soybean	Total
<b>Without</b>				
Yield	ton/ha	1.681	0.000	
Unit Price	Baht/ton	4,291	0	
G. P. V.	Baht/ha	7,213	0	
P. C.	Baht/ha	6,052	0	
N. P. V.	Baht/ha	1,161	0	
Crop Area	ha	2,710	0	2,710
Total NPV	B1,000	3,147	0	3,147
<b>With</b>				
Yield	ton/ha	3,200	1,500	
Unit Price	Baht/ton	4,291	6,458	
G. P. V.	Baht/ha	13,731	9,687	
P. C.	Baht/ha	8,249	5,552	
N. P. V.	Baht/ha	5,482	4,135	
Crop Area	ha	2,580	258	2,838
Total NPV	B1,000	14,144	1,067	15,211
Increment NPV	B1,000	10,997	1,067	12,064

Province: Tak

	Unit	Paddy	Soybean	Total
<b>Without Project</b>				
Yield	ton/ha	1.981	0.000	
Unit Price	Baht/ton	4,291	0	
G. P. V.	Baht/ha	8,500	0	
P. C.	Baht/ha	6,052	0	
N. P. V.	Baht/ha	2,448	0	
Crop Area	ha	2,380	0	2,380
Total NPV	B1,000	5,827	0	5,827
<b>With Project</b>				
Yield	ton/ha	3,200	1,500	
Unit Price	Baht/ton	4,291	6,458	
G. P. V.	Baht/ha	13,731	9,687	
P. C.	Baht/ha	8,249	5,552	
N. P. V.	Baht/ha	5,482	4,135	
Crop Area	ha	2,270	227	2,497
Total NPV	B1,000	12,445	939	13,384
Increment NPV	B1,000	6,618	939	7,557

TABLE I-3-5 SUMMARY OF ROAD BENEFICIARY (1)

Province: Phitsanulok

Road Number	Road Length (Km)		No. of Back-ward Village	No. of Household	Population	Land Use (rai)		Total
	S.R.-1	S.R.-2				Farming	Non-Farming	
PJ11001	42.3	-	12	2,119	10,533	93,341	39,635	265,952
PJ11005	40.0	4.0	1	121	562	4,300	398	9,396
PJ11028	21.4	2.0	3	116	625	7,805	456	16,522
PJ11033	18.7	1.0	4	662	3,472	21,480	47,361	137,682
PJ11041	18.0	0.5	1	73	326	819	551	2,740
PJ11043	14.0	1.5	7	1,052	4,986	53,436	149,353	405,578
PJ11048	26.5	3.5	4	313	1,672	8,855	212,469	442,648
PJ11050	10.0	8.0	1	174	581	6,000	2,360	16,720
PJ11051	9.0	-	-	-	-	-	-	-
PJ11054	30.0	-	-	-	-	-	-	-
PJ11058	6.0	2.0	1	175	757	2,800	200	6,000
PJ11002	6.0	9.0	5	554	2,812	22,325	84,212	213,074
PJ11003	5.5	-	6	1,420	6,528	36,316	30,676	133,984
PJ11004	0.5	-	3	330	1,716	9,554	11,414	41,936
PJ11007	7.0	2.0	12	1,157	5,055	30,200	11,502	83,404
PJ11013	0.5	5.0	4	452	1,937	9,959	1,467	22,852
PJ11014	1.3	-	3	420	2,001	5,731	3,887	19,236
PJ11018	3.0	-	1	95	431	1,592	47	3,278
PJ11019	0.5	-	2	153	613	2,323	2,237	9,120
PJ11021	-	4.0	13	1,805	10,802	47,133	19,850	133,966
PJ11044	3.0	-	-	-	-	-	-	-
R2013	-	5.5	9	1,320	5,608	34,969	48,956	167,850
R1065	-	5.5	7	957	4,180	23,058	2,768	51,652
R12	-	2.5	8	1,212	6,315	38,468	111,469	298,874
R112	-	12.5	6	697	3,135	17,479	2,857	40,672
R111	-	-	8	1,137	5,494	27,734	15,696	86,860
Others	0.5	6.0	28	3,058	13,693	82,055	143,826	451,762
Total	263.7	57.7	149	19,572	93,834	587,732	943,647	3,062,758
		70.0						
		391.4						

TABLE I-3-5 SUMMARY OF ROAD BENEFICIARY (2)

Province: Sukhothai

Road Number	Road Length (Km)		Total	No. of Back-ward Village	No. of Household	Population	Land Use (rai)		Total
	S. T. D.	S. R. -1					S. R. -2	Farming	
ST11001	25.0	-	25.0	2	329	1,418	7,028	46,098	53,126
ST11008	15.5	-	16.0	1	118	488	1,600	455	2,055
ST11010	14.1	-	14.1	1	138	655	4,660	200	4,860
ST11012	24.0	10.0	37.0	2	279	1,323	7,195	11,005	18,200
ST11019	27.0	-	27.0	1	82	310	2,438	3,500	5,938
ST11002	8.0	-	8.5	2	385	1,458	7,874	40,519	48,393
ST11005	1.0	-	3.0	2	341	1,425	7,000	49,500	56,500
ST11027	1.5	3.5	12.0	11	1,252	5,666	30,547	6,952	37,499
R12	-	12.5	26.5	25	4,451	21,784	76,919	59,477	136,396
R101	-	8.5	25.0	24	2,127	10,746	52,117	55,174	107,291
R102	-	5.5	6.0	1	199	829	5,090	210	5,300
R143	-	8.0	12.0	12	1,114	5,393	40,278	9,031	49,309
R1048	-	6.5	11.5	2	145	611	8,670	1,520	10,190
R1053	-	-	5.0	3	188	711	4,817	1,745	6,562
Others	-	1.5	23.0	23	3,123	14,667	67,415	108,848	176,263
<b>Total</b>	<b>116.1</b>	<b>56.0</b>	<b>251.6</b>	<b>112</b>	<b>14,271</b>	<b>67,484</b>	<b>323,648</b>	<b>394,234</b>	<b>717,882</b>



TABLE I-3-5 SUMMARY OF ROAD BENEFICIARY (3)

Province: Kamphaeng Phet

Road Number	Road Length (Km)		S. T. D.	No. of Backward Village	No. of Household	Population	Land Use (rai)		Total
	S. R. -1	S. R. -2					Farming	Non-Farming	
KP11009	-	3.0	19.5	2	279	1,524	7,500	-	7,500
KP11011	5.0	-	7.3	2	152	783	5,358	640	5,998
KP11022	-	0.5	14.0	4	799	4,152	17,220	5,910	23,130
KP11026	-	-	5.4	1	969	6,470	11,060	1,700	12,760
KP11027	-	1.5	9.8	3	1,546	7,050	29,025	5,975	35,000
KP11034	-	-	5.0	-	-	-	-	-	-
KP11037	6.5	4.5	28.0	9	1,202	5,664	44,208	7,339	51,547
KP11002	-	1.0	1.0	2	161	978	5,074	4,176	9,250
KO11003	-	5.0	1.5	2	194	995	3,985	2,715	6,700
KP11012	8.0	1.5	0.5	5	1,200	6,107	31,184	25,087	56,271
KP11013	10.0	5.0	3.5	12	1,216	5,740	50,702	12,627	63,329
KP11018	-	-	2.0	-	-	-	-	-	-
KP11020	-	1.5	2.0	2	147	760	3,550	1,120	4,670
KP11030	3.0	4.5	-	5	693	2,827	25,756	4,529	30,285
KP11032	5.5	7.0	5.5	9	797	4,098	29,400	29,623	59,023
R1	29.0	23.0	-	26	3,462	17,340	70,014	24,921	94,935
R101	-	16.5	-	6	784	3,581	38,185	11,998	50,183
R115	-	6.0	-	6	604	3,082	29,505	7,035	36,540
R1109	-	2.5	-	3	605	3,041	7,350	6,298	13,648
R1117	3.0	5.5	-	8	1,007	5,517	38,917	6,368	45,285
R1065	3.0	2.5	-	4	324	1,315	11,230	4,080	15,310
R1072	-	2.5	-	3	698	3,479	21,402	15,748	37,150
R1074	6.0	1.0	-	4	320	1,803	5,829	2,131	7,960
R1084	-	13.0	-	7	970	5,908	20,557	3,016	23,573
R1112	9.0	5.0	-	12	2,207	11,159	67,177	45,955	113,132
R1242	-	6.0	-	6	698	3,689	23,500	2,965	26,465
R1278	-	5.5	-	7	549	2,408	22,664	4,587	27,251
R1280	-	2.5	-	3	306	1,475	10,251	1,274	11,525
Others	-	46.5	-	31	4,468	23,975	106,296	49,257	155,553
<b>Total</b>	<b>105.0</b>	<b>89.0</b>	<b>173.0</b>	<b>184</b>	<b>26,357</b>	<b>134,920</b>	<b>736,899</b>	<b>287,074</b>	<b>1,023,973</b>

TABLE I-3-5 SUMMARY OF ROAD BENEFICIARY (4)

Province: Tak

Road Number	Road Length (Km)		Total	No. of Back-ward Village	No. of Household	Population	Land Use (rai)		Total
	S.T.D.	S.R.-1					S.R.-2	Farming	
TK11014	5.0	-	5.0	-	-	-	-	-	-
TK11037	5.0	-	5.0	-	-	-	-	-	-
TK11039	13.0	-	13.0	-	-	-	-	-	-
TK11002	1.5	-	4.5	2	391	1,791	10,977	10,878	21,875
TK11003	-	-	1.0	1	82	564	1,000	200	1,200
TK11007	1.0	-	2.0	1	126	654	1,140	8,010	9,150
TK11018	0.5	-	0.5	3	281	1,206	5,929	3,190	9,119
TK11019	2.0	-	3.5	5	555	2,762	10,485	21,604	32,089
TK11023	0.5	4.0	5.5	3	160	727	3,640	11,997	15,637
R1	-	-	4.0	5	536	2,724	6,404	6,122	12,526
R12	-	-	9.0	7	1,045	4,375	12,633	121,185	133,818
R104	-	-	0.5	1	82	387	1,179	6,889	8,068
R105	-	-	2.0	5	592	2,960	17,500	50,472	67,972
R1085	-	14.5	15.5	31	2,713	12,641	22,578	10,759	33,337
R1090	-	15.0	27.5	29	3,089	19,957	68,413	1,488,378	1,556,791
R1099	-	-	0.5	2	116	708	265	27,735	28,000
R1117	-	-	2.5	5	527	2,395	11,887	54,844	66,731
R1118	-	-	2.5	2	409	2,808	4,073	667	4,740
R1110	-	-	2.0	2	273	1,792	3,100	6,076	9,176
R1132	-	-	5.5	2	125	640	1,708	19,989	21,697
R1167	-	-	5.5	8	946	4,806	18,939	602,289	621,228
R1175	-	-	2.5	8	751	3,556	8,346	14,874	23,220
<b>Total</b>	<b>28.5</b>	<b>33.5</b>	<b>119.5</b>	<b>122</b>	<b>12,749</b>	<b>67,453</b>	<b>210,216</b>	<b>2,466,158</b>	<b>2,676,374</b>

TABLE I-3-6 ESTIMATION OF A.D.T. AND SAVING OF V.O.C. (1)

Province: PHITSANULOK

Road No.	Road Length (km)		Popul- ation	Farm Land	Pop./R. Length	Area/R. Length	Pop Multi.	Area Multi.	Total Multi.	A.D.T.	Total V.O.C.S.
	ARD STD	S.R.-1									
PJ11001	42.3	0.0	42.3	0	0	0	0.000	0.000	0.000	0	0
PJ11005	40.0	0.0	10,533	93,341	239	2,121	0.743	1.290	1.017	102	6,749
PJ11028	21.4	0.0	562	4,300	24	184	0.075	0.112	0.093	9	329
PJ11033	18.7	4.0	625	7,805	26	329	0.082	0.200	0.141	14	499
PJ11041	18.0	2.0	3,472	21,480	169	1,048	0.526	0.637	0.581	58	1,803
PJ11043	14.0	0.0	326	819	21	53	0.065	0.082	0.049	5	114
PJ11048	26.5	4.2	4,986	53,436	146	1,562	0.453	0.950	0.701	70	3,554
PJ11050	10.0	8.0	1,672	8,855	93	492	0.288	0.299	0.294	29	763
PJ11051	9.0	0.0	581	6,000	65	667	0.200	0.405	0.303	30	420
PJ11054	30.0	0.0	0	0	0	0	0.000	0.000	0.000	0	0
PJ11058	6.0	0.0	757	2,800	95	350	0.294	0.213	0.253	25	295
PJ11002	6.0	9.0	2,812	22,325	156	1,240	0.485	0.754	0.620	62	1,548
PJ11003	5.5	0.0	6,528	36,316	816	4,540	2.534	2.760	2.647	265	3,040
PJ11004	0.5	0.0	1,716	9,554	572	3,185	1.776	1.936	1.856	186	704
PJ11007	7.0	2.0	5,055	30,200	421	2,517	1.308	1.530	1.419	142	2,426
PJ11013	0.5	5.0	1,937	9,959	258	1,328	0.802	0.807	0.805	80	798
PJ11014	1.3	0.0	2,001	5,731	527	1,508	1.635	0.917	1.276	128	641
PJ11018	3.0	0.0	431	1,592	108	398	0.335	0.242	0.288	29	168
PJ11019	0.5	0.0	613	2,323	245	929	0.761	0.565	0.663	66	211
PJ11021	0.0	4.0	10,802	47,133	772	3,367	2.396	2.047	2.221	222	3,883
PJ11044	3.0	0.0	0	0	0	0	0.000	0.000	0.000	0	0
R2013	0.0	0.0	5,608	34,969	1,020	6,358	3.167	3.865	3.516	352	2,338
R1065	0.0	0.0	4,180	23,058	760	4,192	2.360	2.549	2.454	245	1,632
R12	0.0	12.5	6,315	38,468	421	2,565	1.307	1.559	1.433	143	2,846
R112	0.0	0.0	3,135	17,479	896	4,994	2.782	3.036	2.909	291	1,231
R11	0.0	1.0	5,494	27,734	1,099	5,547	3.412	3.372	3.392	339	2,097
Others	0.5	6.0	13,693	82,055	1,095	6,564	3.402	3.991	3.696	370	5,953
Total	263.7	57.7	93,834	587,732	391.4	3,914	3.402	3.991	3.696	370	44,048

TABLE I-3-6 ESTIMATION OF A.D.T. AND SAVING OF V.O.C. (2)

Province: SUKHOTHAI

Road No.	Road Length (Km)		Popul- ation	Farm Land	Pop./R. Length	Area/R. Length	Pop. Multi.	Area Multi.	Total Multi.	A.D.T.	Total V.O.C.S.
	ARD STD	S.R.-1									
ST11001	25.0	0.0	25.0	1,418	57	281	0.176	0.171	0.174	17	668
ST11008	15.5	0.0	16.0	488	31	100	0.095	0.067	0.078	8	190
ST11010	14.1	0.0	14.1	655	46	330	0.144	0.201	0.173	17	375
ST11012	24.0	10.0	37.0	1,323	36	194	0.111	0.118	0.115	11	619
ST11019	27.0	0.0	27.0	310	11	90	0.036	0.053	0.045	5	188
ST11002	8.0	0.0	8.5	1,458	172	926	0.533	0.563	0.548	55	708
ST11005	1.0	0.0	3.0	1,425	475	2,333	1.475	1.418	1.447	143	572
ST11027	1.5	3.5	7.0	5,666	472	2,546	1.466	1.547	1.507	151	2,334
R12	0.0	12.5	26.5	21,784	822	2,903	2.553	1.765	2.159	216	7,289
R101	0.0	8.5	25.0	10,746	430	2,085	1.335	1.267	1.301	130	4,085
R102	0.0	5.5	6.0	829	138	848	0.429	0.516	0.472	47	379
R143	0.0	8.0	12.0	5,393	449	3,357	1.396	2.040	1.718	172	2,682
R1048	0.0	6.5	11.5	611	53	754	0.165	0.458	0.312	31	461
R1053	0.0	0.0	5.0	711	142	963	0.442	0.589	0.514	51	310
Others	0.0	1.5	23.0	14,667	638	2,931	1.980	1.782	1.881	188	5,270
Total	116.1	56.0	251.6	67,484	323,648						26,130

TABLE I-3-6 ESTIMATION OF A.D.T. AND SAVING OF V.O.C. (3)

