

第8章 結論および提言

当該計画に対する現地調査および国内解析の結果、タゴン農場改修事業は、前述したように直接的には米の増産およびそれによる収入増、地域交通・輸送条件の改善、精米状況の改善、食糧自給の安定、生活環境の改善等の効果、また、間接的には協同組合の拡大・強化、展示効果、社会福祉の安定等の効果が期待でき、本事業はタゴン農場周辺農村の飛躍的發展に貢献するばかりでなく、ビエンチャン平野の農業開発および類似事業の維持管理・運営の先駆的モデルとして、ラオス政府が多大な期待を寄せている事が判明した。

また、ラオスの当該計画の実施主体である農林省は組織上問題がなく、また維持管理については現在の組織を強化し、独立した機構を組織する強い意向が確認された。

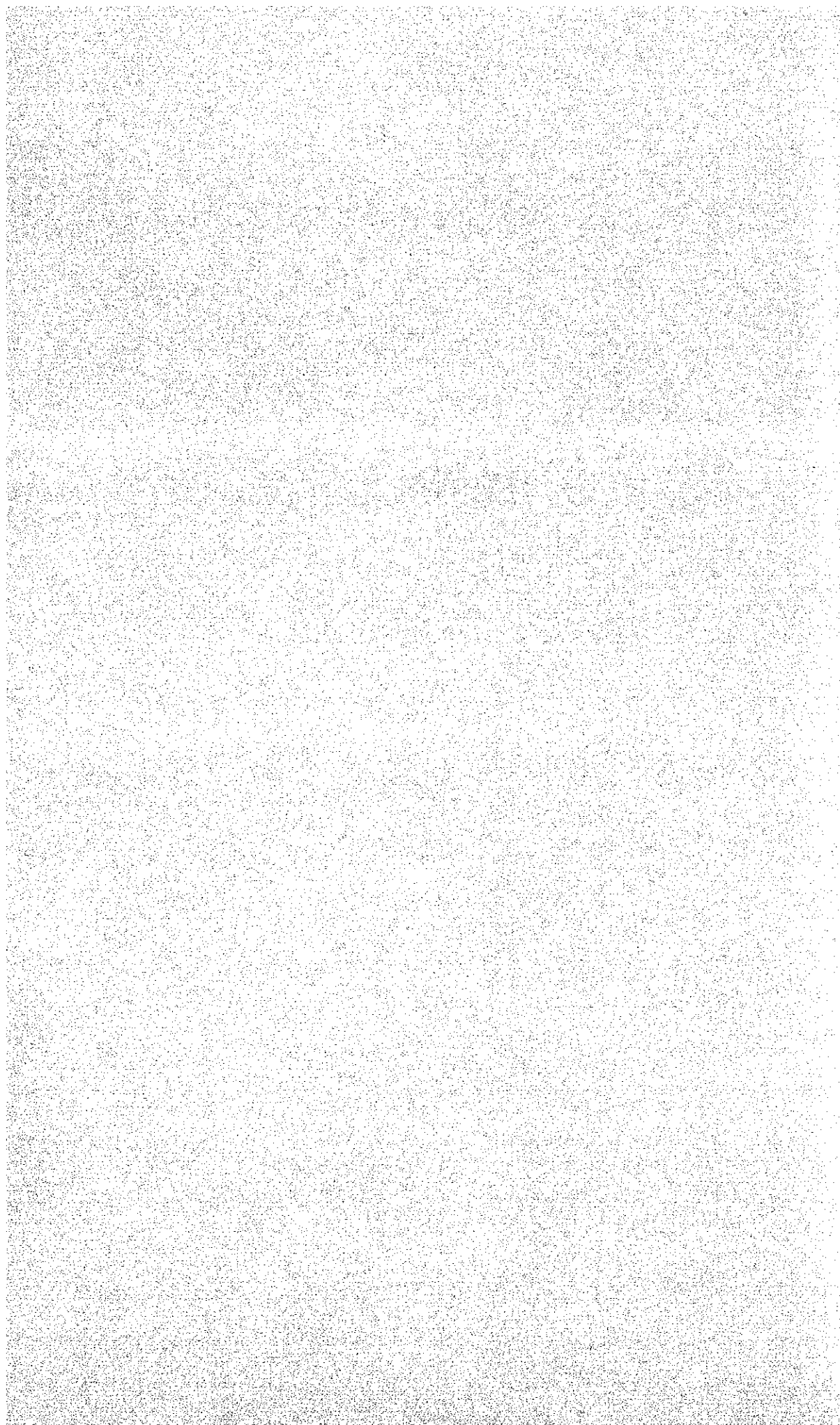
しかしながら、国全体の貿易収支の慢性的赤字、国家財政の逼迫を外国援助に依存しているラオス政府の財政状況からみて、本計画の資金をラオス政府が調達することは非常に困難である。

これらの状況に鑑み、本計画に関するラオス政府からの要請は妥当なものであると判断できるとともに、ビエンチャン平野農業開発の先駆的役割を十分満足し、他の開発計画地区への波及的効果が大きい当該計画を実施する意義は極めて高く、日本政府からの無償資金協力の条件として適当なものであると結論づけられる。

なお、本計画の円滑な実施と適当な運営・維持管理をはかるため、ラオス政府に次のことを提言したい。

- (1) ラオス側が負担する工事の早期実施と期間内の完工
- (2) 建設時のラオス側建設事務所の設立(組織および要員)
- (3) 改修工事終了後の運営・維持管理体制(組織および要員)の確立
- (4) 維持管理体制への予算措置
- (5) 要員の教育・訓練
- (6) 施設機器(ポンプ、計装機器、精米機器)に対する定期的な保守・点検

付表・付図



附表一 月雨量

Station: Tha Ngon (Unit: mm)

Year	J	F	M	A	M	J	J	A	S	O	N	D	Total
1971	N	2.3	10.7	20.5	254.2	343.9	255.8	236.2	234.1	123.6	3.0	12.4	1,496.7
1972	N	11.2	93.2	74.1	125.6	216.0	180.4	317.6	120.5	233.9	12.9	2.6	1,388.3
1973	N	N	66.8	61.7	242.7	276.6	321.5	310.8	309.6	21.0	N	N	1,670.7
1974	T	0.1	57.0	60.3	121.9	304.9	280.5	453.9	157.3	N	39.5	0.8	1,478.2
1975	29.5	17.1	57.4	30.6	417.7	402.9	224.5	494.7	325.0	187.3	7.1	N	2,193.8
1976	N	31.8	83.0	106.6	268.4	251.8	337.8	265.9	344.6	28.6	8.7	N	1,727.2
1977	16.4	N	7.8	142.2	227.6	235.9	338.8	354.0	214.7	50.0	9.0	6.2	1,602.6
1978	8.5	5.6	71.4	171.3	360.4	256.4	434.0	261.1	247.1	53.6	28.2	N	1,897.6
1979	N	12.4	1.2	74.3	470.9	260.5	183.6	76.2	192.4	2.8	N	N	1,274.0
1980	N	3.0	97.4	74.5	289.4	543.5	443.0	341.5	430.8	71.2	N	N	2,294.3
1981	N	N	17.4	138.7	347.6	227.2	707.7	249.4	362.7	146.8	18.1	N	2,215.6
1982	N	6.4	36.2	105.1	177.8	204.0	369.5	548.3	495.5	92.2	6.4	N	2,041.4
1983	53.2	10.8	15.6	30.6	67.3	264.9	269.5	399.9	258.0	84.7	N	5.7	1,460.2
1984	N	39.8	5.4	33.3	358.0	199.4	396.6	461.6	192.4	140.6	10.9	N	1,838.0
1985	31.9	20.4	31.0	56.5	191.2	491.2	359.8	214.2	249.5	170.3	2.2	N	1,818.2
Average	9.3	10.7	43.3	78.7	261.5	298.7	340.3	332.4	275.6	93.8	9.7	1.8	1,755.8

Note: T = Trace

N = Nil

付表-2 平均気温

Station: Vientiane												(Unit: °C)
Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1971	20.2	23.4	26.3	29.9	29.0	28.3	28.2	28.6	28.1	24.4	16.5	22.5
1972	22.6	24.9	25.0	29.1	30.3	29.3	29.2	28.3	28.4	27.9	25.9	23.5
1973	24.1	26.3	28.4	30.6	29.3	29.2	28.9	27.6	28.0	25.6	22.7	18.9
1974	18.4	24.1	25.0	28.5	28.8	28.9	28.7	28.9	28.2	27.4	25.6	23.9
1975	22.9	25.0	29.0	30.9	29.2	28.6	28.7	28.2	27.8	27.3	22.1	13.7
1976	20.2	21.0	26.1	27.7	27.1	27.7	27.7	26.8	27.1	26.7	23.3	22.3
1977	24.1	24.4	25.9	29.1	30.9	30.8	29.0	28.8	27.9	26.9	22.6	23.7
1978	24.1	24.4	27.8	29.2	28.5	29.1	28.6	28.2	28.4	24.5	24.1	24.7
1979	25.8	26.0	28.5	30.4	29.2	28.3	24.6	28.3	28.5	25.9	23.5	22.0
1980	22.3	23.8	27.7	29.1	28.5	27.6	27.8	27.7	27.0	27.2	25.2	23.0
1981	21.6	25.4	27.8	28.3	27.8	27.6	27.2	27.8	27.8	26.5	25.1	20.6
1982	21.9	24.7	28.1	27.4	29.1	28.5	27.8	27.0	26.7	26.8	25.8	20.2
1983	20.2	25.0	26.6	30.6	28.8	28.5	28.3	27.4	27.1	26.7	22.9	20.4
1984	20.9	24.7	27.2	29.5	27.5	28.0	26.9	27.1	26.9	25.3	24.6	22.2
1985	22.5	24.6	26.0	28.4	28.1	27.6	27.2	27.2	27.1	26.2	25.6	21.7
Average	22.1	24.5	27.0	29.2	28.8	28.5	27.9	27.9	27.7	26.4	23.7	21.6

付表-3 湿度

Station: Vientiane												(Unit: %)
Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1980	66	63	58	64	74	83	82	82	83	74	70	70
1981	66	65	63	70	78	82	83	81	79	78	71	67
1982	70	70	66	70	72	75	80	84	83	80	74	70
1983	75	68	62	63	77	80	84	87	85	82	70	74
1984	72	70	64	67	77	81	85	83	83	81	74	73
1985	74	73	65	66	77	82	84	86	85	83	76	72
Average	71	68	63	67	76	81	83	83	83	80	73	71

付表一4 風速

Station: Vientiane											Unit: (m/s)	
Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1976	1.5	1.5	2.0	1.3	1.3	1.2	1.3	1.2	1.3	1.4	1.7	1.2
1977	1.6	1.9	1.8	1.8	1.8	1.7	1.5	1.5	1.8	1.5	1.7	1.3
1978	1.8	1.7	1.7	1.8	1.9	1.7	1.7	1.6	1.8	1.3	1.3	1.5
1979	1.5	1.4	1.4	2.1	2.1	1.4	1.4	0.5	0.6	0.5	0.7	0.6
1980	1.6	1.7	1.8	3.3	3.6	1.7	1.8	1.6	1.9	1.4	1.3	1.4
1981	1.4	1.5	1.5	1.6	1.8	1.6	1.9	1.8	1.5	1.8	1.8	1.9
1982	1.3	1.7	1.6	1.7	1.8	1.7	2.0	1.8	2.0	1.5	1.6	1.8
1983	1.7	1.3	2.0	1.4	2.5	2.0	1.8	1.4	1.5	1.7	1.6	1.6
1984	1.8	2.2	1.8	2.2	2.3	2.8	2.3	2.5	1.7	1.6	1.7	1.5
1985	1.6	1.8	2.1	2.4	1.7	1.8	1.9	2.4	1.7	1.8	1.3	1.5
Average	1.6	1.6	1.6	1.5	2.1	1.8	1.8	1.6	1.6	1.5	1.5	1.4

付表一5 計器蒸發量

Station: Vientiane											Unit: (mm/day)	
Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1973	145.0	166.0	196.0	204.4	175.1	136.6	108.5	113.9	111.2	126.1	112.0	124.0
1974	117.0	124.6	137.7	157.4	163.5	119.7	129.4	107.8	112.4	136.5	113.2	111.2
1975	95.0	120.3	129.2	192.8	103.9	102.8	-	104.6	115.7	130.9	122.0	107.0
1976	113.5	111.5	135.6	121.4	105.2	144.3	104.0	108.9	106.2	129.3	-	-
1977	99.2	118.0	129.6	142.5	146.7	156.1	126.1	100.7	131.3	126.0	121.5	108.1
1978	116.6	92.6	131.1	141.6	139.8	121.5	115.6	102.5	102.9	131.6	121.7	116.7
1979	114.7	105.0	134.2	155.1	126.2	116.9	143.3	114.0	107.9	132.0	135.8	125.5
1980	107.3	115.7	152.6	134.0	106.5	77.6	84.5	106.2	90.6	130.0	138.0	134.0
1981	129.0	119.3	152.1	149.7	137.1	107.3	103.5	124.7	106.0	123.3	118.0	116.0
1982	114.0	105.1	111.3	114.8	130.3	114.9	103.9	76.6	85.5	113.2	120.2	94.8
1983	96.1	99.7	122.5	168.6	148.6	102.4	112.3	80.6	86.6	103.7	102.5	93.2
1984	101.5	127.3	148.5	142.2	110.4	101.1	83.0	80.7	79.6	94.1	117.3	114.0
1985	106.8	104.2	137.4	149.8	120.5	80.2	106.7	99.4	109.7	119.4	115.5	112.0
Average	112.0	116.1	139.8	151.9	131.8	114.0	110.1	101.6	103.5	122.8	131.2	113.0

付表一6 日照時間

Station: Vientiane											Unit: (hr/day)	
Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1980	8.4	6.7	5.4	7.3	7.3	4.2	3.9	4.6	4.1	7.6	8.3	8.7
1981	9.1	7.4	6.7	6.4	6.1	3.9	4.2	4.6	6.4	5.1	6.7	7.8
1982	8.3	6.6	5.7	7.1	7.6	5.3	3.9	3.0	4.2	7.3	8.3	8.1
1983	6.8	8.2	7.5	7.6	7.4	6.2	5.9	4.8	5.9	6.1	7.8	8.2
1984	8.4	7.5	6.7	7.6	7.0	5.4	5.1	4.6	7.0	6.5	7.8	8.9
1985	8.1	7.0	8.2	7.2	6.4	4.1	5.2	3.2	6.6	7.0	7.7	7.5
Average	8.2	7.2	6.7	7.2	7.0	4.9	4.7	4.1	5.7	6.6	7.8	8.2

付表-7 ナム・グム川水位

Year	River: Nam Ngum			Station: Tha Ngon			C.A.: 16,500 km ²			Unit: m		
	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1971	3.34	3.04	2.92	2.63	2.75	5.19	10.55	13.66	12.34	7.18	5.03	4.02
1972	3.74	3.37	3.27	3.24	3.06	4.26	7.20	12.93	11.49	8.02	5.48	4.21
1973	3.71	3.43	3.28	3.24	3.52	5.14	10.02	11.45	15.79	9.67	5.58	4.38
1974	3.63	3.34	3.25	3.31	3.62	4.74	6.73	10.25	11.58	7.91	5.64	4.04
1975	3.48	3.15	3.44	3.19	3.74	7.53	10.79	13.70	15.17	9.40	6.16	4.45
1976	3.84	3.52	3.18	2.76	3.68	5.77	7.28	10.91	10.97	9.89	7.29	4.54
1977	3.49	3.36	5.77	5.29	4.08	3.93	7.25	9.18	10.56	5.86	4.27	3.44
1978	3.23	2.94	3.10	3.19	4.84	8.15	12.34	15.26	13.26	7.46	4.39	3.33
1979	4.39	4.93	4.89	4.92	5.58	7.02	7.58	8.56	11.24	6.57	5.22	4.62
1980	4.11	4.43	4.47	4.68	5.18	7.69	9.19	12.45	13.61	7.73	5.62	5.14
1981	5.06	5.09	4.97	4.27	5.71	7.86	13.37	14.36	12.97	10.43	5.99	5.28
1982	4.93	4.72	4.97	5.17	5.14	6.02	8.11	11.11	11.17	10.52	5.89	5.23
1983	5.00	4.90	4.94	4.92	4.57	5.19	8.29	11.69	11.28	7.65	6.14	5.18
1984	5.04	4.95	4.52	4.37	5.28	6.24	10.53	10.90	10.21	8.14	5.91	5.65
Average	4.07	3.94	4.42	3.94	3.94	6.05	9.23	11.89	12.26	8.32	5.62	4.25

付表-8 ナム・グム川流量

Year	River: Nam Ngum			Station: Tha Ngon			C.A.: 16,500 km ²			Unit: m ³ /sec		
	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
1971	214	189	180	158	183	422	1,242	2,160	1,672	715	382	274
1972	251	215	207	205	179	304	705	1,894	1,435	769	452	323
1973	256	221	209	219	222	396	1,163	1,498	2,781	1,132	445	316
1974	241	213	206	211	239	359	626	1,191	1,561	775	447	284
1975	226	207	197	201	254	738	1,371	2,013	2,656	1,141	517	338
1976	262	238	209	174	246	479	676	1,322	1,270	1,143	676	339
1977	227	216	460	393	299	283	690	1,041	1,236	479	317	226
1978	205	191	194	199	369	769	1,692	2,730	1,838	737	332	220
1979	359	357	363	369	445	617	722	945	1,450	594	401	326
1980	290	321	326	330	400	744	1,187	1,746	2,039	745	455	391
1981	385	388	374	321	479	779	2,062	2,368	2,174	1,288	515	407
1982	370	350	376	395	377	530	812	1,445	1,311	1,320	477	401
1983	391	368	372	370	335	416	864	1,472	1,405	790	510	397
1984	382	373	317	315	408	507	1,336	1,294	1,202	838	479	447
Average	283	275	285	276	317	525	1,082	1,651	1,716	890	458	335

付表一9 タゴン農場収量調査結果

Code No.	Variety	No. of hill/m ²	No. of panicle/hill	No. of total grains/hill	No. of ripened grains/hill	No. of unripened grains/hill	% of ripened grains/hill	Weight of ripened grains/hill		Yield/ha (ton)	No. of ripened grains/m ²	Weight of ripened grains/panicle (gr)	No. of ripened grains/panicle
								in 14% of MC (gr)	in 14% of MC (gr)				
1	LR-16	28	5	450	349	101	77.6	10.8	30.9	2.27	9,772	2.16	69.8
2	LR-16	36	6	479	394	85	82.3	13.4	34.0	3.62	14,184	2.23	65.7
3	LR-16	33	5	279	255	24	91.4	8.7	34.1	2.15	8,415	1.74	51.0
4	LR-16	34	6	303	228	75	75.2	6.6	29.7	1.68	7,752	1.10	38.0
5	7-8-9	26	9	925	667	258	72.1	10.9	23.8	3.10	17,342	1.77	74.0
6	7-8-9	28	6	653	449	204	68.8	9.5	21.1	2.00	12,572	1.58	74.8
7	7-8-9	26	7	519	285	234	54.9	7.5	26.3	1.46	7,410	1.07	40.7
8	7-8-9	23	7	485	302	183	62.3	6.6	21.9	1.14	6,946	0.94	43.1
9	7-8-9	32	6	664	541	123	81.5	18.0	33.2	4.32	17,312	3.00	90.2
(10)	Local	11	22	2,173	1,882	291	86.6	43.9	23.3	3.62	20,702	2.00	85.5
11	LR-16	35	7	775	529	246	68.3	13.2	25.0	3.47	18,515	1.89	75.6
12	LR-16	32	5	602	443	159	73.6	15.2	34.0	3.65	14,176	3.04	88.6
13	LR-16	35	6	518	347	171	67.0	9.3	27.3	2.44	12,145	1.55	57.8
14	LR-16	38	5	449	315	134	70.2	7.6	24.1	2.17	11,970	1.52	63.0
15	Local	18	8	601	334	267	55.6	12.0	35.9	1.62	6,012	1.50	41.8
16	Local	17	9	1,040	655	385	63.0	21.6	33.0	2.75	11,135	2.40	72.8
17	Dedeng	19	9	281	182	99	64.8	7.7	42.3	1.10	3,458	0.86	20.2
18	LR-16	41	6	458	276	182	60.3	9.7	35.1	2.98	11,316	1.62	46.0
\bar{x}		28.4	7.4		385.4		69.9		30.1	2.47	11,201	1.76	59.6

Note: Sample number (10) does not include in this analysis of yield components due to special local variety.

