Table 9.5.3.1 (48)

Result of the Measurement in Chao Phraya River and Its Tributaries

Location : Main river, Chainat before diverting to Noi river

Station No. : 1

(Water level is measured from point (0, 0) of the coordinate system in the cross sectional survey)

Date	Time	Water Level (m)	Cross Sectional Area (m2)	Average Velocity (m/s)	Flow Rate (m3/s)		Remarks
					Measured	Interpolated	
16th January 1993	09:00-10:00						
	10:00-11:00					68.72	
	11:00-12:00					68.75	
	12:00-13:00	-4.52	1,375.62	0.050	68.78	68.78	
	13:00-14:00					69.24	
	14:00-15:00					69.70	
	15:00-16:00					70.16	
	16:00-17:00					70.62	
	17:00-18:00					71.07	
	18:00-19:00	-4.52	1,375.62	0.052	71.53	71.53	
	19:00-20:00					71.53	
	20:00-21:00					71.53	
	21:00-22:00					71.53	
	22:00-23:00					71.53	
	23:00-24:00					71.53	
17th January 1993	24:00-01:00	-4.52	1,375.62	0.052	71.53	71.53	
	01:00-02:00					71.04	
	02:00-03:00					70.56	
	03:00-04:00					70.07	
	04:00-05:00					69.58	
	05:00-06:00					69.09	
	06:00-07:00	-4.53	1,372.06	0.050	68.60	68.60	
	07:00-08:00					68.63	
	08:00-09:00					68.66	
	09:00-10:00					68.69	
	10:00-11:00						
	11:00-12:00						
Average		-4.52	1,374.73	0.051	70.11	70.11	
Flow rate (m3/day)		-	-	-	6,057,698	6,057,698	

Table 9.5.3.1 (49)
Result of the Measurement in Chao Phraya River and Its Tributaries

Location : Main river, Sing Buri before diverting to Lop Buri river
Station No. : 2

(Water level is measured from point (0, 0) of the coordinate system in the cross sectional survey)

Date	Time	Water Level (m)	Cross Sectional Area (m2)	Average Velocity (m/s)	Flow Rate (m3/s)		Remarks
					Measured	Interpolated	
16th January 1993	09:00-10:00						
	10:00-11:00					15.69	
	11:00-12:00					15.35	
	12:00-13:00	-10.17	242.03	0.062	15.01	15.01	
	13:00-14:00					12.50	
	14:00-15:00					10.00	
	15:00-16:00					7.50	
	16:00-17:00					5.00	
	17:00-18:00					2.50	
	18:00-19:00	-13.67	0.00	0.000	0.00	0.00	
	19:00-20:00					4.71	
	20:00-21:00					9.42	
	21:00-22:00					14.14	
	22:00-23:00					18.85	
	23:00-24:00					23.56	
17th January 1993	24:00-01:00		183.58	0.154	28.27	28.27	
	01:00-02:00					26.40	
	02:00-03:00					24.53	
	03:00-04:00					22.66	
	04:00-05:00					20.79	
	05:00-06:00					18.92	
	06:00-07:00		126.34	0.135	17.06	17.06	
	07:00-08:00					16.71	
	08:00-09:00					16.37	
	09:00-10:00					16.03	
	10:00-11:00						
	11:00-12:00						
Average		-11.92	137.99	0.088	15.08	15.08	
Flow rate (m3/day)		-	-	-	1,303,165	1,303,165	

Table 9.5.3.1 (50)

Result of the Measurement in Chao Phraya River and Its Tributaries

Location : Main river, Ayutthaya, before joining with Pasak river

Station No. : 3

(Water level is measured from point (0, 0) of the coordinate system in the cross sectional survey)

Date	Time	Water Level (m)	Cross Sectional Area (m2)	Average Velocity (m/s)	Flow Rate (m3/s)		Remarks
					Measured	Average in 6 hrs.	
16th January 1993	09:00-10:00						
	10:00-11:00	-4.09	353.42	0.364	128.57		
	11:00-12:00	-3.87	369.63	-0.153	-56.58		
	12:00-13:00	-3.64	386.97	-0.201	-77.87	-84.25	
	13:00-14:00	-3.49	398.53	-0.416	-165.70		
	14:00-15:00	-3.45	401.65	-0.414	-166.46		
	15:00-16:00	-3.38	407.14	-0.411	-167.43		
	16:00-17:00	-3.37	407.93	-0.391	-159.69		
	17:00-18:00	-3.44	402.43	0.148	59.44		
	18:00-19:00	-3.62	388.50	0.350	136.01	101.17	
	19:00-20:00	-3.72	380.89	0.477	181.76		
	20:00-21:00	-3.86	370.38	0.478	177.10		
	21:00-22:00	-3.98	361.50	0.588	212.40		
	22:00-23:00	-4.11	351.96	0.523	184.21		
	23:00-24:00	-4.19	346.13	0.584	202.13		
17th January 1993	24:00-01:00	-4.29	338.89	0.577	195.52	152.86	
	01:00-02:00	-4.28	339.61	0.428	145.26		
	02:00-03:00	-4.13	350.50	0.301	105.44		
	03:00-04:00	-3.90	366.94	0.231	84.63		
	04:00-05:00	-3.80	374.86	0.199	74.68		
	05:00-06:00	-3.76	377.87	0.127	47.82		
	06:00-07:00	-3.70	382.40	0.143	54.87	54.90	
	07:00-08:00	-3.68	383.92	0.125	47.98		
	08:00-09:00	-3.70	382.40	0.143	54.81		
	09:00-10:00	-3.64	386.97	0.127	49.23		
	10:00-11:00						
	11:00-12:00						
Average		-3.80	375.48	0.164	56.17	56.17	
Flow rate (m3/day)		-	-	-	4,853,106	4,853,106	

Table 9.5.3.1 (51)
Result of the Measurement in Chao Phraya River and Its Tributaries

Location : Main river, Ayutthaya, after joining with Pasak river
Station No. : 4

(Water level is measured from point (0, 0) of the coordinate system in the cross sectional survey)

Date	Time	Water Level (m)	Cross Sectional Area (m2)	Average Velocity (m/s)	Flow Rate (m3/s)		Remarks
					Measured	Average in 6 hrs.	
16th January 1993	09:00-10:00						
	10:00-11:00	-2.08	993.64	0.257	255.12		
	11:00-12:00	-1.89	1,025.16	-0.159	162.94		
	12:00-13:00	-1.67	1,062.18	-0.371	-394.25	-249.23	
	13:00-14:00	-1.54	1,084.23	-0.506	-548.78		
	14:00-15:00	-1.44	1,101.23	-0.485	-533.73		
	15:00-16:00	-1.36	1,114.85	-0.392	-436.70		
	16:00-17:00	-1.34	1,118.25	-0.442	-494.68		
	17:00-18:00	-1.38	1,111.44	-0.176	-196.03		
	18:00-19:00	-1.56	1,081.12	0.332	358.69	203.64	
	19:00-20:00	-1.74	1,050.36	0.494	519.12		
	20:00-21:00	-1.83	1,035.21	0.524	542.34		
	21:00-22:00	-1.96	1,013.50	0.486	492.41		
	22:00-23:00	-2.06	996.93	0.482	480.68		
	23:00-24:00	-2.20	973.95	0.452	439.82		
17th January 1993	24:00-01:00	-2.27	962.54	0.457	440.28	350.22	
	01:00-02:00	-2.28	960.91	0.363	349.10		
	02:00-03:00	-2.17	978.85	0.244	238.93		
	03:00-04:00	-1.93	1,018.49	0.150	152.49		
	04:00-05:00	-1.80	1,040.25	0.151	156.89		
	05:00-06:00	-1.76	1,046.98	0.150	157.05		
	06:00-07:00	-1.73	1,052.04	0.137	143.73	114.14	
	07:00-08:00	-1.67	1,062.18	0.052	55.50		
	08:00-09:00	-1.64	1,067.26	0.109	116.24		
	09:00-10:00	-1.63	1,068.96	0.052	55.44		
	10:00-11:00						
	11:00-12:00						
Average		-1.79	1,042.52	0.098	104.69	104.69	
Flow rate (m3/day)		-	-	-	9,045,407	9,045,407	

Table 9.5.3.1 (52)
Result of the Measurement in Chao Phraya River and Its Tributaries

Location : Main river, Nonthaburi beside provincial office
Station No. : 5

(Water level is measured from point (0, 0) of the coordinate system in the cross sectional survey)

Date	Time	Water Level (m)	Cross Sectional Area (m2)	Average Velocity (m/s)	Flow Rate (m3/s) Measured	Flow Rate (m3/s) Average in 6 hrs.	Remarks
16th January 1993	09:00-10:00						
	10:00-11:00	-0.36	2,608.10	-0.484	-1,263.55		
	11:00-12:00	-0.27	2,635.72	-0.662	-1,745.12		
	12:00-13:00	-0.14	2,675.63	-0.723	-1,933.87	-1,393.87	
	13:00-14:00	-0.16	2,669.49	-0.589	-1,571.51		
	14:00-15:00	-0.15	2,672.56	-0.476	-1,271.65		
	15:00-16:00	-0.41	2,593.10	-0.223	-577.55		
	16:00-17:00	-0.54	2,552.90	0.294	750.29		
	17:00-18:00	-0.94	2,430.42	0.575	1,398.25		
	18:00-19:00	-1.08	2,387.62	0.691	1,649.08	1,455.13	
	19:00-20:00	-1.22	2,344.90	0.755	1,770.20		
	20:00-21:00	-1.24	2,338.81	0.758	1,773.54		
	21:00-22:00	-1.32	2,314.49	0.600	1,389.42		
	22:00-23:00	-1.36	2,302.35	0.592	1,362.93		
	23:00-24:00	-1.09	2,384.56	0.413	985.51		
17th January 1993	24:00-01:00	-0.85	2,457.96	0.086	212.14	822.13	
	01:00-02:00	-0.77	2,482.44	0.220	545.93		
	02:00-03:00	-0.69	2,506.94	0.340	852.32		
	03:00-04:00	-0.71	2,500.82	0.389	973.94		
	04:00-05:00	-0.60	2,534.51	0.370	936.53		
	05:00-06:00	-0.60	2,534.51	0.266	675.37		
	06:00-07:00	-0.54	2,552.90	0.207	529.64	-12.95	
	07:00-08:00	-0.52	2,559.03	-0.239	-612.71		
	08:00-09:00	-0.41	2,592.65	-0.318	-824.87		
	09:00-10:00	-0.39	2,598.89	-0.301	-781.67		
	10:00-11:00						
	11:00-12:00						
Average		-0.68	2,509.64	0.106	217.61	217.61	
Flow rate (m3/day)		-	-	-	18,801,306	18,801,306	

Table 9.5.3.1 (53)
Result of the Measurement in Chao Phraya River and Its Tributaries