Province: KAMPHAENG PHET

Road No.	Road Length (Km)		Popul- ation	Farm Land	Pop./R. Length	Area/R. Length	Pop. Multi.	Area Multi.	Total Multi.	A.D.T.	Total V.O.C.S.
	ARD STD	S.R.-1									
KP11009	19.5	0.0	1,524	7,500	68	333	0.210	0.203	0.206	21	556
KP11011	7.3	5.0	783	5,358	64	436	0.198	0.265	0.231	23	332
KP11022	14.0	0.0	4,152	17,220	286	1,188	0.889	0.722	0.806	81	1,428
KP11026	5.4	0.0	5,470	11,060	1,198	2,048	3.721	1.245	2.483	248	1,651
KP11027	9.8	0.0	7,050	29,025	624	2,569	1.938	1.561	1.750	175	2,365
KP11034	5.0	0.0	0	0	0	0	0.000	0.000	0.000	0	0
KP11037	28.0	6.5	5,664	44,208	145	1,134	0.451	0.683	0.570	57	2,613
KP11002	1.0	0.0	978	5,074	489	2,537	1.519	1.542	1.530	153	336
KP11003	1.5	0.0	995	3,985	153	613	0.475	0.373	0.424	42	283
KP11012	0.5	8.0	6,107	31,184	611	3,118	1.897	1.896	1.896	190	2,026
KP11013	3.5	10.0	5,740	50,702	310	2,741	0.964	1.666	1.315	131	2,619
KP11018	2.0	0.0	0	0	0	0	0.000	0.000	0.000	0	0
KP11020	2.0	0.0	760	3,550	217	1,014	0.574	0.617	0.645	65	253
KP11030	0.0	3.0	2,827	25,756	377	3,434	1.171	2.088	1.629	163	1,236
KP11032	5.5	0.0	4,098	29,400	328	2,352	1.018	1.430	1.224	122	1,657
R1	0.0	29.0	17,340	70,014	333	1,346	1.036	0.818	0.927	93	4,959
R101	0.0	0.0	3,581	38,185	217	2,314	0.674	1.407	1.040	104	1,660
R115	0.0	0.0	3,082	29,505	514	4,918	1.595	2.989	2.292	229	1,330
R1109	0.0	0.0	3,041	7,350	1,216	2,940	3.778	1.787	2.782	278	673
R1117	0.0	3.0	5,517	38,917	649	4,578	2.016	2.783	2.399	240	2,052
R1065	0.0	3.0	1,315	11,230	239	2,042	0.743	1.241	0.992	99	560
R1072	0.0	0.0	3,479	21,402	1,392	8,561	4.322	5.204	4.763	476	1,152
R1074	0.0	6.0	1,803	5,829	258	833	0.800	0.506	0.653	65	485
R1084	0.0	0.0	5,908	20,557	454	1,581	1.411	0.961	1.186	119	1,492
R1112	0.0	9.0	11,159	67,177	797	4,798	2.475	2.917	2.696	270	3,919
R1242	0.0	3.5	3,689	23,500	388	2,474	1.206	1.504	1.355	135	1,297
R1278	0.0	3.0	2,408	22,664	283	2,666	0.880	1.621	1.250	125	1,063
R1280	0.0	0.0	1,475	10,251	590	4,100	1.832	2.493	2.162	216	523
Others	0.0	0.0	23,975	106,296	516	2,286	1.501	1.390	1.495	150	6,726
Total	105.0	89.0	134,920	736,899							45,253

TABLE I-3-6 ESTIMATION OF A.D.T. AND SAVING OF V.O.C. (4)

Province: TAK

Road No.	Road Length (km)		Popul- ation	Farm Land	Pop./R. Length	Area/R. Length	Pop. Multi.	Area Multi.	Total Multi.	A.D.T.	Total V.O.C.S.
	ARD STD	S.R.-1									
TK11014	5.0	0.0	5.0	0	0	0	0.000	0.000	0.000	0	0
TK11037	5.0	0.0	5.0	0	0	0	0.000	0.000	0.000	0	0
TK11039	13.0	0.0	13.0	0	0	0	0.000	0.000	0.000	0	0
TK11002	1.5	0.0	4.5	1,791	398	2,444	1,236	1,486	1,361	136	808
TK11003	0.0	0.0	1.0	564	564	1,000	1,752	0.608	1.180	118	143
TK11007	1.0	0.0	2.0	654	327	570	1,016	0.347	0.681	68	187
TK11013	0.5	0.0	0.5	1,206	2,412	11,858	7,491	7,209	7,350	735	566
TK11019	2.0	0.0	3.5	2,762	789	2,996	2,451	1,821	2,136	214	1,045
TK11023	0.5	4.0	5.5	727	132	662	0.411	0.402	0.406	41	299
R1	0.0	0.0	4.0	2,724	681	1,601	2,115	0.973	1,544	154	747
R12	0.0	0.0	9.0	4,375	436	1,404	1,510	0.853	1,181	118	1,286
R104	0.0	0.0	0.5	387	774	2,358	2,404	1,433	1,919	192	116
R105	0.0	0.0	2.0	2,960	1,480	8,750	4,596	5,319	4,958	496	1,199
R1085	0.0	14.5	15.5	12,641	816	1,457	2,533	0.885	1,709	171	3,545
R1090	0.0	15.0	27.5	19,957	726	2,488	2,254	1,512	1,883	188	6,650
R1099	0.0	0.0	0.5	708	265	1,416	4,398	0.322	2,360	236	143
R1117	0.0	0.0	2.5	2,395	958	4,755	2,975	2,890	2,933	293	886
R1118	0.0	0.0	2.5	2,808	1,123	1,629	3,488	0.990	2,239	224	677
R1110	0.0	0.0	2.0	1,792	896	1,550	2,783	0.942	1,862	186	450
R1132	0.0	0.0	5.5	640	116	311	0.361	0.189	0.275	28	183
R1167	0.0	0.0	5.5	4,806	874	3,443	2,714	2,093	2,404	240	1,598
R1175	0.0	0.0	2.5	3,556	1,422	3,338	4,417	2,029	3,223	322	974
Total	28.5	33.5	119.5	67,453	210,216						21,501

TABLE I-3-7 VILLAGE-WISE WATER CHARGES IN MODEL PROJECT AREAS

Name of Village	No. of H.H.	Total Population	Average H.H. Size	Monthly Consumption (cu. m/H.H.)	Monthly Water Charge		Monthly Water Charge		Annual Water Charge	
					Financial	Economic	Financial	Economic	Financial	Economic
				(cu. m/H.H.)	(B/Month/H.H.)	(B/Month/Village)	(B/Year/Village)	(B/Year/Village)	(B/Year/Village)	(B/Year/Village)
<b>PHITSANULOK</b>										
- Samu Ru	184	746	4.55	8.19	30.7	5,035	4,641	60,420	55,692	
- Kaeng Wa	245	1,087	4.23	7.61	28.5	6,983	6,444	83,796	77,328	
- Kaeng Hai	95	399	4.20	7.56	28.4	2,698	2,480	32,876	29,760	
<u>Total</u>	<u>504</u>	<u>2,182</u>	-	-	-	<u>14,716</u>	<u>13,565</u>	<u>176,592</u>	<u>162,780</u>	
(Average)	(168)	(727)				(4,905)	(4,522)	(58,864)	(54,260)	
<b>SUKHOTHAI</b>										
- Huai Krai	281	1,468	5.22	9.40	35.3	9,919	9,104	119,028	109,248	
- Lan Thong	139	548	3.94	7.09	26.6	3,697	3,406	44,364	40,872	
- Wang Phong	61	238	3.90	7.02	26.3	1,604	1,476	19,248	17,712	
- Phu Thong	271	1,342	4.95	8.91	33.4	9,051	8,320	108,612	99,840	
<u>Total</u>	<u>752</u>	<u>3,569</u>	-	-	-	<u>24,271</u>	<u>22,306</u>	<u>291,252</u>	<u>267,672</u>	
(Average)	(188)	(892)				(6,068)	(5,577)	(72,813)	(66,918)	
<b>KAMPHAENG PHET</b>										
- Nam Dip Ma Phraw	139	548	3.94	7.09	26.6	3,697	3,406	44,364	40,872	
- Samo Khon	135	475	3.52	6.34	23.8	3,213	2,957	38,556	35,484	
<u>Total</u>	<u>274</u>	<u>1,023</u>	-	-	-	<u>6,910</u>	<u>6,363</u>	<u>82,920</u>	<u>76,356</u>	
(Average)	(137)	(512)				(3,455)	(3,182)	(41,460)	(38,178)	
<b>TAK</b>										
- Na Bot	318	1,594	5.01	9.02	33.8	10,748	9,890	128,976	118,680	
- Wang Tamlung	50	499	9.98	17.96	80.8	4,040	3,720	48,480	44,640	
- Lat Yao	187	1,035	5.53	9.95	37.3	6,975	6,414	83,700	76,968	
- Takian Duan	75	308	4.11	7.40	27.8	2,085	1,913	25,020	22,956	
<u>Total</u>	<u>630</u>	<u>3,436</u>	-	-	-	<u>23,848</u>	<u>21,937</u>	<u>286,176</u>	<u>263,244</u>	
(Average)	(158)	(859)				(5,962)	(5,484)	(71,544)	(65,811)	

Note: H.H. : Household

TABLE I-3-8 BENEFIT OF INLAND FISHERY

1. Productivity per ha (walking catfish as a representative)

1-1. Release of Fingerling : 30,000 per year

1-2. Feeding : None

1-3. Fish Catch : 1,500 Kg (15,000 fish with weight of 0.1 Kg, 10 to 12 months after release)

	<u>Financial Price</u>	<u>Economic Price</u>
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1-4. Production	1,500 Kg	1,500 Kg
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1-5. Selling Price	B 30/Kg	B 27.6/Kg
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1-6. G. P. V.	B 45,000	B 41,400
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1-7. Production Cost

- Fingerling

- Labour

- Sub-total

60 man-days

B 12,000	B 11,040
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4,500	4,140
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B 16,500	B 15,180
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1-8. N. P. V.	B 28,500	B 26,220
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2. Benefit

Province	Water Surface Area (ha)		Financial (B1,000)		Economic (B1,000)	
	Model	Project	Overall Plan	Model	Project	Overall Plan
- Phitsanulok	3.70	149.30	105	4,255	97	3,915
- Sukhothai	1.88	272.28	54	7,760	49	7,139
- Kamphaeng Phet	3.13	241.03	89	6,869	82	6,320
- Tak	5.30	41.90	151	1,194	139	1,099
<u>Total</u>	<u>14.01</u>	<u>704.51</u>	<u>399</u>	<u>20,078</u>	<u>367</u>	<u>18,473</u>



## I-4 Farm Budget Analysis

### I-4-1 Crop Budget

All prices of input and output to be used for the financial analysis are based on their market ones including taxes and subsidies. And net income arising from crop cultivation is calculated on farm management basis, excluding family labor cost. In connection with net income of perennial crops such as orchard and bamboo, their gross income and production cost were capitalized as annual basis with interest rate of 12.5 percent over 20 years. Table I-4-1 presents the crop budget in both cases of without and with project.

### I-4-2 Farm Budget

In order to evaluate a financial impact on beneficiary farmers through implementation of the proposed model projects, farm budget analysis for typical farms has been made in cases of "without" and "with" project. The size of the typical farms has been derived from the result of the farm economic survey for 257 farms in the 4 model project areas, namely, 3.62 ha in Huai Sam Ru, 3.49 ha in Huai Nong Kho, 1.75 ha in Khlong Samo Khon and 3.04 ha in Khlong Sai. In addition, the result has been referred for off-farm income, household expenditure and so forth.

No off-farm income is considered for the 3 model project areas of Huai Sam Ru, Huai Nong Kho and Khlong Sai, in which the typical farm size exceeds 3 ha and farmers shall be concentrating on their farming only. On the other hand, farmers in Khlong Samo Khon area will be able to earn a half of the present off-farm income, taking into consideration workable capacity as off-farm labor, because the typical farm size is as smaller 1.75 ha than the other areas.

Taking into consideration soil condition, present farming practices, marketability, farmers attitude and so on, the following 8 types of farming patterns are taken into account in the farm budget analysis;

- Type-0 : Proposed Cropping Pattern
- Type-1 : Paddy + Upland Crop
- Type-2 : Paddy + Vegetables
- Type-3 : Paddy + Sugarcane
- Type-4 : Paddy + Orchard
- Type-5 : Paddy + Mulberry
- Type-6 : Upland Crop + Bamboo
- Type-7 : Upland Crop + Orchard
- Type-8 : Upland Crop + Mulberry

Table I-4-2 shows the result of the farm budget analysis by these farming type in each model project.

TABLE I-4-1 FINANCIAL CROP BUDGET (STORAGE PROJECT) (1)

Sub-Project: HUAI SAM RU														
	Unit	Paddy	Maize	Soybean	Groundnut	Sugarcane	Cassava	Vegetables	Bamboo	Upland Ric	Sesame	Mulberry	Feedgrass	Orchard
Without														
Yield	ton/ha	1.494	1.725	0.969	1.313	0.000	12.500	0.000	0.000	1.875	0.592	0.000	0.000	3.125
Unit Price	Baht/ton	3.696	2.212	6.525	8.200	0	650	0	0	2.900	20.500	0	0	7.380
Gross Income	Baht/ha	5.522	3.816	6.323	10.767	0	8.125	0	0	5.438	12.186	0	0	23.063
P.C. *	Baht/ha	3.860	1.947	4.107	3.263	0	3.285	0	0	3.646	4.710	0	0	11.694
Net Income	Baht/ha	1.662	1.869	2.216	7.504	0	4.840	0	0	1.792	7.426	0	0	11.369
With														
Yield	ton/ha	4.000	2.500	1.875	1.875	62.500	0.000	15.160	5.616	0.000	0.000	0.300	25.000	6.533
Unit Price	Baht/ton	3.696	2.212	6.525	8.200	330	0	2.000	5.980	0	0	70.000	350	7.380
Gross Income	Baht/ha	14,784	5,530	12,234	15,375	20,625	0	30,320	33,584	0	0	21,000	8,750	48,214
P.C. *	Baht/ha	5,977	2,765	4,504	4,634	6,492	0	3,860	18,668	0	0	8,619	2,771	17,357
Net Income	Baht/ha	8,807	2,765	7,730	10,741	14,133	0	26,460	14,916	0	0	12,381	5,979	30,857

Note: P.C. does not include cost of family labor

Sub-Project: HUAI NONG KHO														
	Unit	Paddy	Maize	Soybean	Groundnut	Sugarcane	Cassava	Vegetables	Bamboo	Upland Ric	Sesame	Mulberry	Feedgrass	Orchard
Without														
Yield	ton/ha	1.838	1.638	0.850	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.125
Unit Price	Baht/ton	3.696	2.212	6.525	0	0	0	0	0	0	0	0	0	7.380
Gross Income	Baht/ha	6.793	3.623	5.546	0	0	0	0	0	0	0	0	0	23.063
P.C. *	Baht/ha	3.997	1.761	4.134	0	0	0	0	0	0	0	0	0	11.694
Net Income	Baht/ha	2.796	1.862	1.412	0	0	0	0	0	0	0	0	0	11.369
With														
Yield	ton/ha	4.000	2.500	1.875	1.875	62.500	0.000	15.160	5.616	0.000	0.000	0.300	25.000	6.533
Unit Price	Baht/ton	3.696	2.212	6.525	8.200	330	0	2.000	5.980	0	0	70.000	350	7.380
Gross Income	Baht/ha	14,784	5,530	12,234	15,375	20,625	0	30,320	33,584	0	0	21,000	8,750	48,214
P.C. *	Baht/ha	6,172	2,495	4,543	4,323	7,825	0	3,732	18,668	0	0	9,052	2,821	17,357
Net Income	Baht/ha	8,612	3,035	7,691	11,052	12,800	0	26,588	14,916	0	0	11,948	5,929	30,857

Note: P.C. does not include cost of family labor.

TABLE I-4-1 FINANCIAL CROP BUDGET (STORAGE PROJECT) (2)

Sub-Project: KHLONG SAMO KHON														
	Unit	Paddy	Maize	Soybean	Groundnut	Sugarcane	Cassava	Vegetables	Bamboo	Upland Ric	Sesame	Mulberry	Feedgrass	Orchard
Without														
Yield	ton/ha	1,681	1,490	0,956	0,000	43,750	0,000	0,000	0,000	0,000	0,000	0,000	0,000	3,125
Unit Price	Baht/ton	3,696	2,212	6,525	0	330	0	0	0	0	0	0	0	7,380
Gross Income	Baht/ha	6,213	3,296	6,288	0	14,438	0	0	0	0	0	0	0	23,063
P.C. *	Baht/ha	4,208	1,459	4,321	0	4,801	0	0	0	0	0	0	0	11,758
Net Income	Baht/ha	2,005	1,827	1,917	0	9,637	0	0	0	0	0	0	0	11,305
With														
Yield	ton/ha	4,000	0,000	1,875	0,000	62,500	0,000	15,150	0,000	0,000	0,000	0,300	0,000	6,533
Unit Price	Baht/ton	3,696	0	6,525	0	330	0	2,000	0	0	0	70,000	0	7,380
Gross Income	Baht/ha	14,784	0	12,234	0	20,625	0	30,320	0	0	0	21,000	0	48,214
P.C. *	Baht/ha	6,476	0	4,813	0	6,644	0	4,378	0	0	0	9,173	0	17,357
Net Income	Baht/ha	8,308	0	7,421	0	13,981	0	25,942	0	0	0	11,825	0	30,857

Note: P.C. does not include cost of family labor.

Sub-Project: KHLONG SAI														
	Unit	Paddy	Maize	Soybean	Groundnut	Sugarcane	Cassava	Vegetables	Bamboo	Upland Ric	Sesame	Mulberry	Feedgrass	Orchard
Without														
Yield	ton/ha	1,981	1,410	1,200	1,313	0,000	0,000	0,000	0,000	1,875	0,000	0,000	0,000	3,125
Unit Price	Baht/ton	3,696	2,212	6,525	8,200	0	0	0	0	2,900	0	0	0	7,380
Gross Income	Baht/ha	7,322	3,119	7,830	10,767	0	0	0	0	5,438	0	0	0	23,063
P.C. *	Baht/ha	4,194	1,973	4,572	2,646	0	0	0	0	3,853	0	0	0	11,817
Net Income	Baht/ha	3,128	1,146	3,258	8,121	0	0	0	0	1,585	0	0	0	11,246
With														
Yield	ton/ha	4,000	2,500	1,975	0,000	62,500	0,000	15,160	0,000	0,000	0,000	0,300	25,000	6,533
Unit Price	Baht/ton	3,696	2,212	6,525	0	330	0	2,000	0	0	0	70,000	350	7,380
Gross Income	Baht/ha	14,784	5,530	12,234	0	20,625	0	30,320	0	0	0	21,000	8,750	48,214
P.C. *	Baht/ha	6,458	2,801	5,053	0	8,689	0	4,831	0	0	0	11,872	3,029	17,357
Net Income	Baht/ha	8,325	2,729	7,181	0	11,936	0	25,489	0	0	0	9,128	5,721	30,857

Note: P.C. does not include cost of family labor.