付表-10 水質試験結果 (1/5)

1. Place of sampling : タ・ゴン・レストラン用深井戸(県営)、タ・ゴン村
2. Sampler : Member of the Basic Design Study Team of the Tha Ngon Rehabilitation and Rural Development Project
3. Sampling date of water : November 12, 1986
4. Weather : Fine
5. Water temperature : -
6. Tester : The Laboratory of Food Hygiene, Tokyo Kenbikyoin

TEST RESULTS

DESCRIPTIONS	STANDARDS IN LAOS	RESULTS
1) Turbidity	2.0	12
2) Colour	≤ 5	24
3) Odor	None	-
4) Taste	None	-
5) pH Value	5.8 - 8.6	7.2
6) Total Hardness	≤ 300	161
7) Nitrite Nitrogen (ppm)	} ≤ 10	0.36
8) Nitrate nitrogen (ppm)		
9) Iron (ppm)	≤ 0.3	-
10) Copper (ppm)	≤ 1	-
11) Zinc (ppm)	≤ 1.0	-
12) Chlorine (ppm)	≤ 200	3.2
13) Potassium Permanganate Consumed (ppm)	≤ 10	1.4
14) Cyanide (ppm)	None	-
15) Mercury (ppm)	None	-
16) Organophosphonate (ppm)	None	-
17) Manganase (ppm)	≤ 0.3	-
18) Lead (ppm)	≤ 0.1	-
19) Hexavalent Chromium (ppm)	≤ 0.05	-
20) Arsenic (ppm)	≤ 0.05	-
21) Fluoride (ppm)	≤ 0.8	-
22) Anion Active Substances (ppm)	≤ 0.5	-
23) Cadmium (ppm)	≤ 0.01	-
24) Bacterial Count	≤ 100	33,120
25) Coliform Group	None	Positive

付表-10 水質試験結果 (2/5)

1. Place of sampling : タゴン飼料工場用深井戸(国営)、タゴン村
2. Sampler : Member of the Basic Design Study Team of the Tha Ngon Rehabilitation and Rural Development Project
3. Sampling date of water : November 12, 1986
4. Weather : Fine
5. Water temperature : —
6. Tester : The Laboratory of Food Hygiene, Tokyo Kenbikyoin

TEST RESULTS

DESCRIPTIONS		STANDARDS IN LAOS	RESULTS
1) Turbidity		2.0	0
2) Colour		≤ 5	1
3) Odor		None	—
4) Taste		None	—
5) pH Value		5.8 — 8.6	7.2
6) Total Hardness		≤ 300	204
7) Nitrite Nitrogen	(ppm)	} ≤ 10	0.13
8) Nitrate nitrogen	(ppm)		
9) Iron	(ppm)	≤ 0.3	0.12
10) Copper	(ppm)	≤ 1	—
11) Zinc	(ppm)	≤ 1.0	—
12) Chlorine	(ppm)	≤ 200	3.2
13) Potassium Permanganate Consumed	(ppm)	≤ 10	0.12
14) Cyanide	(ppm)	None	—
15) Mercury	(ppm)	None	—
16) Organophosphonate	(ppm)	None	—
17) Manganase	(ppm)	≤ 0.3	—
18) Lead	(ppm)	≤ 0.1	—
19) Hexavalent Chromium	(ppm)	≤ 0.05	—
20) Arsenic	(ppm)	≤ 0.05	—
21) Fluoride	(ppm)	≤ 0.8	—
22) Anion Active Substances	(ppm)	≤ 0.5	—
23) Cadmium	(ppm)	≤ 0.01	—
24) Bacterial Count		≤ 100	44,320
25) Coliform Group		None	Positive

付表-10 水質試験結果 (3/5)

1. Place of sampling : ラトクワイ養豚センター用深井戸(国営)、ラトクワイ村
2. Sampler : Member of the Basic Design Study Team of the Tha Ngon Rehabilitation and Rural Development Project
3. Sampling date of water : November 12, 1986
4. Weather : Fine
5. Water temperature : —
6. Tester : The Laboratory of Food Hygiene, Tokyo Kenbikyoin

TEST RESULTS

DESCRIPTIONS	STANDARDS IN LAOS	RESULTS
1) Turbidity	2.0	8
2) Colour	≤ 5	16
3) Odor	None	—
4) Taste	None	—
5) pH Value	5.8 - 8.6	6.7
6) Total Hardness	≤ 300	276
7) Nitrite Nitrogen (ppm)	} ≤ 10	0.45
8) Nitrate nitrogen (ppm)		
9) Iron (ppm)	≤ 0.3	0.21
10) Copper (ppm)	≤ 1	—
11) Zinc (ppm)	≤ 1.0	—
12) Chlorine (ppm)	≤ 200	27.6
13) Potassium Permanganate Consumed (ppm)	≤ 10	1.4
14) Cyanide (ppm)	None	—
15) Mercury (ppm)	None	—
16) Organophosphonate (ppm)	None	—
17) Manganase (ppm)	≤ 0.3	—
18) Lead (ppm)	≤ 0.1	—
19) Hexavalent Chromium (ppm)	≤ 0.05	—
20) Arsenic (ppm)	≤ 0.05	—
21) Fluoride (ppm)	≤ 0.8	—
22) Anion Active Substances (ppm)	≤ 0.5	—
23) Cadmium (ppm)	≤ 0.01	—
24) Bacterial Count	≤ 100	49,120
25) Coliform Group	None	Positive

付表-10 水質試験結果 (4/5)

1. Place of sampling : 一般の浅井戸(個人共同)、タ・ゴン村
2. Sampler : Member of the Basic Design Study Team of the Tha Ngon Rehabilitation and Rural Development Project
3. Sampling date of water : November 12, 1986
4. Weather : Fine
5. Water temperature : -
6. Tester : The Laboratory of Food Hygiene, Tokyo Kenbikyoin

TEST RESULTS

DESCRIPTIONS		STANDARDS IN LAOS	RESULTS
1) Turbidity		2.0	0
2) Colour		≤ 5	1
3) Odor		None	-
4) Taste		None	-
5) pH Value		5.8 - 8.6	3.8
6) Total Hardness		≤ 300	-
7) Nitrite Nitrogen	(ppm)	} ≤ 10	10.55
8) Nitrate nitrogen	(ppm)		
9) Iron	(ppm)	≤ 0.3	-
10) Copper	(ppm)	≤ 1	-
11) Zinc	(ppm)	≤ 1.0	-
12) Chlorine	(ppm)	≤ 200	19.7
13) Potassium Permanganate Consumed	(ppm)	≤ 10	1.3
14) Cyanide	(ppm)	None	-
15) Mercury	(ppm)	None	-
16) Organophosphonate	(ppm)	None	-
17) Manganase	(ppm)	≤ 0.3	-
18) Lead	(ppm)	≤ 0.1	-
19) Hexavalent Chromium	(ppm)	≤ 0.05	-
20) Arsenic	(ppm)	≤ 0.05	-
21) Fluoride	(ppm)	≤ 0.8	-
22) Anion Active Substances	(ppm)	≤ 0.5	-
23) Cadmium	(ppm)	≤ 0.01	-
24) Bacterial Count		≤ 100	3,180
25) Coliform Group		None	Negative

付表-10 水質試験結果 (5/5)

1. Place of sampling : 一般の浅井戸(個人共同)、ウドン・ポール村
2. Sampler : Member of the Basic Design Study Team of the Tha Ngon Rehabilitation and Rural Development Project
3. Sampling date of water : November 12, 1986
4. Weather : Fine
5. Water temperature : -
6. Tester : The Laboratory of Food Hygiene, Tokyo Kenbikyoin

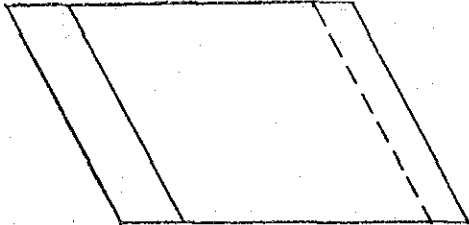
TEST RESULTS

DESCRIPTIONS	STANDARDS IN LAOS	RESULTS
1) Turbidity	2.0	3
2) Colour	≤ 5	1
3) Odor	None	-
4) Taste	None	-
5) pH Value	5.8 - 8.6	4.3
6) Total Hardness	≤ 300	-
7) Nitrite Nitrogen	(ppm) } ≤ 10	-
8) Nitrate nitrogen	(ppm)	-
9) Iron	(ppm) ≤ 0.3	-
10) Copper	(ppm) ≤ 1	-
11) Zinc	(ppm) ≤ 1.0	-
12) Chlorine	(ppm) ≤ 200	3.2
13) Potassium Permanganate Consumed	(ppm) ≤ 10	1.6
14) Cyanide	(ppm) None	-
15) Mercury	(ppm) None	-
16) Organophosphonate	(ppm) None	-
17) Manganase	(ppm) ≤ 0.3	-
18) Lead	(ppm) ≤ 0.1	-
19) Hexavalent Chromium	(ppm) ≤ 0.05	-
20) Arsenic	(ppm) ≤ 0.05	-
21) Fluoride	(ppm) ≤ 0.8	-
22) Anion Active Substances	(ppm) ≤ 0.5	-
23) Cadmium	(ppm) ≤ 0.01	-
24) Bacterial Count	≤ 100	2,240
25) Coliform Group	None	Positive

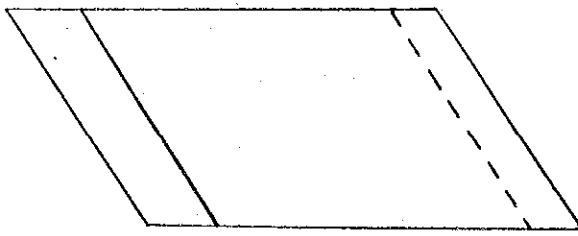
付表-11 感存蒸発散量(ペンマン法)

	Unit	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
T mean	°C	22.1	24.5	27.0	29.2	28.8	28.5	27.9	27.9	27.7	26.4	23.7	21.6
RH mean	%	71	68	63	67	76	81	83	83	83	80	73	71
ea	m bar	26.6	30.8	35.7	40.6	39.6	39.0	37.6	37.6	37.2	34.4	29.3	25.8
ed	m bar	18.9	20.9	22.5	27.2	30.1	31.5	31.2	31.2	30.9	27.6	21.4	18.3
ea-ed	m bar	7.7	9.9	13.2	13.4	9.5	7.5	6.4	6.4	6.3	6.8	7.9	7.5
U	Km/day	135	135	135	127	178	152	152	135	135	127	127	118
$f(u)=0.27(1+U/100)$		0.63	0.63	0.63	0.61	0.75	0.68	0.68	0.63	0.63	0.61	0.61	0.59
1-W		0.29	0.26	0.24	0.22	0.23	0.23	0.23	0.23	0.23	0.25	0.27	0.30
W		0.71	0.74	0.76	0.78	0.77	0.77	0.77	0.77	0.77	0.75	0.73	0.70
Ra	mm/day	11.6	13.0	14.6	15.6	16.1	16.1	16.1	15.8	14.9	13.6	12.0	11.1
Rns	mm/day	5.4	5.6	5.8	6.3	6.3	5.2	5.2	4.9	5.4	5.4	5.4	5.2
f (T)		15.0	15.4	16.0	16.4	16.4	16.3	16.2	16.2	16.1	15.8	15.3	14.9
f (ed)		0.14	0.14	0.13	0.11	0.10	0.09	0.09	0.09	0.10	0.11	0.14	0.15
f (n/N)		0.76	0.68	0.60	0.62	0.59	0.43	0.42	0.39	0.52	0.61	0.72	0.77
Rn $\bar{\rho}$	mm/day	1.7	1.5	1.3	1.1	0.9	0.6	0.6	0.6	0.8	1.0	1.5	1.7
Rn=Rns-Rn $\bar{\rho}$	mm/day	3.7	4.1	4.5	5.2	5.3	4.6	4.5	4.3	4.6	4.4	3.9	3.4
RHmax	%	99	97	95	96	98	98	99	99	98	98	97	98
U	m/sec	1.6	1.6	1.6	1.5	2.1	1.8	1.8	1.6	1.6	1.5	1.5	1.4
C		1.01	1.02	1.03	1.04	1.02	1.00	1.00	1.00	1.01	1.02	1.02	1.02
ETC	mm/day	4.1	4.8	5.6	6.1	5.9	4.7	4.5	4.2	4.5	4.4	4.2	3.8
	mm/month	127	134	174	183	183	141	140	130	135	136	126	118

附表-12 灌溉用水量(雨期)

		Wet Season							
		MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
									
		MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
(1) ET	(mm)	-	141	140	130	135	136		
(2) CF		-	1.2	1.3	1.4	1.3	1.3		
(3) (1)x(2)	(mm)	-	169	182	182	176	177		
(4) P	(mm)	-	90	93	93	90	93		
(5) ER	(mm)	-	168	180	178	138	50		
(6) (3)+(4)-(5)	(mm)	-	91	95	97	128	220		
(7) AF		-	0.21	0.84	1.00	0.92	0.33		
(8) (6)x(7)	(mm)	-	19	80	97	118	73		
(9) PW	(mm)	18	125	37	-	-	-		
(10) NW	(mm)	24	16	-	-	-	-		
(11) FWR (8)+(9)+(10)	(mm)	42	160	117	97	118	73		
(12) DW (11)/E	(mm)	70	267	195	162	197	122		
	(lit/sec/ha)	0.26	1.03	0.73	0.60	0.76	0.46		

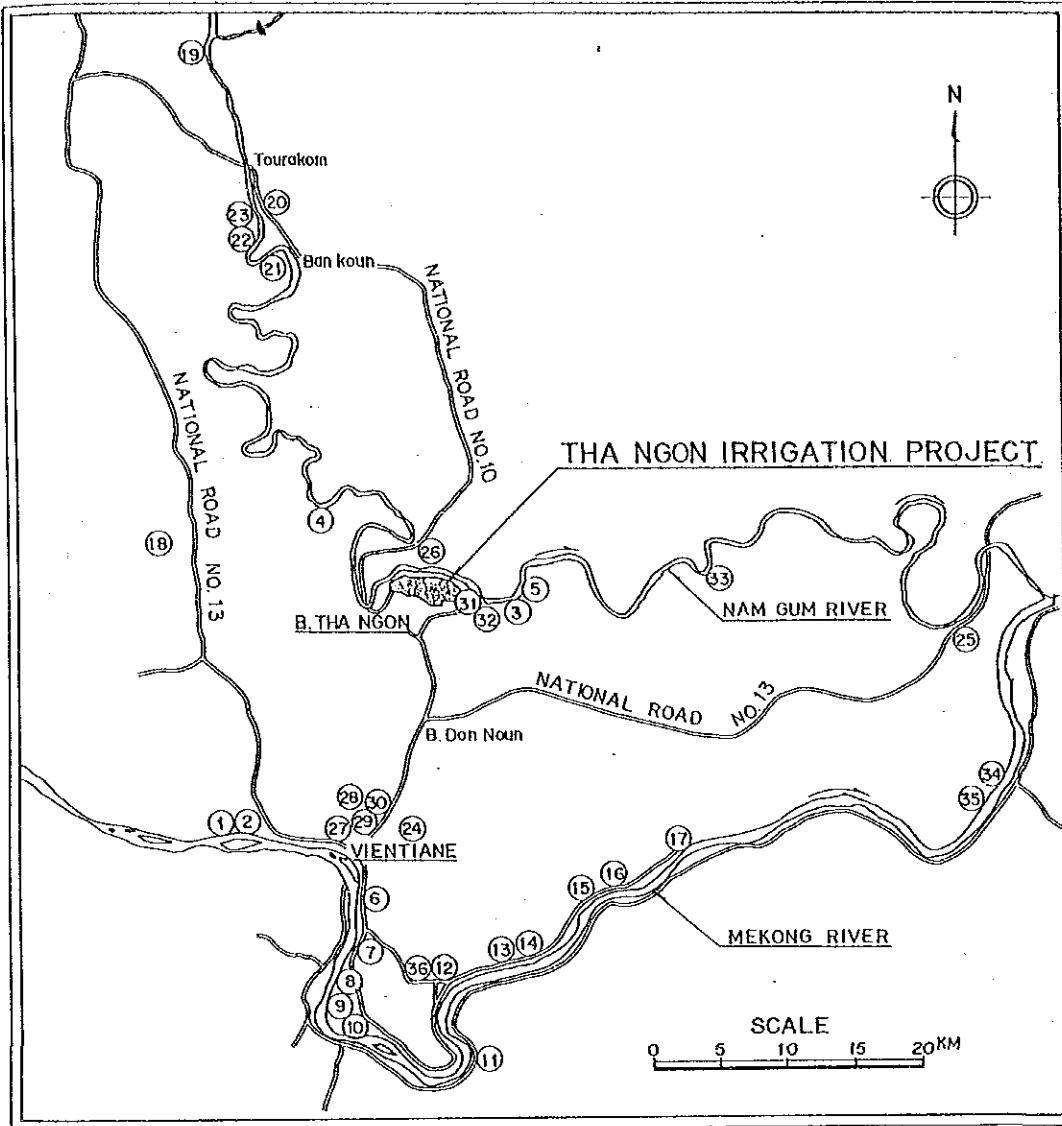
附表-13 灌溉用水量(乾期)

		Dry Season							
		NOV	DEC	JAN	FEB	MAR	APR	MAY	
									
		NOV	DEC	JAN	FEB	MAR	APR	MAY	
(1)	ET (mm)	-	118	127	134	174	183	183	
(2)	CF	-	1.1	1.2	1.3	1.3	1.2	1.1	
(3)	(1)x(2) (mm)	-	130	152	174	226	220	201	
(4)	P (mm)	-	93	93	84	93	90	93	
(5)	ER (mm)	-	0	0	5	30	56	153	
(6)	(3)+(4)-(5) (mm)	-	223	245	253	289	254	141	
(7)	ΔF	-	0.08	0.67	1.00	0.99	0.54	0.02	
(8)	(6)x(7) (mm)	-	18	164	253	286	137	3	
(9)	PW (mm)	5	112	83	-	-	-	-	
(10)	NW (mm)	13	27	-	-	-	-	-	
(11)	FWR (8)+(9)+(10) (mm)	18	157	247	253	286	137	3	
(12)	DW (11)/E (mm)	30	262	412	422	477	228	5	
		(lit/sec/ha)	0.12	0.98	1.54	1.74	1.78	0.88	0.02

付表-14 高圧線延長工事概算工事費(ラオス側負担)

NO.	DESCRIPTIONS	Q'TY	COST (Kip)	
			UNIT	AMOUNT
A. MATERIAL COST				
1.	End pole w/accessories	2 sets	33,533	67,066
2.	Ordinary pole w/accessories	52 sets	28,177	1,465,204
3.	Angle (small) pole w/accessories	4 sets	41,784	167,136
4.	Angle (large) pole w/accessories	1 set	50,243	50,243
5.	Conductors, ACSR 70 mm ² /12	11,025 m	121	1,334,025 (3,083,674)
6.	Miscellaneous Materials (2% of 1 to 5)	L.S.	-	61,674
	Sub-total:			3,145,348
B. INSTALLATION COST				
1.	Tractor & trailer, 20 t (8 trips)	8 days	9,615	76,920
2.	Ordinary truck, 3 t	20 days	2,621	52,420
3.	Truck Crane, 16 t	4 days	16,631	66,524
4.	Crane w/auger for pole install. (4 poles/day)	20 days	8,503	170,060
5.	Labour, grade 1	60 M/D	334	20,040
6.	Labour, grade 2	200 M/D	292	58,400
7.	Labour, grade 3	200 M/D	257	51,400 (495,764)
8.	Miscellaneous mat. & tools (2% of 1 to 4)	L.S.	-	7,318
	Sub-total:			503,082
	Total:			Kip 3,648,430