Location : Noi river, Chainat after diverting from main river
Station No. : 6

(Water level is measured from point (0, 0) of the coordinate system in the cross sectional survey)

Date	Time	Water Level (m)	Cross Sectional Area (m2)	Average Velocity (m/s)	Flow Rate (m3/s)		Remarks
					Measured	Interpolated	
16th January 1993	09:00-10:00						
	10:00-11:00					8.87	
	11:00-12:00					8.59	
	12:00-13:00	-7.01	31.98	0.260	8.32	8.32	
	13:00-14:00					8.27	
	14:00-15:00					8.22	
	15:00-16:00					8.18	
	16:00-17:00					8.13	
	17:00-18:00					8.09	
	18:00-19:00	-7.04	31.16	0.258	8.04	8.04	
	19:00-20:00					8.04	
	20:00-21:00					8.04	
	21:00-22:00					8.04	
	22:00-23:00					8.04	
	23:00-24:00					8.04	
17th January 1993	24:00-01:00	-7.04	31.16	0.258	8.04	8.04	
	01:00-02:00					8.36	
	02:00-03:00					8.68	
	03:00-04:00					9.01	
	04:00-05:00					9.33	
	05:00-06:00					9.65	
	06:00-07:00	-7.04	31.16	0.320	9.97	9.97	
	07:00-08:00					9.70	
	08:00-09:00					9.42	
	09:00-10:00					9.14	
	10:00-11:00						
	11:00-12:00						
Average		-7.03	31.37	0.274	8.59	8.59	
Flow rate (m3/day)		-	-	-	742,308	742,308	

Table 9.5.3.1 (54)
Result of the Measurement in Chao Phraya River and Its Tributaries

Location : Lop Buri river, Lop Buri
Station No. : 7

(Water level is measured from point (0.0) of the coordinate system in the cross sectional survey)

Date	Time	Water Level (m)	Cross Sectional Area (m2)	Average Velocity (m/s)	Flow Rate (m3/s)		Remarks
					Measured	Interpolated	
16th January 1993	09:00-10:00						
	10:00-11:00					0.02	
	11:00-12:00					0.02	
	12:00-13:00	-6.11	0.22	0.101	0.02	0.02	
	13:00-14:00					0.02	
	14:00-15:00					0.02	
	15:00-16:00					0.02	
	16:00-17:00					0.02	
	17:00-18:00					0.02	
	18:00-19:00	-6.13	0.16	0.103	0.02	0.02	
	19:00-20:00					0.02	
	20:00-21:00					0.02	
	21:00-22:00					0.02	
	22:00-23:00					0.02	
	23:00-24:00					0.02	
17th January 1993	24:00-01:00	-6.13	0.16	0.100	0.02	0.02	
	01:00-02:00					0.02	
	02:00-03:00					0.01	
	03:00-04:00					0.01	
	04:00-05:00					0.01	
	05:00-06:00					0.01	
	06:00-07:00	-6.15	0.11	0.106	0.01	0.01	
	07:00-08:00					0.01	
	08:00-09:00					0.01	
	09:00-10:00					0.02	
	10:00-11:00						
	11:00-12:00						
Average		-6.13	0.16	0.103	0.02	0.02	
Flow rate (m3/day)		-	-	-	1,420	1,420	

Table 9.5.3.1 (55)

Result of the Measurement in Chao Phraya River and Its Tributaries

Location : Lop Buri river, Ayutthaya, before joining with Pasak river

Station No. : 8

(Water level is measured from point (0, 0) of the coordinate system in the cross sectional survey)

Date	Time	Water Level (m)	Cross Sectional Area (m2)	Average Velocity (m/s)	Flow Rate (m3/s)		Remarks
					Measured	Average in 6 hrs.	
16th January 1993	09:00-10:00						
	10:00-11:00	-1.57	157.11	-0.072	-11.33		
	11:00-12:00	-1.37	167.63	-0.142	-23.80		
	12:00-13:00	-1.16	178.85	-0.093	-16.62	-17.79	
	13:00-14:00	-1.09	182.63	-0.167	-30.45		
	14:00-15:00	-0.99	188.06	-0.056	-10.47		
	15:00-16:00	-0.92	191.89	-0.073	-14.09		
	16:00-17:00	-0.88	194.08	-0.067	-12.98		
	17:00-18:00	-0.91	192.43	0.114	21.95		
	18:00-19:00	-1.06	184.25	0.231	42.61	28.28	
	19:00-20:00	-1.21	176.16	0.229	40.43		
	20:00-21:00	-1.31	170.82	0.154	26.38		
	21:00-22:00	-1.42	164.99	0.311	51.28		
	22:00-23:00	-1.55	158.16	0.261	41.34		
	23:00-24:00	-1.64	153.49	0.315	48.34		
17th January 1993	24:00-01:00	-1.74	148.38	0.282	41.86	37.56	
	01:00-02:00	-1.77	146.86	0.243	35.62		
	02:00-03:00	-1.63	154.01	0.116	17.80		
	03:00-04:00	-1.45	163.40	0.247	40.42		
	04:00-05:00	-1.35	168.69	0.032	5.36		
	05:00-06:00	-1.28	172.42	0.035	5.96		
	06:00-07:00	-1.25	174.02	-0.073	-12.77	-3.86	
	07:00-08:00	-1.20	176.70	-0.094	-16.56		
	08:00-09:00	-1.17	178.31	0.000	0.00		
	09:00-10:00	-1.15	179.39	-0.029	-5.13		
	10:00-11:00						
	11:00-12:00						
Average		-1.29	171.78	0.071	11.05	11.05	
Flow rate (m3/day)		-	-	-	954,524	954,524	

Table 9.5.3.1 (56)

Result of the Measurement in Chao Phraya River and Its Tributaries

Location : Pasak river, Ayutthaya, before joining with Lop Buri river

Station No. : 9

(Water level is measured from point (0, 0) of the coordinate system in the cross sectional survey)

Date	Time	Water Level (m)	Cross Sectional Area (m2)	Average Velocity (m/s)	Flow Rate (m3/s)		Remarks
					Measured	Average in 6 hrs.	
16th	09:00-10:00						
January	10:00-11:00	-3.52	292.27	-0.186	-54.48		
1993	11:00-12:00	-3.36	306.62	-0.165	-50.49		
	12:00-13:00	-3.21	320.16	-0.376	-120.37	-101.55	
	13:00-14:00	-3.08	331.97	-0.410	-136.18		
	14:00-15:00	-2.98	341.10	-0.390	-133.16		
	15:00-16:00	-2.92	346.59	-0.331	-114.61		
	16:00-17:00	-2.91	347.51	-0.290	-100.69		
	17:00-18:00	-2.83	354.85	-0.170	-60.35		
	18:00-19:00	-2.99	340.18	0.098	33.32	50.45	
	19:00-20:00	-3.09	331.06	0.410	135.90		
	20:00-21:00	-3.21	320.16	0.433	138.76		
	21:00-22:00	-3.29	312.92	0.498	155.79		
	22:00-23:00	-3.42	301.23	0.530	159.79		
	23:00-24:00	-3.55	289.60	0.540	156.39		
17th	24:00-01:00	-3.65	280.71	0.865	242.81	143.47	
January	01:00-02:00	-3.72	274.54	0.573	157.33		
1993	02:00-03:00	-3.64	281.59	0.235	66.29		
	03:00-04:00	-3.40	303.02	0.258	78.21		
	04:00-05:00	-3.28	313.83	0.259	81.29		
	05:00-06:00	-3.28	313.83	0.299	93.73		
	06:00-07:00	-3.22	319.25	0.352	112.26	80.00	
	07:00-08:00	-3.18	322.88	0.389	125.45		
	08:00-09:00	-3.12	328.33	0.384	126.08		
	09:00-10:00	-3.08	331.97	-0.177	-58.83		
	10:00-11:00						
	11:00-12:00						
Average		-3.25	316.92	0.151	43.09	43.09	
Flow rate (m3/day)		-	-	-	3,723,168	3,723,168	

Table 9.5.3.1 (57)
Result of the Measurement in Chao Phraya River and Its Tributaries

Location : Noi river, Bang Sai, before joining with main river
Station No. : 10

(Water level is measured from point (0, 0) of the coordinate system in the cross sectional survey)

Date	Time	Water Level (m)	Cross Sectional Area (m2)	Average Velocity (m/s)	Flow Rate (m3/s) Measured	Flow Rate (m3/s) Average in 6 hrs.	Remarks
16th January 1993	09:00-10:00						
	10:00-11:00	-2.33	563.09	-0.138	-77.90		
	11:00-12:00	-2.10	600.60	-0.390	-234.36		
	12:00-13:00	-2.00	617.48	-0.400	-246.79	-182.52	
	13:00-14:00	-1.86	641.39	-0.229	-146.57		
	14:00-15:00	-1.79	653.46	-0.319	-208.27		
	15:00-16:00	-1.77	656.93	-0.276	-181.24		
	16:00-17:00	-1.75	660.40	0.077	51.12		
	17:00-18:00	-1.99	619.18	0.349	216.16		
	18:00-19:00	-2.12	597.24	0.425	253.71	217.76	
	19:00-20:00	-2.25	579.24	0.530	307.10		
	20:00-21:00	-2.35	559.96	0.432	241.64		
	21:00-22:00	-2.47	541.49	0.437	236.83		
	22:00-23:00	-2.63	517.58	0.508	263.00		
	23:00-24:00	-2.73	503.05	0.423	212.96		
17th January 1993	24:00-01:00	-2.75	500.19	0.283	141.36	157.45	
	01:00-02:00	-2.58	524.96	0.116	60.74		
	02:00-03:00	-2.43	547.59	0.280	153.33		
	03:00-04:00	-2.29	569.42	0.199	113.32		
	04:00-05:00	-2.23	579.09	0.187	108.07		
	05:00-06:00	-2.17	588.93	0.108	63.81		
	06:00-07:00	-2.11	598.92	0.061	36.60	28.81	
	07:00-08:00	-2.08	603.96	0.051	30.75		
	08:00-09:00	-2.07	605.65	-0.023	-13.66		
	09:00-10:00	-2.00	617.48	-0.085	-52.70		
	10:00-11:00						
	11:00-12:00						
Average		-2.20	585.30	0.109	55.37	55.37	
Flow rate (m3/day)		-	-	-	4,784,383	4,784,383	

Table 9.5.3.1 (58)
Result of the Measurement in Chao Phraya River and Its Tributaries

Location : Drainage Channel, Ang Thong
Station No. : 11

(Water level is measured from point (0.0) of the coordinate system in the cross sectional survey)