TABLE I-4-2 FARM BUDGET ANALYSIS (1)

Model Project : Huai Sam Ru

	Unit	Without Project	With Project										
			Type - 0	Type - 1	Type - 2	Type - 3	Type - 4	Type - 5	Type - 6	Type - 7	Type - 8		
1. Farm Size	ha	3.62	3.62	-	-	-	3.62	3.62	3.62	3.62	3.62	-	-
2. Fallow Area	ha	0.17	-	-	-	-	-	-	-	-	-	-	-
3. Cropped Area	ha	3.45	5.07	-	-	-	4.62	4.62	4.86	4.44	4.42	-	-
4. Crop Intensity	%	95	140	-	-	-	128	128	134	123	122	-	-
5. <u>Farm Income</u>	Baht	23,199	73,676	-	-	-	104,858	104,858	74,056	57,663	65,908	-	-
- Crop Income		5,281	-	-	-	-	-	-	-	-	-	-	-
- Off Farm Income		28,480	73,676	-	-	-	104,858	104,858	74,056	57,663	65,908	-	-
- Sub-total													
6. <u>Farm Expenses</u>	Baht	11,920	28,268	-	-	-	38,955	38,955	28,708	23,439	23,588	-	-
- On-Farm		12,524	12,524	-	-	-	12,524	12,524	12,524	12,524	12,524	-	-
- Household		24,444	40,792	-	-	-	54,179	54,179	41,232	35,963	36,112	-	-
- Sub-total													
7. <u>Farm Surplus (Increment)</u>	Baht	4,036	32,884	-	-	-	50,679	50,679	32,824	21,700	29,796	-	(-)
			(28,848)	(-)	(-)	(-)	(46,643)	(46,643)	(28,788)	(17,664)	(25,760)		

TABLE I-4-2 FARM BUDGET ANALYSIS (2)

Model Project : Huai Nong Kho

	Unit	Without Project	With Project										
			Type - 0	Type - 1	Type - 2	Type - 3	Type - 4	Type - 5	Type - 6	Type - 7	Type - 8		
1. Farm Size	ha	3.49	3.49	-	-	-	3.49	3.49	3.49	3.49	3.49	3.49	-
2. Fallow Area	ha	0.08	-	-	-	-	-	-	-	-	-	-	-
3. Cropped Area	ha	3.41	4.62	-	-	-	4.86	4.44	4.42	4.37	4.37	4.37	-
4. Crop Intensity	%	98	132	-	-	-	139	127	127	125	125	125	-
5. Farm Income	Baht	21,969	61,134	-	-	-	73,067	61,795	93,996	123,296	123,296	123,296	-
- Crop Income		12,832	-	-	-	-	-	-	-	-	-	-	-
- Off Farm Income		34,801	61,134	-	-	-	73,067	61,795	93,996	123,296	123,296	123,296	-
- Sub-total													
6. Farm Expenses	Baht	12,927	24,652	-	-	-	28,660	25,065	41,144	42,845	42,845	42,845	-
- On-Farm		12,371	12,371	-	-	-	12,371	12,371	12,371	12,371	12,371	12,371	-
- Household		25,298	37,023	-	-	-	41,031	37,436	53,515	55,216	55,216	55,216	-
- Sub-total													
7. Farm Surplus (Increment)	Baht	9,503 (-)	24,111 (14,608)	- (-)	- (-)	- (-)	32,036 (22,533)	24,359 (14,856)	40,481 (30,973)	63,080 (53,577)	63,080 (53,577)	63,080 (53,577)	- (-)

TABLE I-4-2 FARM BUDGET ANALYSIS (3)

Model Project : Khlong Samo Khon

	Unit	With Project										
		Type - 0	Type - 1	Type - 2	Type - 3	Type - 4	Type - 5	Type - 6	Type - 7	Type - 8		
1. Farm Size	ha	1.75	-	1.75	1.75	-	1.75	-	-	-	-	-
2. Fallow Area	ha	0.11	-	-	-	-	-	-	-	-	-	-
3. Cropped Area	ha	1.64	-	2.19	2.11	-	2.11	-	-	-	-	-
4. Crop Intensity	%	121	-	125	121	-	121	-	-	-	-	-
5. <u>Farm Income</u>	Baht											
- Crop Income		11,176	-	34,207	34,573	-	34,689	-	-	-	-	-
- Off Farm Income		13,537	-	6,768	6,768	-	6,768	-	-	-	-	-
- Sub-total		24,713	-	40,975	41,341	-	41,457	-	-	-	-	-
6. <u>Farm Expenses</u>	Baht											
- On-Farm		6,991	-	13,052	12,782	-	13,567	-	-	-	-	-
- Household		10,966	-	10,966	10,966	-	10,966	-	-	-	-	-
- Sub-total		17,957	-	24,018	23,748	-	24,533	-	-	-	-	-
7. <u>Farm Surplus</u> (Increment)	Baht	6,756 (-)	- (-)	16,957 (10,201)	17,593 (10,837)	- (-)	16,924 (10,168)	- (-)	- (-)	- (-)	- (-)	

TABLE I-4-2 FARM BUDGET ANALYSIS (4)

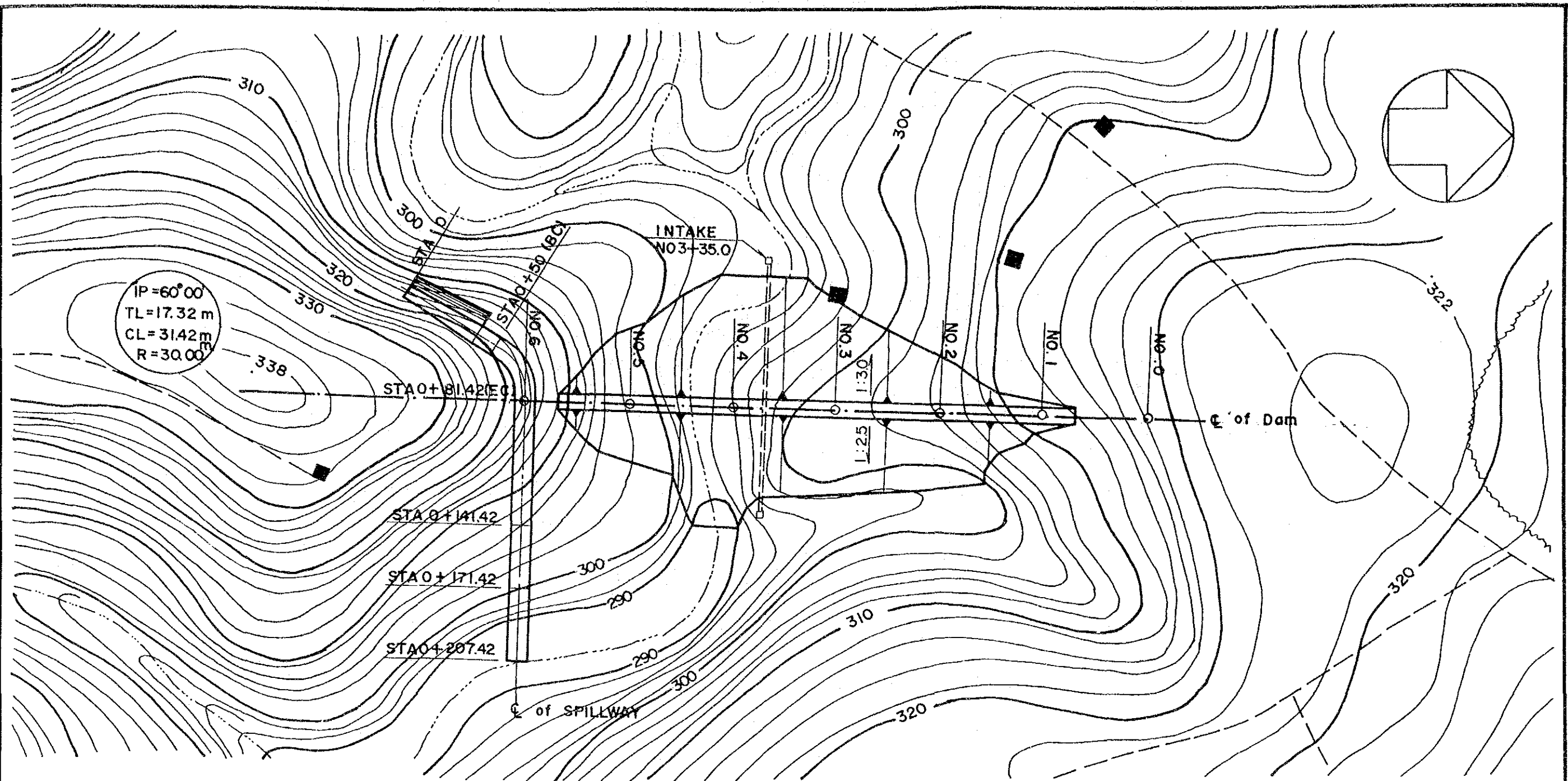
Model Project : Khlong Sai

	Unit	Without Project	With Project								
			Type - 0	Type - 1	Type - 2	Type - 3	Type - 4	Type - 5	Type - 6	Type - 7	Type - 8
			Proposed Cropping Pattern	Paddy + Upland Crop	Paddy + Vegetables	Paddy + Sugarcane	Paddy + Orchard	Paddy + Mulberry	Upland Crop + Bamboo	Upland Crop + Orchard	Upland Crop + Mulberry
1. Farm Size	ha	3.04	3.04	-	3.04	-	3.04	-	-	3.04	3.04
2. Fallow Area	ha	0.02	-	-	-	-	-	-	-	-	-
3. Cropped Area	ha	3.02	3.35	-	3.04	-	3.04	-	-	3.74	3.89
4. Crop Intensity	%	99	110	-	100	-	100	-	-	123	128
5. <u>Farm Income</u>	Baht	21,096	75,127	-	57,372	-	91,745	-	-	97,922	55,037
- Crop Income		11,871	-	-	-	-	-	-	-	-	-
- Off Farm Income		32,967	75,127	-	57,372	-	91,745	-	-	97,922	55,037
- Sub-total											
6. <u>Farm Expenses</u>	Baht	12,110	28,328	-	18,333	-	34,393	-	-	35,997	25,823
- On-Farm		16,853	16,853	-	16,853	-	16,853	-	-	16,853	16,853
- Household		28,963	45,681	-	35,186	-	51,746	-	-	52,850	42,676
- Sub-total											
7. <u>Farm Surplus (Increment)</u>	Baht	4,004 (-)	23,446 (24,442)	-	22,186 (18,182)	-	39,999 (35,995)	-	-	45,072 (41,068)	12,361 (8,357)



## **APPENDIX J. DRAWINGS**

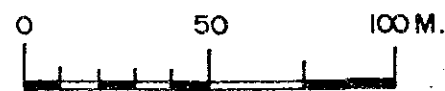




DAM DIMENSION		
Catchment	sq. km	28.00
Gross Reservoir Capacity	MCM	4.30
Effective Capacity	MCM	3.98
Sediment Volume	MCM	0.42
High Water Level	m	310.40
Full Water Level	m	308.80
Dead Water Level	m	298.20
Dam Type		Earth-fill
Dam Height	m	24.40
Dam Length	m	252.00
Dam Crest Elevation	m	311.90
Embankment Volume	cu. m.	136,000
Design Flood	cu. m/s	178.00
Spillway Capacity	cu. m/s	170.00
Spillway Type		Non-gated Overflow
Overflow Depth	m	1.60
Spillway Crest Length	m	40.00
Intake Capacity	cu. m/s	0.930

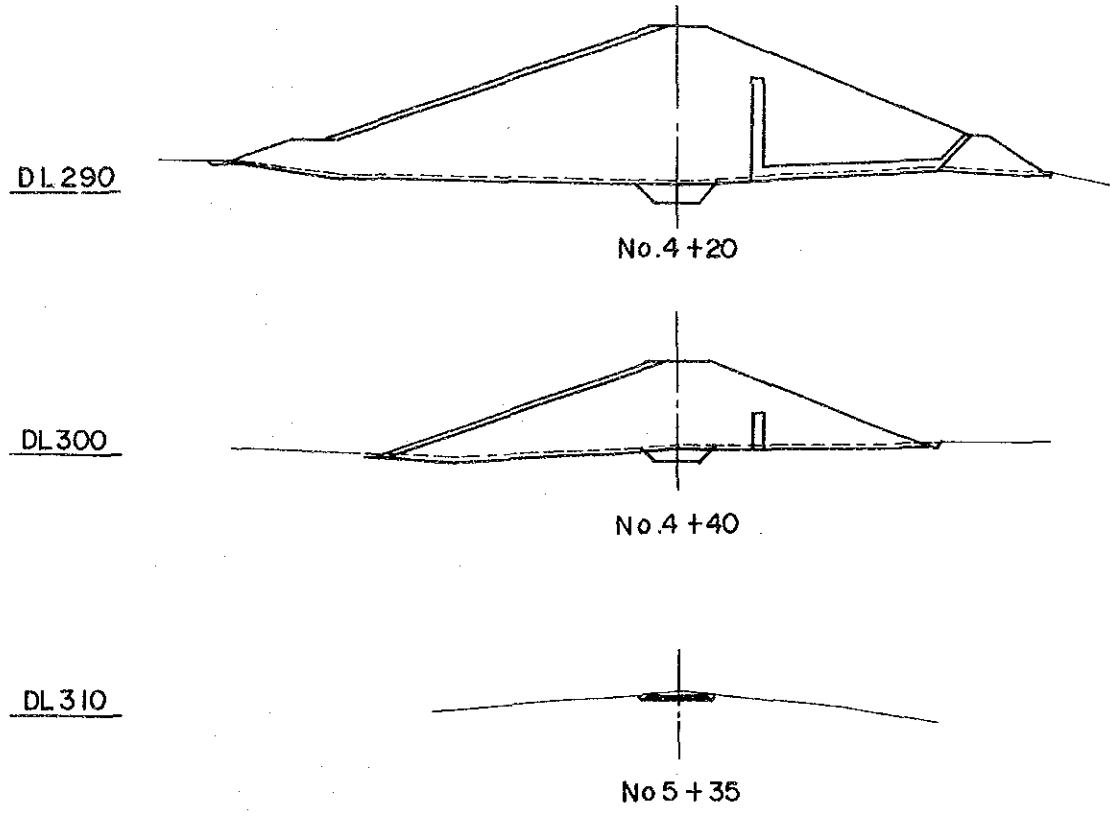
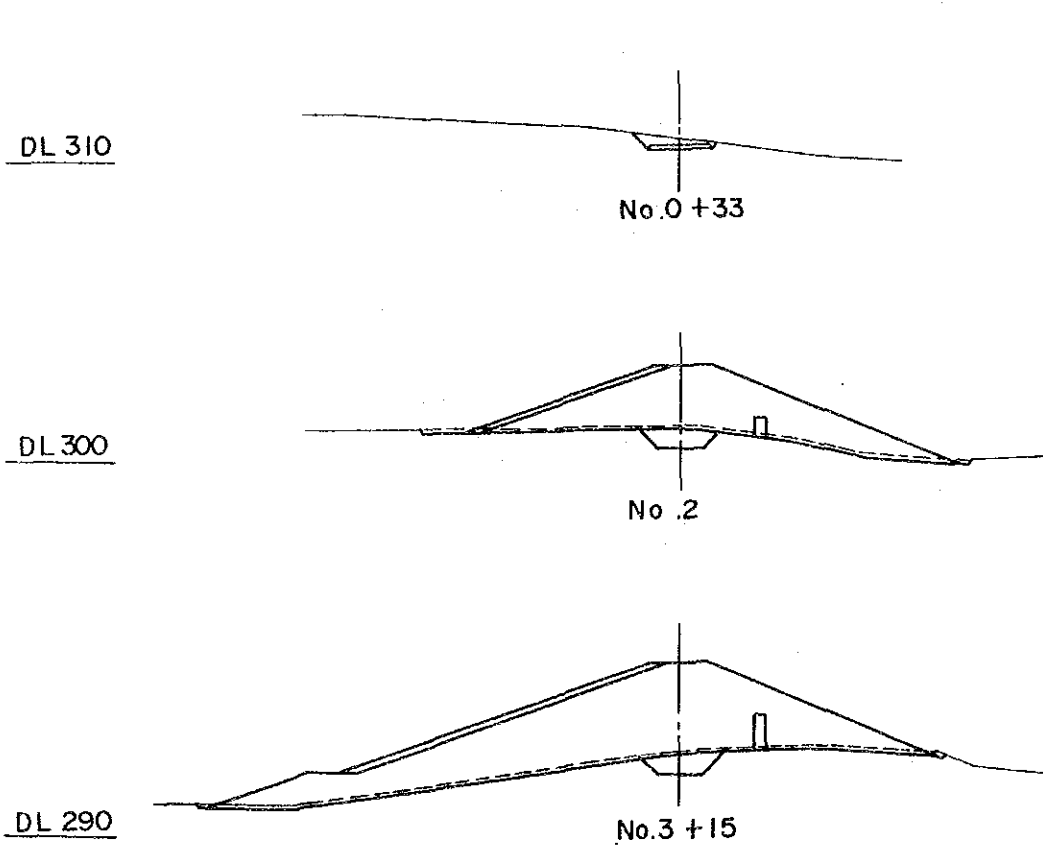
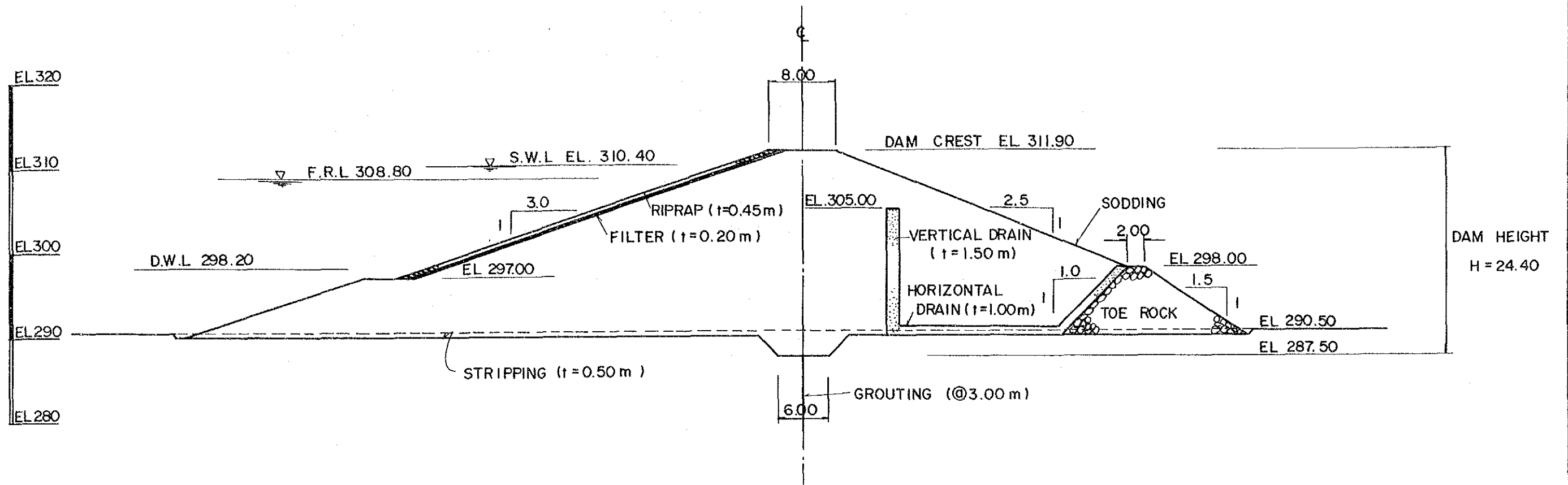
PLAN