付図-1 ビエンチャン平野灌漑プロジェクト

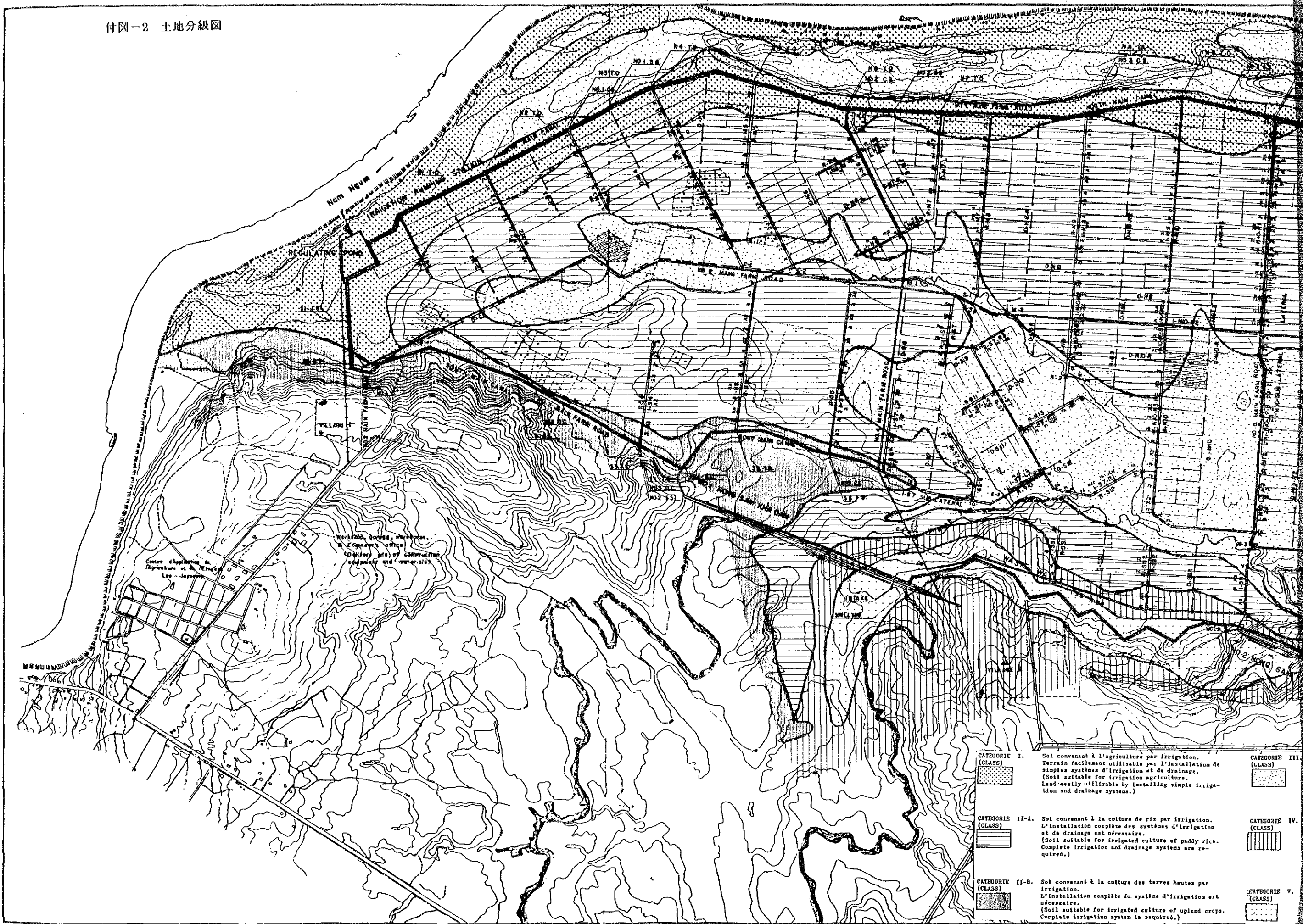








No.	Project	Irrigation Area (ha)	Irrigation System	Supporting Country	Construction period	Realization	No.	Project	Irrigation Area (ha)	Irrigation System	Supporting Country	Construction period	Realization
1	KAOLIAO I	1,000	Pump	Australia	1982	constructed	19	THA LIT	400	Pump	Australia		Under Construction
2	KAOLIAO II	150	-	Holland	1978	-	20	PAKJACHONG	300	Pump	IDA	1986	planning
3	DONGBANG	400	-	Australia	1982	-	21	VIENGKHAN	300	-	-	1986	-
4	YANAKUAN	700	-	IDA		Under Construction	22	PACHANG	450	-	Holland		Under Construction
5	NAPANG	250	-	-	1981	constructed	23	BAW CHENG	500	Pump	Australia		Under Construction
6	PHANLAMI	600	-	Australia	1982	-	24	BIA BINA	300	-	IAO P.R.B.	1984	constructed
7	CHENABANG	115	-	Holland	1979	-	25	BAK PHAO	300	-	-		Under Construction
8	KENGKANG	160	-	-	1979	-	26	MIT KIENG	300	-	-		Under Construction
9	HAYGAKKED	113	-	-	1976	-	27	NOHO DONKAO	300	-	-	1984	constructed
10	NONTHONG	180	-	-	1982	-	28	DOWE DEWO	300	-	-	1983	-
11	SATPHONE	80	-	-	1979	-	29	BOWO SEHO II	1,097	-	-	1984	-
12	KANAI	300	-	Quaker ¹⁾	1979	-	30	BOWO SEHO I	140	-	-	1983	-
13	Km. 19	400	-	Holland	1979	-	31	LIX KHOUA I	60	-	-	1983	-
14	THA DEVA	63	-	-	1979	-	32	LIX KHOUA II	100	-	-	1983	-
15	THA PHA	400	-	-	1979	-	33	KEBONG	300	-	-	1983	-
16	PHIMPHENG	303	-	-	1979	-	34	KIX KAO	350	-	-	1984	-
17	SIBHANG	300	-	-	1979	-	35	KIX HIO	160	-	-	1984	-
18	HANHONG	3,000	Earth Dam	IAO P.R.B.		Under Construction	36	NOHO YAKO	300	-	-	1984	-

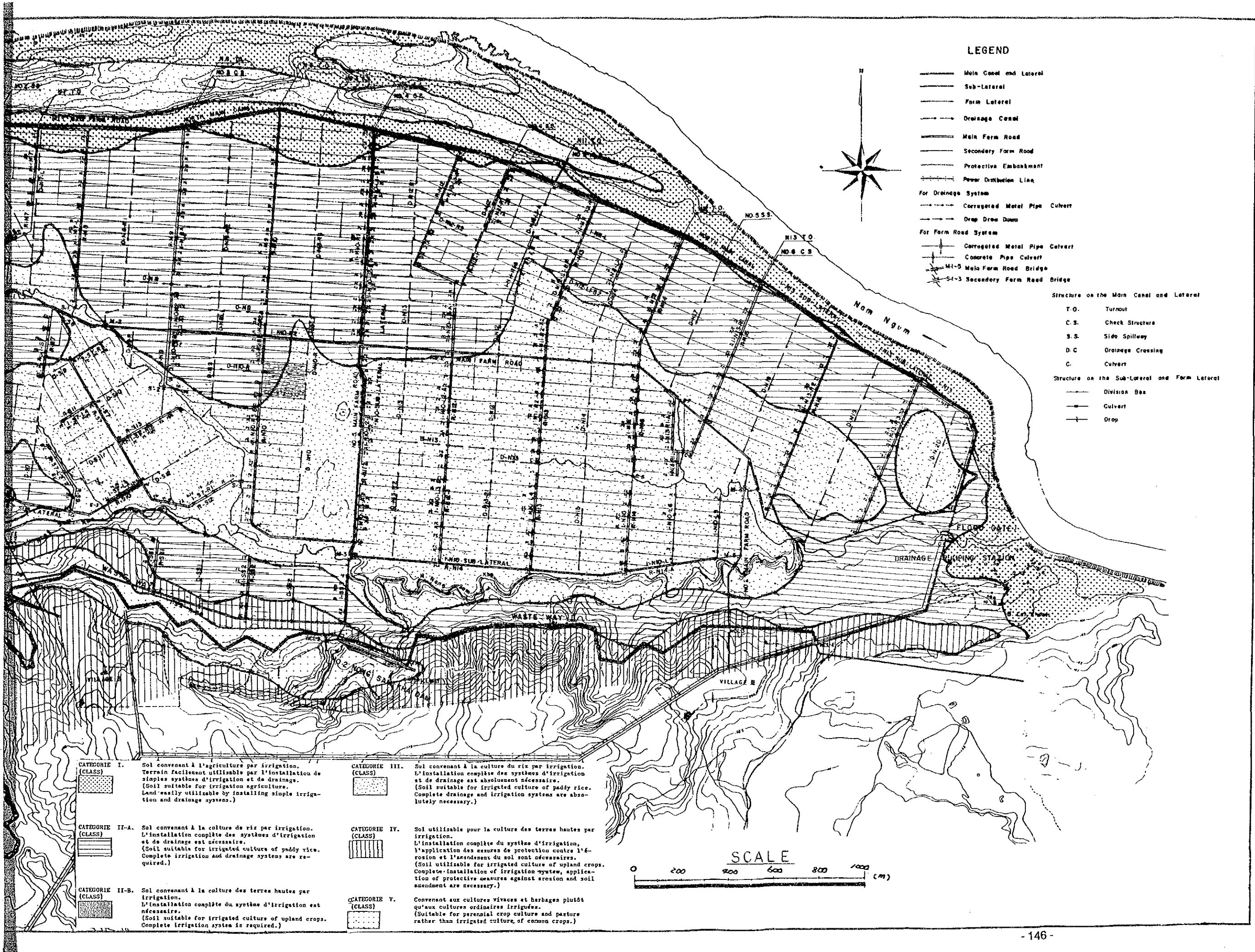
1) Quaker : Non Government

Source : Department of Irrigation, MAFIC

付図-2 土地分級図



<p>CATEGORIE I. (CLASS)</p> 	<p>Sol convenant à l'agriculture par irrigation. Terrain facilement utilisable par l'installation de simples systèmes d'irrigation et de drainage. (Soil suitable for irrigation agriculture. Land easily utilisable by installing simple irrigation and drainage systems.)</p>	<p>CATEGORIE III. (CLASS)</p> 
<p>CATEGORIE II-A. (CLASS)</p> 	<p>Sol convenant à la culture de riz par irrigation. L'installation complète des systèmes d'irrigation et de drainage est nécessaire. (Soil suitable for irrigated culture of paddy rice. Complete irrigation and drainage systems are required.)</p>	<p>CATEGORIE IV. (CLASS)</p> 
<p>CATEGORIE II-B. (CLASS)</p> 	<p>Sol convenant à la culture des terres hautes par irrigation. L'installation complète du système d'irrigation est nécessaire. (Soil suitable for irrigated culture of upland crops. Complete irrigation system is required.)</p>	<p>CATEGORIE V. (CLASS)</p> 



LEGEND

- Main Canal and Lateral
- Sub-Lateral
- Farm Lateral
- Drainage Canal
- Main Farm Road
- Secondary Farm Road
- Protective Embankment
- Power Distribution Line
- For Drainage System**
- Corrugated Metal Pipe Culvert
- Drop Down
- For Farm Road System**
- Corrugated Metal Pipe Culvert
- Concrete Pipe Culvert
- M-5 Main Farm Road Bridge
- S-3 Secondary Farm Road Bridge

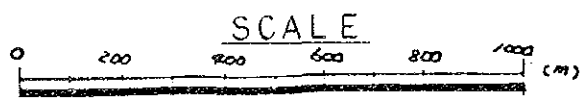
Structure on the Main Canal and Lateral

- T.O. Turnout
- C.S. Check Structure
- S.S. Side Spillway
- D.C. Drainage Crossing
- C. Culvert

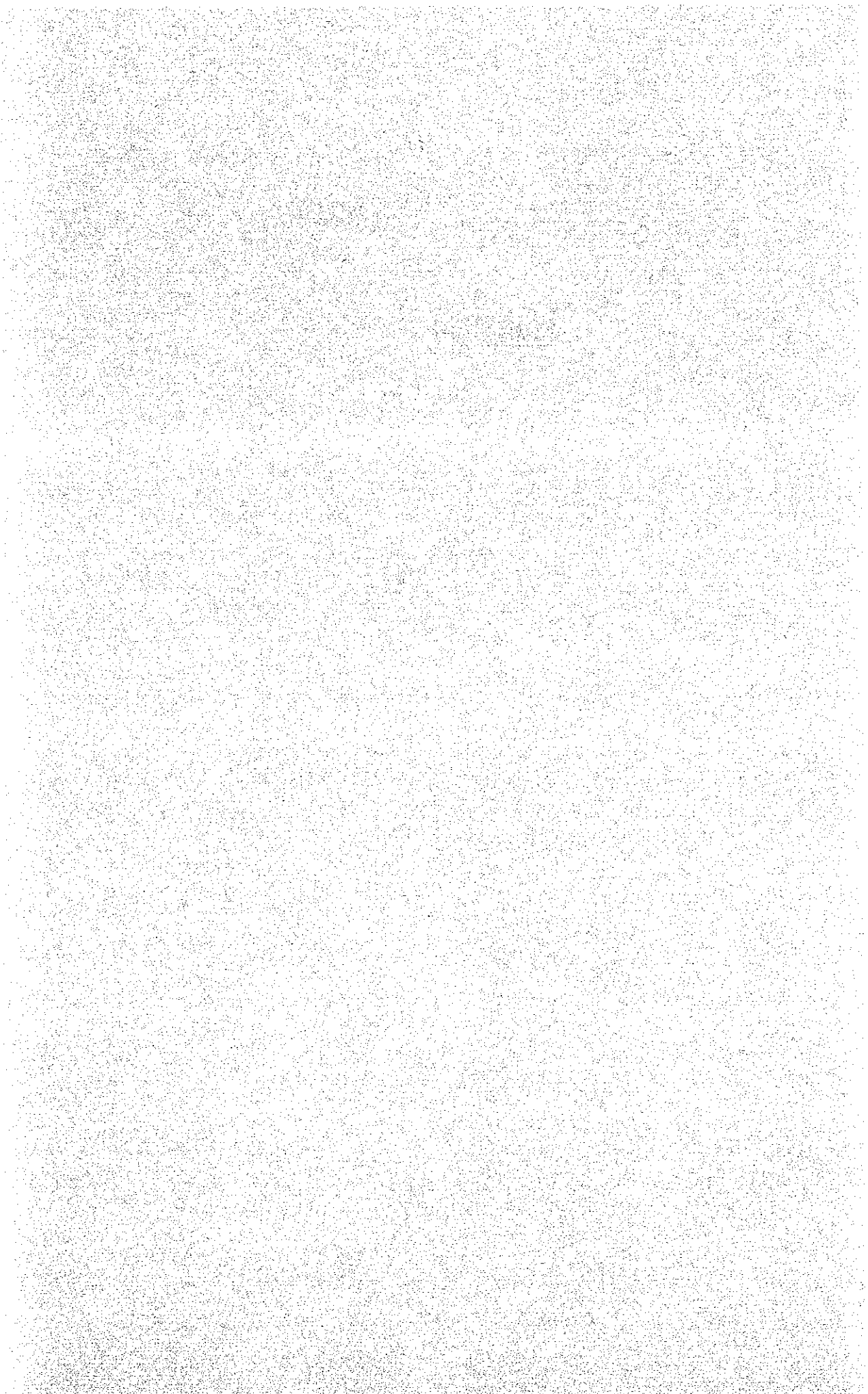
Structure on the Sub-Lateral and Farm Lateral

- Division Box
- Culvert
- Drop

<p>CATEGORIE I. (CLASS)</p> <p>Sol convenant à l'agriculture par irrigation. Terrain facilement utilisable par l'installation de simples systèmes d'irrigation et de drainage. (Soil suitable for irrigated agriculture. Land easily utilisable by installing simple irrigation and drainage systems.)</p>	<p>CATEGORIE III. (CLASS)</p> <p>Sol convenant à la culture du riz par irrigation. L'installation complète des systèmes d'irrigation et de drainage est absolument nécessaire. (Soil suitable for irrigated culture of paddy rice. Complete drainage and irrigation systems are absolutely necessary.)</p>
<p>CATEGORIE II-A. (CLASS)</p> <p>Sol convenant à la culture de riz par irrigation. L'installation complète des systèmes d'irrigation et de drainage est nécessaire. (Soil suitable for irrigated culture of paddy rice. Complete irrigation and drainage systems are required.)</p>	<p>CATEGORIE IV. (CLASS)</p> <p>Sol utilisable pour la culture des terres hautes par irrigation. L'installation complète du système d'irrigation, l'application des mesures de protection contre l'érosion et l'assèchement du sol sont nécessaires. (Soil utilisable for irrigated culture of upland crops. Complete installation of irrigation system, application of protective measures against erosion and soil amendment are necessary.)</p>
<p>CATEGORIE II-B. (CLASS)</p> <p>Sol convenant à la culture des terres hautes par irrigation. L'installation complète du système d'irrigation est nécessaire. (Soil suitable for irrigated culture of upland crops. Complete irrigation system is required.)</p>	<p>CATEGORIE V. (CLASS)</p> <p>Convenant aux cultures vivaces et herbages plutôt qu'aux cultures ordinaires irriguées. (Suitable for perennial crop culture and pasture rather than irrigated culture of common crops.)</p>



付属資料



タゴン農場改修計画基本設計調査団

団 長	太 田 信 介	農林水産省経済局国際部国際協力課 海外技術協力官
調 整	松 永 龍 児	国際協力事業団無償資金協力計画調査部 基本設計調査第一課
灌排計画	秋 月 勲	日本工営株式会社 第二農業水利部
土木設計	田 中 重 之	日本工営株式会社 第一農業水利部
施設設計	瀬 戸 憲 司	日本工営株式会社 プラント技術部
農業施設	税 所 敦 哉	日本工営株式会社 建設管理部
農業経済	山 田 喜 作	日本工営株式会社 営農部

報告書草案説明ミッション

団 長	真 綱 寛	外務省経済協力局無償資金協力課
灌排計画	秋 月 勲	日本工営株式会社 第二農業水利部

調査日程表

日順	月日	曜日	宿泊地	太田団長	松永団員	秋月団員	田中団員	税所団員	山田団員	瀬戸団員
1	10/24	金	バンコック	東京-バンコック: TG 741						
2	25	土	ヴィエンチャン	バンコック-ヴィエンチャン: QV 426						
3	26	日	"	市場調査および資料整理						
4	27	月	"	ラオス農林省 (MAFIC) へ Inception Report の説明ならびに Topo-survey等の協力依頼						
5	28	火	"	午前中 Kao Lio Pump Irrigation Scheme (オーストラリア援助) を視察。ラオス外務省、農林省、表徴。午後タゴゴン農場現場調査						
6	29	水	"	午前: SPC, 日本大使館表徴。午後: MAFIC と議事録協議						
7	30	木	"	議事録編印						
8	31	金	"	製薬技術開発センター視察						
9	11/1	土	"	ヴィエンチャン-バンコック: QV 416						
10	2	日	"	バンコック-東京: TG 740						
11	3	月	"		MAFIC にて資料収集 資料整理 ヴィエンチャンにて資料収集	同上	現地にて資料収集 MAFIC にて資料収集 資料整理 農業試験場	現場調査および調査工程作成		
12	4	火	"		Mr. Alom と協議	追加村追加調査	同上	精米所, 井戸調査		
13	5	水	"		灌漑局長と面談	追加村追加調査	追加村追加調査, 20地	同上		
14	6	木	"		State Contractor 訪問	資料整理	MAFIC にて資料収集	資料整理		
15	7	金	"		Mr. Alom と協議	揚水機場入口測量	SADC にて資料収集	資料整理		
16	8	土	"		ヴィエンチャンにて資料収集	追加水路測量	井戸掘削調査	資料整理		
17	9	日	"		資料整理	既設構造物調査	資料整理	資料整理		
18	10	月	"		農道、用水路調査		水路内ゲート調査	養漁業調査		
19	11	火	"		同上	追加水路測量	同上	市場調査		
20	12	水	"		資料収集および現場調査に関する中間打ち合せ		基本設計調査(台およびカウタンク-パーバート)			
21	13	木	"		骨材採取現場	資料整理	工事材料の調査	ヴィエンチャン-バンコック: TH 507		
22	14	金	"		ヴィエンチャンにて資料収集	現場測量	電気工事関係調査	バンコック-東京: TG 740		
23	15	土	"		State Contractor 訪問	資料整理	State Contractor 訪問			
24	16	日	"		資料整理	資料整理	資料整理			
25	17	月	"		水文資料調査	測量成果整理	現場で再確認調査			
26	18	火	"		現場にて土取場等の調査					
27	19	水	"		現場にて計画内容説明 (日本大使館, MAFIC, 農政府)					
28	20	木	"		資料整理 資料収集	資料整理 資料収集	資料整理 資料収集			
29	21	金	バンコック		MAFIC と最終協議。日本大使館報告					
30	22	土			ヴィエンチャン-バンコック: QV 416					
31	23	日			バンコック-東京					

調査団日程表

(報告書草案説明)

日順	月日	曜日	宿泊地	真鍋団長	秋月団員
1	1/14	水	バンコック	東京 - バンコック : TG 641	
2	15	木	ヴィエンチャン	バンコック-ヴィエンチャン : TH 506	日本大使館表敬 ヴィエンチャン県副知事表敬
3	16	金	"		外務省表敬、農林省表敬、報告書草案提出
4	17	土	"		農林省にて報告書草案説明
5	18	日	"		団内打合せ
6	19	月	"		農林省にて討議議事録打合せ。討議議事録調印
7	20	日	"	ヴィエンチャン-バンコック : QV 412	農林省にて草案説明
8	21	水	"		"
9	22	木	バンコック		ヴィエンチャン-バンコック : TH 507
10	23	金	-		バンコック-東京 : TG 740

収 集 資 料 リ ス ト

1. 地図関係

- (1) 地形図 縮尺： 1/10,000 (1967/68年作成) 6葉
 (2) 航空写真 縮尺： 1/30,000 (1981年撮影) 6葉

2. 国家開発計画、統計資料関係

- (1) 10 Years of Socio-economic Development in The Lao People's Democratic Republic, State Planning Committee, Vientiane 1985
 (2) Lao People's Democratic Republic, Country Economic Memorandum, July 15, 1986, World Bank
 (3) Lao People's Democratic Republic, Peace, Independence, Unity, Socialism, Report on the Economic and Social Situation, Development Strategy and Assistance Needs, Geneva, April 1986, Volume I and Volume II
 (4) Report on Development Co-operation, Lao PDR 1985, United Nations Development Programme, Vientiane, July 1986

3. 水文資料

- (1) 日雨量
 ビエンチャン： 1971～1985
 タゴン : 1971～1985
 (2) 月別気象資料 (気温、湿度、蒸発、風速、日照)
 ビエンチャン： 1971～1985
 (3) 日水位・日流量
 タゴン : 1971～1985

MINUTES OF DISCUSSIONS
ON
THE BASIC DESIGN STUDY
FOR
THE THA NGON REHABILITATION AND RURAL DEVELOPMENT PROJECT
IN
LAO PEOPLE'S DEMOCRATIC REPUBLIC

In response to the request of the Government of Lao People's Democratic Republic, the Government of Japan decided to conduct a basic design study on the Tha Ngon Rehabilitation and Rural Development Project (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA"). JICA sent to Laos the Study Team headed by Mr. Shinsuke Ota from October 24, 1986 to November 23, 1986.