Date	Time	Water Level (m)	Cross Sectional Area (m2)	Average Velocity (m/s)	Flow Rate (m3/s)		Remarks
					Measured	Interpolated	
16th January 1993	09:00-10:00						
	10:00-11:00					0.40	
	11:00-12:00					0.40	
	12:00-13:00	-2.18	4.74	0.086	0.41	0.41	
	13:00-14:00					0.39	
	14:00-15:00					0.36	
	15:00-16:00					0.34	
	16:00-17:00					0.32	
	17:00-18:00					0.30	
	18:00-19:00	-2.21	4.35	0.064	0.28	0.28	
	19:00-20:00					0.28	
	20:00-21:00					0.28	
	21:00-22:00					0.27	
	22:00-23:00					0.27	
	23:00-24:00					0.27	
17th January 1993	24:00-01:00	-2.21	4.35	0.062	0.27	0.27	
	01:00-02:00					0.29	
	02:00-03:00					0.31	
	03:00-04:00					0.33	
	04:00-05:00					0.35	
	05:00-06:00					0.37	
	06:00-07:00	-2.15	5.13	0.076	0.39	0.39	
	07:00-08:00					0.39	
	08:00-09:00					0.40	
	09:00-10:00					0.40	
	10:00-11:00						
	11:00-12:00						
Average		-2.19	4.64	0.072	0.34	0.34	
Flow rate (m3/day)		-	-	-	29,060	29,060	

Table 9.5.3.1 (59)
Result of the Measurement in Chao Phraya River and Its Tributaries

Location : Drainage Channel, Ayutthaya connecting main river and Noi river
Station No. : 12

(Water level is measured from point (0, 0) of the coordinate system in the cross sectional survey)

Date	Time	Water Level (m)	Cross Sectional Area (m2)	Average Velocity (m/s)	Flow Rate (m3/s)		Remarks
					Measured	Interpolated	
16th January 1993	09:00-10:00						
	10:00-11:00					-30.60	
	11:00-12:00					-34.96	
	12:00-13:00	-0.82	106.25	-0.370	-39.31	-39.31	
	13:00-14:00					-25.99	
	14:00-15:00					-12.66	
	15:00-16:00					0.66	
	16:00-17:00					13.99	
	17:00-18:00					27.31	
	18:00-19:00	-0.72	109.83	0.370	40.64	40.64	
	19:00-20:00					38.27	
	20:00-21:00					35.91	
	21:00-22:00					33.54	
	22:00-23:00					31.18	
	23:00-24:00					28.82	
17th January 1993	24:00-01:00	-1.37	88.17	0.300	26.45	26.45	
	01:00-02:00					19.84	
	02:00-03:00					13.24	
	03:00-04:00					6.63	
	04:00-05:00					0.02	
	05:00-06:00					-6.59	
	06:00-07:00	-0.84	105.54	-0.125	-13.19	-13.19	
	07:00-08:00					-17.55	
	08:00-09:00					-21.90	
	09:00-10:00					-26.25	
	10:00-11:00						
	11:00-12:00						
Average		-0.94	102.45	0.044	3.65	3.65	
Flow rate (m3/day)		-	-	-	315,038	315,038	

Table 9.5.3.1 (60)

Result of the Measurement in Chao Phraya River and Its Tributaries

Location : Drainage Channel, Ayutthaya, flowing to Pasak river

Station No. : 13

(Water level is measured from point (0, 0) of the coordinate system in the cross sectional survey)

Date	Time	Water Level (m)	Cross Sectional Area (m2)	Average Velocity (m/s)	Flow Rate (m3/s)		Remarks
					Measured	Interpolated	
16th	09:00-10:00						
January	10:00-11:00					0.24	
1993	11:00-12:00					0.25	
	12:00-13:00	-3.28	1.22	0.207	0.25	0.25	
	13:00-14:00					0.26	
	14:00-15:00					0.26	
	15:00-16:00					0.27	
	16:00-17:00					0.27	
	17:00-18:00					0.27	
	18:00-19:00	-3.23	1.46	0.191	0.28	0.28	
	19:00-20:00					0.30	
	20:00-21:00					0.33	
	21:00-22:00					0.35	
	22:00-23:00					0.38	
	23:00-24:00					0.40	
17th	24:00-01:00	-3.03	2.53	0.167	0.42	0.42	
January	01:00-02:00					0.39	
1993	02:00-03:00					0.36	
	03:00-04:00					0.32	
	04:00-05:00					0.29	
	05:00-06:00					0.26	
	06:00-07:00	-3.28	1.22	0.185	0.23	0.23	
	07:00-08:00					0.23	
	08:00-09:00					0.23	
	09:00-10:00					0.24	
	10:00-11:00						
	11:00-12:00						
Average		-3.21	1.61	0.188	0.30	0.30	
Flow rate (m3/day)		-	-	-	25,510	25,510	

Table 9.5.3.1 (61)
Result of the Measurement in Chao Phraya River and Its Tributaries

Location : Drainage Channel, Pathum Thani, flowing to main river

Station No. : 14

(Water level is measured from point (0.0) of the coordinate system in the cross sectional survey)

Date	Time	Water Level (m)	Cross Sectional Area (m2)	Average Velocity (m/s)	Flow Rate (m3/s)		Remarks
					Measured	Interpolated	
16th January 1993	09:00-10:00						
	10:00-11:00					0.51	
	11:00-12:00					0.57	
	12:00-13:00	-1.10	17.32	0.036	0.62	0.62	
	13:00-14:00					0.48	
	14:00-15:00					0.34	
	15:00-16:00					0.20	
	16:00-17:00					0.07	
	17:00-18:00					-0.07	
	18:00-19:00	-1.42	11.27	-0.019	-0.21	-0.21	
	19:00-20:00					-0.20	
	20:00-21:00					-0.19	
	21:00-22:00					-0.17	
	22:00-23:00					-0.16	
	23:00-24:00					-0.14	
17th January 1993	24:00-01:00	-1.62	7.97	-0.016	-0.13	-0.13	
	01:00-02:00					-0.06	
	02:00-03:00					0.01	
	03:00-04:00					0.08	
	04:00-05:00					0.15	
	05:00-06:00					0.22	
	06:00-07:00	-0.94	20.55	0.014	0.29	0.29	
	07:00-08:00					0.34	
	08:00-09:00					0.40	
	09:00-10:00					0.46	
	10:00-11:00						
	11:00-12:00						
Average		-1.27	14.28	0.004	0.14	0.14	
Flow rate (m3/day)		-	-	-	12,300	12,300	

Table 9.5.3.1 (62)
Result of the Measurement in Chao Phraya River and Its Tributaries

Location : Drainage Channel, Nonthaburi, flowing to main river
Station No. : 15

(Water level is measured from point (0, 0) of the coordinate system in the cross sectional survey)

Date	Time	Water Level (m)	Cross Sectional Area (m2)	Average Velocity (m/s)	Flow Rate (m3/s)		Remarks
					Measured	Interpolated	
16th January 1993	09:00-10:00						
	10:00-11:00					-0.08	
	11:00-12:00					-0.14	
	12:00-13:00	-1.94	3.26	-0.061	-0.20	-0.20	
	13:00-14:00					-0.15	
	14:00-15:00					-0.10	
	15:00-16:00					-0.05	
	16:00-17:00					-0.00	
	17:00-18:00					0.05	
	18:00-19:00	-2.88	1.00	0.098	0.10	0.10	
	19:00-20:00					0.09	
	20:00-21:00					0.08	
	21:00-22:00					0.07	
	22:00-23:00					0.06	
	23:00-24:00					0.06	
17th January 1993	24:00-01:00	-2.46	2.01	0.024	0.05	0.05	
	01:00-02:00					0.07	
	02:00-03:00					0.09	
	03:00-04:00					0.11	
	04:00-05:00					0.13	
	05:00-06:00					0.15	
	06:00-07:00	-2.24	2.54	0.065	0.16	0.16	
	07:00-08:00					0.10	
	08:00-09:00					0.04	
	09:00-10:00					-0.02	
	10:00-11:00						
	11:00-12:00						
Average		-2.38	2.20	0.032	0.03	0.03	
Flow rate (m3/day)		-	-	-	2,434	2,434	

STATION NO.3

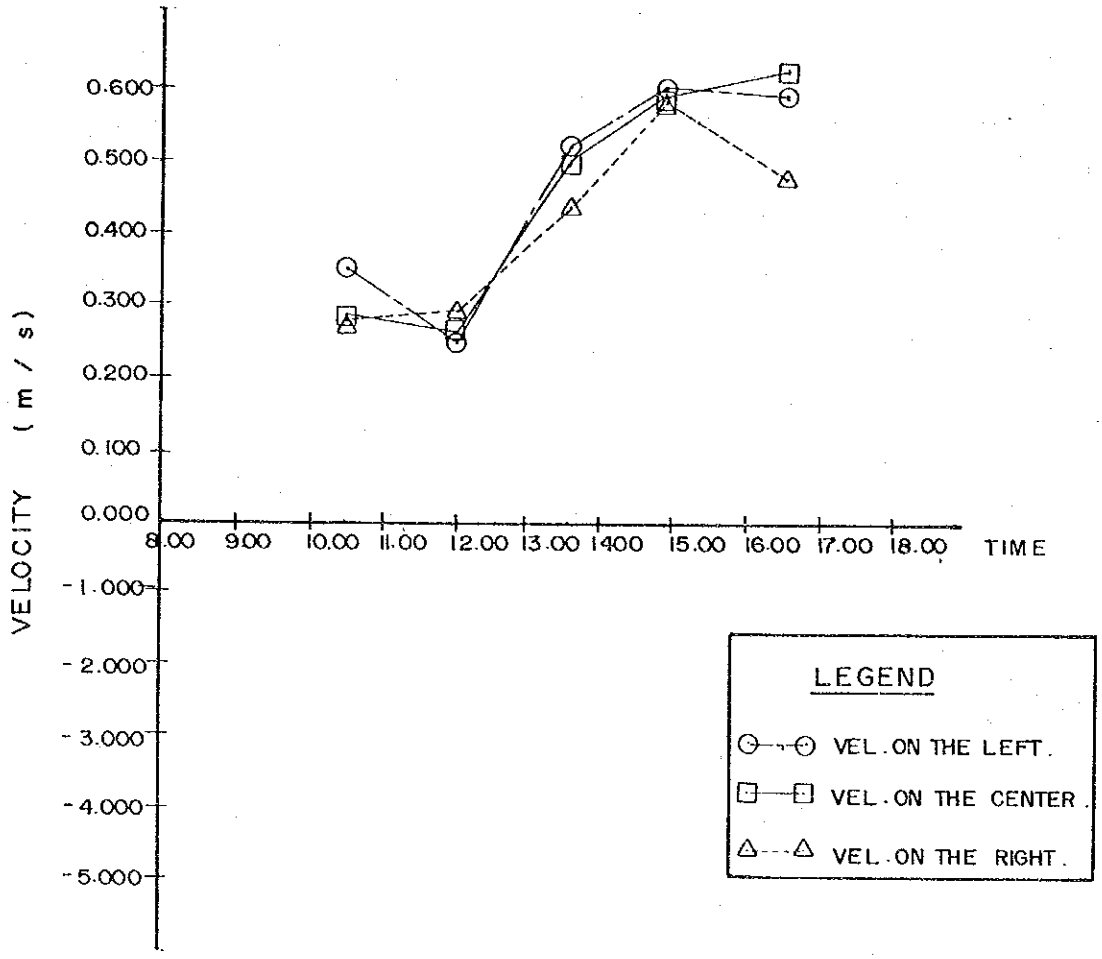


FIG. 9.5.3.1 (1) TIDAL VELOCITY VARIATION OF CHAO PHRAYA RIVER ON 13TH JUNE 1992 (NO.3)