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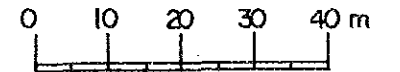


THE FEASIBILITY STUDY ON THE INTEGRATED RURAL DEVELOPMENT PROJECT AT LOWER NORTH THAILAND	
PLAN of DAM	
HUAI SAM RU MODEL PROJECT	
NO.	JAPAN INTERNATIONAL COOPERATION AGENCY

# TYPICAL CROSS SECTION



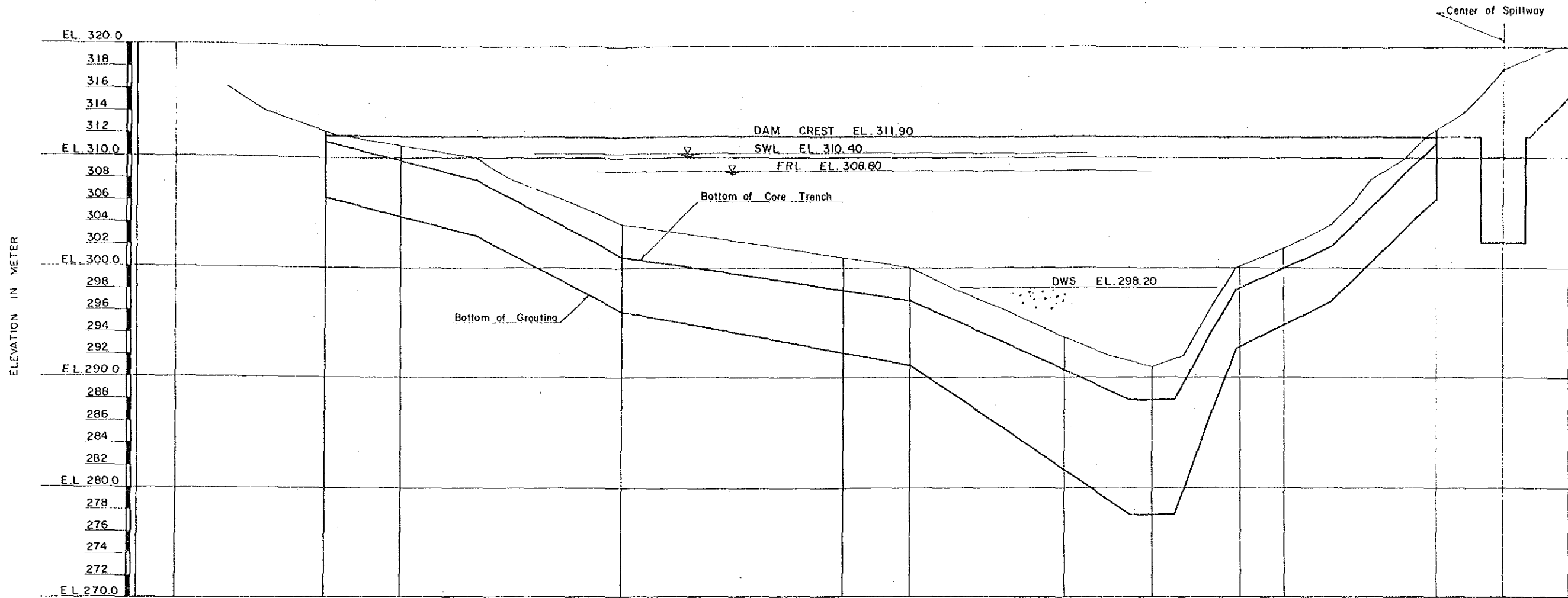
## CROSS SECTION



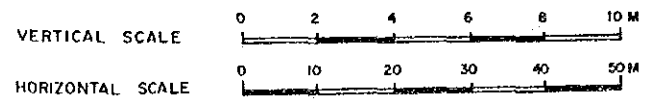
THE FEASIBILITY STUDY ON  
THE INTEGRATED RURAL DEVELOPMENT PROJECT  
AT LOWER NORTH THAILAND

CROSS SECTION of DAM  
HUA I SAM RU MODEL PROJECT

NO. JAPAN INTERNATIONAL COOPERATION AGENCY



DAM CREST ELEVATION (m)		311.90	311.90	311.90	311.90	311.90	311.90	311.90	311.90	311.90	311.90	311.90	311.90	311.90
CORE TRENCH ELEVATION (m)		311.40	309.80	301.20	298.00	297.00	290.60	288.00	296.30	300.00	300.00	311.30		
ORIGINAL GROUND ELEVATION (m)		312.30	311.00	304.20	301.00	300.00	293.40	291.00	300.20	301.80	312.30	318.00		
ACCUMULATED DISTANCE (m)	0.00	33.00	50.00	100.00	150.00	165.00	200.00	220.00	240.00	250.00	285.00	300.00		
DISTANCE (m)	0.00	33.00	17.00	50.00	50.00	15.00	35.00	20.00	20.00	10.00	35.00	15.00		
STATION	NO. 0	+33.00	NO. 1	NO. 2	NO. 3	+15.00	NO. 4	+20.00	+40.00	NO. 5	+35.00	NO. 6		

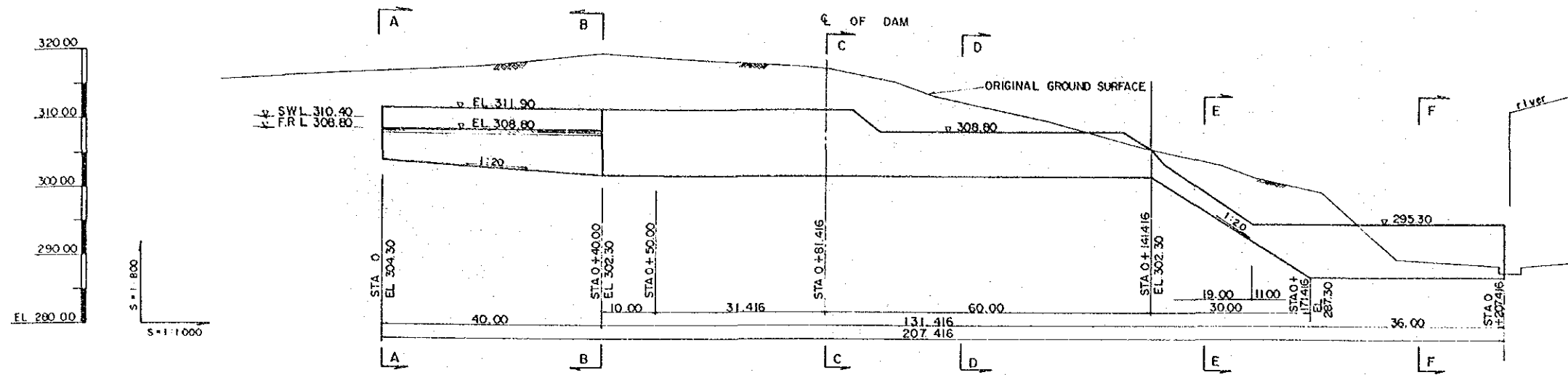


THE FEASIBILITY STUDY ON  
THE INTEGRATED RURAL DEVELOPMENT PROJECT  
AT LOWER NORTH THAILAND

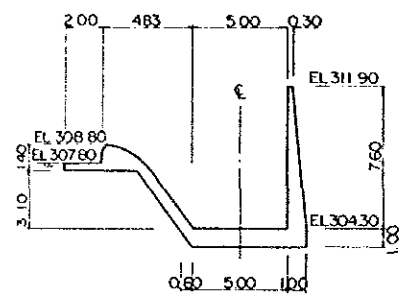
PROFILE OF DAM AXIS

HUAI SAM RU MODEL PROJECT

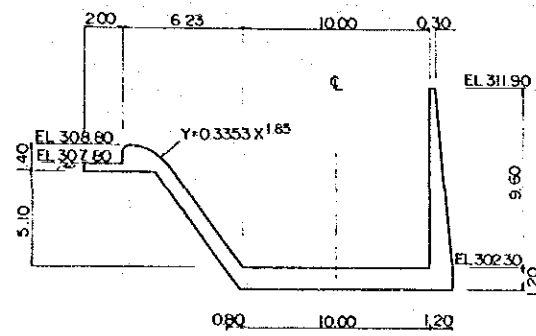
NO. JAPAN INTERNATIONAL COOPERATION AGENCY



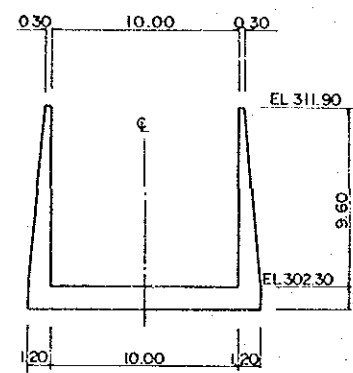
LONGITUDINAL SECTION OF SPILLWAY



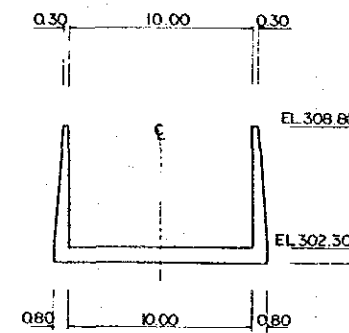
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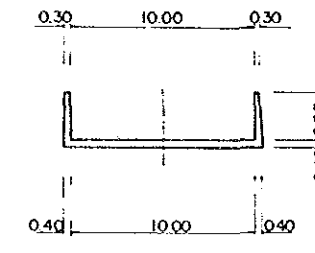
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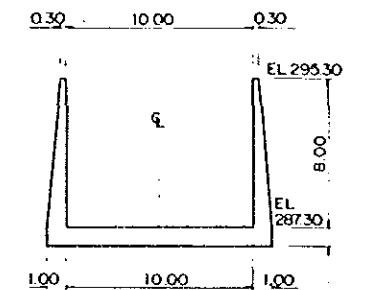
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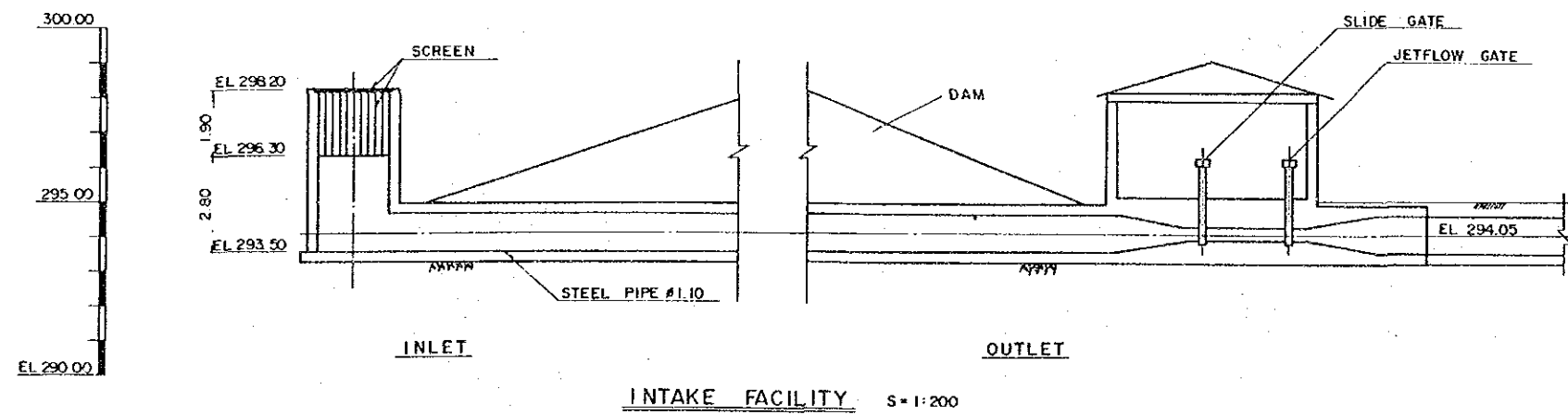
SECTION D-D S=1:400