The Team had a series of discussions on the Project with the officials concerned of the Government of Lao People's Democratic Republic headed by Mr. Alom Thavonesouk, Deputy Director of planning Department, the Ministry of Agriculture, Forestry, Irrigation and Cooperatives, and conducted a field survey.

As a result of the study, both parties agreed to recommend to their respective Governments that the major points of understanding reached between them, attached herewith, should be examined towards the realization of the Project.

Vientiane, October 30, 1986

太田信介

Shinsuke Ota

Leader of Study Team



Alom Thavonesouk

Leader of the Lao Team

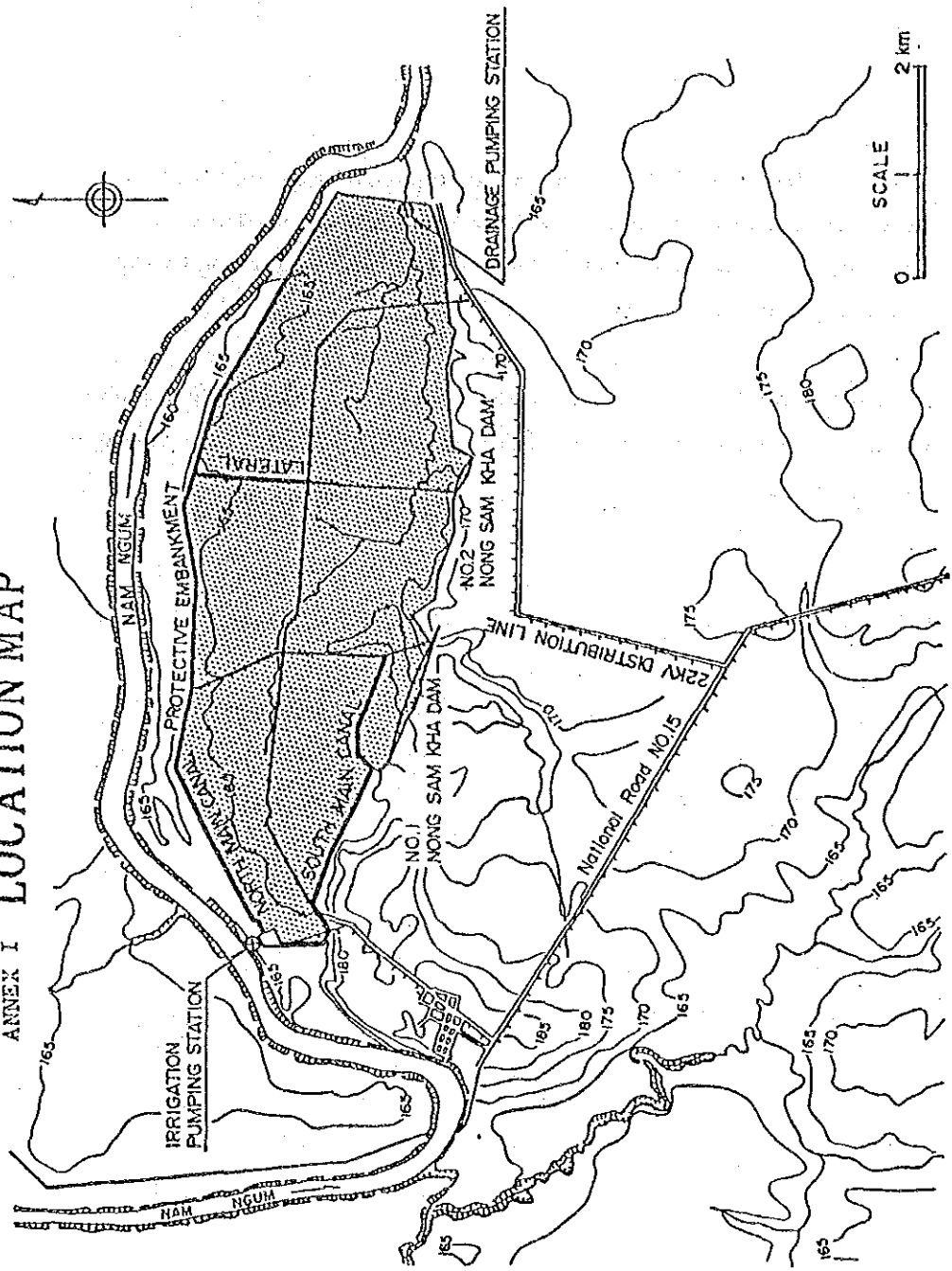
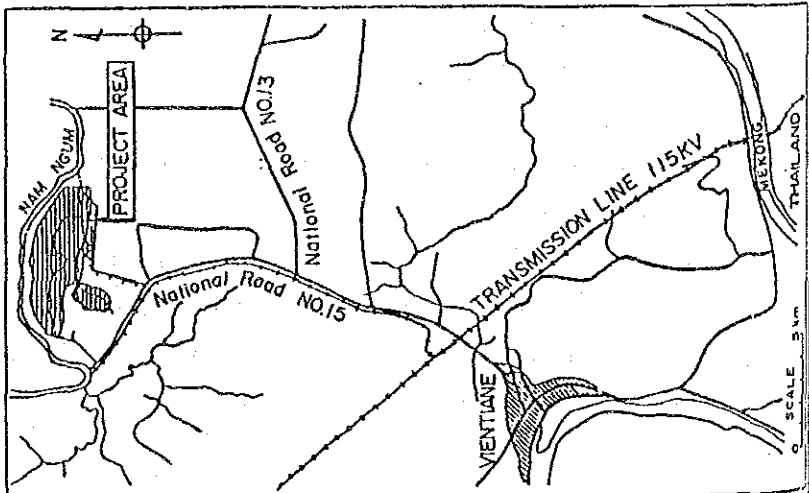
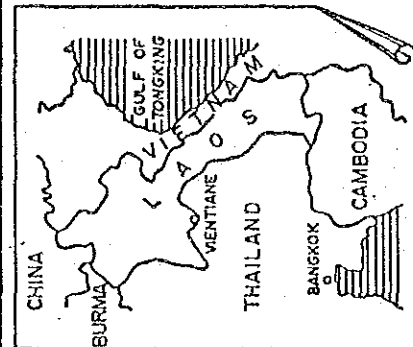
Ministry of Agriculture, Forestry,
Irrigation and Cooperatives

ATTACHMENT

1. The objective of the Project is to develop the prospective rural area through the rehabilitation of irrigation and drainage system in the Tha Ngon irrigation scheme and improvement of rural infrastructures around the scheme, and to contribute to the similar development of small and medium scale irrigation scheme integrated with the rural development in the Vientiane plain as a pilot project.
2. The site of the Project is located at about 25 km north from Vientiane, the capital of Lao People's Democratic Republic as shown Annex I.
3. The main concept of the Project will be:
 - (1) To increase and stabilize yield and production of rice through proper rehabilitation of irrigation and drainage system and introduction of sufficient operation and maintenance of the system,
 - (2) To increase farmer's income through establishment of the rice processing and storage facilities which contributes to improvement of rice quality, and
 - (3) To improve and stabilize the social welfare through the supply of sufficient and qualified water to the rural populace and improvement of rural road.
4. The Ministry of Agriculture, Forestry, Irrigation and Cooperatives is responsible for the administration and execution of the Project.
5. The Study Team will convey to the Government of Japan the desire of the Government of Lao People's Democratic Republic that the Government of Japan takes necessary measures to cooperate in implementation of the Project and to provide the rehabilitation of irrigation and drainage facilities and improvement of rural infrastructures listed in Annex II within the scope of Japanese economic cooperation program in grant form.

6. The Government of Lao People's Democratic Republic has understood Japan's Grant Aid System explained by the Team which includes a principle of use of a Japanese Consultant Firm and Japanese General Contractor for the construction.
7. The Government of Lao People's Democratic Republic will take necessary measures listed in Annex III on condition that the Grant Aid would be extended to the Project.

ANNEX I LOCATION MAP



LEGEND

- Main Canal and Lateral
- Main Farm Road
- Power Distribution Line
- ▨ Project Area

ANNEX II MAIN WORKS REQUESTED BY THE GOVERNMENT
OF LAO PEOPLE'S DEMOCRATIC REPUBLIC
FOR GRANT AID OF JAPAN

1. Rehabilitation of Irrigation and Drainage Facilities

- (1) Irrigation pumping station
- (2) Regulating pond
- (3) Main and lateral irrigation canals
- (4) Drainage canals
- (5) Drainage pumping station
- (6) No.1 Nong Sam Kha dam
- (7) Supply of operation and maintenance equipment and spare parts

2. Rural Development Works

- (1) Farm roads
- (2) Rice mill plant and store house
- (3) Water supply system

ANNEX III ARRANGEMENT TO BE UNDERTAKEN BY
THE GOVERNMENT OF LAO PEOPLE'S
DEMOCRATIC REPUBLIC

- (1) To secure the lands for the proposed rice processing and storage facilities.
- (2) To clear and reclaim the above lands as required before start of the construction.
- (3) To provide electricity distribution line to the proposed processing and storage facility sites.
- (4) To bear commissions to a Japanese foreign exchange bank for the banking services based upon the Banking Arrangement.
- (5) To exempt and to take necessary measures for custom clearance of the materials and equipment brought for the Project at the port of disembarkation.
- (6) To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the verified contracts such facilities as may be necessary for their entry into the Lao People's Democratic Republic and stay therein for the performance of their work.
- (7) To maintain and use properly and effectively the facilities constructed and equipment purchased under the grant aid.
- (8) To bear all the expenses other than those to be borne by the grant aid necessary for construction of facilities as well as for transportation and installation of the equipment.

協 議 事 錄

MINUTES OF DISCUSSIONS
ON
THE DRAFT FINAL REPORT OF THE BASIC DESIGN STUDY
FOR
THE THA NGON REHABILITATION AND RURAL DEVELOPMENT PROJECT
IN
LAO PEOPLE'S DEMOCRATIC REPUBLIC

The Governemnt of Japan sent, through the Japan International Cooperation Agency (JICA), the Basic Design Study Team to Lao People's Democratic Republic from January 14 to January 23, 1987 to present and explain the Draft Final Report of the Basic Design Study on the Tha Ngon Rehabilitation and Rural Development Project.

After a series of discussions between the Basic Design Study Team and the authorities concerned of Lao People's Democratic Republic, both sides confirmed the results attached herewith (See ATTACHMENT).

Vientiane, January 19., 1987



Hiroshi MANABE

Leader of Study Team



Alom THAVONESOUK

Leader of the Lao Team

Ministry of Agriculture, Forestry,
Irrigation and Cooperatives

ATTACHMENT

1. Both sides reconfirmed the Minutes of Discussions which were mutually agreed and signed on October 30, 1986.
2. The Lao side agreed, in principle, to the basic design proposed in the Draft Final Report.
3. The Lao side understood Japan's Grant Aid System and the following arrangements to be undertaken by the Lao side for realization of the Project:
 - (1) To secure the lands for the proposed rice processing and storage facilities and the rural water supply systems,
 - (2) To clear and reclaim the above lands as required before start of the construction,
 - (3) To extend the electric power line to the prospective rice processing and storage facility site in the Tha Som Mo village by the beginning of October, 1987,
 - (4) To provide the electricity for pumps, free of charge, to supply the water to the paddy fields in the dry season and the fish pond during the construction period,
 - (5) To provide temporarily the lands for construction of temporary canals to supply the irrigation water to the paddy fields in the dry season during the construction period,
 - (6) To provide temporarily the lands for the site office, motor pool, precast concrete factory, etc. during the construction period, and
 - (7) To carry out the rehabilitation works for on-farm facilities by using O & M equipment supplied under the grant aid of Japan in parallel with the works to be done under the Project.

4. The Lao side agreed to make his efforts to the followings:

- (1) to organize the Tha Ngon Project Office and to secure the project staffs as recommended in the Draft Final Report,
- (2) to reorganize the Tha Ngon Operation and Maintenance Office and to secure the operation and maintenance staffs as recommended in the Draft Final Report,
- (3) to secure the annual budget for the above Operation and Maintenance Office as recommended in the Draft Final Report,
- (4) to train the operation and maintenance staff and farmers,
- (5) to check and maintain periodically the equipment and instruments for irrigation and drainage pump stations, rice processing facilities, and the rural water supply system as well as the operation and maintenance equipment supplied under the grant aid, and
- (6) to operate and maintain properly the irrigation and drainage facilities, farm roads, etc..

5. The Lao side expressed to the Study Team his desire that the Government of Japan is requested to extend the following cooperation for proper operation and maintenance of the Project in future:

- (1) to despatch an electrical and mechanical engineer, an irrigation engineer and an agronomist to the project site, and
- (2) to train the Laotian engineer in Japan.

Construction Schedule

Item	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25														
from E/N	▲																																							
Signing of Exchange Note	▼																																							
Consultant Contract	▼																																							
Detailed Design	▬																																							
Preparation of Tender Documents	▬																																							
Tendering	▬																																							
Evaluation and Construction Contract	▬																																							
Construction	▬																																							
1. Phase I	▬																																							
(1) Pump Equipment	▬																																							
(2) Gate	▬																																							
(3) O/M Equipment	▬																																							
a) Group-1	▬																																							
b) Group-2	▬																																							
(4) Civil Works	▬																																							
a) Earthworks and lining	▬																																							
b) Structure	▬																																							
2. Phase II	▬																																							
(1) North Main Canal	▬																																							
a) Earthworks and lining	▬																																							
b) Structure	▬																																							
c) Gate	▬																																							
(2) Farm Road	▬																																							
(3) Rice Processing and Storage Facilities	▬																																							
a) Rice mill plant	▬																																							
b) Civil works	▬																																							
c) Building works	▬																																							
(4) Rural Water Supply System	▬																																							
a) Tube well	▬																																							
b) Pipe line	▬																																							
c) Elevated tank and pump	▬																																							
	▼	▬																							▼	▬					▬					▬				
		Phase I																								Phase II					Transportation									

面談者および調査団カウンターパート

1. 面談者

Mr. Khamsing Xaya Korn	Vice Minister of MAFIC
Mr. Kou Chansia	Director of Planning Department, MAFIC
Mr. Langsy Xayvisith	Director of Irrigation Department, MAFIC
Mr. Sombath Chounlamany	Director of Department No. 2, Ministry of Foreign Affairs
Mr. Thongphachanh Sonnasinh	Director of International Economic Relationship Department, State Planning Committee
Mr. Holady	Director of Foreign Currency Department, Ministry of Finance
Mr. He Dhounvixay	Director, Irrigation Construction Company No. 1
Mr. Vongphachanh Vongsykeo	Director, Irrigation Construction Company No. 2
Mr. Chanthavong Malayphet	General Director, State Enterprise for Construction & Shipping
Mr. Khampong Sourinphomy	Chief of Agricultural Division, Vientiane Prefecture
Mr. Khongkousol Khamhoung	Director, State Enterprise for Operation & Maintenance
上 東 参 事 官	在ラオス日本大使館
田 村 書 記 官	在ラオス日本大使館

2. 調査団カウンターパート

Mr. Alom Thavonsouk	Deputy Director of Planning Department, MAFIC
Mr. Vankham Thammachak	Deputy Director of Survey & Design Office for Irrigation
Mr. Anousith Many	Chief of Service Planning Irrigation, Irrigation Department, MAFIC
Mr. Sisamay Khotrhotha	Director of Laboratory, Department of Agriculture, MAFIC
Mr. Sichanh thauong Kindavong	Chief-adjoint of Service Agricultural Production Plan, Planning Department, MAFIC
Mr. Souvanh Thammavongsa	Section Chief Survey, Survey & Design Office for Irrigation
Mr. Nou Khousakoun	Section Chief of Soil & Hydrogeology, Survey & Design Office for Irrigation

Country Data

I 基礎指標

1. 国名 ラオス人民民主共和国首都 ビエンチャン 人口 15万人 (1985年)独立年月日 1975年12月2日

2. 国土・人口 (1985年)

面積 236,800 km² 人口 3,584,803 人 人口密度 15人/km²人口増加率 2.9% 都市人口比率 15% 平均寿命 45 才

3. 政 体

ラオス人民革命党の率いる民主共和制

4. 宗 教

仏 教

5. 言 語

ラオス語

6. 民 族

タイ系 (ラオ、黒タイ族等) 60%、プロトネシア系、中国系

7. 教 育

成人識字率 (15才~45才) 98.75% (1985年)初等学校就学率 89.5% (1980年)

8. 通貨レート

通貨単位 キップ (KIP)レート 34.65 キップ (対US\$) 1985年

9. 気候・地勢・緯度

ラオスはその国境を中国、ビルマ、タイ、カンボジア、ヴェトナムに接する内陸国で、ほぼ日本の本州に匹敵する国土を有する。熱帯気候のため高温多湿で、雨期 (5月~10月) と乾期 (11月~4月) にわかれている。国土の約80%が標高200m~3,000mの間にあり、メコン川およびその支川沿いの低地で稲作が行われている。北緯14°~22°、東経100°~108°に位置する南北に細長い国である。

II 社会・経済指標

1. 国内総生産 (1985年)

GDP 489百万US\$ 一人当りGDP US\$135

成長率 5% (1980年~1985年)

2. 産業構成 (1984年)

農業 62% 工業 5.9% サービス業 32.1%

3. 主要輸出品目

	(百万US\$)				
	1981	1982	1983	1984	1985(推定)
(1)交換可能通貨圏	16.9	27.8	27.8	30.1	34.8
コーヒー	—	—	1.6	0.6	0.7
電力	10.8	23.9	24.0	25.2	27.4
木材	5.1	3.5	1.7	3.7	5.6
その他	1.0	0.4	0.5	0.6	1.1
(2)非交換可能通貨圏	6.2	12.2	13.0	15.0	12.8
コーヒー	3.1	8.1	6.9	8.1	2.9
木材	—	0.5	1.3	1.3	3.0
すず、石こう	1.6	2.6	3.7	4.0	4.2
その他	1.5	1.0	1.1	1.6	2.8
合計	23.1	40.0	40.8	45.1	47.6

主要輸入品目

	(百万US\$)				
	1981	1982	1983	1984	1985(推定)
(1)交換可能通貨圏 (非援助)	36.2	44.0	52.1	35.4	29.7
米およびその他食糧	2.0	5.6	6.3	4.0	1.0
石油	12.9	13.8	14.0	10.8	10.4
機械および鋼材	—	15.9	16.0	10.3	7.8
公的輸入	21.3	8.7	11.0	5.3	9.7
私的輸入	—	—	4.8	4.9	0.8
(2)非交換可能通貨圏 (非援助)	13.8	30.2	40.2	62.0	70.8
(3)援助による輸入	59.5	58.0	57.3	56.5	62.8
交換可能通貨圏	15.5	29.7	24.2	15.9	19.0
非交換可能通貨圏	44.0	28.3	33.1	40.6	43.8
合計	109.5	132.2	149.4	153.9	163.3
交換可能通貨圏	51.7	73.7	76.3	51.3	48.7
非交換可能通貨圏	57.8	58.5	73.1	102.6	114.6

出典: Lao PDR, Country Economic Memorandum, July 15, 1986 World Bank

4. 就労人口 (1985年)

労働人口 1.6百万人

5. インフレ率

					(%)
1980-81年	1981-82年	1982-83年	1983-84年	1984-85年	
3.4	7.0	6.3	2.7	9.0	

出典: Lao PDR, Country Economic Memorandum, July15,1986 World Bank

6. 国際収支

						(百万US\$)
	1981	1982	1983	1984	1985(推定)	
貿易収支	-86.4	-92.2	-108.6	-108.8	-115.7	
輸出	23.1	40.0	40.8	45.1	47.6	
輸入	109.5	132.2	149.4	153.9	163.3	
サービス	-6.3	-7.1	-12.5	-5.5	-7.6	
移転収支	23.5	31.0	25.4	28.9	28.0	
経常収支	-69.2	-68.3	-95.7	-85.4	-95.3	
資本収支	51.4	60.2	76.5	89.6	99.0	
誤差・脱漏	13.2	3.8	31.1	-7.0	-	
総合収支	-4.6	-4.3	11.9	-2.8	3.7	