MASTER PLANNING FOR THE SEWERAGE DEVELOPMENT PROJECT FOR LOWER CHAO PHRAYA RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

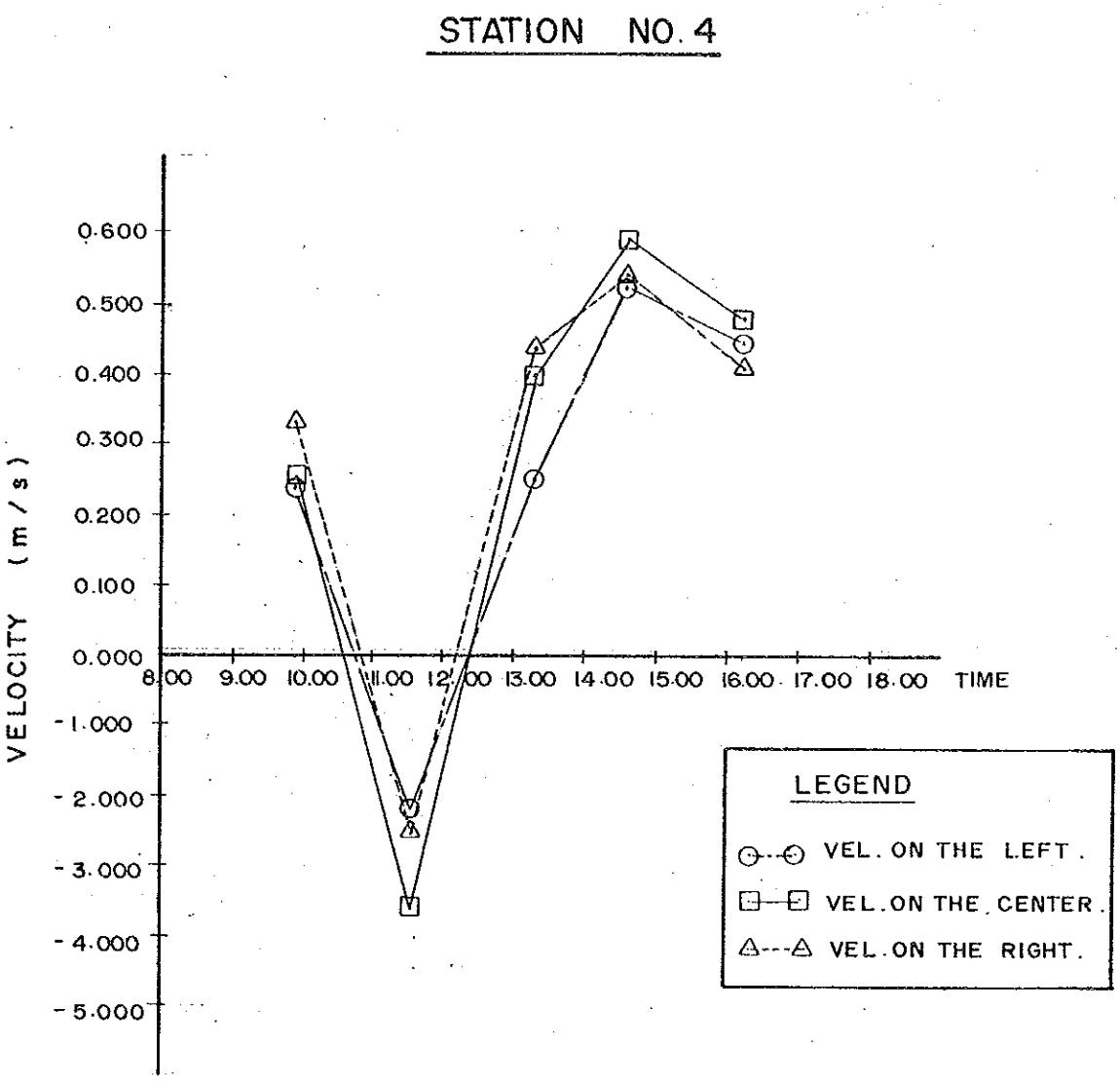


FIG. 9.5.3.1 (2) TIDAL VELOCITY VARIATION OF CHAO PHRAYA RIVER ON 13TH JUNE 1992 (NO.4)

MASTER PLANNING FOR THE SEWERAGE DEVELOPMENT PROJECT FOR LOWER CHAO PHRAYA RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

STATION NO. 5

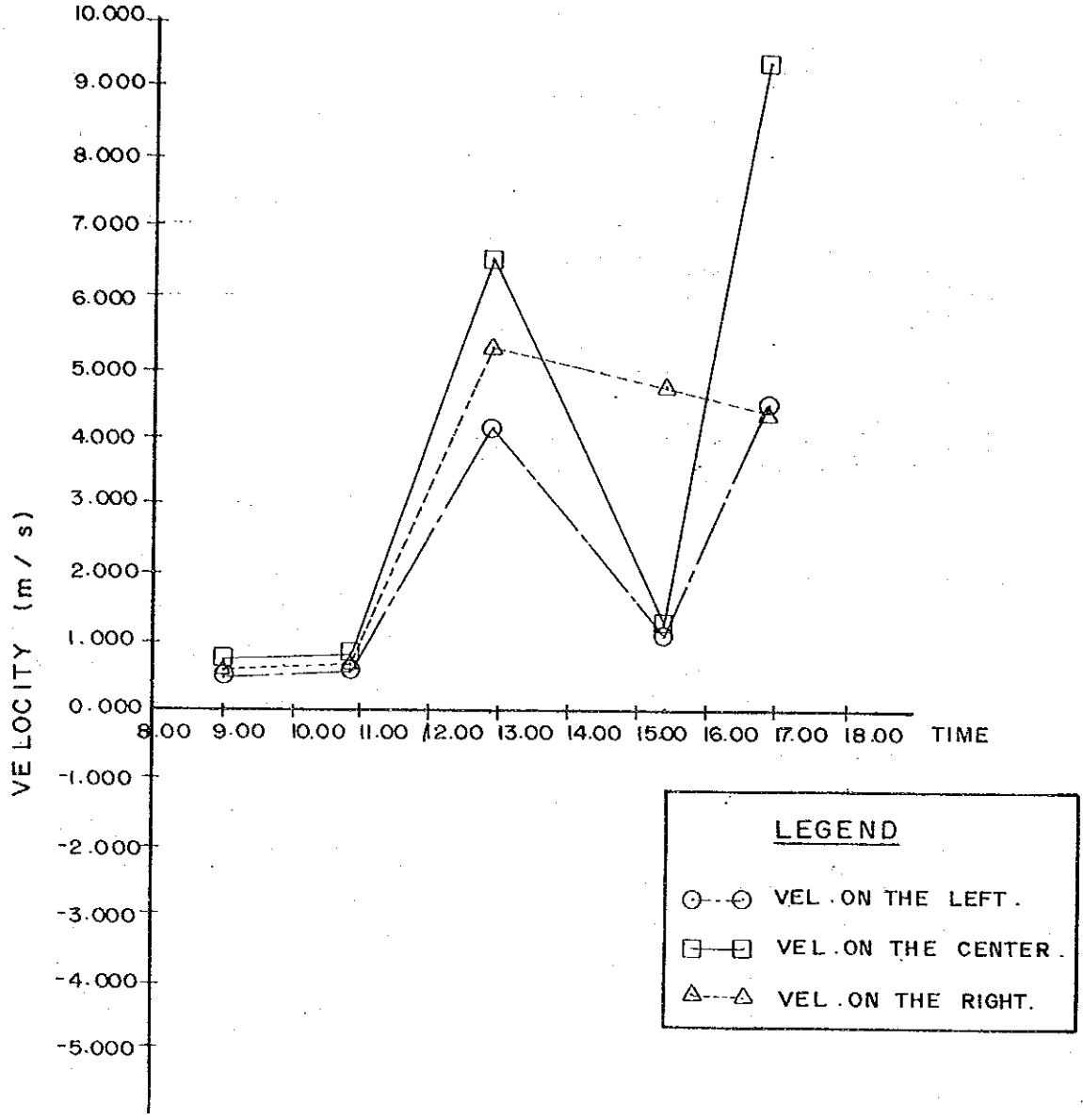


FIG. 9.5.3.1 (3) TIDAL VELOCITY VARIATION OF CHAO PHRAYA RIVER ON 13TH JUNE 1992 (NO.5)

MASTER PLANNING FOR THE SEWERAGE DEVELOPMENT PROJECT FOR LOWER CHAO PHRAYA RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