SECTION E-E S=1:400



SECTION F-F S=1:400



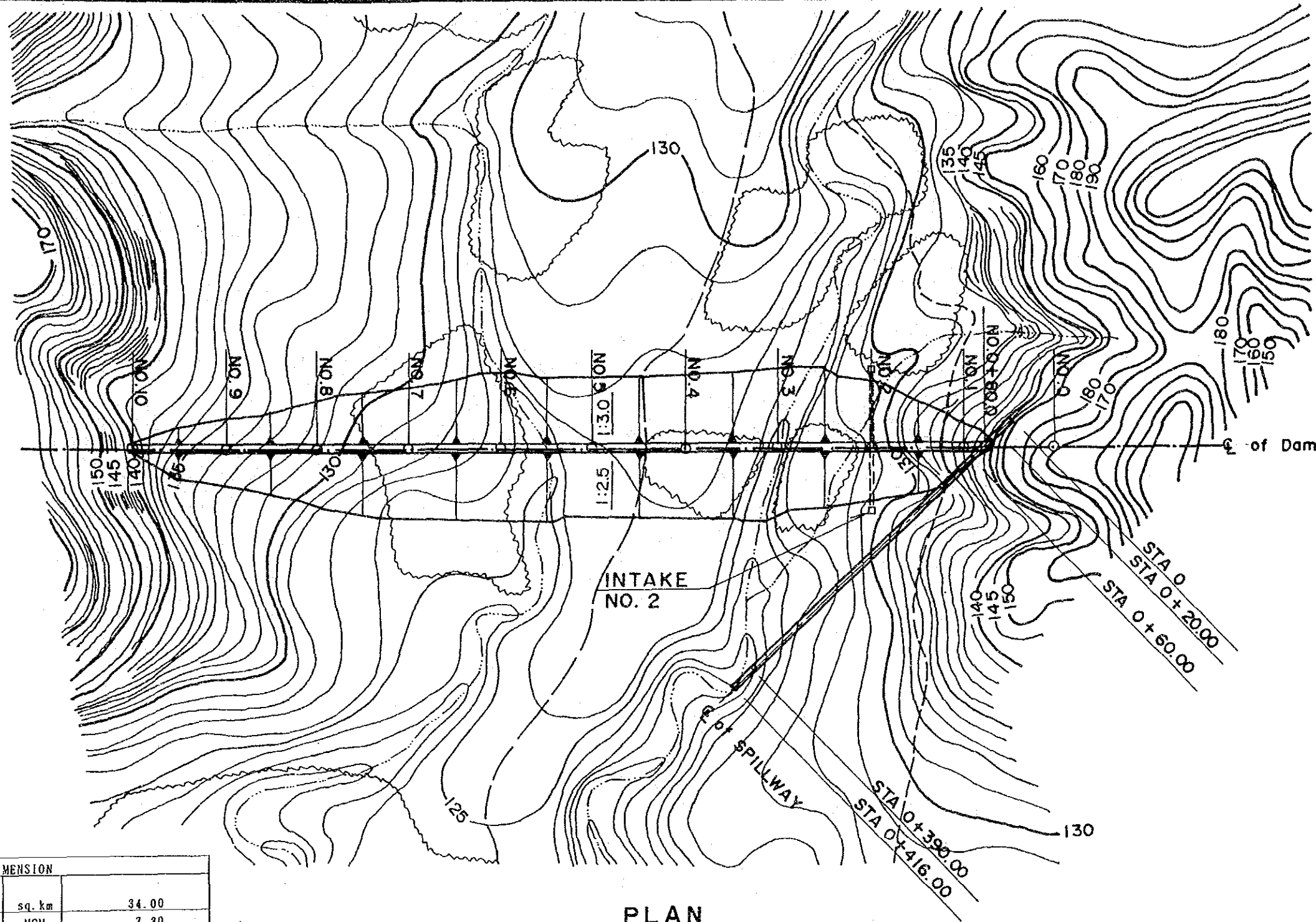
INTAKE FACILITY S=1:200

THE FEASIBILITY STUDY ON  
THE INTEGRATED RURAL DEVELOPMENT PROJECT  
AT LOWER NORTH THAILAND

SPILLWAY and INTAKE

HUAI SAM RU MODEL PROJECT in PHITSANULOK

NO. JAPAN INTERNATIONAL COOPERATION AGENCY



INTAKE  
NO. 2

PLAN

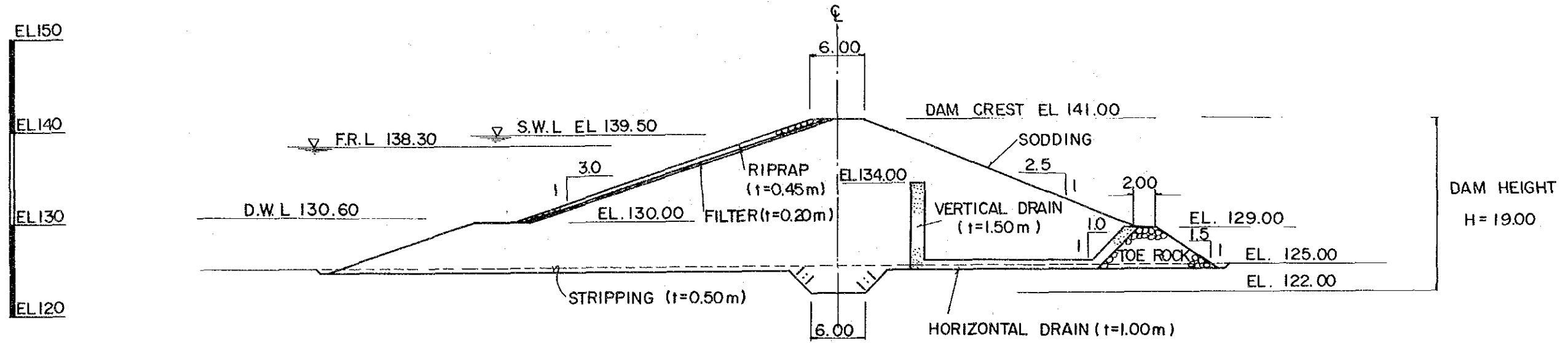
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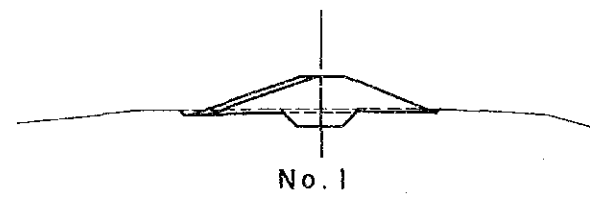
DAM DIMENSION		
Catchment	sq. km	34.00
Gross Reservoir Capacity	MCM	7.30
Effective Capacity	MCM	6.79
Sediment Volume	MCM	0.51
High Water Level	m	139.50
Full Water Level	m	138.30
Dead Water Level	m	130.60
Dam Type		Earth-fill
Dam Height	m	19.00
Dam Length	m	935.00
Dam Crest Elevation	m	141.00
Embankment Volume	cu. m.	460,000
Design Flood	cu. m/s	127.00
Spillway Capacity	cu. m/s	55.00
Spillway Type		Non-gated Overflow
Overflow Depth	m	1.20
Spillway Crest Length	m	20.00
Intake Capacity	cu. m/s	1.108

THE FEASIBILITY STUDY ON THE INTEGRATED RURAL DEVELOPMENT PROJECT AT LOWER NORTH THAILAND	
PLAN of DAM	
HUAI NONG KHO MODEL PROJECT	
NO.	JAPAN INTERNATIONAL COOPERATION AGENCY

# TYPICAL CROSS SECTION

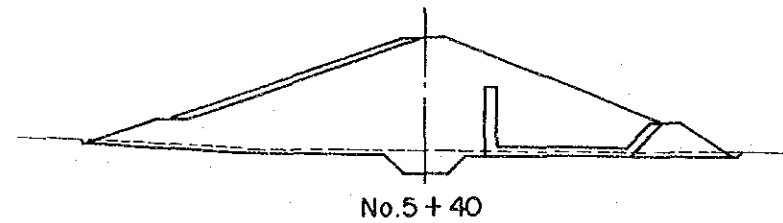


DL 130



No. 1

DL 120

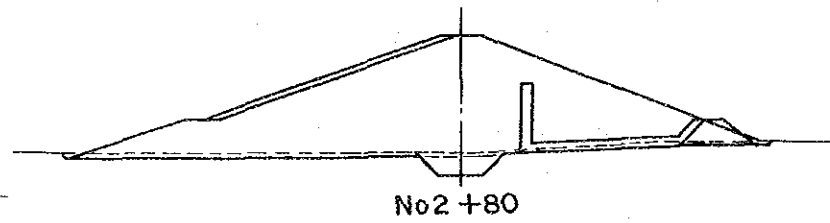


No. 5 + 40

## CROSS SECTION

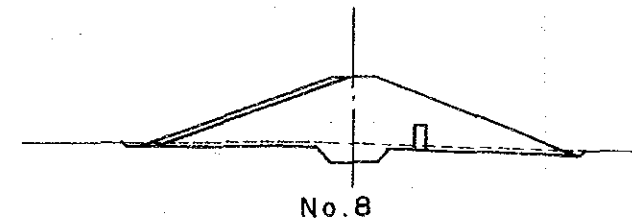


DL 120



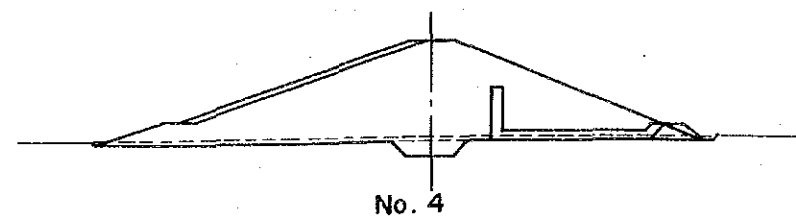
No. 2 + 80

DL 130



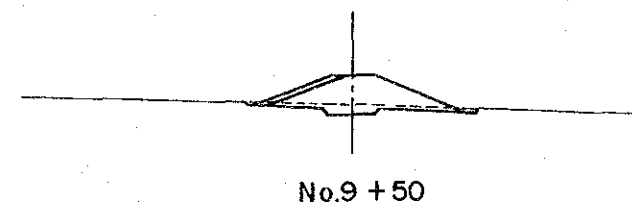
No. 8

DL 120



No. 4

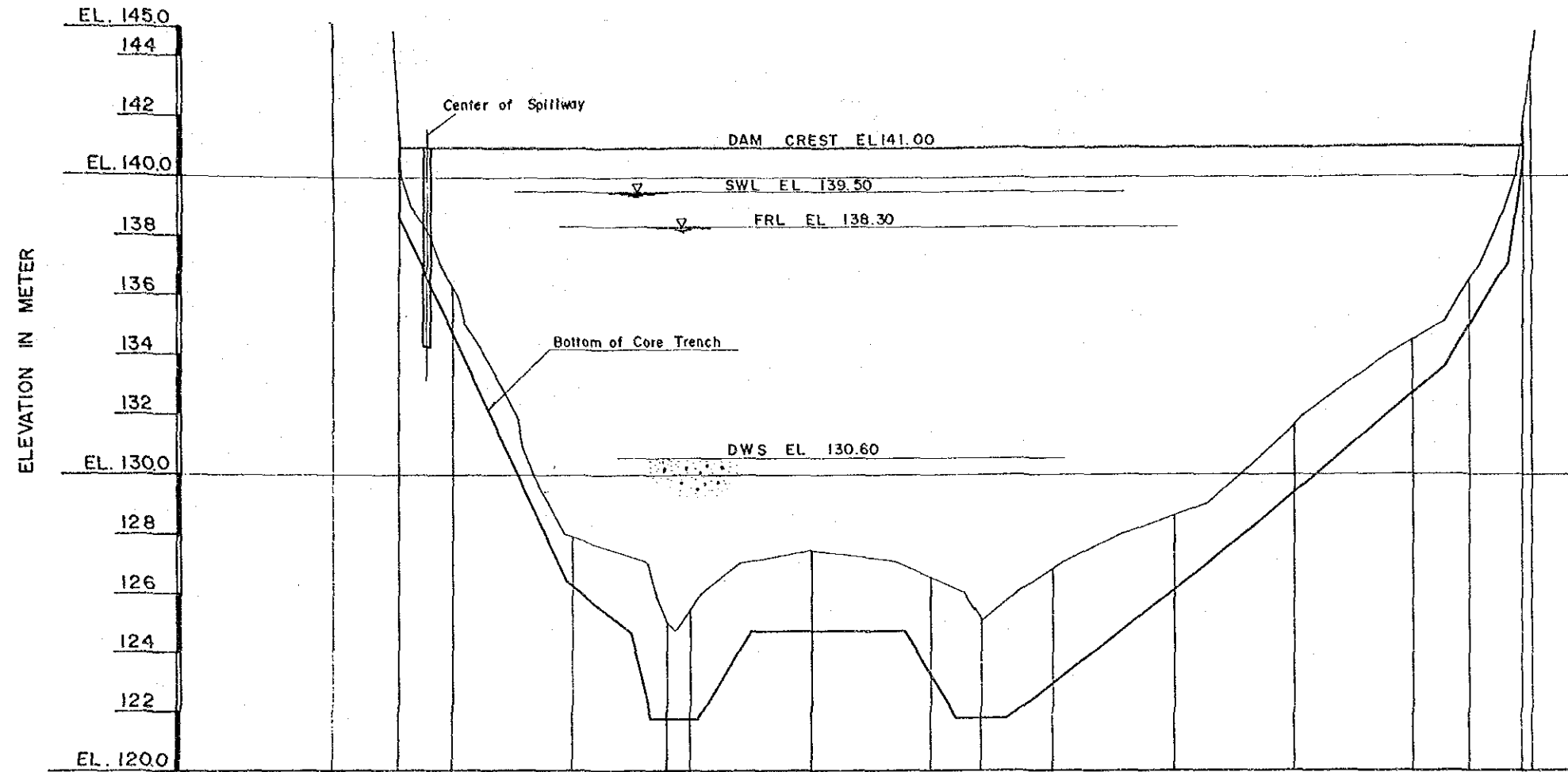
DL 130



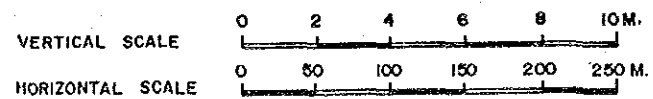
No. 9 + 50

THE FEASIBILITY STUDY ON THE INTEGRATED RURAL DEVELOPMENT PROJECT AT LOWER NORTH THAILAND	
CROSS SECTION of DAM HUAI NONG KHO MODEL PROJECT	
NO.	JAPAN INTERNATIONAL COOPERATION AGENCY





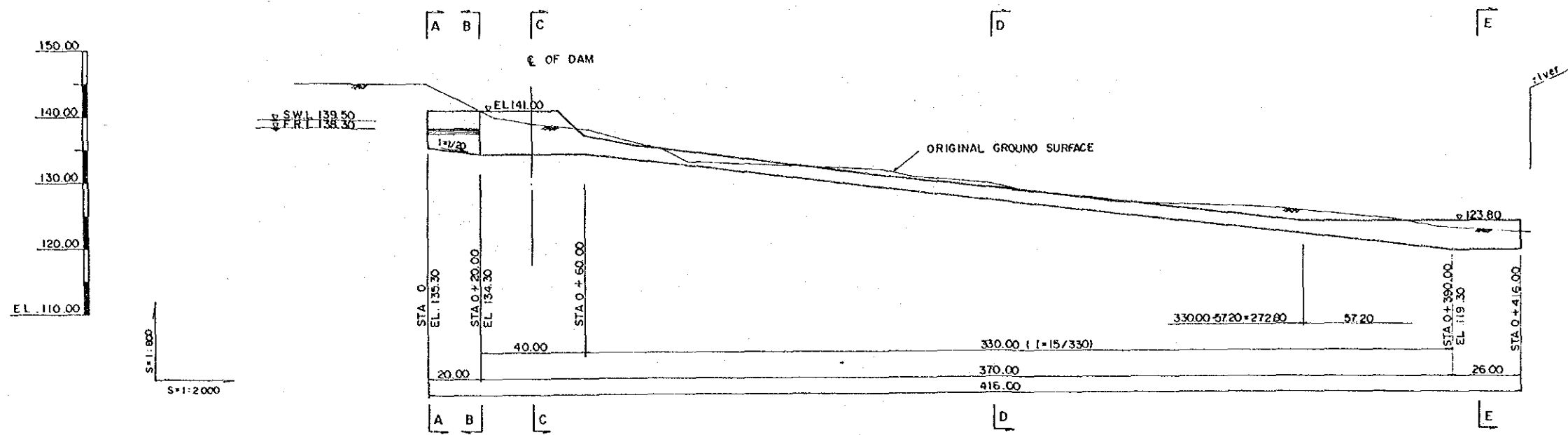
DAM CREST ELEVATION (m)		141.00	141.00	141.00	141.00	141.00	141.00	141.00	141.00	141.00	141.00	141.00	141.00	141.00	141.00	141.00	141.00	141.00	141.00				
CORE TRENCH ELEVATION (m)		138.80	134.90	126.40	121.80	121.80	124.80	123.30	121.80	123.00	126.20	129.40	132.70	135.00	140.50								
ORIGINAL GROUND ELEVATION (m)		141.00	136.40	128.00	125.00	125.50	127.50	126.60	125.10	126.90	128.70	131.70	134.50	135.60	141.50	143.70							
ACCUMULATED DISTANCE (m)		0.00	55.00	100.00	200.00	280.00	300.00	400.00	500.00	540.00	600.00	700.00	800.00	900.00	950.00	990.00	1000.00						
DISTANCE (m)		0.00	55.00	45.00	100.00	80.00	20.00	100.00	100.00	40.00	60.00	100.00	100.00	100.00	50.00	40.00	10.00						
STATION		NO. 0	+55.00	NO. 1		NO. 2	+80.00	NO. 3		NO. 4		NO. 5	+40.00	NO. 6		NO. 7		NO. 8		NO. 9	+50.00	+80.00	NO. 10



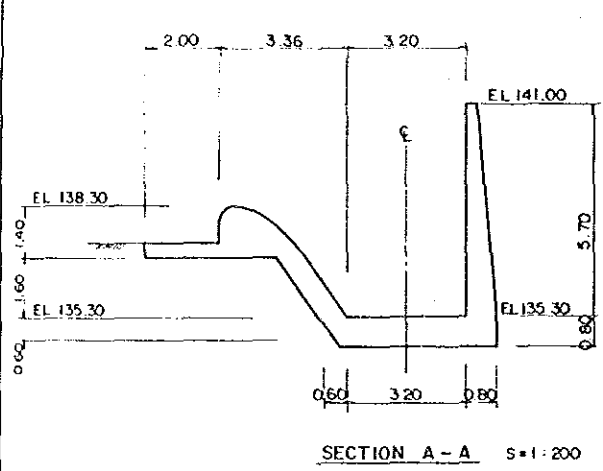
THE FEASIBILITY STUDY ON  
THE INTEGRATED RURAL DEVELOPMENT PROJECT  
AT LOWER NORTH THAILAND

PROFILE OF DAM AXIS  
HUAI NONG KHO MODEL PROJECT

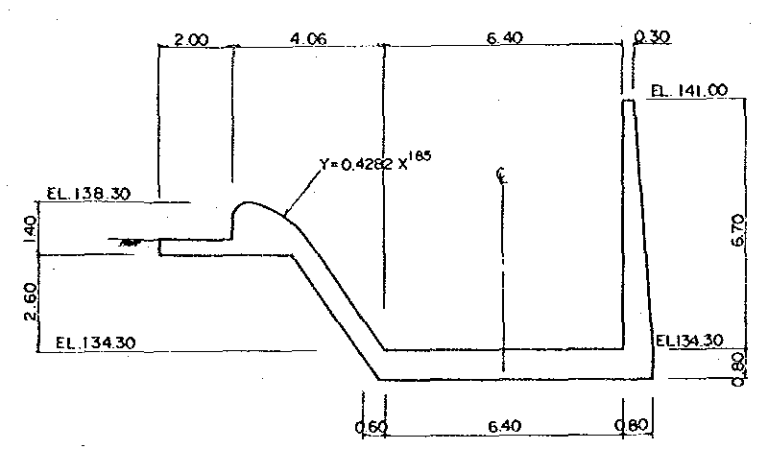
NO. JAPAN INTERNATIONAL COOPERATION AGENCY