出典: Lao PDR, Country Economic Memorandum, July15,1986 World Bank

7. 外貨準備高

						(百万US\$)
	1981	1982	1983	1984	1985(June)	
金	0.60	0.60	0.60	0.60	0.60	
外国為替	12.09	7.62	18.70	10.52	16.15	
SDRs	0.65	0.05	0.14	0.01	0.03	
外貨準備高合計	<u>13.34</u>	<u>8.27</u>	<u>19.44</u>	<u>11.13</u>	<u>16.78</u>	
対外流動債務	-15.06	-14.27	-13.55	-9.99	-4.74	
純外貨準備高	-1.72	-6.00	5.89	1.14	12.04	

出典: Lao PDR, Country Economic Memorandum, July15,1986 World Bank

8. 对外債務返済比率

	(%)				
	1981	1982	1983	1984	1985(計画)
交換可能通貨圏	27.9	13.6	16.4	25.9	36.9
非交換可能通貨圏	1.0	13.3	4.4	12.6	18.8
合計債務返済比率	22.6	13.5	13.2	22.3	33.2

出典：Lao PDR, Country Economic Memorandum, July 15, 1986 World Bank

9. 対日貿易

	(百万US\$)			
	1981	1982	1983	1984
輸出(木材)	3.79	1.16	2.36	0.63
輸入(機械、金属製品)	8.95	9.79	15.23	5.17

出典：日本側通関統計

10. 財政収支

	(百万キップ)					
	1980	1981	1982	1983	1984	1985(推定)
歳入	748	989	2,755	3,496	4,948	6,143
歳出	1,028	1,028	2,259	2,945	4,126	5,439
經常収支	-280	-39	496	551	822	704
開発支出	749	928	3,216	3,750	4,528	5,035
財政収支	-1,029	-967	-2,720	-3,199	-3,436	-4,331
資金調達 (对外借款)	1,029	967	2,720	3,199	3,436	4,331

出典：Lao PDR, Country Economic Memorandum, July 15, 1986 World Bank

III 開発指標

1. 国家開発計画

(1) 過去の開発計画 (1975年以降)

3ヶ年計画 1978年～1980年

第1次5ヶ年計画 1981年～1985年

上記開発計画通じ基礎的食糧自給および農産品輸出のため、農業および林業資源の開発政策に着手し、同時に農民を貨幣経済の流通網下に徐々に取り込むために、都市と地方間の取引の視点から商業を発展させ、かつ、商業および通信の向上をはかることにより、自然経済による後進性を克服することを目指してきた。

第1次5ヶ年計画の目標は次のとおりであった。

- i) 農業および林業生産の増大
- ii) 工業生産の増大
- iii) 経済インフラの改善
- iv) 人的資源の開発、教育、保健制度の向上
- v) 国内商業および貿易の拡大
- vi) 国家歳入、歳出の増大
- vii) 公営企業の能力の強化・向上
- viii) 農業組合を通じた生産の奨励
- ix) 国家企業の強化および公営企業の効率向上

本5ヶ年計画期間中の各セクターの実質成長率は次表のとおりである。

(%)

	計画目標 1980-85	推定 1980-84
農業	4.2	4.7
工業	17.0	-2.6
電力	—	1.3
電鋸製造業	—	5.8
建設	—	-7.5
交通・通信	13.1	23.0
商売の他	11.8	7.2
原料生産	—	4.4
	7.0	3.5
		5.0

出典：Lao PDR, Country Economic Memorandum, July 15, 1986 World Bank

(2) 現行開発計画

第2次5ヶ年計画（1986年～1990年）

一般目標

- i) 食糧自給の達成、食糧以外の輸入の削減、国際収支の改善を目的とする生産および輸出の促進
- ii) 運輸および通信部門の整備
- iii) 基幹要員の養成および人的資源の開発

重点施策

i) 経済成長の刺激策

既存インフラおよび機械の有効利用、小規模で高収益プロジェクトの選択、生産へのインセンティブ（国営、公営、民営の生産者に対する価格、サービス面での支援）、農業生産の多様化および増大、自国の一次産品のより効率的な使用の促進

ii) 財政措置

財政赤字の安定と支出抑制および一部税収の増大による財政の均衡の回復、輸出促進による貿易収支および国際収支の改善

iii) インフレ抑制策

通貨の増大抑制、公的部門の債務の減少、国民所得に占める貯蓄率の向上、価格および補助金政策の改訂

iv) 計画立案および経済運営面での措置

信頼し得る統計機関の設立、経済政策と外国援助との調整促進、計画の選択・実施・評価能力の向上、行政機関および国営企業の合理化、民間部門の機能面の合理化

2. 国家予算、開発予算

国家予算 (1985年1月~12月)

歳入		歳出	
非税収入	4,238百万キップ	経常支出	5,439百万キップ
税収入	1,905 "	開発支出	5,035 "
外国援助	4,331 "		
合計	10,474 "	合計	10,474 "

非税収入および税収入は
1984年予算のそれぞれ29%
および14%増である。
又外国援助は1984年度の
26%増である。

経常支出は1984年度より32%
増大し、又開発支出は18%増
大している。

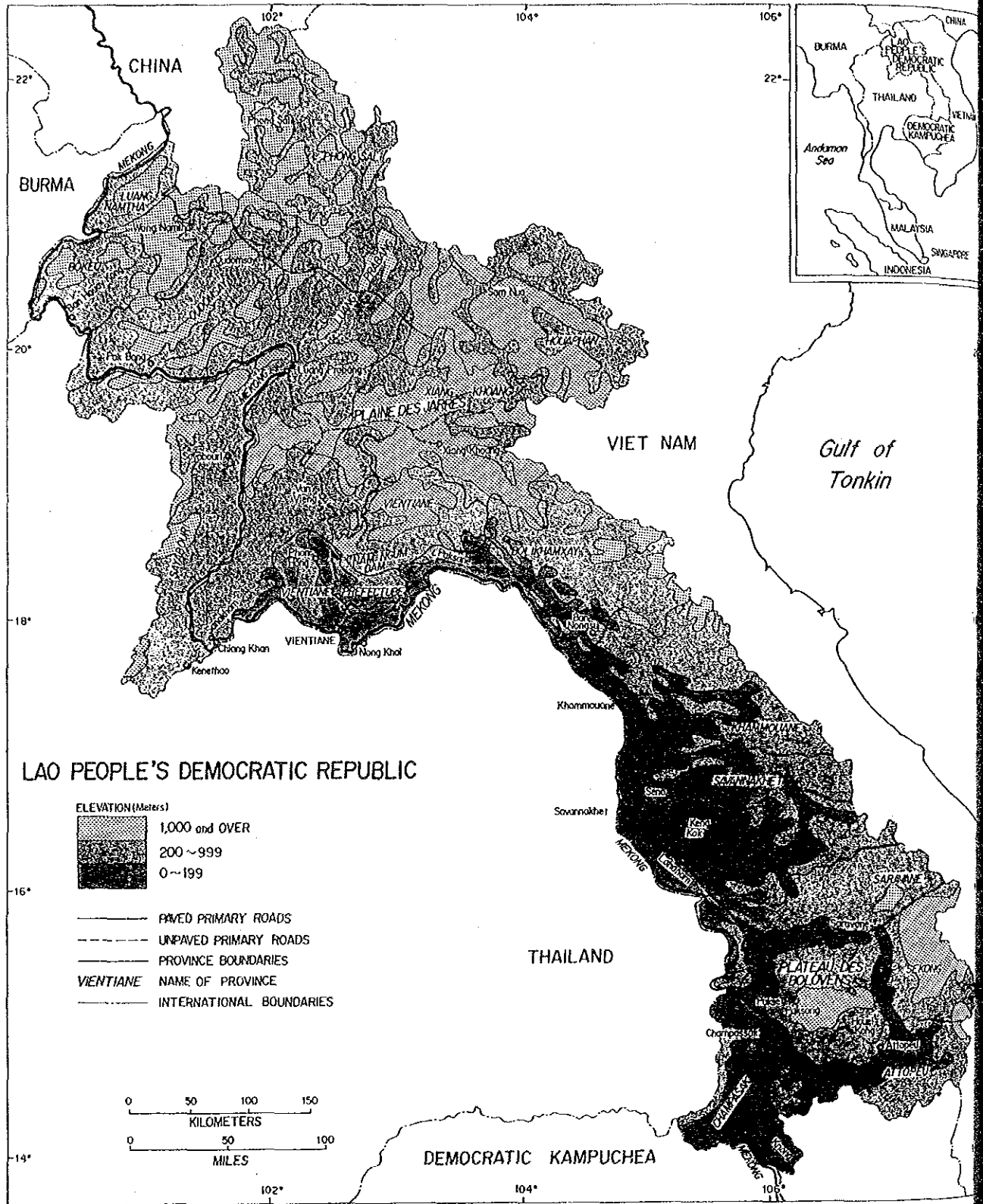
開発予算

第2次5ヶ年計画期間中の投資額は次のように計画されている。

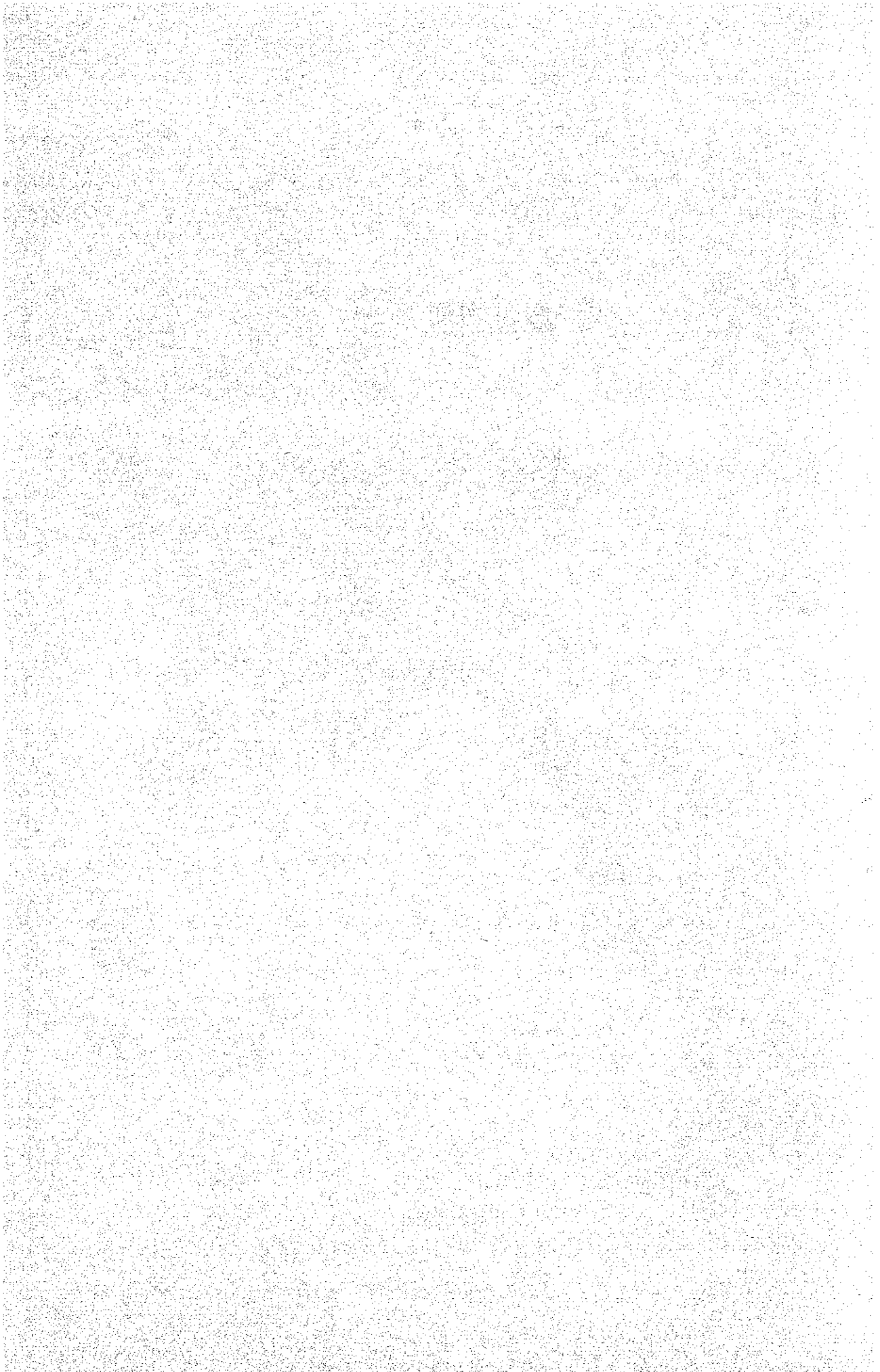
部 門	投資額 (百万US\$)	割合 (%)
1. 農 業 部 門	127.0	34.7
(1)天水稻作および他作物	18.5	5.1
(2)畜産および水産	27.5	7.5
(3)灌 漑	70.6	19.3
(4)教育訓練	10.4	2.8
2. 鉱工業およびエネルギー	77.2	21.1
(1)工 業	9.7	2.7
(2)エネルギー	66.6	18.2
(3)その他	0.9	0.2
3. 運輸および通信	106.0	29.0
4. 商 業	13.4	3.7
5. 住宅および水道	14.8	4.0
6. 教 育	13.9	3.8
6. 保健・衛生	13.2	3.6
合 計	365.5	100.0

出典：Lao PDR, Country Economic Memorandum, July 15, 1986 World Bank

IV 国土概要图



添付図面



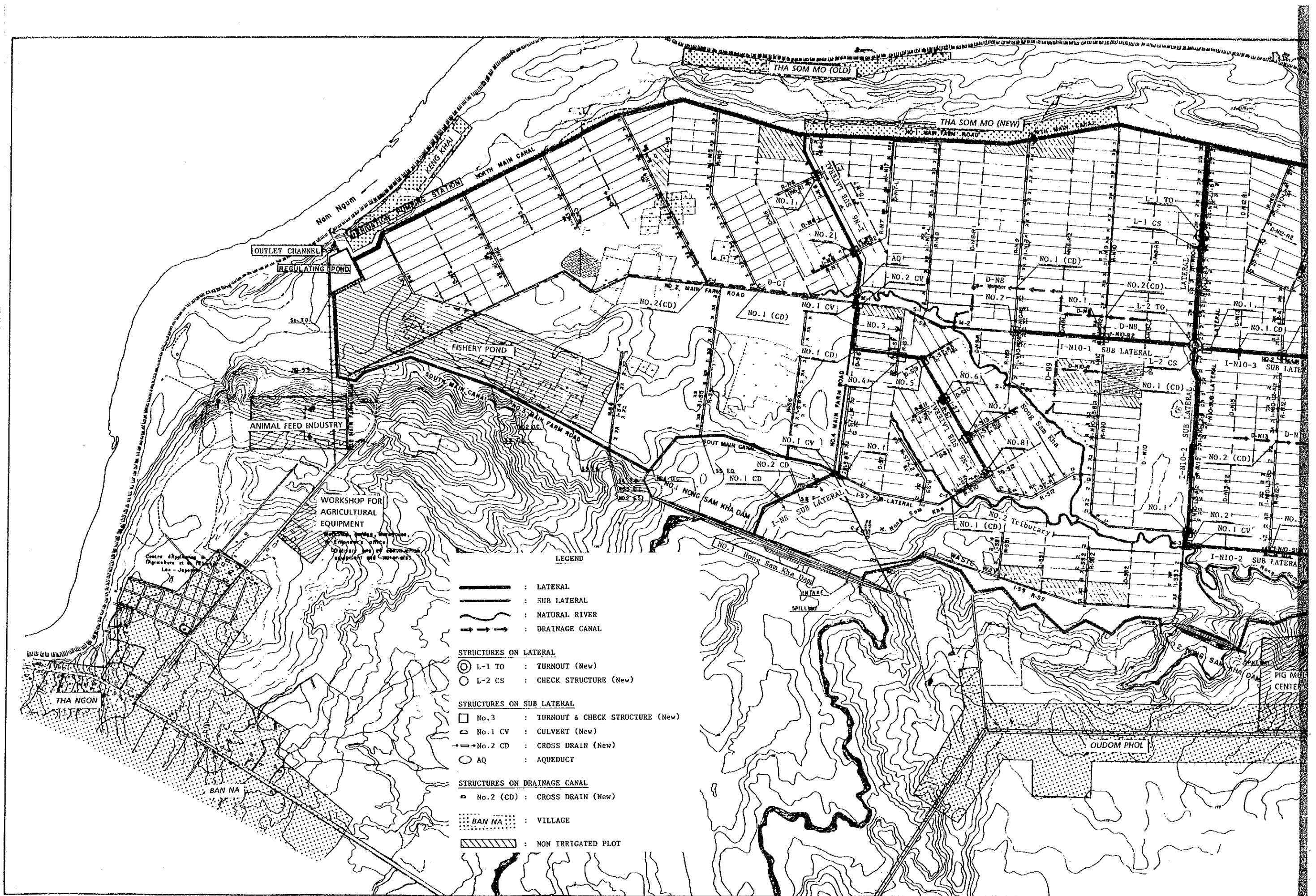
図面リスト (1/2)

NO.	DRAWING NO.	TITLE
1	0001	GENERAL LAYOUT (PHASE I)
2	0002	GENERAL LAYOUT (PHASE II)
3	1001	IRRIGATION PUMP STATION : GENERAL ARRANGEMENT
4	1002	IRRIGATION PUMP STATION : PANELS
5	1003	IRRIGATION PUMP STATION AND REGULATING POND : PUMP OUTLET AND HEADRACE, OUTLET OF INTAKE FOR NORTH MAIN CANAL
6	1004	IRRIGATION PUMP STATION : OPERATION HOUSE (1/3)
7	1005	IRRIGATION PUMP STATION : OPERATION HOUSE (2/3)
8	1006	IRRIGATION PUMP STATION : OPERATION HOUSE (3/3)
9	1007	PUMP STATIONS : LIGHTING FIXTURE
10	2001	NORTH MAIN CANAL : PROFILE (1/3)
11	2002	NORTH MAIN CANAL : PROFILE (2/3)
12	2003	NORTH MAIN CANAL : PROFILE (3/3)
13	2004	LATERAL AND SUB-LATERAL : PROFILE
14	3001	NORTH MAIN CANAL : TURNOUT/GAUGING STAFF
15	3002	NORTH MAIN CANAL : FOOT PATH BRIDGE AND SIDE SPILLWAY
16	3003	NORTH MAIN CANAL AND LATERAL : CANAL LINING AND WASHING STEP
17	3004	NORTH MAIN CANAL AND LATERAL : CONCRETE BLOCK AND JOINT FOR CANAL LINING
18	3005	NORTH MAIN CANAL AND LATERAL : CHECK STRUCTURE
19	3006	LATERAL : L-2 TURNOUT
20	3007	SUB-LATERAL : TURNOUT & CHECK STRUCTURE
21	3008	SUB-LATERAL : CULVERT, AQUEDUCT/STEEL GATE FOR TURNOUT & CHECK STRUCTURE
22	4001	DRAINAGE PUMP STATION : GENERAL ARRANGEMENT
23	4002	DRAINAGE PUMP STATION : PANELS
24	4003	DRAINAGE PUMP STATION : OPERATION HOUSE (1/2)
25	4004	DRAINAGE PUMP STATION : OPERATION HOUSE (2/2)
26	5001	NONG SAM KHA RIVER : PROFILE (1/4)
27	5002	NONG SAM KHA RIVER : PROFILE (2/4)
28	5003	NONG SAM KHA RIVER : PROFILE (3/4)
29	5004	NONG SAM KHA RIVER : PROFILE (4/4)
	D-N12	: PROFILE

図面リスト (2/2)