STATION NO. 8

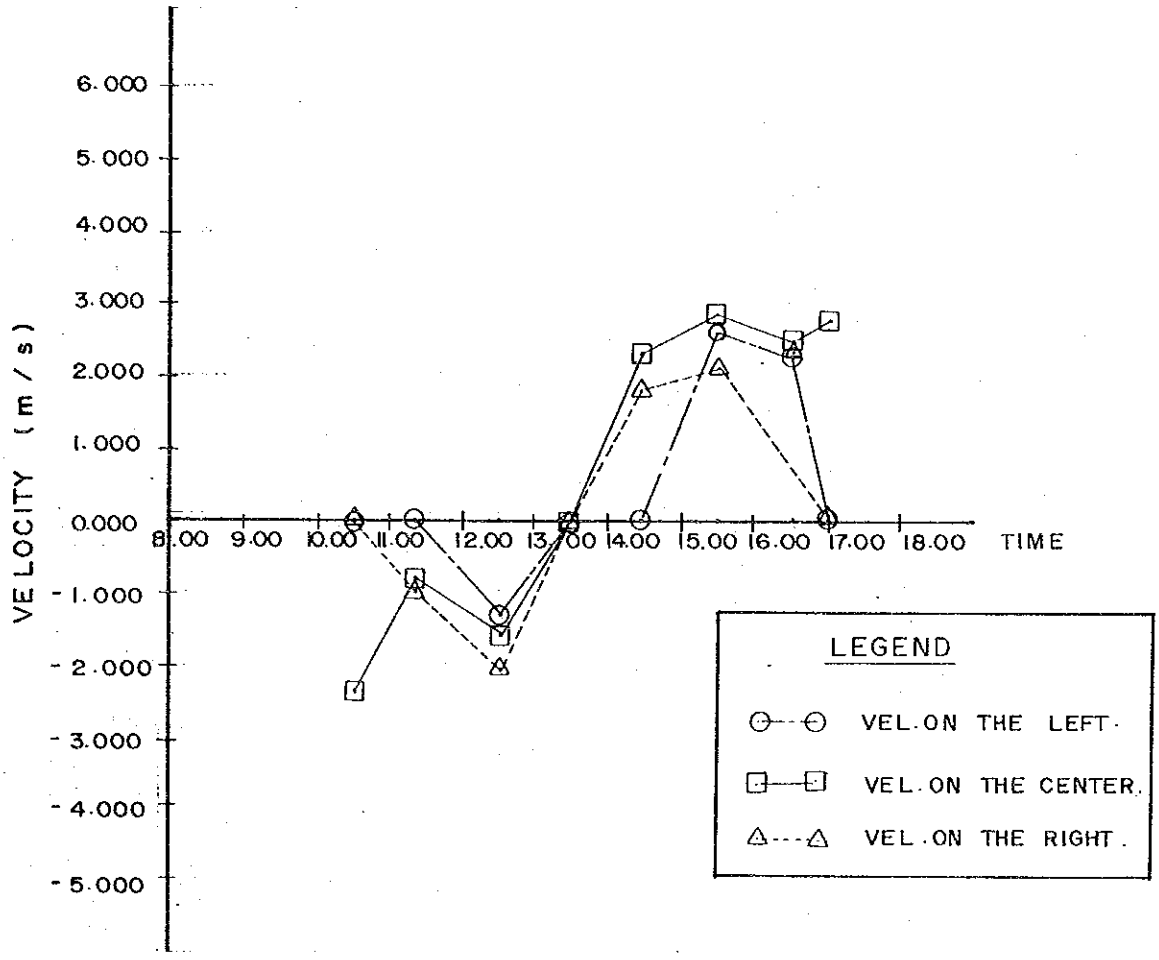


FIG. 9.5.3.1 (4) TIDAL VELOCITY VARIATION OF CHAO PHRAYA RIVER ON 13TH JUNE 1992 (NO.8)

MASTER PLANNING FOR THE SEWERAGE DEVELOPMENT PROJECT FOR LOWER CHAO PHRAYA RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

STATION NO. 9

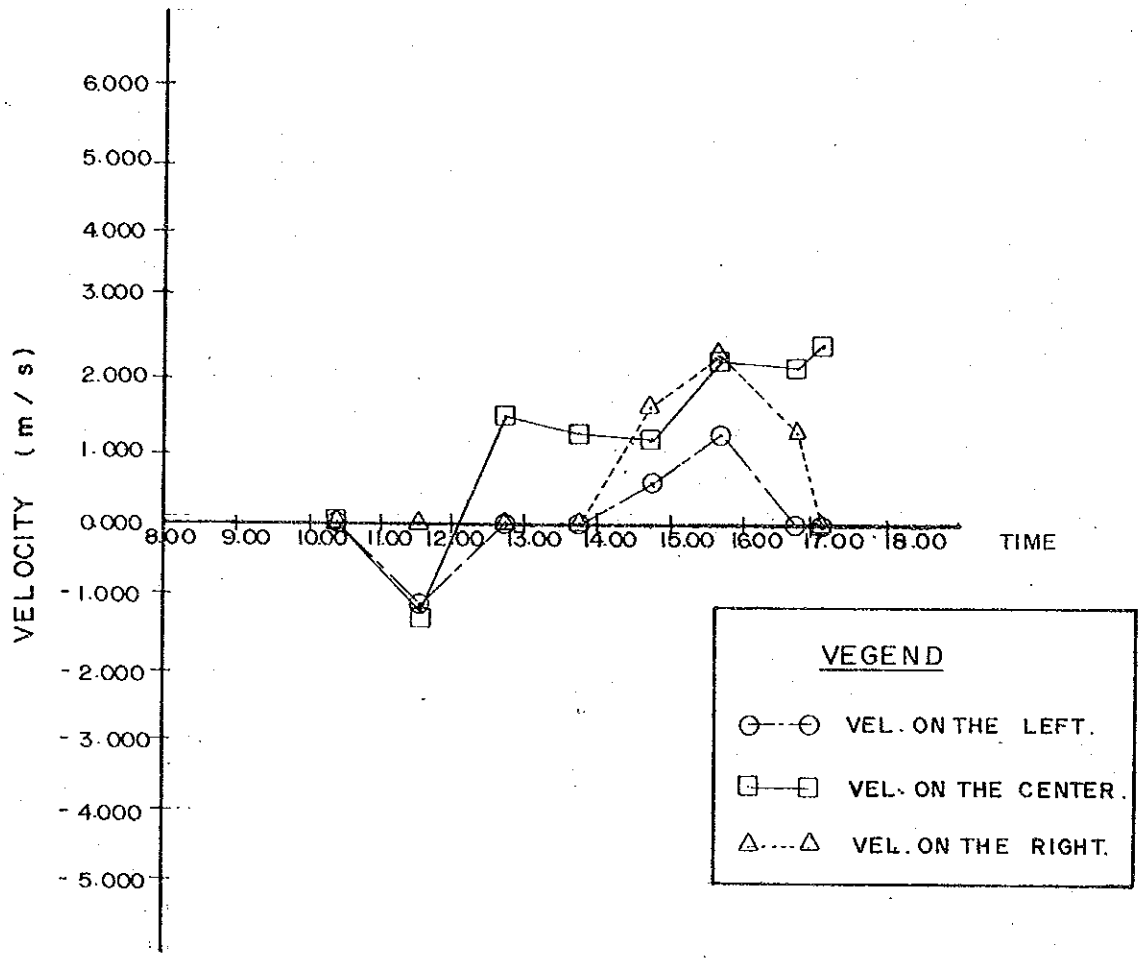


FIG. 9.5.3.1 (5) TIDAL VELOCITY VARIATION OF CHAO PHRAYA RIVER ON 13TH JUNE 1992 (NO.9)

MASTER PLANNING FOR THE SEWERAGE DEVELOPMENT PROJECT FOR LOWER CHAO PHRAYA RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

STATION NO.3

(OBSERVED ON 20th - 21st JUNE, 1992)

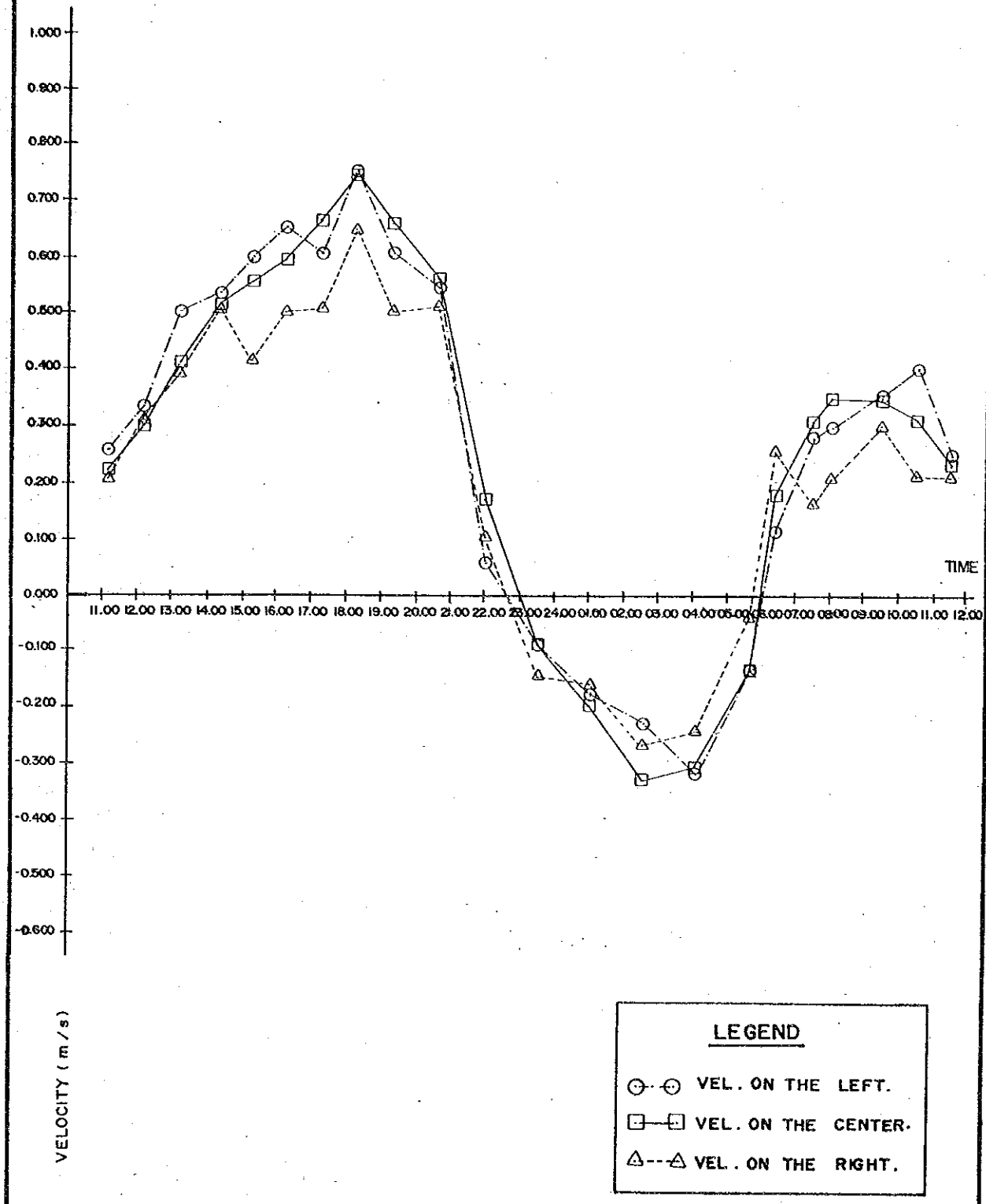


FIG. 9.5.3.1 (6) TIDAL VELOCITY VARIATION OF CHAO PHRAYA RIVER ON 20TH - 21ST JUNE, 1992 (NO.3)

MASTER PLANNING FOR THE SEWERAGE DEVELOPMENT PROJECT FOR LOWER CHAO PHRAYA RIVER BASIN

JAPAN INTERNATION COOPERATION AGENCY

STATION NO. 4

(OBSERVED ON 20th - 21st JUNE, 1992)