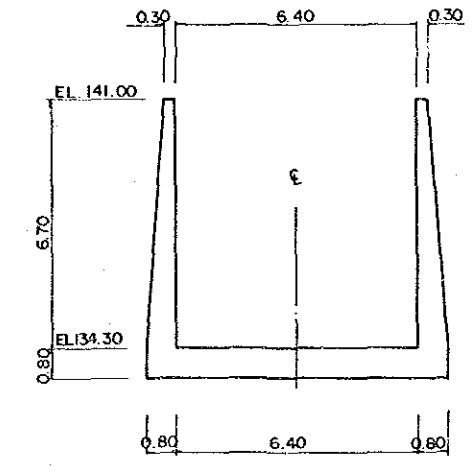
LONGITUDINAL SECTION OF SPILL WAY



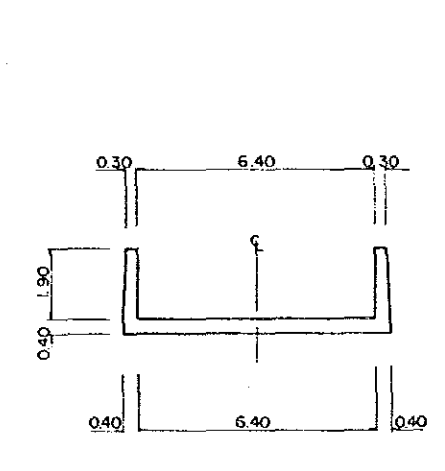
SECTION A - A S=1:200



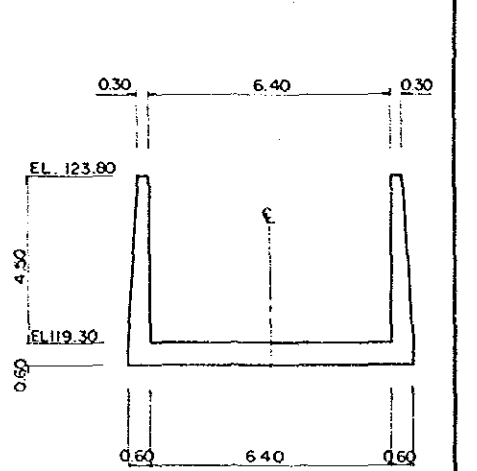
SECTION B - B S=1:200



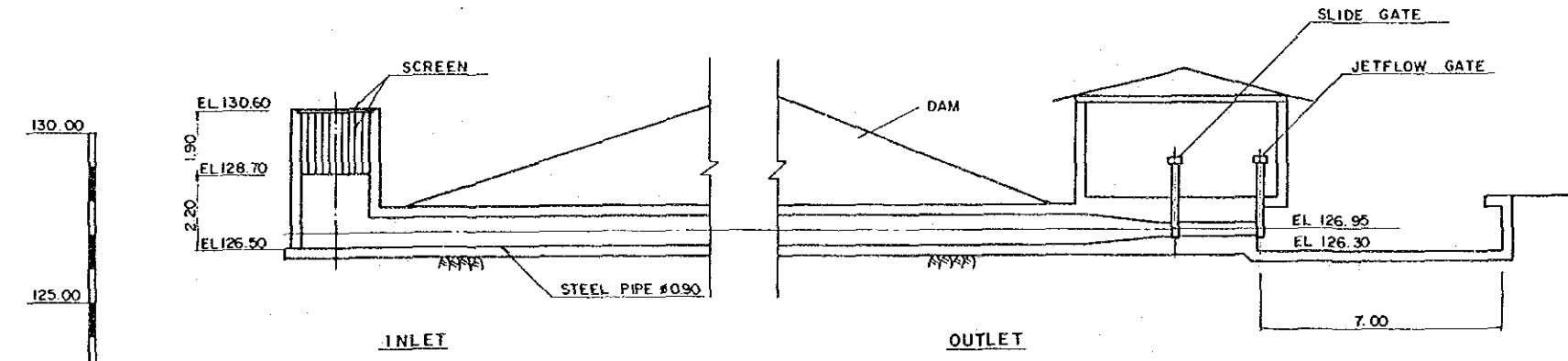
SECTION C - C S=1:200



SECTION D - D S=1:200

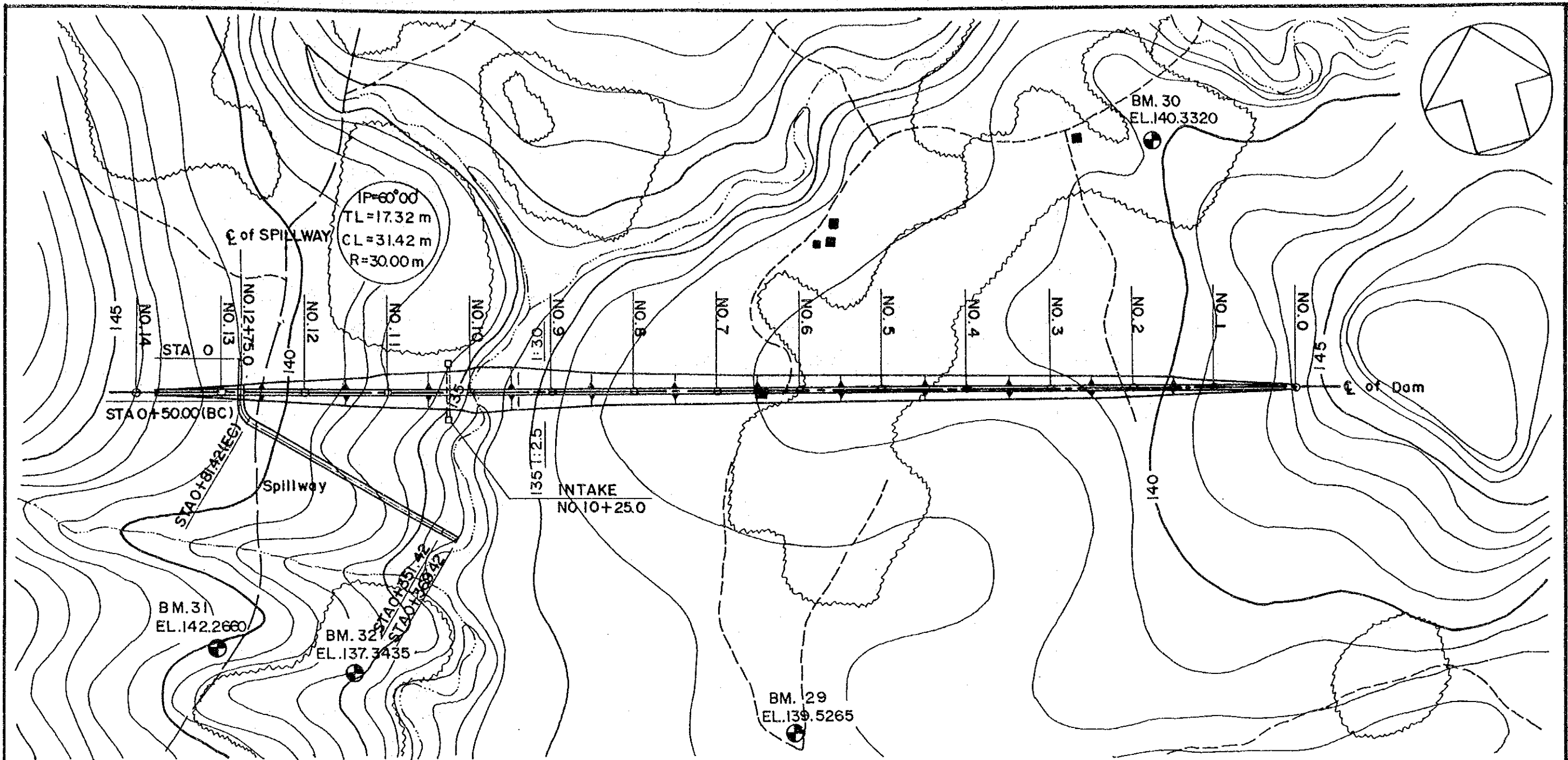


SECTION E - E S=1:200



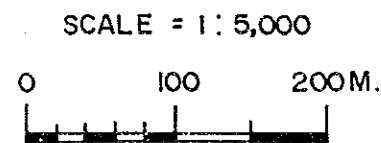
INTAKE FACILITY S=1:200

THE FEASIBILITY STUDY ON THE INTEGRATED RURAL DEVELOPMENT PROJECT AT LOWER NORTH THAILAND	
SPILLWAY and INTAKE	
HUAI NONG KHO MODEL PROJECT in SUKHOTHAI	
NO.	JAPAN INTERNATIONAL COOPERATION AGENCY



DAM DIMENSION		
Catchment	sq. km	13.00
Gross Reservoir Capacity	MCM	2.60
Effective Capacity	MCM	2.40
Sediment Volume	MCM	0.20
High Water Level	m	141.00
Full Water Level	m	140.20
Dead Water Level	m	136.10
Dam Type		Earth-fill
Dam Height	m	12.50
Dam Length	m	1380.00
Dam Crest Elevation	m	142.50
Embankment Volume	cu. m.	179,000
Design Flood	cu. m/s	135.00
Spillway Capacity	cu. m/s	45.00
Spillway Type		Non-gated Overflow
Overflow Depth	m	0.80
Spillway Crest Length	m	30.00
Intake Capacity	cu. m/s	0.387

PLAN



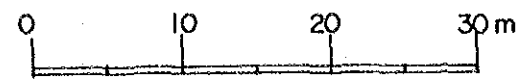
THE FEASIBILITY STUDY ON  
THE INTEGRATED RURAL DEVELOPMENT PROJECT  
AT LOWER NORTH THAILAND

PLAN of DAM

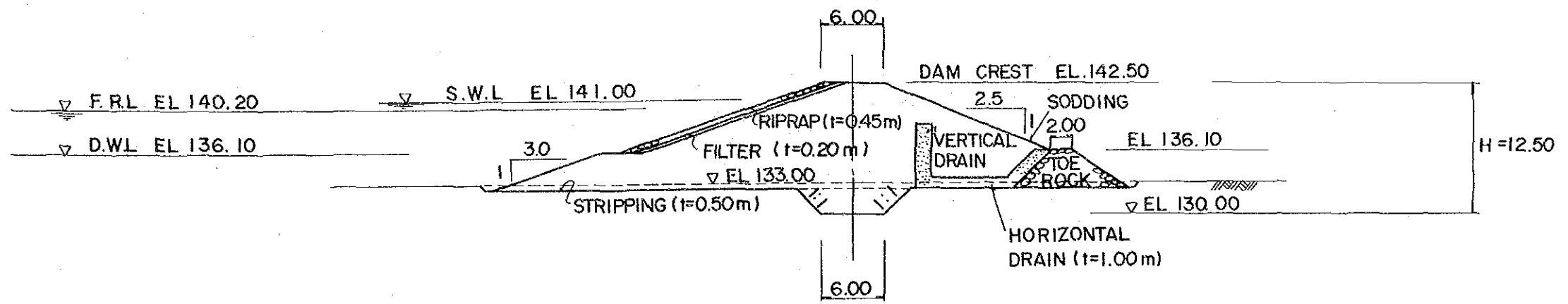
KHILONG SAMO KHON MODEL PROJECT

NO. JAPAN INTERNATIONAL COOPERATION AGENCY

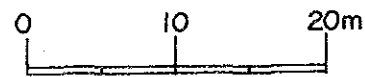
TYPICAL CROSS SECTION



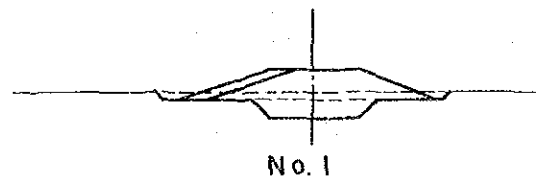
EL150  
EL140  
EL130



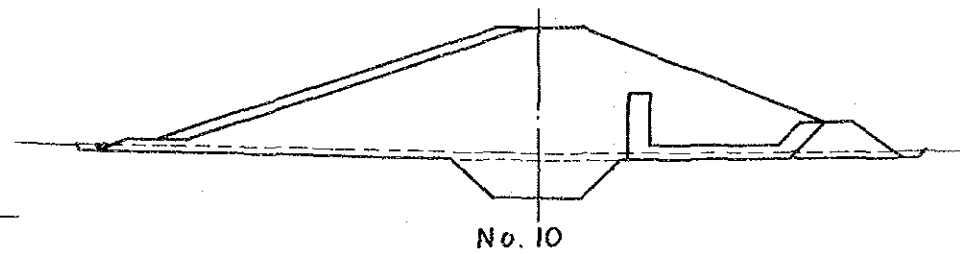
CROSS SECTION



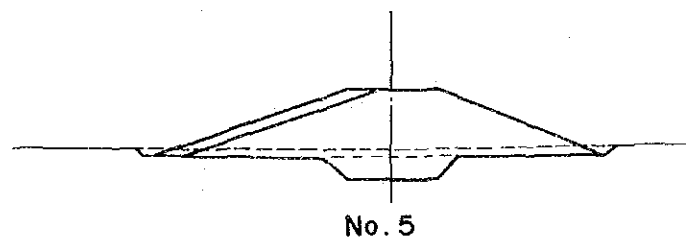
DL140



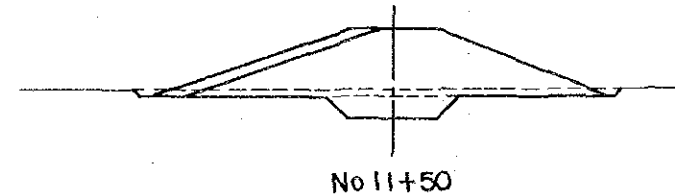
DL 130



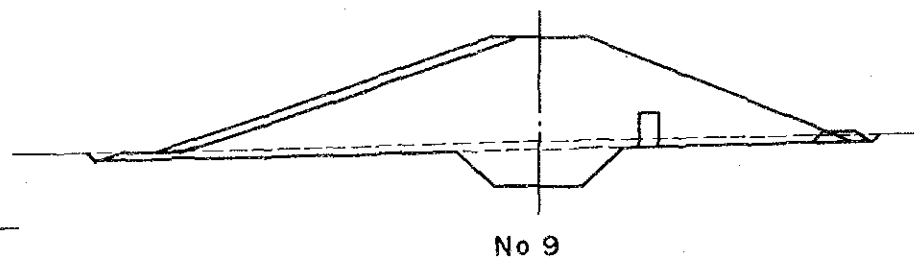
DL 135



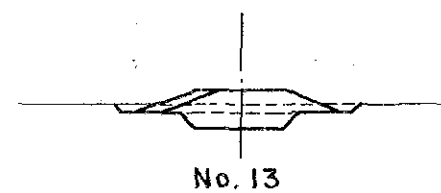
DL 135



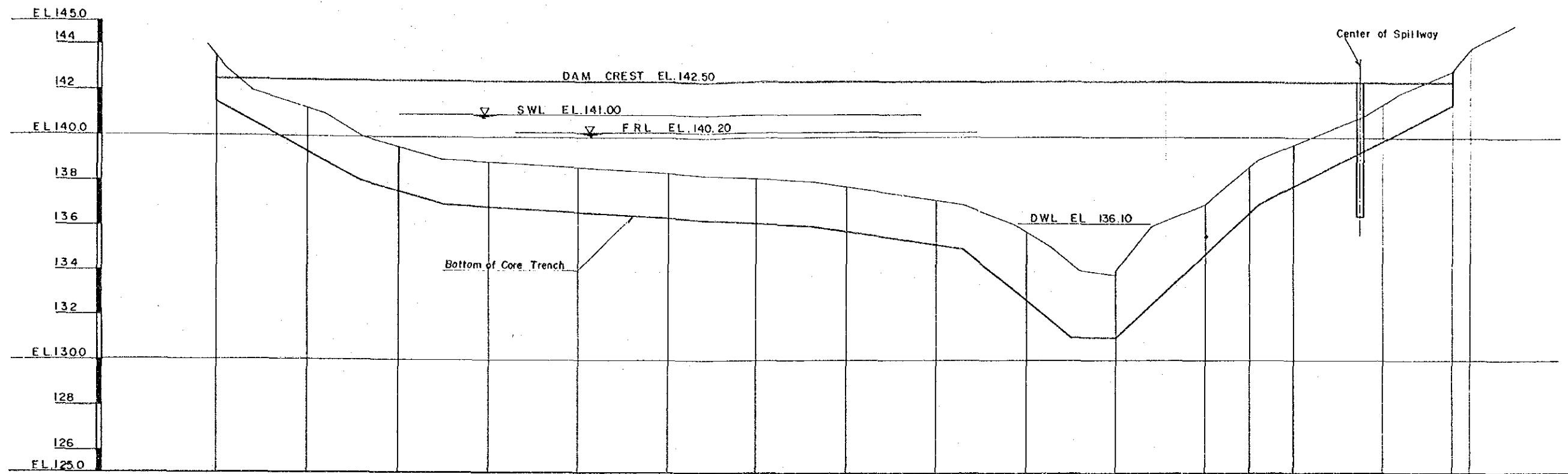
DL 130



DL140



THE FEASIBILITY STUDY ON THE INTEGRATED RURAL DEVELOPMENT PROJECT AT LOWER NORTH THAILAND	
CROSS SECTION of DAM	
KHLONG SAMO KHON MODEL PROJECT	
NO.	JAPAN INTERNATIONAL COOPERATION AGENCY