NO.	DRAWING NO.	TITLE
30	5005	NO.1 TRIBUTARY : PROFILE
31	6001	NO.1 AND NO.2 RURAL ROAD : PROFILE
32	7001	CROSS DRAIN (1/2)
33	7002	CROSS DRAIN (2/2)
34	7003	GATES AND HOISTS
35	8001	INTAKE FOR I-NS SUB-LATERAL ON NO.1 NONG SAM KHA DAM
36	9001	RURAL WATER SUPPLY SYSTEM : GENERAL LAYOUT
37	10001	RICE MILL AND STORAGE FACILITIES (1/3)
38	10002	RICE MILL AND STORAGE FACILITIES (2/3)
39	10003	RICE MILL AND STORAGE FACILITIES (3/3)

f



LEGEND

- : LATERAL
- : SUB LATERAL
- : NATURAL RIVER
- : DRAINAGE CANAL

STRUCTURES ON LATERAL

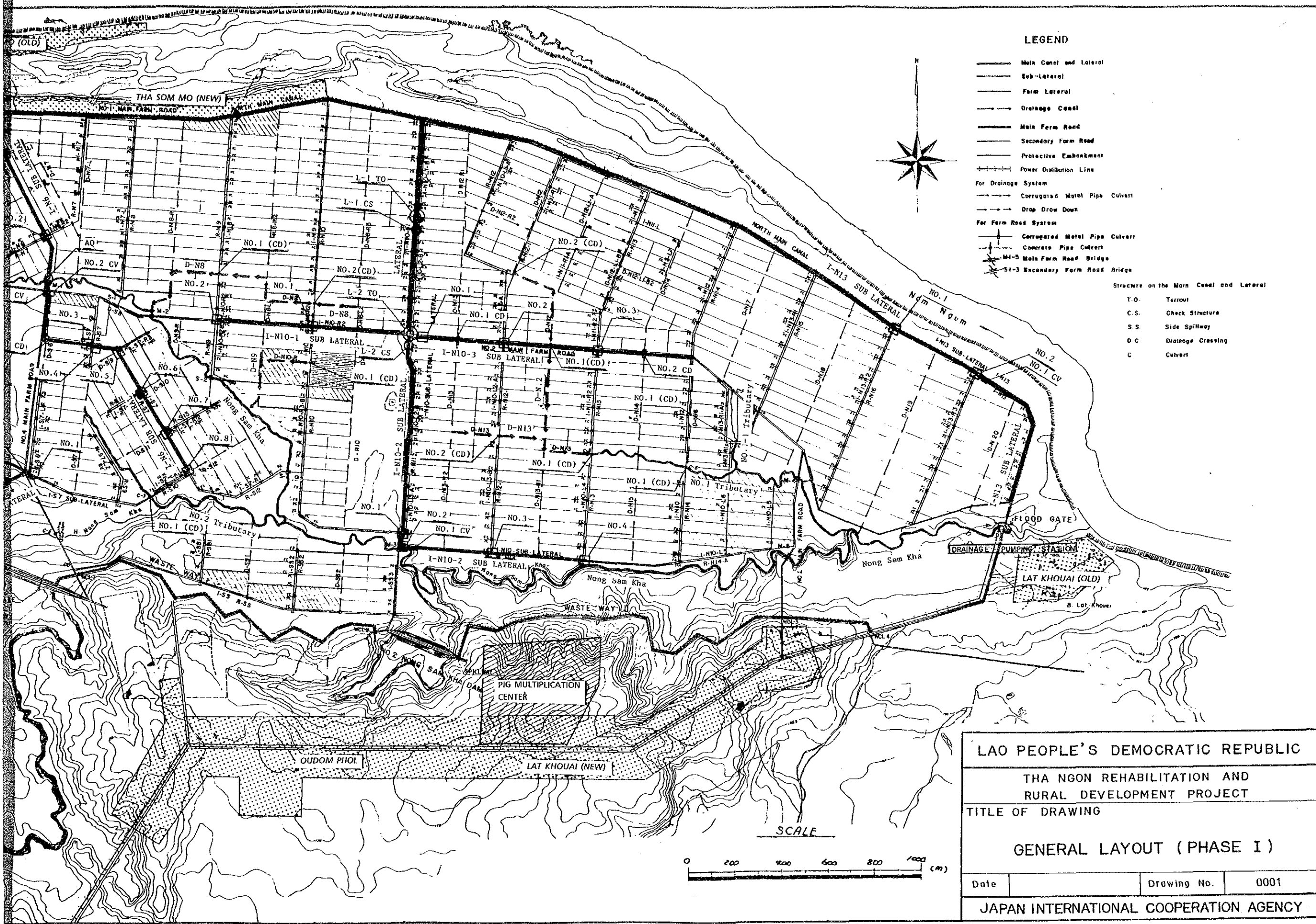
- ⊙ L-1 TO : TURNOUT (New)
- L-2 CS : CHECK STRUCTURE (New)

STRUCTURES ON SUB LATERAL

- No. 3 : TURNOUT & CHECK STRUCTURE (New)
- ▭ No. 1 CV : CULVERT (New)
- No. 2 CD : CROSS DRAIN (New)
- AQ : AQUEDUCT

STRUCTURES ON DRAINAGE CANAL

- ▭ No. 2 (CD) : CROSS DRAIN (New)
- ⋯ BAN NA : VILLAGE
- ▨ : NON IRRIGATED PLOT



LEGEND

- Main Canal and Lateral
- Sub-Lateral
- Farm Lateral
- Drainage Canal
- Main Farm Road
- Secondary Farm Road
- Protective Embankment
- Power Distribution Line
- For Drainage System
 - Corrugated Metal Pipe Culvert
 - Drop Down
- For Farm Road System
 - Corrugated Metal Pipe Culvert
 - Concrete Pipe Culvert
 - M-5 Main Farm Road Bridge
 - S-3 Secondary Farm Road Bridge

- Structure on the Main Canal and Lateral
- T.O. Turnout
 - C.S. Check Structure
 - S.S. Side Spillway
 - D.C. Drainage Crossing
 - C. Culvert

LAO PEOPLE'S DEMOCRATIC REPUBLIC

THA NGON REHABILITATION AND RURAL DEVELOPMENT PROJECT

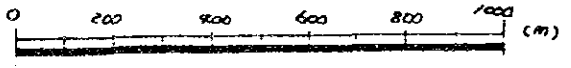
TITLE OF DRAWING

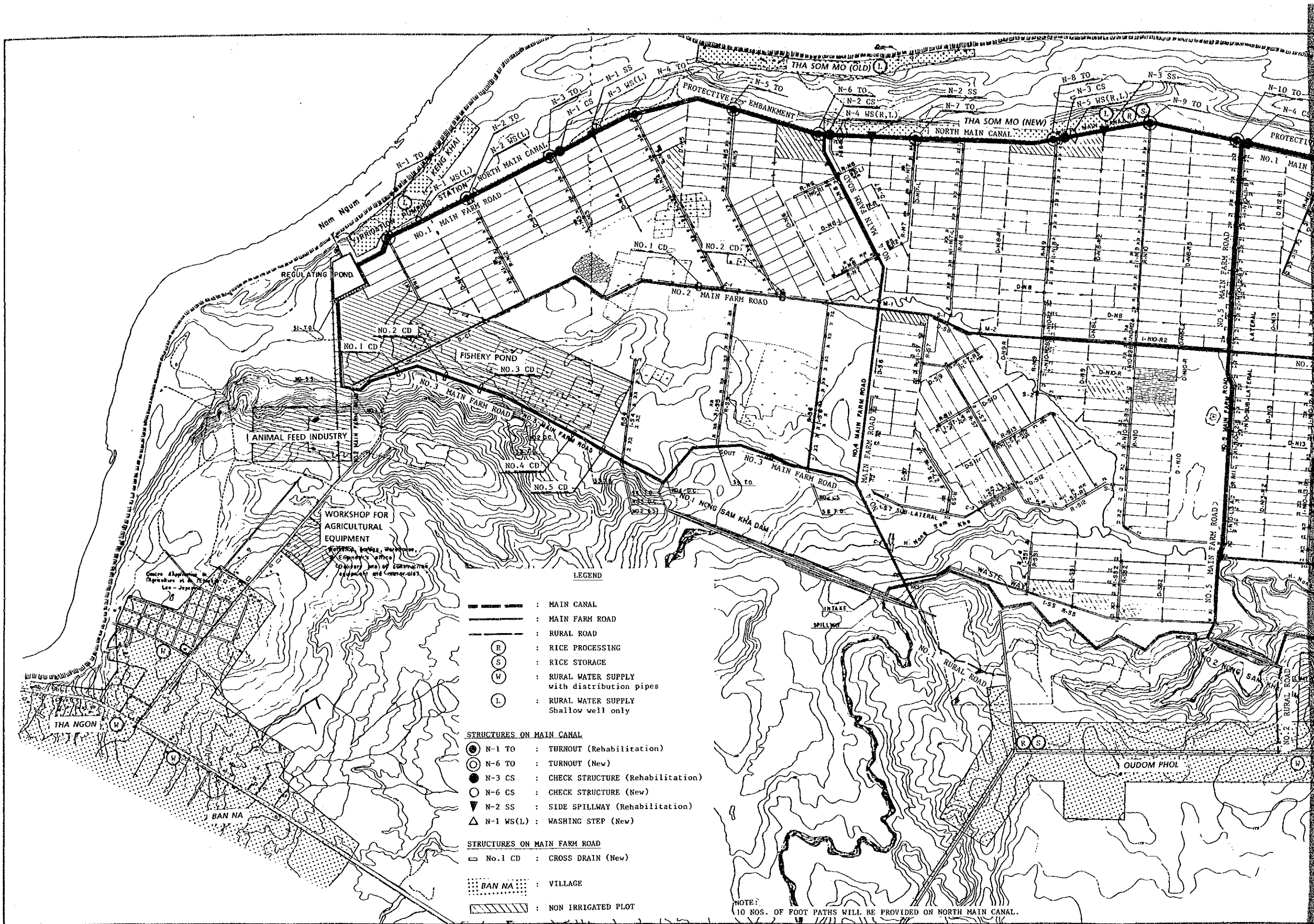
GENERAL LAYOUT (PHASE I)

Date _____ Drawing No. 0001

JAPAN INTERNATIONAL COOPERATION AGENCY

SCALE

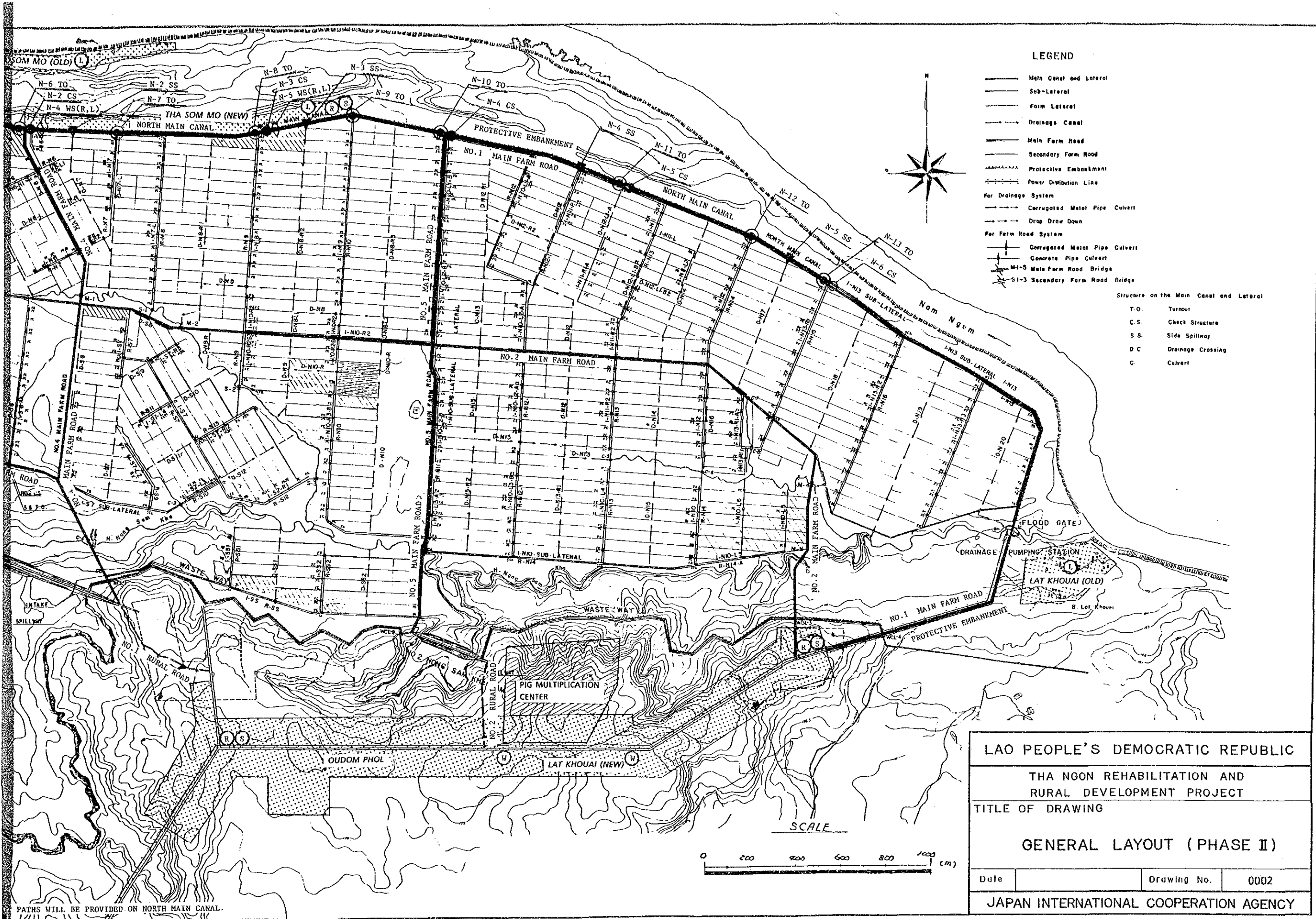




LEGEND

- : MAIN CANAL
 - : MAIN FARM ROAD
 - : RURAL ROAD
 - (R) : RICE PROCESSING
 - (S) : RICE STORAGE
 - (W) : RURAL WATER SUPPLY with distribution pipes
 - (L) : RURAL WATER SUPPLY Shallow well only
- STRUCTURES ON MAIN CANAL**
- ⊙ N-1 TO : TURNOUT (Rehabilitation)
 - N-6 TO : TURNOUT (New)
 - N-3 CS : CHECK STRUCTURE (Rehabilitation)
 - N-6 CS : CHECK STRUCTURE (New)
 - ▽ N-2 SS : SIDE SPILLWAY (Rehabilitation)
 - △ N-1 WS(L) : WASHING STEP (New)
- STRUCTURES ON MAIN FARM ROAD**
- No.1 CD : CROSS DRAIN (New)
 - ▨ BAN NA : VILLAGE
 - ▨ : NON IRRIGATED PLOT

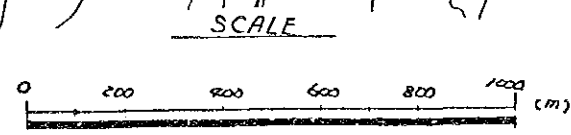
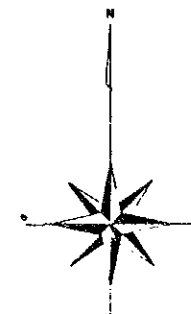
NOTE:
10 NOS. OF FOOT PATHS WILL BE PROVIDED ON NORTH MAIN CANAL.



LEGEND

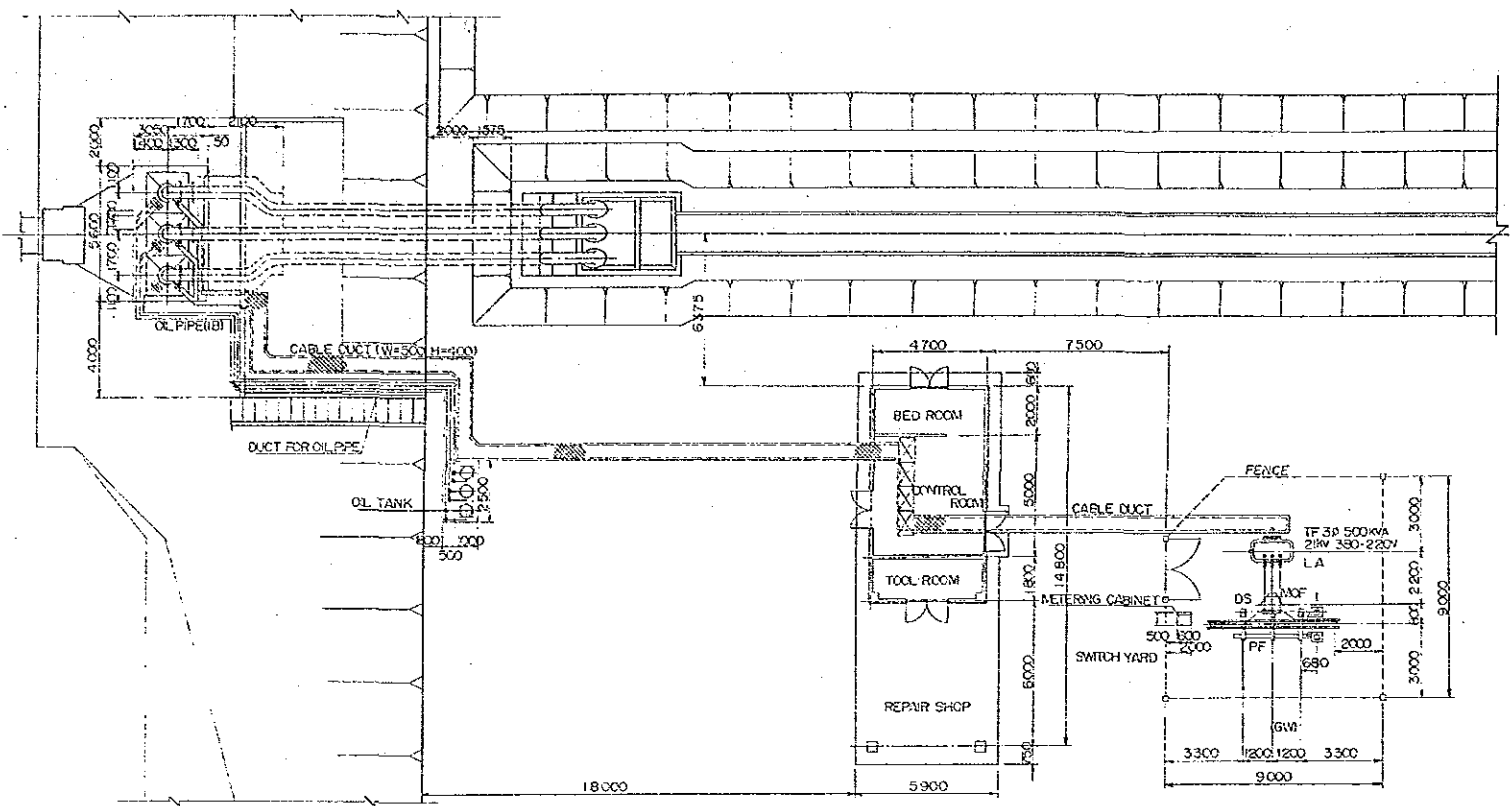
- Main Canal and Lateral
- Sub-Lateral
- Form Lateral
- Drainage Canal
- Main Farm Road
- Secondary Farm Road
- Protective Embankment
- Power Distribution Line
- For Drainage System
 - Corrugated Metal Pipe Culvert
 - Drop Draw Down
- For Farm Road System
 - Corrugated Metal Pipe Culvert
 - Concrete Pipe Culvert
 - M-5 Main Farm Road Bridge
 - S-3 Secondary Farm Road Bridge

- Structure on the Main Canal and Lateral
- T.O. Turnout
 - C.S. Check Structure
 - S.S. Side Spillway
 - D.C. Drainage Crossing
 - C. Culvert

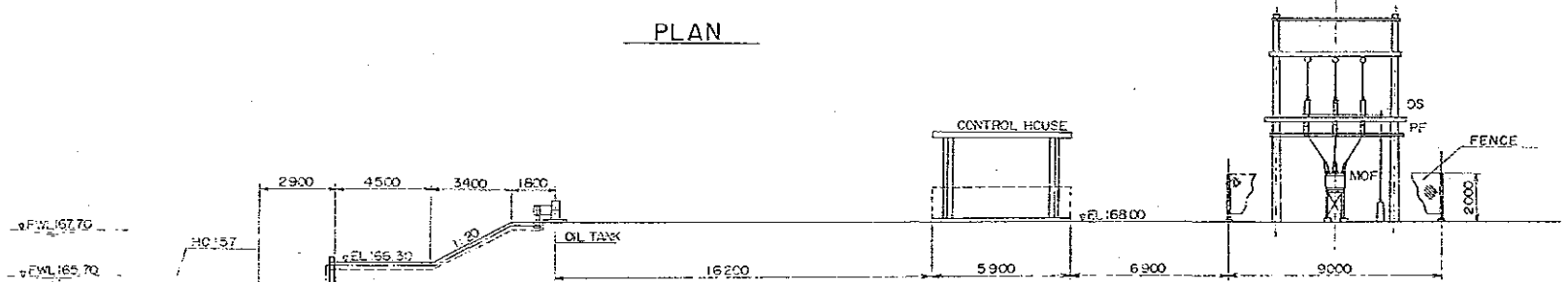


LAO PEOPLE'S DEMOCRATIC REPUBLIC		
THA NGON REHABILITATION AND RURAL DEVELOPMENT PROJECT		
TITLE OF DRAWING		
GENERAL LAYOUT (PHASE II)		
Date	Drawing No.	0002
JAPAN INTERNATIONAL COOPERATION AGENCY		

PATHS WILL BE PROVIDED ON NORTH MAIN CANAL.