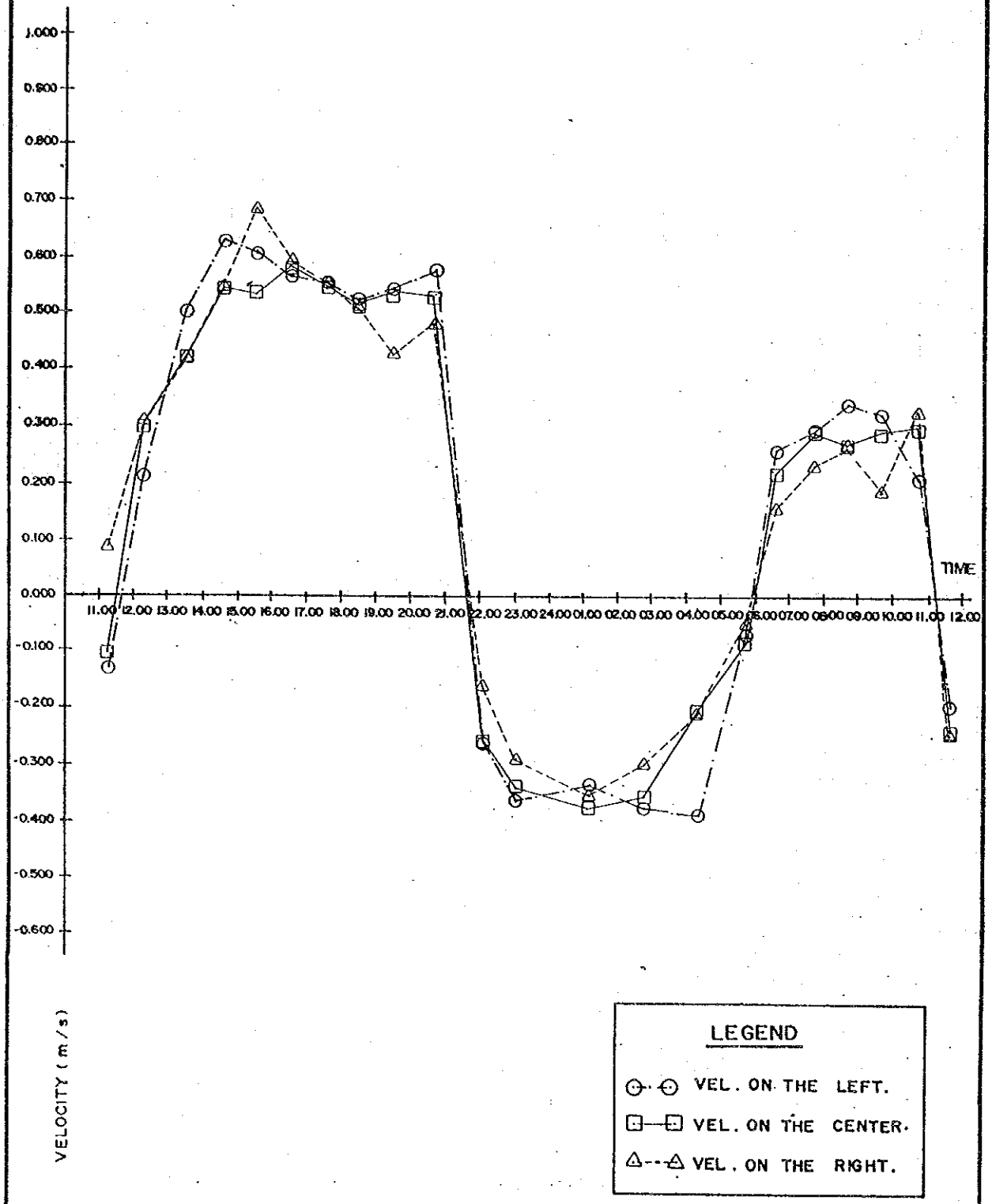


FIG. 9.5.3.1 (7) TIDAL VELOCITY VARIATION OF CHAO PHRAYA RIVER ON 20TH - 21ST JUNE, 1992 (NO.4)

MASTER PLANNING FOR THE SEWERAGE DEVELOPMENT PROJECT FOR LOWER CHAO PHRAYA RIVER BASIN

JAPAN INTERNATION COOPERATION AGENCY

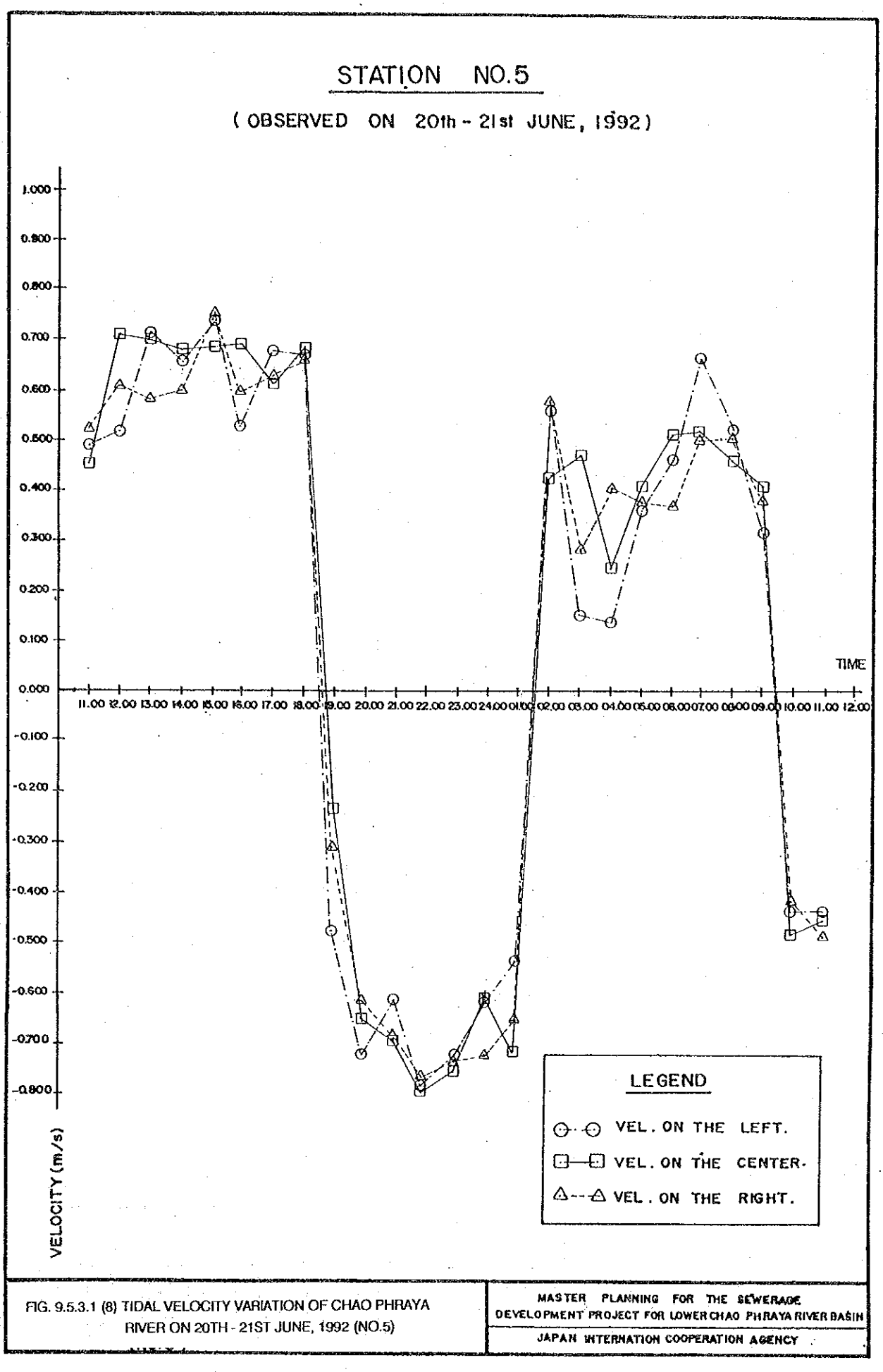


FIG. 9.5.3.1 (8) TIDAL VELOCITY VARIATION OF CHAO PHRAYA RIVER ON 20TH - 21ST JUNE, 1992 (NO.5)

MASTER PLANNING FOR THE SEWERAGE DEVELOPMENT PROJECT FOR LOWER CHAO PHRAYA RIVER BASIN

JAPAN INTERNATION COOPERATION AGENCY

STATION NO. 8

(OBSERVED ON 20th - 21st JUNE, 1992)

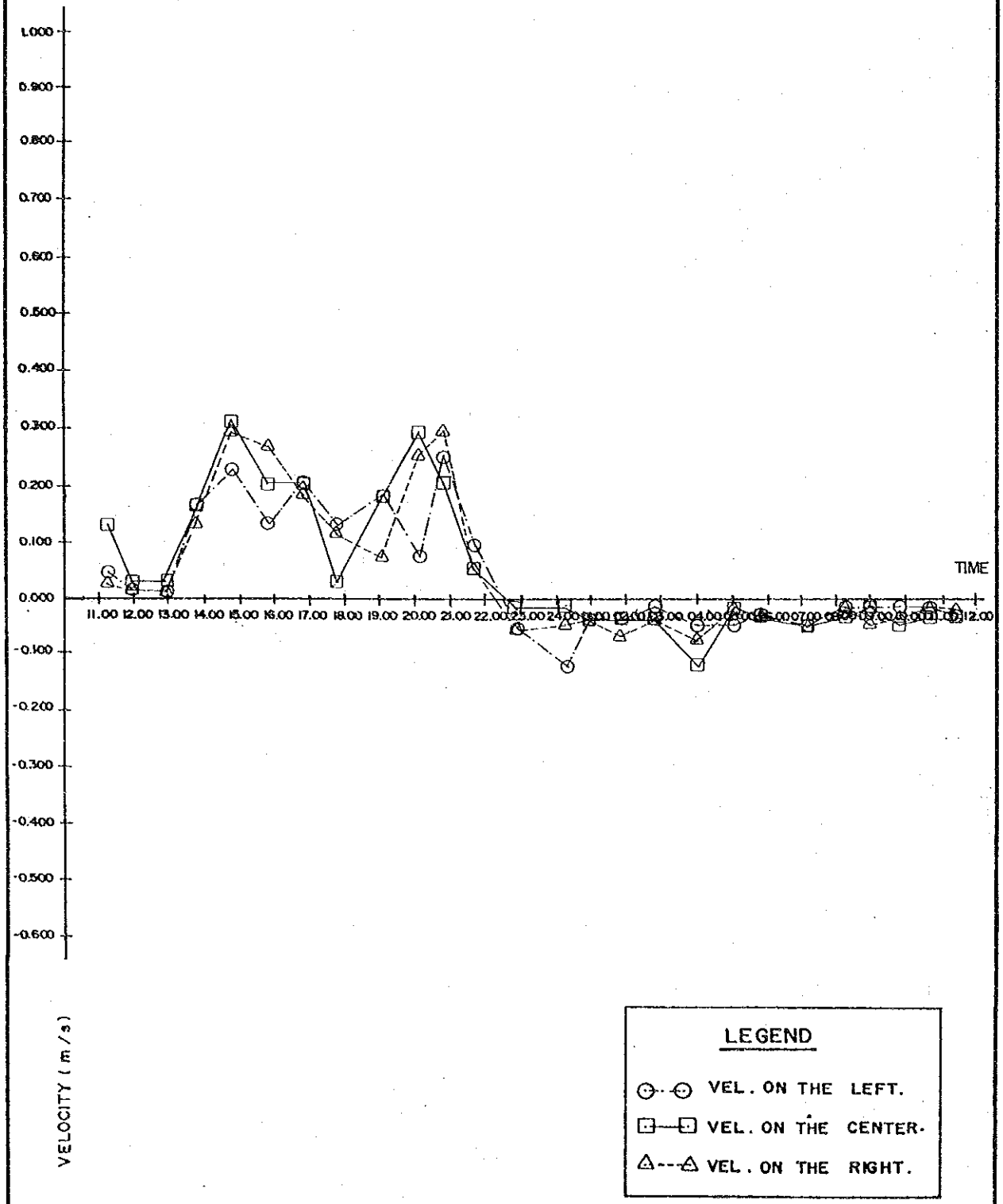


FIG. 9.5.3.1 (9) TIDAL VELOCITY VARIATION OF CHAO PHRAYA RIVER ON 20TH - 21ST JUNE, 1992 (NO.8)