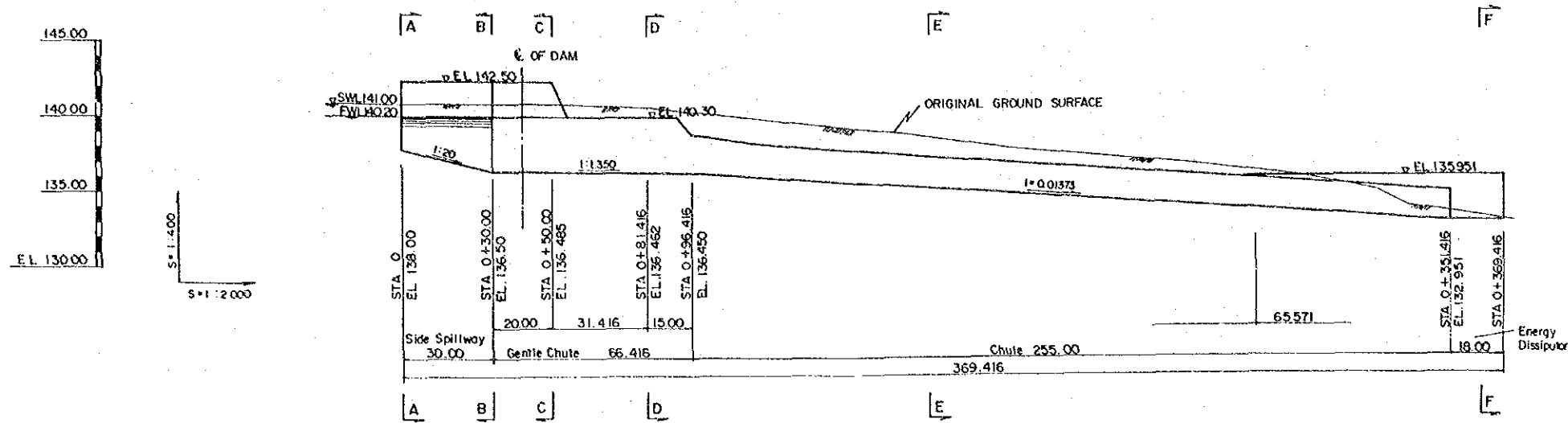
DAM CREST ELEVATION (m)	142.50	142.50	142.50	142.50	142.50	142.50	142.50	142.50	142.50	142.50	142.50	142.50	142.50	142.50	142.50	142.50	142.50	142.50
CORE TRENCH ELEVATION (m)	141.50	139.35	137.55	136.90	136.65	136.40	136.15	135.75	135.15	132.65	131.00	134.75	136.70	137.80	139.90	141.50	141.50	144.00
ORIGINAL GROUND ELEVATION (m)	143.50	141.25	139.55	138.90	138.65	138.40	138.15	137.75	137.15	135.75	134.00	137.00	138.70	139.70	141.50	143.00	144.00	144.00
ACCUMULATED DISTANCE (m)	0.00	100.00	200.00	300.00	400.00	500.00	600.00	700.00	800.00	900.00	1000.00	1100.00	1150.00	1200.00	1300.00	1380.00	1400.00	1400.00
DISTANCE (m)	0.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	50.00	50.00	100.00	80.00	20.00	20.00
STATION	NO. 0	NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	NO. 6	NO. 7	NO. 8	NO. 9	NO. 10	NO. 11	+50.00	NO. 12	NO. 13	+80.00	NO. 14	NO. 14

THE FEASIBILITY STUDY ON  
THE INTEGRATED RURAL DEVELOPMENT PROJECT  
AT LOWER NORTH THAILAND

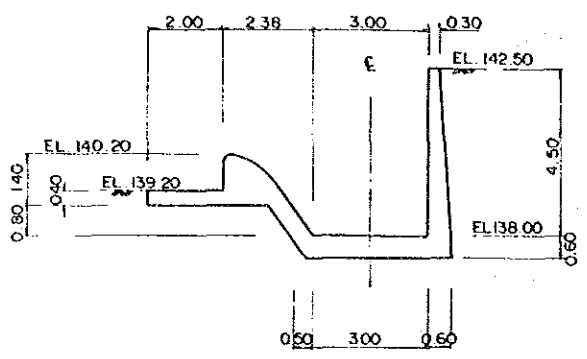
PROFILE OF DAM AXIS

KHLONG SAMO KHON MODEL PROJECT

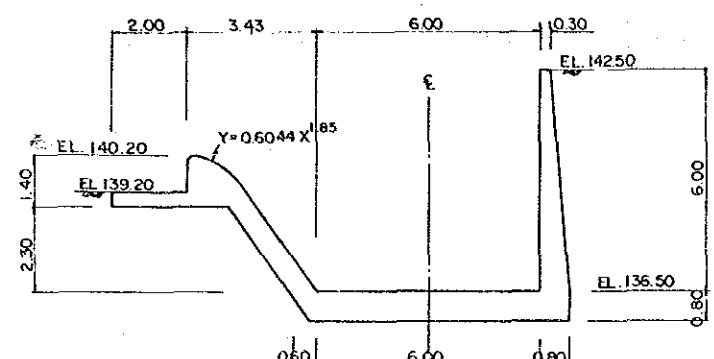
NO. JAPAN INTERNATIONAL COOPERATION AGENCY



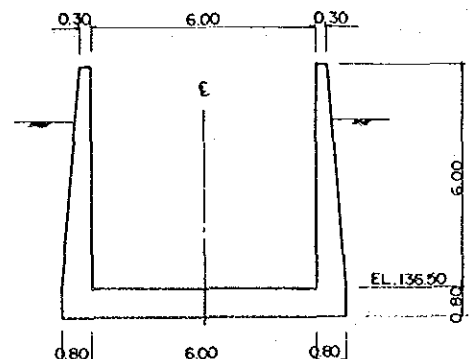
LONGITUDINAL SECTION OF SPILLWAY



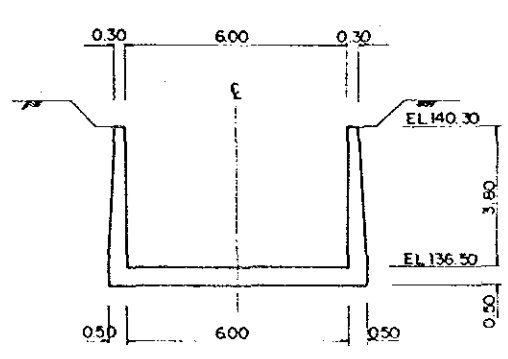
SECTION A - A S=1:200



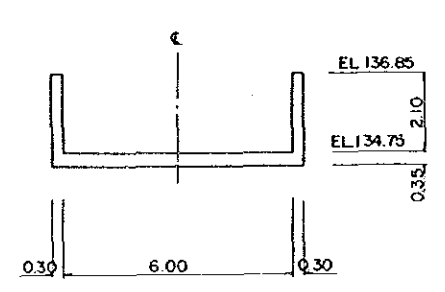
SECTION B - B S=1:200



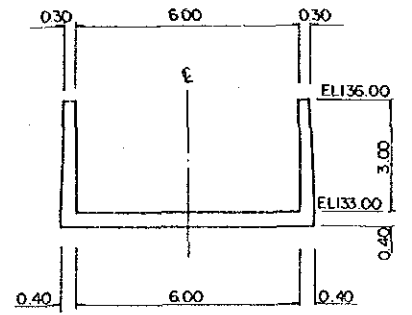
SECTION C - C S=1:200



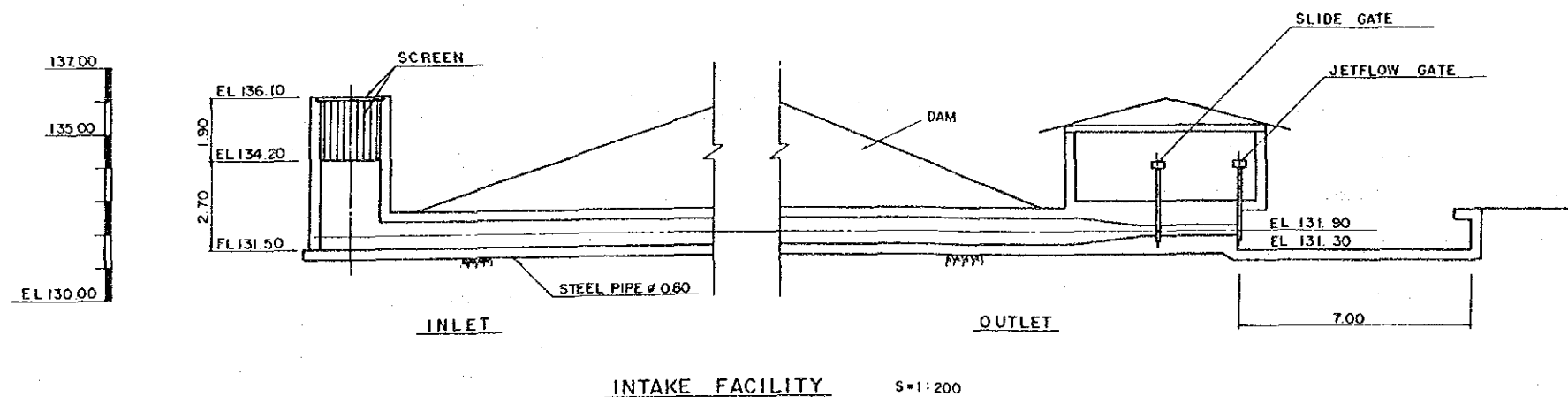
SECTION D - D S=1:200



SECTION E - E S=1:200

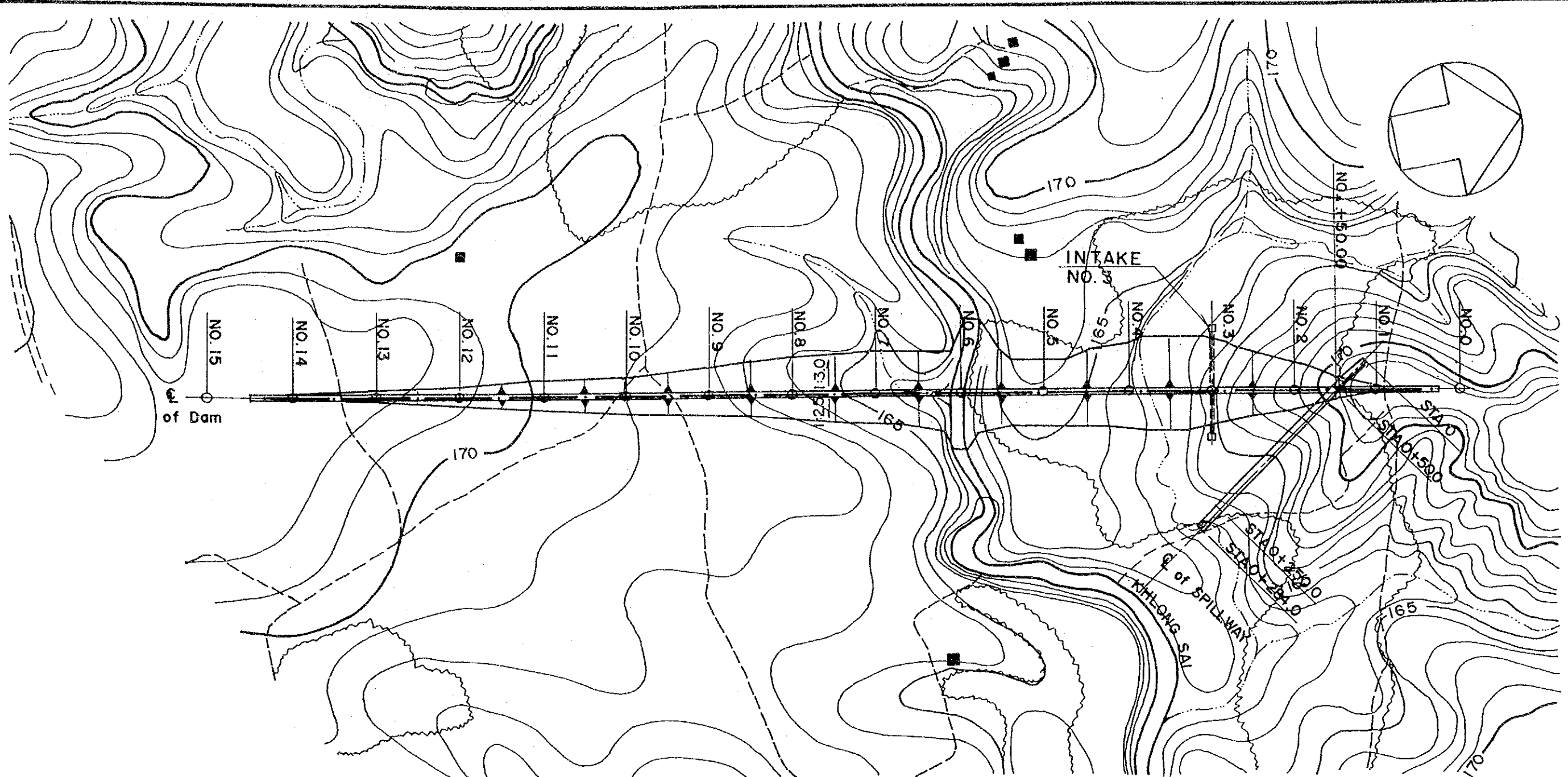


SECTION F - F S=1:200



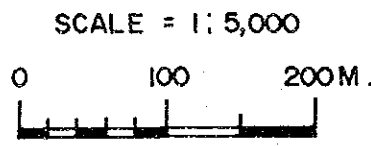
INTAKE FACILITY S=1:200

THE FEASIBILITY STUDY ON THE INTEGRATED RURAL DEVELOPMENT PROJECT AT LOWER NORTH THAILAND	
SPILLWAY and INTAKE KHLONG SAMO KHOR MODEL PROJECT in KAMPHAENG PHET	
NO.	JAPAN INTERNATIONAL COOPERATION AGENCY



DAM DIMENSION		
Catchment	sq. km	47.00
Gross Reservoir Capacity	MCM	2.85
Effective Capacity	MCM	2.14
Sediment Volume	MCM	0.71
High Water Level	m	171.10
Full Water Level	m	169.80
Dead Water Level	m	166.90
Dam Type	Earth-fill	
Dam Height	m	12.60
Dam Length	m	1425.00
Dam Crest Elevation	m	172.60
Embankment Volume	cu. m	220,000
Design Flood	cu. m/s	222.00
Spillway Capacity	cu. m/s	187.00
Spillway Type	Non-gated Overflow	
Overflow Depth	m	1.30
Spillway Crest Length	m	60.00
Intake Capacity	cu. m/s	0.464

PLAN



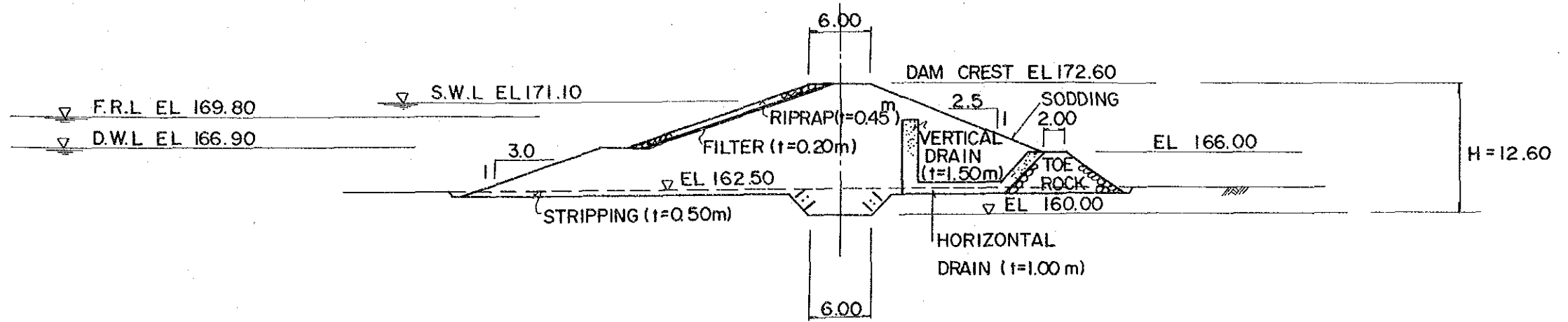
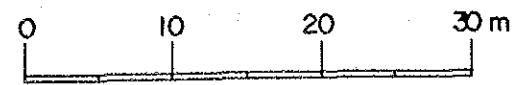
THE FEASIBILITY STUDY ON  
THE INTEGRATED RURAL DEVELOPMENT PROJECT  
AT LOWER NORTH THAILAND