PLAN

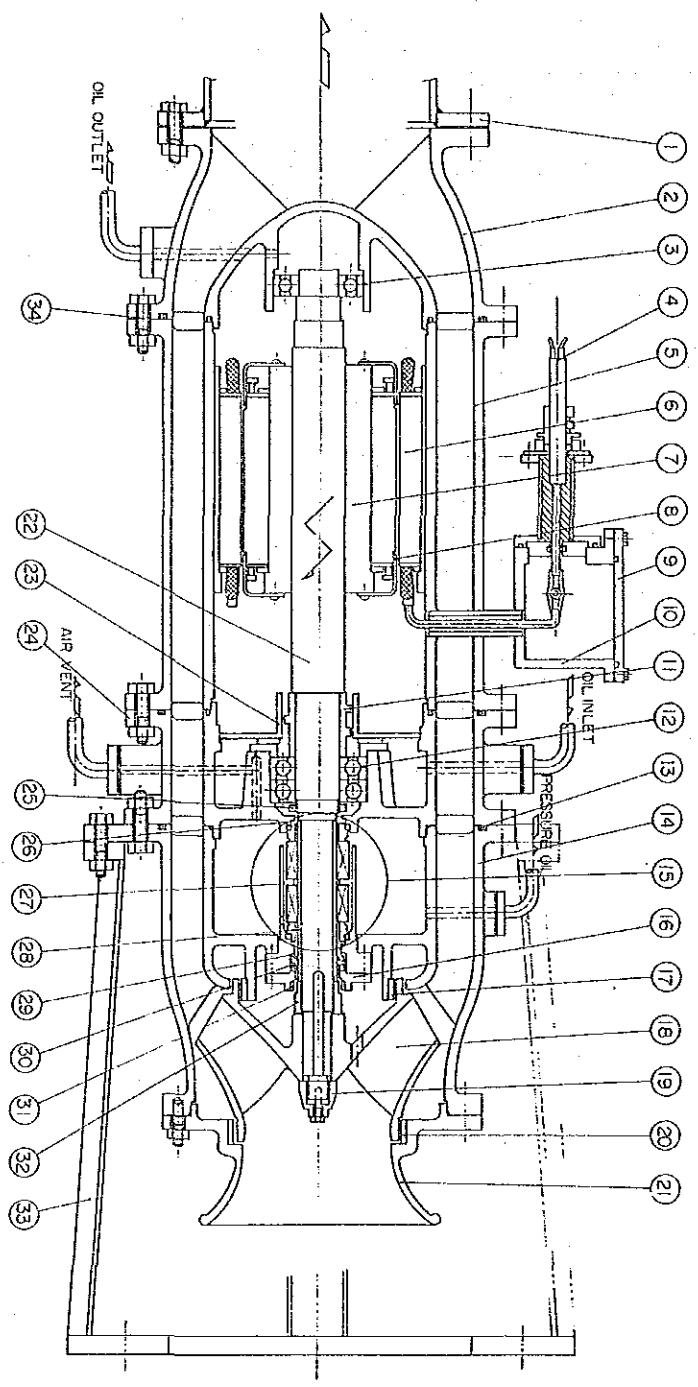


PROFILE

PARTS LIST

PART NAME	MATERIALS	PART NAME	MATERIALS	PART NAME	MATERIALS
1 DELIVERY PIPE	SS 41	13 PACKING	Hycar OR15	25 BALL NUT	S25C
2 MOTOR TOP COVER	FC 20	14 PUMP CASING	FC 20	26 PACKING	Hycar OR15
3 BALL BEARING	NO 6314	15 MECHANICAL SEAL	SPECIAL	27 SEAL CASE	SUS 52
4 CABLE	CHLOROPRENE CABLETYPE-CABLE	16 SEAL COVER	SUS 52	28 SEAL LINER	SUS 27 TIG PLATING
5 MOTOR CASE	SS 41	17 BALANCE RING	SCS 2	29 OIL SEAL	SYNTHETIC RUBBER
6 STATOR		18 IMPELLER	SC 46	30 DUST SEAL	SYNTHETIC RUBBER
7 ROTOR		19 IMPELLER NUT	SUS 52	31 SEAL RING	SUS 27 STELLITE WELDING
8 END RING COVER	SUS 27	20 SUCTION RING	SCS 2	32 SLINGER	SUS 27 STELLITE WELDING
9 TERMINAL COVER	SS 41	21 BELL MOUTH	FC 20	33 PUMP BASE	SS41
10 TERMINAL CASE	SS 41	22 SHAFT	S35C	34 BOLT AND NUT	S 25 C
11 SCREW	SS 41	23 BEARING COVER	SUS 27		
12 BALL BEARING	NO 7320 DF	24 MOTOR BOTTOM COVER	FC 20		

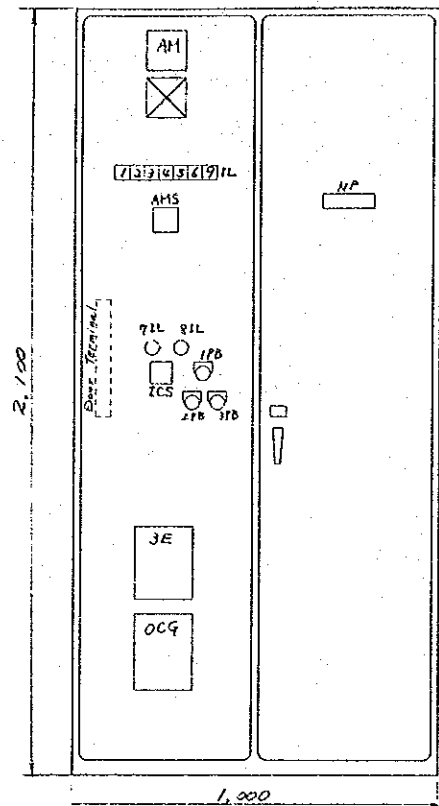
DESIGN DATA	
DIAMETER	500 MM
TOTAL HEAD	19 M
CAPACITY	32.4 M ³ /MIN
SPEED	970 RPM
MOTOR	135 KW



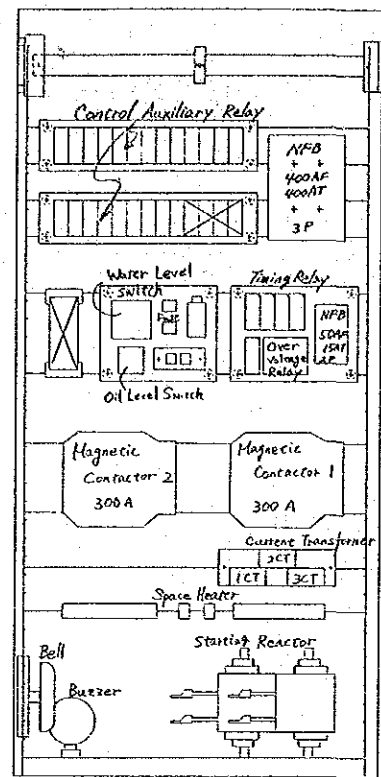
DETAIL OF PUMP

LAO PEOPLE'S DEMOCRATIC REPUBLIC		
THA NGON REHABILITATION AND RURAL DEVELOPMENT PROJECT		
TITLE OF DRAWING		
IRRIGATION PUMP STATION		
GENERAL ARRANGEMENT		
Date	Drawing No.	1001
JAPAN INTERNATIONAL COOPERATION AGENCY		

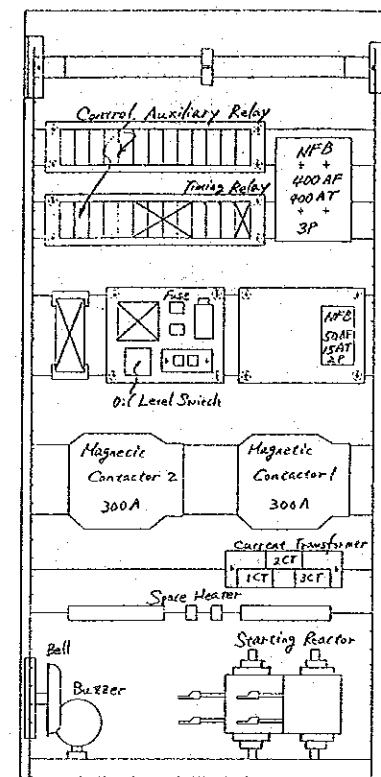
W 1,000 H 2,100 D 600



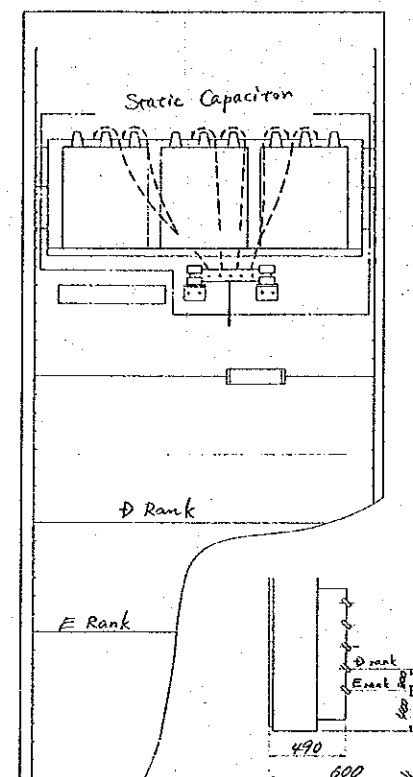
FRONT VIEW (DOOR)
Control Panel Nos. 1, 2 & 3



FRONT VIEW (IN DOOR)
Control Panel No. 1



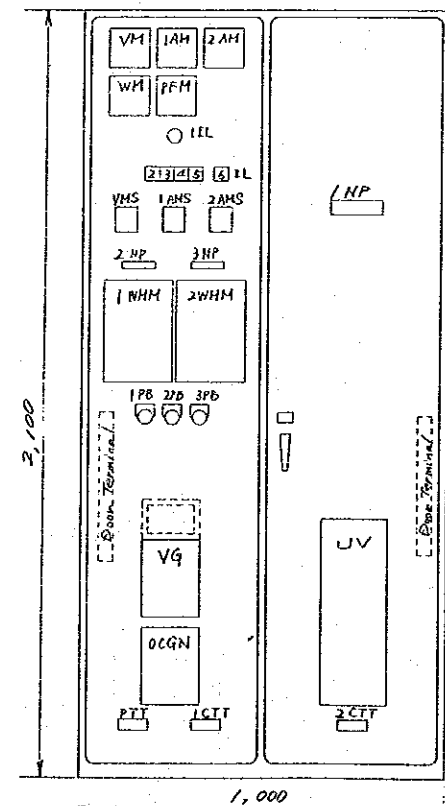
FRONT VIEW (IN DOOR)
Control Panel Nos. 2 & 3



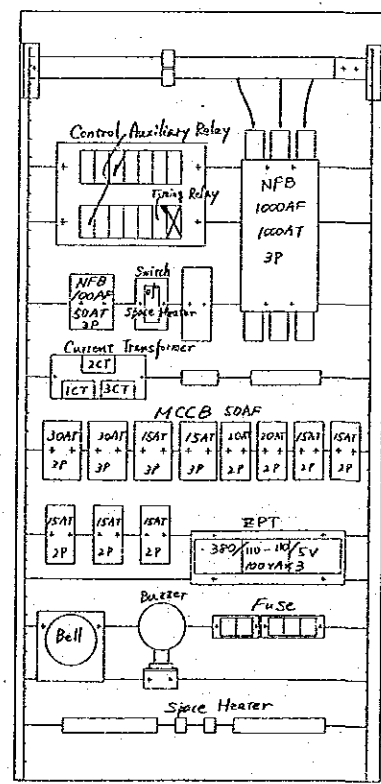
REAR VIEW (IN DOOR)
Control Panel Nos. 1, 2 & 3

Code	Description	Rating
NP	Name plate	
1 IL	Lamp for JE Tripping	110V 2W Red
2 IL	" NFB Tripping	" "
3 IL	" High water level	" "
4 IL	" Grounding	" "
5 IL	" Low water level	" Orange
6 IL	" Low level oil	" "
7 IL	" Stop	" Green
8 IL	" Run	" Red
9 IL	" Spare	" Orange
AM	AC Ammeter	300/5A 1.5 class
AMS	Switch for ammeter	3P Transfer
ICS	Control switch	Stop → ← Start
1PB	Push button for trouble reset	
2PB	" bell stop	
3PB	" buzzer stop	
3E		5A 50/60 Hz
OCG		0.5A 50Hz

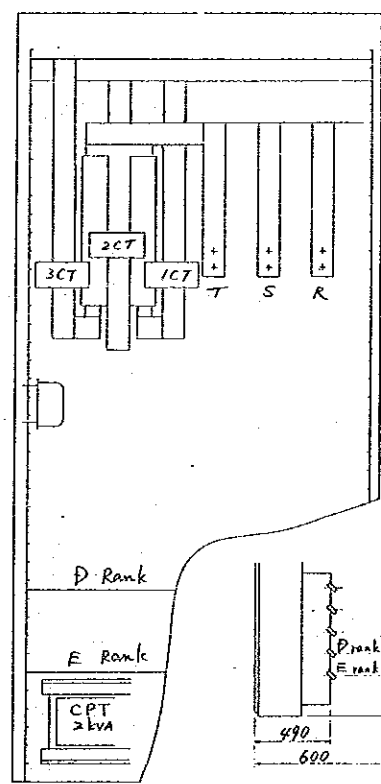
W 1,000 H 2,100 D 600



FRONT VIEW (DOOR)
Distribution Panel



FRONT VIEW (IN DOOR)
Distribution Panel



REAR VIEW (IN DOOR)
Distribution Panel

Code	Description	Rating
1NP	Name plate	
2NP	Name plate	HAIN
3NP	Name plate	STATION
1 IL	Lamp for power source	110V 2W White
2 IL	" under voltage	" Red
3 IL	" NFB tripping	" "
4 IL	" high temperature of trans.	" "
5 IL	" grounding	" "
6 IL	" open permit of P.S.	" White
VM	AC Voltmeter	510/150V 1.5 class
VMS	Switch for voltmeter	3P transfer
1AM	AC Ammeter	1000/5A 1.5 class
2AM	"	75/5A 1.5 class
1AMS	Switch for ammeter	3P transfer
2AMS	"	"
PFM	3P Power factor meter	110V 1/2 SA 150V 1.5 class
WM	3P Wattmeter	PT 300/110V CT 1000/5A
1WHM	3P Watt-hour meter	
2WHM	"	
1PB	Push button for bell stop	
2PB	" buzzer stop	
3PB	" trouble reset	
UV	Under voltage relay	
OVG	Over voltage ground relay	
OCGN	Over current ground neutral relay	
PTT	Test terminal for voltage	
CTT	" current	

LAO PEOPLE'S DEMOCRATIC REPUBLIC

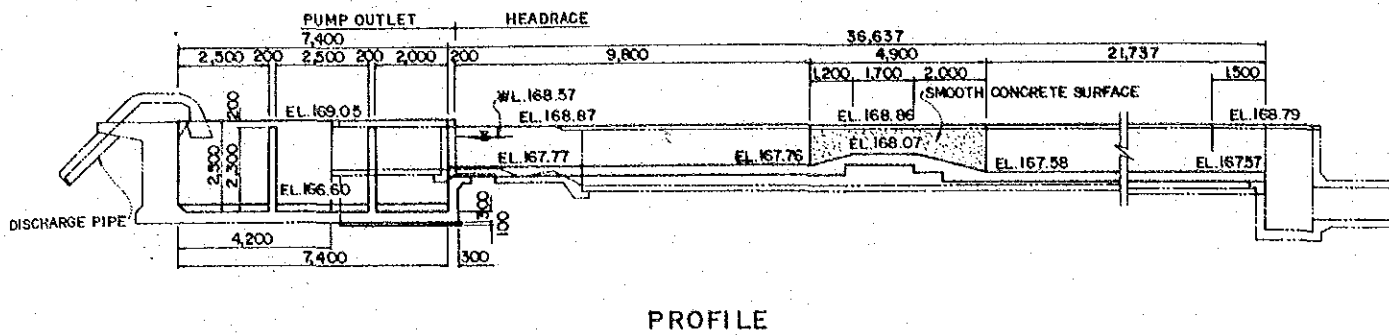
THA NGON REHABILITATION AND RURAL DEVELOPMENT PROJECT