MASTER PLANNING FOR THE SEWERAGE DEVELOPMENT PROJECT FOR LOWER CHAO PHRAYA RIVER BASIN

JAPAN INTERNATION COOPERATION AGENCY

STATION NO.9

(OBSERVED ON 20th - 21st JUNE, 1992)

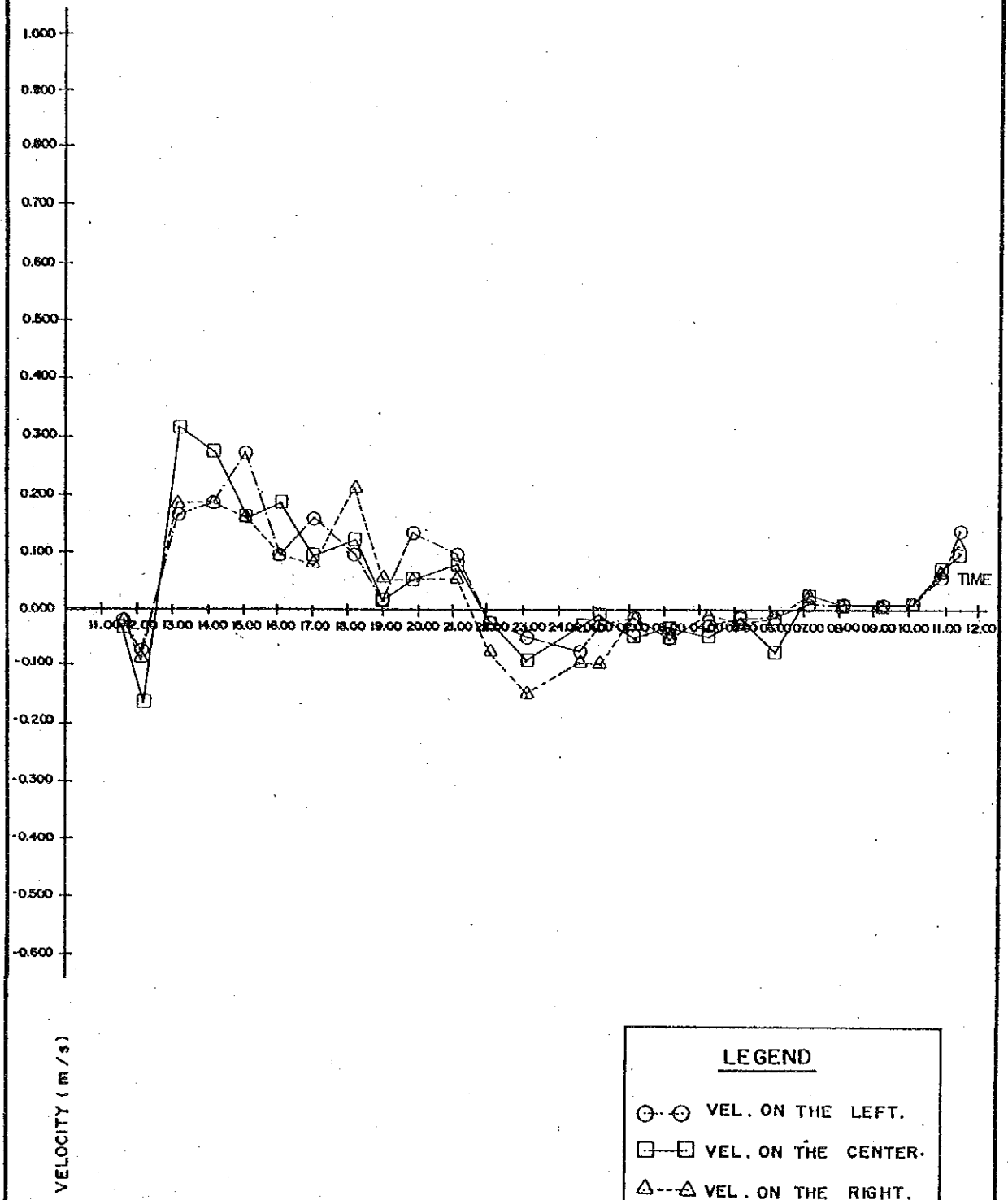


FIG. 9.5.3.1 (10) TIDAL VELOCITY VARIATION OF CHAO PHRAYA RIVER ON 20TH - 21ST JUNE, 1992 (NO.9)

MASTER PLANNING FOR THE SEWERAGE DEVELOPMENT PROJECT FOR LOWER CHAO PHRAYA RIVER BASIN

JAPAN INTERNATION COOPERATION AGENCY

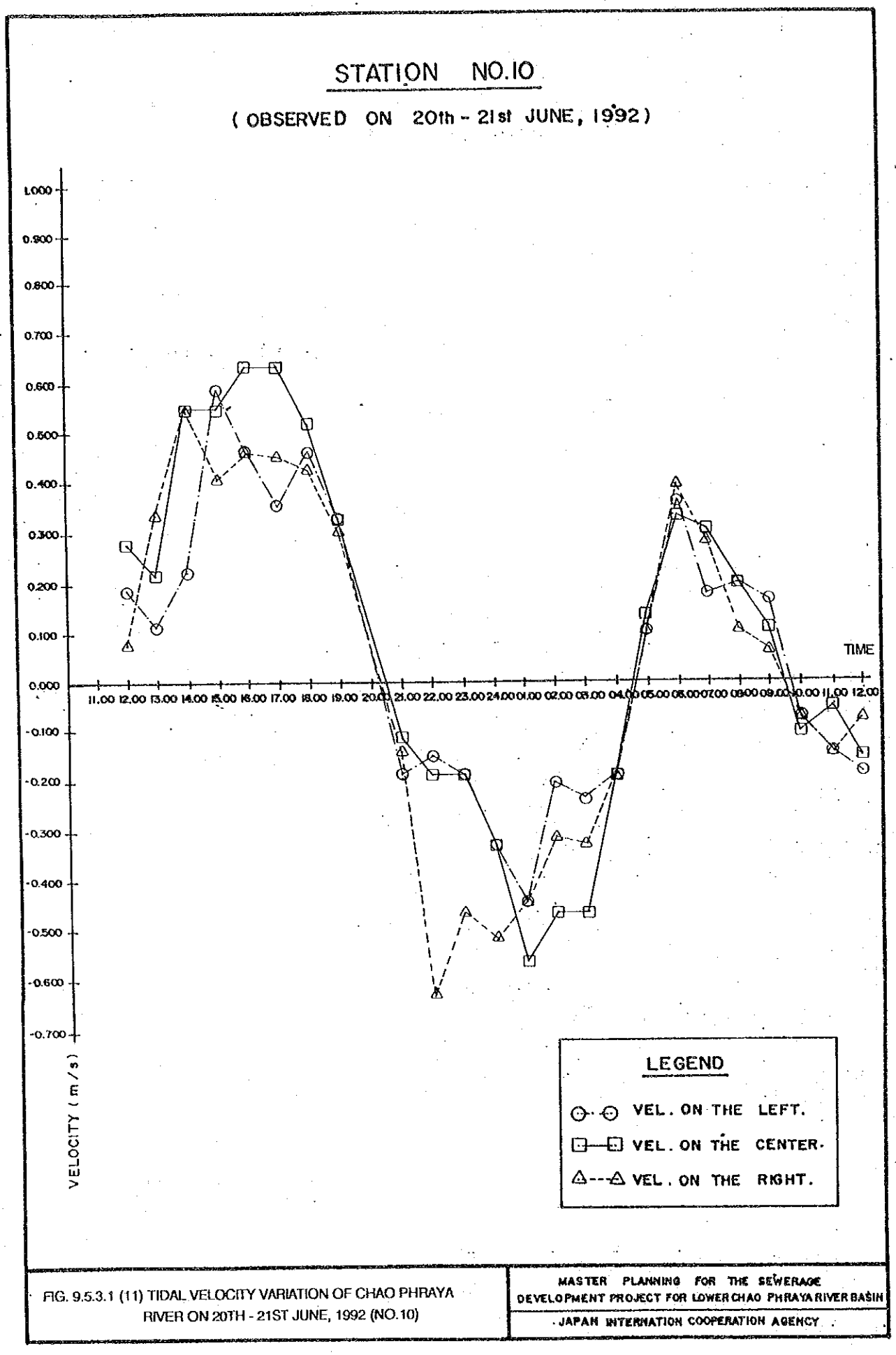


FIG. 9.5.3.1 (11) TIDAL VELOCITY VARIATION OF CHAO PHRAYA RIVER ON 20TH - 21ST JUNE, 1992 (NO.10)

MASTER PLANNING FOR THE SEWERAGE DEVELOPMENT PROJECT FOR LOWER CHAO PHRAYA RIVER BASIN

JAPAN INTERNATION COOPERATION AGENCY

TABLE 9.5.3.1 (63)
MEASUREMENT RECORD OF SURVEY (NO.1)

PROJECT NAME	Sewerage Development M/P for Lower Chao Phraya River Basin
LOCATION	NO.1 CHAO PHRAYA RIVER : CHAINAT (MAIN RIVER)
SURVEYOR	DR. SUKIT VISESHSIN