PLAN of DAM

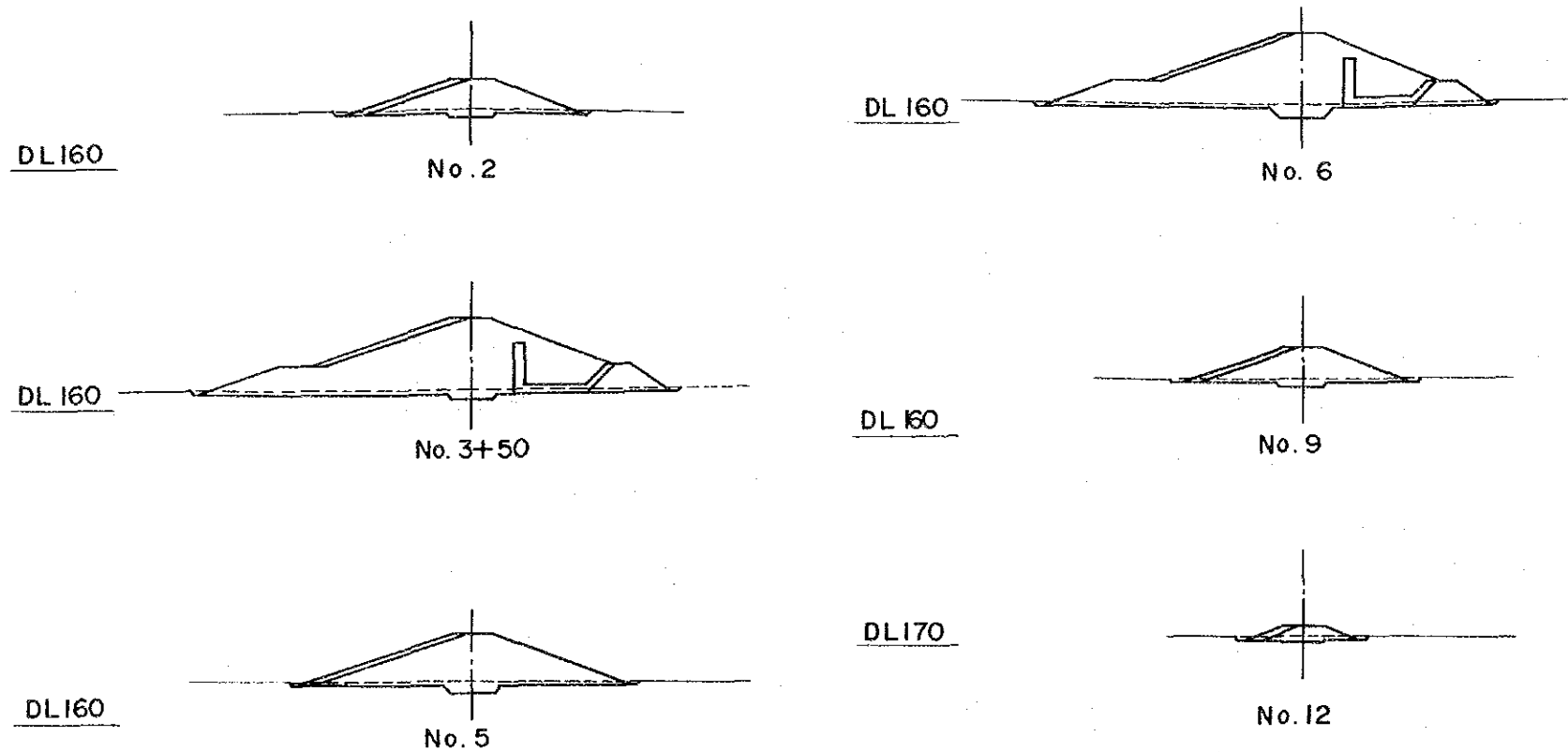
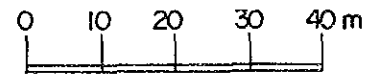
KHLONG SAI MODEL PROJECT

NO. JAPAN INTERNATIONAL COOPERATION AGENCY

### TYPICAL CROSS SECTION

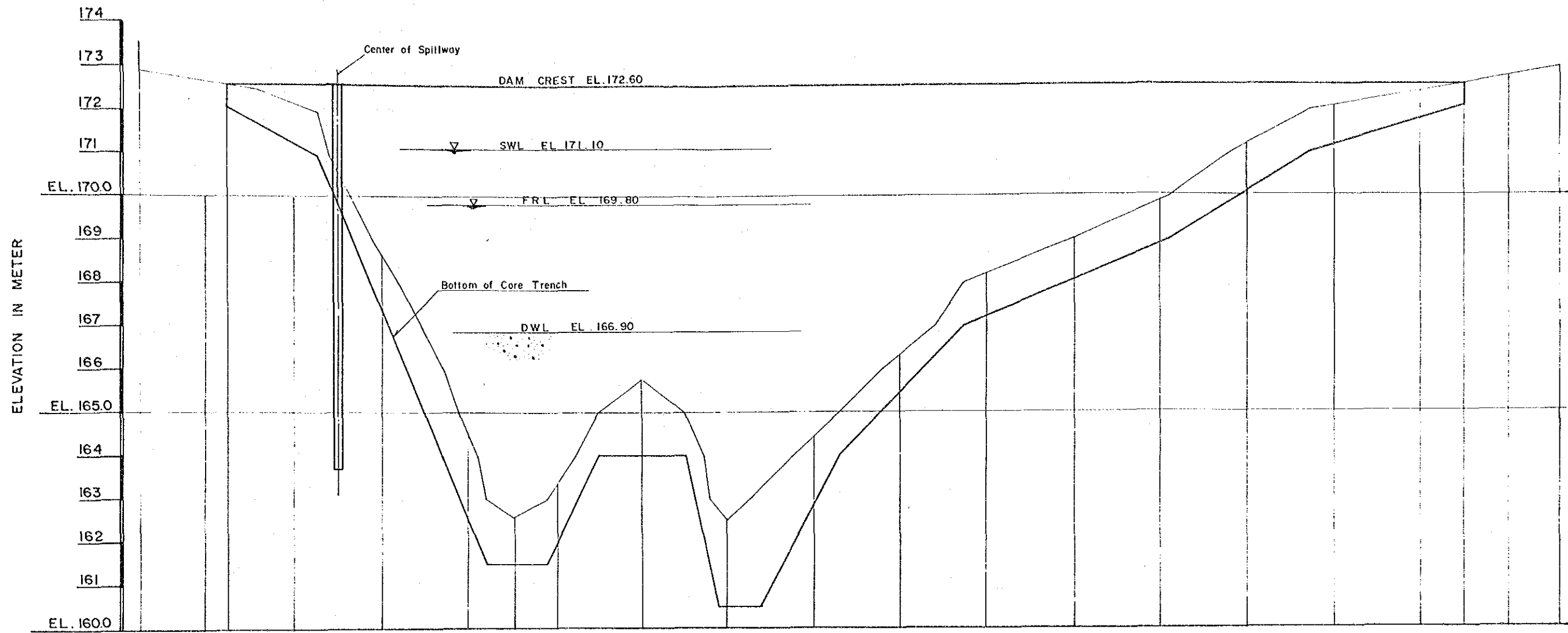


### CROSS SECTION



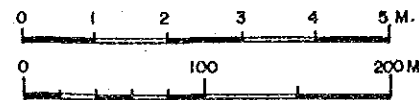
THE FEASIBILITY STUDY ON THE INTEGRATED RURAL DEVELOPMENT PROJECT AT LOWER NORTH THAILAND	
CROSS SECTION of DAM KHLONG SATI MODEL PROJECT	
NO.	JAPAN INTERNATIONAL COOPERATION AGENCY





DAM CREST ELEVATION (m)	172.60	172.60	172.60	172.60	172.60	172.60	172.60	172.60	172.60	172.60	172.60	172.60	172.60	172.60	172.60	172.60	172.60	172.60	172.60
CORE TRENCH ELEVATION (m)	172.10	171.25	167.40	162.50	161.50	162.00	164.00	160.50	162.90	165.50	167.25	168.10	168.90	170.10	171.15	171.80	172.10	172.60	172.60
ORIGINAL GROUND ELEVATION (m)	172.60	172.15	168.65	164.50	162.50	163.40	165.80	162.50	164.50	166.35	168.20	169.00	169.90	171.20	172.10	172.40	172.60	172.60	172.60
ACCUMULATED DISTANCE (m)	0.00	25.00	100.00	200.00	300.00	350.00	400.00	500.00	600.00	700.00	800.00	900.00	1,000.00	1,100.00	1,200.00	1,300.00	1,400.00	1,450.00	1,500.00
DISTANCE (m)	0.00	25.00	75.00	100.00	100.00	50.00	50.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	50.00	50.00
STATION	NO. 0 + 25.00	NO. 1	NO. 2	NO. 3	+50.00	NO. 4	NO. 5	NO. 6	NO. 7	NO. 8	NO. 9	NO. 10	NO. 11	NO. 12	NO. 13	NO. 14	+50.00	NO. 15	

VERTICAL SCALE  
HORIZONTAL SCALE

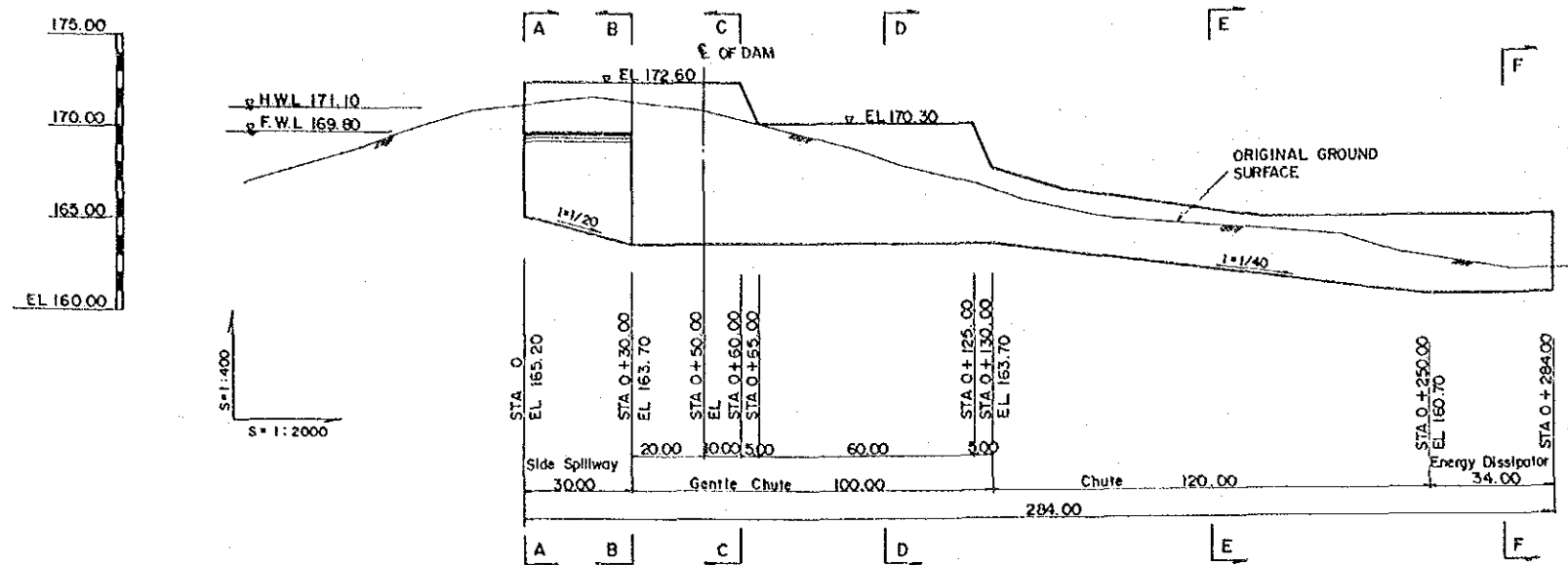


THE FEASIBILITY STUDY ON  
THE INTEGRATED RURAL DEVELOPMENT PROJECT  
AT LOWER NORTH THAILAND

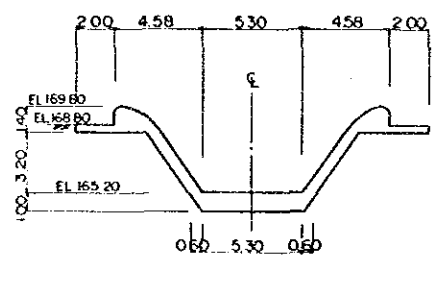
PROFILE OF DAM AXIS

KHLONG SAI MODEL PROJECT

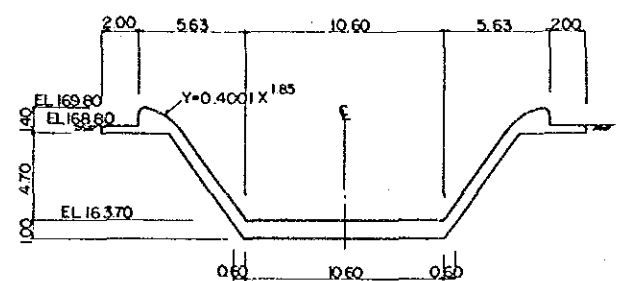
NO. JAPAN INTERNATIONAL COOPERATION AGENCY



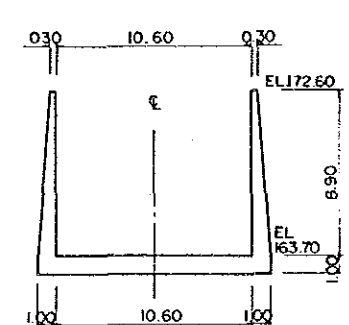
LONGITUDINAL SECTION OF SPILLWAY



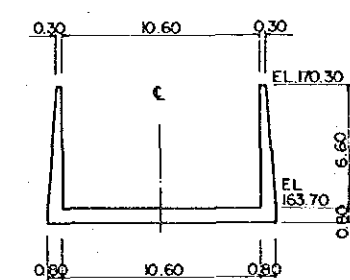
SECTION A-A S=1:400



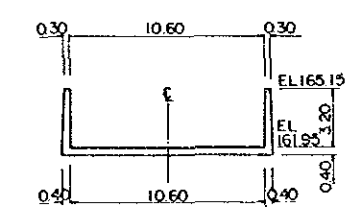
SECTION B-B S=1:400



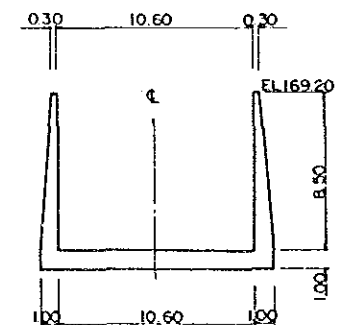
SECTION C-C S=1:400



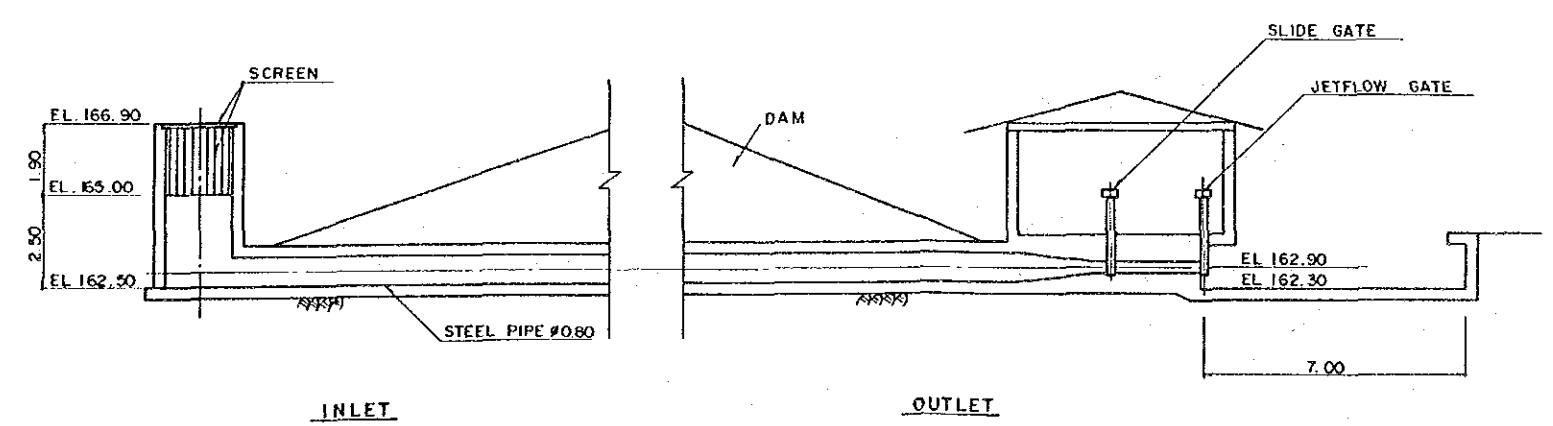
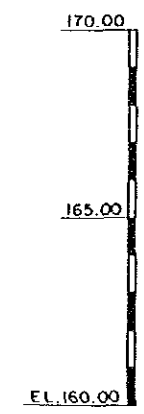
SECTION D-D S=1:400



SECTION E-E S=1:400



SECTION F-F S=1:400



INTAKE FACILITY S=1:200

THE FEASIBILITY STUDY ON THE INTEGRATED RURAL DEVELOPMENT PROJECT AT LOWER NORTH THAILAND	
SPILLWAY and INTAKE KHLONG SAI MODEL PROJECT In TAK	
NO.	JAPAN INTERNATIONAL COOPERATION AGENCY