TITLE OF DRAWING
IRRIGATION PUMP STATION
PANELS

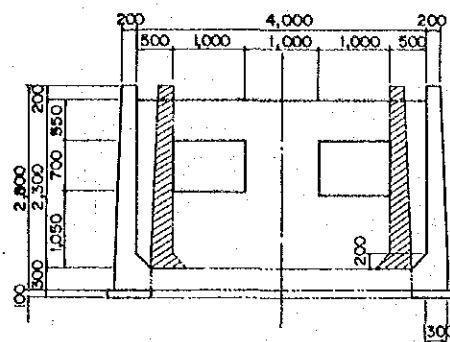
Date: _____ Drawing No.: 1002

JAPAN INTERNATIONAL COOPERATION AGENCY

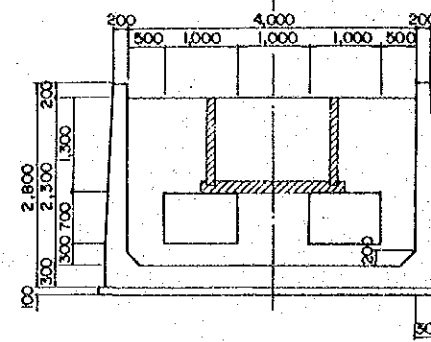
PUMP OUTLET AND HEADRACE



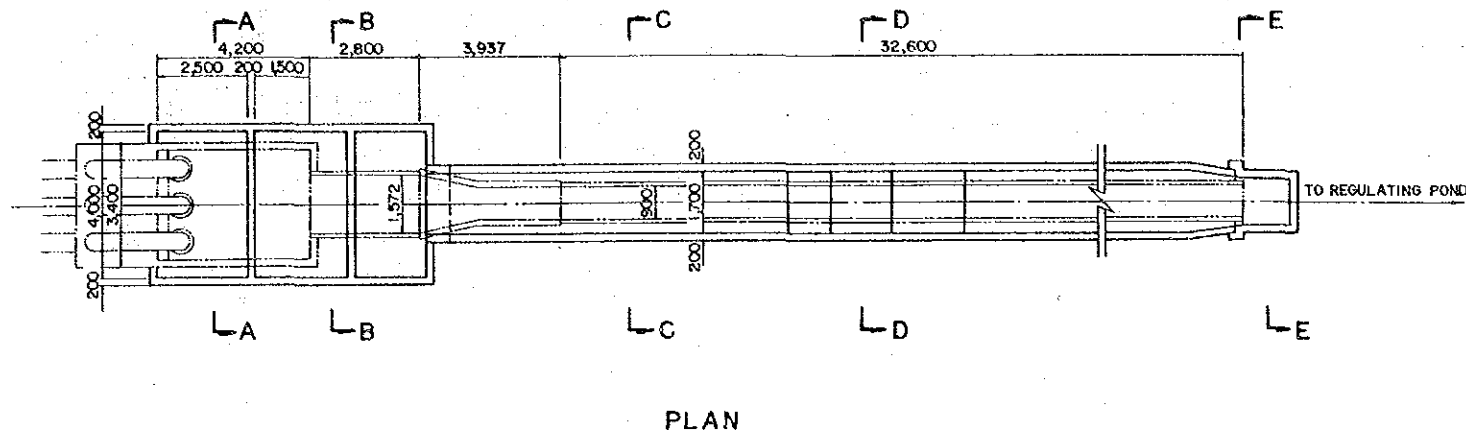
PROFILE



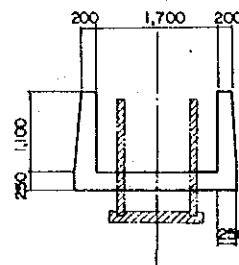
SECTION A-A



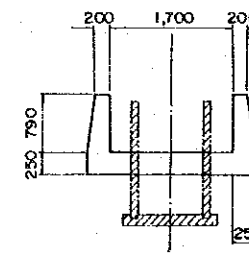
SECTION B-B



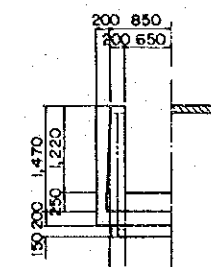
PLAN



SECTION C-C

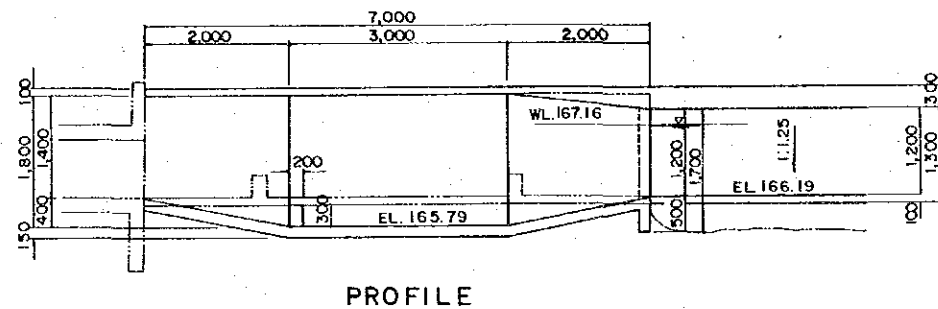


SECTION D-D

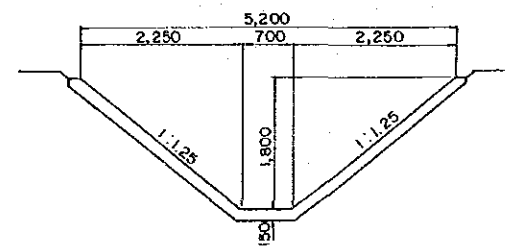


SECTION E-E

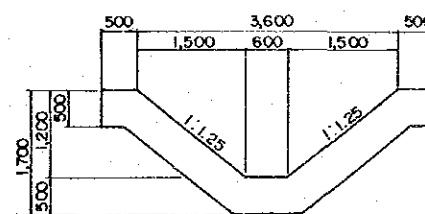
OUTLET OF INTAKE FOR NORTH MAIN CANAL



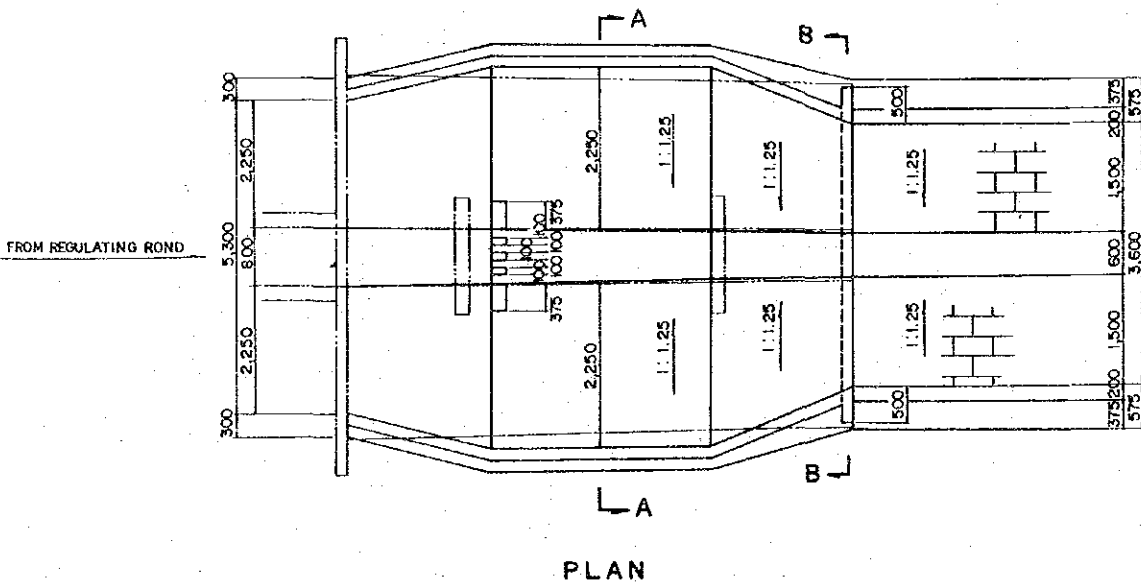
PROFILE



SECTION A-A



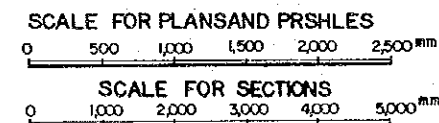
SECTION B-B



PLAN

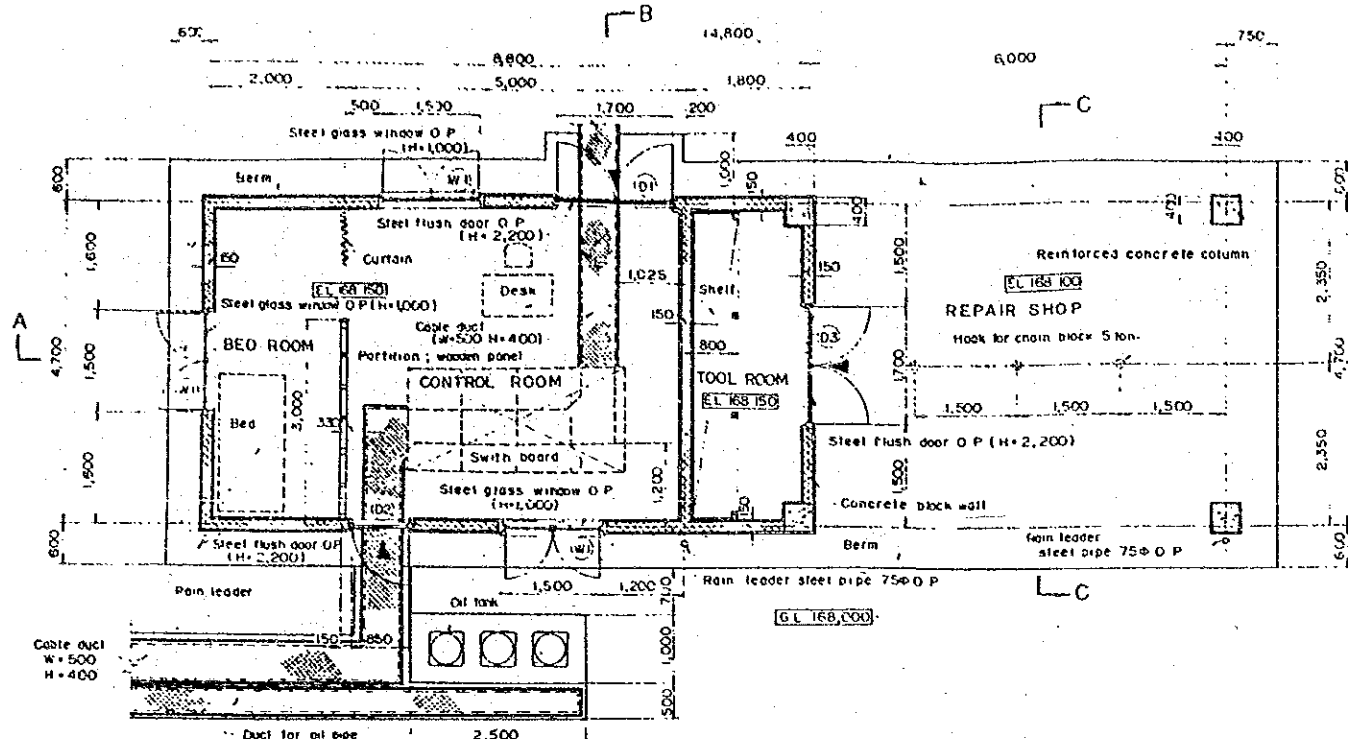
LEGEND :

- — — — — EXISTING STRUCTURE
- ▨ EXISTING STRUCTURE TO BE DEMOLISHED
- ▩ RAISING ON EXISTING STRUCTURE



LAO PEOPLE'S DEMOCRATIC REPUBLIC		
THA NGON REHABILITATION AND RURAL DEVELOPMENT PROJECT		
TITLE OF DRAWING IRRIGATION PUMP STATION AND REGULATING POND PUMP OUTLET AND HEADRACE, OUTLET OF INTAKE FOR NORTH MAIN CANAL		
Date	Drawing No	1003
JAPAN INTERNATIONAL COOPERATION AGENCY		

REPAIRING OF CONTROL HOUSE (1)



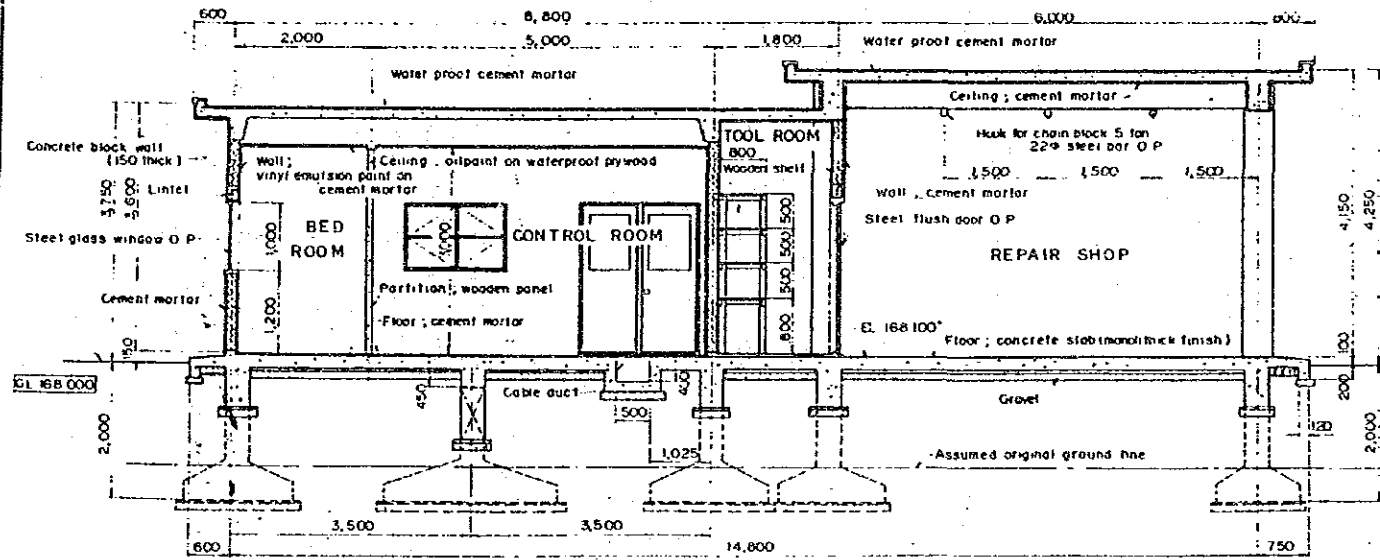
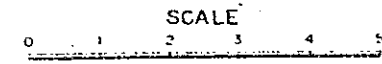
PLAN (Building area 69.56 m²)

SCHEDULE OF FINISH

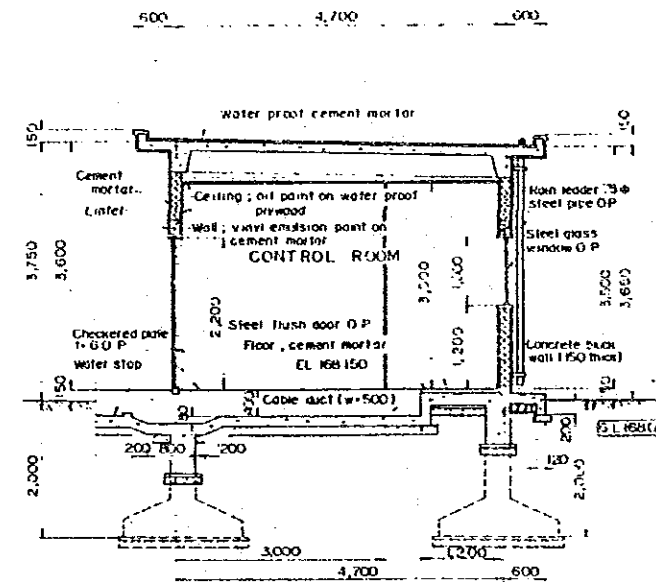
EXTERIOR FINISH					
ROOF	water proof cement mortar				
WALL	Cement mortar	Repainting			
WAINSCOT	Cement mortar				
BERM	Concrete slab (monolithic finish)				
INTERIOR FINISH					
	FLOOR	SKIRTING	WALL	CEILING	REMARKS
CONTROL ROOM	Cement mortar	Cement mortar	Vinyl emulsion paint on cement mortar	Oil paint on waterproof plywood (4mm thick)	
BED ROOM	Cement mortar	Cement mortar	Vinyl emulsion paint on cement mortar	Oil paint on waterproof plywood (4mm thick)	
TOOL ROOM	Cement mortar	Cement mortar	Cement mortar	Cement mortar	Shelf for tools
REPAIR SHOP	Concrete slab (monolithic finish)	Cement mortar	Cement mortar	Cement mortar	Hook for 5 tons chain block

Item of repairing as follows.

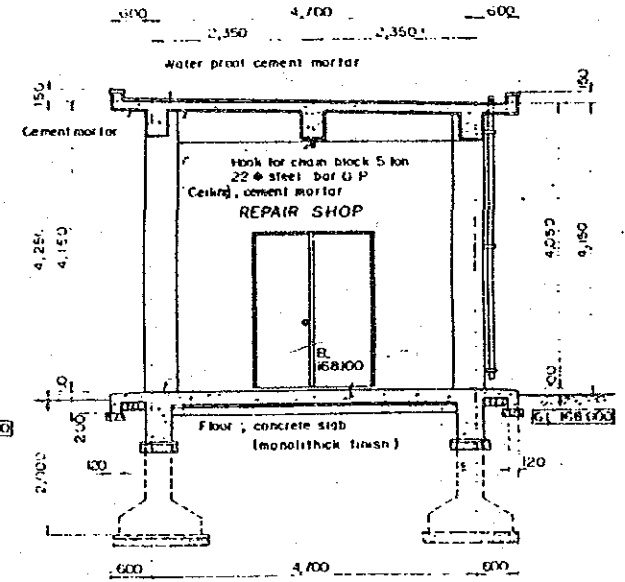
1. Repainting of exterior and interior wall.
2. Renew and painting of ceiling.
3. Renew of door and window.
4. Renew of lighting fixture.



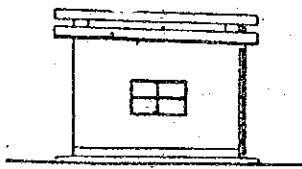
SECTION A-A



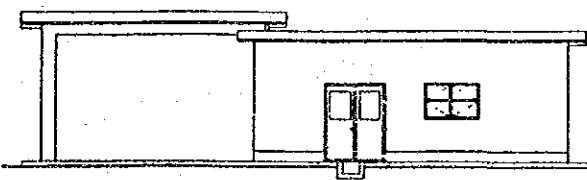
SECTION B-B



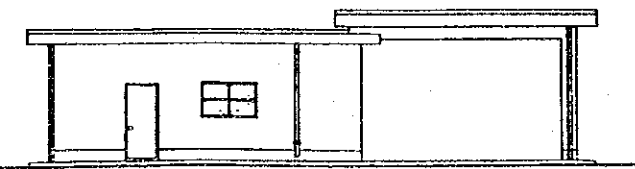
SECTION C-C



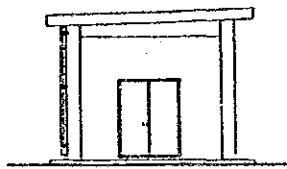
RIGHT SIDE ELEVATION



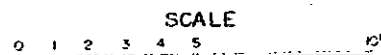
FRONT ELEVATION



REAR ELEVATION



LEFT SIDE ELEVATION



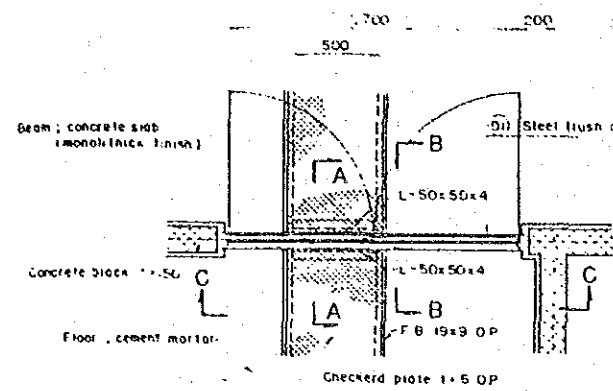
LAO PEOPLE'S DEMOCRATIC REPUBLIC

THA NGON REHABILITATION AND RURAL DEVELOPMENT PROJECT

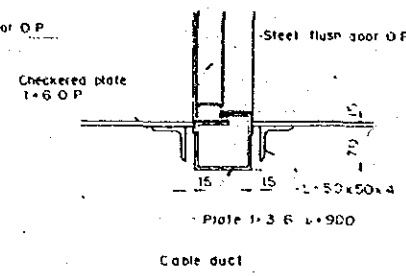
TITLE OF DRAWING
IRRIGATION PUMP STATION
OPERATION HOUSE (1/3)

Date	Drawing No.	1004
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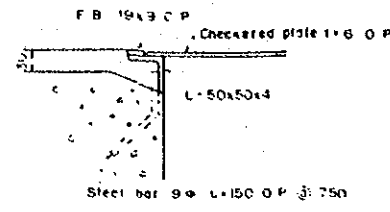
JAPAN INTERNATIONAL COOPERATION AGENCY



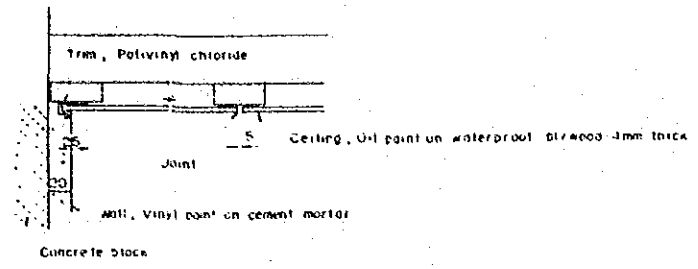
PLAN



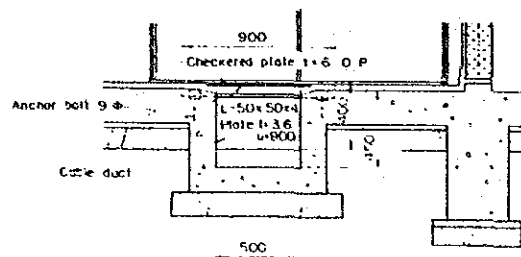
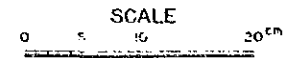
SECTION A-A



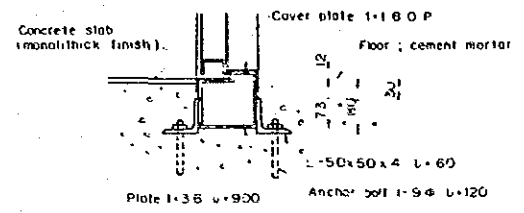
DETAIL OF CABLE DUCT



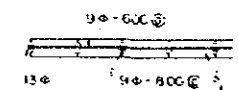
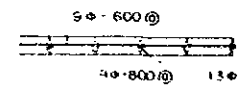
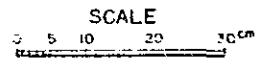
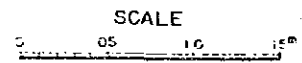
DETAIL OF CEILING



SECTION C-C

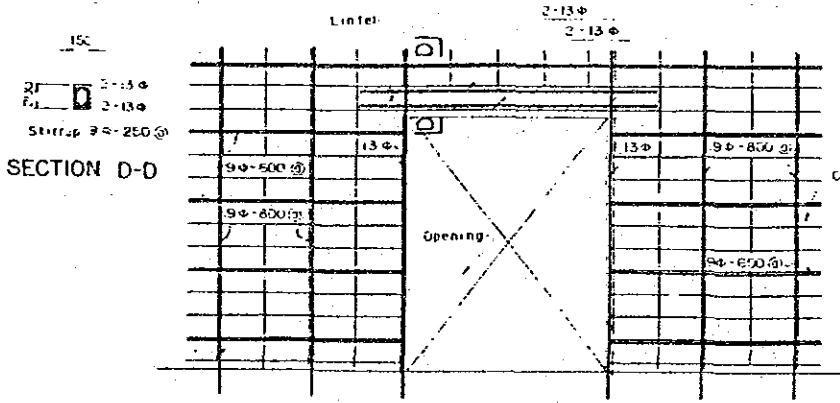


SECTION B-B



PLAN

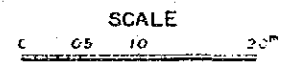
Concrete block 1150



SECTION D-D

ELEVATION

CONCRETE BLOCK WALL BAR ARRANGEMENT



LIST OF DOOR & WINDOW

Mark	Steel flush door	Steel flush door	Steel flush door	Steel glass window
Quantity	1 no	1 no	1 no	1 nos
Dimension	1,700 x 2,200	850 x 2,200	1,700 x 2,200	1,500 x 1,000
Hardware	Hinge, Cylinder lock, Door bolt, Stop	Hinge, Cylinder lock, Door bolt, Stop	Hinge, Cylinder lock, Door bolt, Stop	Fastener, Adjuster
Glass	Sheet glass 3mm thick			Sheet glass 3mm thick
Painting	Oil paint fin	Oil paint fin	Oil paint fin	Oil paint fin
Form	 1,700 2,200 Renew	 850 2,200 Renew	 1,700 2,200 Renew	 1,500 1,000 Casement window Renew for alum. window.

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THA NGON REHABILITATION AND RURAL DEVELOPMENT PROJECT

TITLE OF DRAWING
IRRIGATION PUMP STATION
OPERATION HOUSE (2/3)

Date: _____ Drawing No. 1005

JAPAN INTERNATIONAL COOPERATION AGENCY