DISTANCE				HEIGHT				GROUND LEVEL		REMARK
SECTION		CUMULATION		B.S.		F.S.(DEPTH)		(RIVER BED L)		
		0	00	0	15			+ 0	11	(R) Standard Point
2	00	2	00			0	33	- 0	07	
2	00	4	00			0	35	- 0	09	
2	00	6	00			0	40	- 0	14	
2	00	8	00			0	86	- 0	60	
2	00	10	00			1	48	- 1	22	
2	00	12	00			2	26	- 2	00	
2	00	14	00			2	69	- 2	43	
2	00	16	00			2	83	- 2	57	
2	00	18	00			3	28	- 3	02	
2	00	20	00			3	60	- 3	34	WL.= 0.00 (Post H=1.05)
11	55	31	55			(2	11)	- 5	45	
11	03	42	58			(2	70)	- 6	04	
3	31	45	89			(2	95)	- 6	29	
20	00	65	89			(2	93)	- 6	27	
20	00	85	89			(2	91)	- 6	25	
20	00	105	89			(2	89)	- 6	23	
12	62	118	51			(2	88)	- 6	22	
26	60	145	11			(3	20)	- 6	54	SOUNDING
4	19	149	30			(3	45)	- 6	79	
1	76	151	06			(3	95)	- 7	29	
11	26	162	32			(3	95)	- 7	29	
2	65	164	97			(3	81)	- 7	15	
3	20	168	17			(3	81)	- 7	15	
4	97	173	14			(4	52)	- 7	86	
20	00	193	14			(4	96)	- 8	30	

TABLE 9.5.3.1 (64)
MEASUREMENT RECORD OF SURVEY (NO.1)

PROJECT NAME	Sewerage Development M/P for Lower Chao Phraya River Basin
LOCATION	NO.1 CHAO PHRAYA RIVER : CHAINAT (MAIN RIVER)
SURVEYOR	DR. SUKIT VISESHSIN

DISTANCE				HEIGHT				GROUND LEVEL		REMARK
SECTION		CUMULATION		B.S.		F.S.(DEPTH)		(RIVER BED L)		
12	44	205	58			(5	23)	- 8	57	
22	41	227	99			(7	90)	- 11	24	
6	40	234	39			(8	95)	- 12	29	
10	92	245	31			(9	15)	- 12	49	
19	87	265	18			(8	74)	- 12	08	
6	29	271	47			(8	85)	- 12	19	
13	02	284	49			(7	38)	- 10	72	SOUNDING
10	71	295	20			(7	25)	- 10	59	
12	25	307	45			(5	96)	- 9	30	
21	74	329	19			(6	15)	- 9	49	
5	85	335	04			(5	81)	- 9	15	
10	81	345	85			(6	15)	- 9	49	
5	63	351	48			(5	50)	- 8	84	
15	23	366	71			(4	70)	- 8	04	
9	71	376	42			(3	40)	- 6	74	↓
9	16	385	58	3	44	(0	00)	- 3	34	WL.= 0.00
4	90	390	48			1	12	- 1	02	
3	00	393	48			1	21	- 1	11	
3	00	396	48			0	86	- 0	76	
4	00	400	48			0	10	0	00	(L) Standard Point

TABLE 9.5.3.1 (65)
MEASUREMENT RECORD OF SURVEY (NO.2)

PROJECT NAME	Sewerage Development M/P for Lower Chao Phraya River Basin
LOCATION	NO.2 CHAO PHRAYA RIVER : SINGBURI (MAIN RIVER)
SURVEYOR	DR. SUKIT VISESHSIN

DISTANCE				HEIGHT				GROUND LEVEL		REMARK
SECTION		CUMULATION		B.S.		F.S.(DEPTH)		(RIVER BED L)		
		0	00	0	00			0	00	(L) Standard Point
23	42	23	42			- 8	85	- 8	85	
2	97	26	39			- 9	09	- 9	09	
1	58	27	97			- 9	86	- 9	86	WL.= 0.00 (Post H= - 0.04)
4	98	32	95			(1	58)	- 11	44	
6	40	39	35			(1	99)	- 11	85	
9	30	48	65			(2	00)	- 11	86	
10	09	58	74			(2	53)	- 12	39	
4	86	63	60			(2	41)	- 12	27	
3	69	67	29			(2	91)	- 12	76	
7	76	75	05			(2	48)	- 12	34	
19	20	94	25			(2	92)	- 12	78	SOUNDING
1	91	96	16			(2	55)	- 12	41	
5	97	102	13			(2	55)	- 12	41	
2	46	104	59			(2	88)	- 12	66	
3	32	107	91			(2	56)	- 12	42	
5	66	113	57			(2	60)	- 12	46	
8	37	121	94			(3	16)	- 13	02	
6	16	128	10			(3	20)	- 13	06	
3	87	131	97			(2	16)	- 12	02	
6	16	138	13			(1	55)	- 11	41	
7	75	145	88			(1	20)	- 11	06	
1	43	147	31			- 9	86	- 9	86	WL.= 0.00
7	14	154	45			- 6	52	- 6	52	
12	82	167	27			- 1	78	- 1	78	(R) Standard Point

TABLE 9.5.3.1 (66)
MEASUREMENT RECORD OF SURVEY (NO.3)

PROJECT NAME	Sewerage Development M/P for Lower Chao Phraya River Basin
LOCATION	NO.3 CHAO PHRAYA RIVER : AYUTTHAYA (BEFORE JOINING PASAK RIVER) (MAIN RIVER)
SURVEYOR	DR. SUKIT VISESHSIN

DISTANCE				HEIGHT				GROUND LEVEL		REMARK
SECTION		CUMULATION		B.S.		F.S.(DEPTH)		(RIVER BED L)		
		0	00	0	00			0	00	(L) Standard Point
1	89	1	89			- 1	20	- 1	20	
10	02	11	91			- 3	90	- 3	90	WL.= 0.00 (Post H= 1.92)
2	15	14	06			(2	20)	- 6	10	
4	11	18	17			(3	95)	- 7	85	
5	39	23	56			(4	69)	- 8	59	
3	68	27	24			(6	60)	- 10	50	
5	06	32	30			(8	80)	- 12	70	SOUNDING
1	05	33	35			(8	80)	- 12	70	
4	58	37	93			(7	68)	- 11	58	
9	41	47	34			(6	24)	- 10	14	
10	60	57	94			(5	56)	- 9	46	
12	70	70	64			(4	26)	- 8	16	
3	73	74	37			(2	92)	- 6	82	
1	62	75	99			(2	92)	- 6	82	
3	72	79	71			(1	70)	- 5	60	
6	16	89	87			- 3	92	- 3	92	WL.= 0.02
4	26	90	13			- 3	12	- 3	12	
2	41	92	54			- 0	61	- 0	16	(R) Standard Point

TABLE 9.5.3.1 (67)
MEASUREMENT RECORD OF SURVEY (NO.4)

PROJECT NAME	Sewerage Development M/P for Lower Chao Phraya River Basin
LOCATION	NO.4 CHAO PHRAYA RIVER : AYUTTHAYA (AFTER JOINING PASAK RIVER) (MAIN RIVER)
SURVEYOR	DR. SUKIT VISESHSIN

DISTANCE				HEIGHT				GROUND LEVEL		REMARK
SECTION		CUMULATION		B.S.		F.S.(DEPTH)		(RIVER BED L)		
		0	00	0	00			0	00	(L) Standard Point
0	80	0	80			0	00	0	00	
0	30	1	10			- 0	75	- 0	75	
1	97	3	07			- 1	75	- 1	75	
6	59	9	66			- 2	56	- 2	56	WL.= 0.00 (Post H= 1.05)
4	58	14	24			(1	61)	- 4	16	
6	77	21	01			(3	18)	- 5	74	
11	77	26	57			(3	55)	- 6	11	
5	81	32	38			(4	40)	- 6	96	
3	35	35	73			(4	41)	- 6	97	
2	04	37	77			(4	10)	- 6	66	
5	68	43	45			(5	39)	- 7	95	
3	60	47	05			(5	71)	- 8	27	SOUNDING
2	21	49	26			(5	50)	- 8	06	
1	02	50	28			(5	55)	- 8	11	
17	74	68	02			(6	71)	- 9	27	
8	10	76	12			(7	25)	- 9	81	
2	20	78	32			(6	95)	- 9	51	
9	50	87	82			(6	91)	- 9	47	
1	60	89	42			(7	34)	- 9	90	
6	70	96	12			(7	45)	- 10	01	
1	50	97	62			(7	80)	- 10	36	
3	40	101	02			(7	86)	- 10	42	
6	40	107	42			(7	10)	- 9	66	
2	10	109	52			(7	19)	- 9	75	
3	80	113	32			(7	82)	- 10	38	

TABLE 9.5.3.1 (68)
MEASUREMENT RECORD OF SURVEY (NO.4)

PROJECT NAME	Sewerage Development M/P for Lower Chao Phraya River Basin
LOCATION	NO.4 CHAO PHRAYA RIVER : AYUTTHAYA (AFTER JOINING PASAK RIVER) (MAIN RIVER)
SURVEYOR	DR. SUKIT VISESHSIN

DISTANCE				HEIGHT				GROUND LEVEL		REMARK
SECTION		CUMULATION		B.S.		F.S.(DEPTH)		(RIVER BED L)		
16	20	129	52			(8	10)	- 10	66	
11	20	140	72			(6	90)	- 9	46	
8	90	149	62			(4	96)	- 7	52	SOUNDING
13	90	163	52			(2	76)	- 5	32	
2	90	166	42			(2	00)	- 4	56	
2	44	168	86			- 2	56	- 2	56	WL.= 0.05
3	66	172	52			- 1	56	- 1	56	
3	04	175	56			+ 3	32	+ 3	32	(R) Standard Point

TABLE 9.5.3.1 (69)
MEASUREMENT RECORD OF SURVEY (NO.5)

PROJECT NAME	Sewerage Development M/P for Lower Chao Phraya River Basin
LOCATION	NO.5 CHAO PHRAYA RIVER : NONTHABURI (MAIN RIVER)
SURVEYOR	DR. SUKIT VISESHSIN

DISTANCE				HEIGHT				GROUND LEVEL		REMARK
SECTION		CUMULATION		B.S.		F.S.(DEPTH)		(RIVER BED L)		
		0	00	0	00			0	00	(L) Standard Point
0	65	0	65			0	00	0	00	
0	00	0	65			+ 0	28	+ 0	28	
0	20	0	85			+ 0	28	+ 0	28	
0	00	0	85			- 2	43	- 2	43	WL.= 0.91 (Post H= 1.80)
7	80	8	65			(1	00)	- 2	52	
17	20	25	85			(1	19)	- 2	71	
7	80	33	65			(1	43)	- 2	95	
5	50	39	15			(1	81)	- 3	33	
18	30	57	45			(6	00)	- 7	52	
15	10	72	55			(7	10)	- 8	62	
11	80	84	35			(11	17)	- 12	69	
7	10	91	45			(11	57)	- 13	09	
3	10	94	55			(12	35)	- 13	87	
8	90	103	45			(12	28)	- 13	80	SOUNDING
10	80	114	25			(11	78)	- 13	30	
18	80	133	05			(12	05)	- 13	57	
5	30	138	35			(11	50)	- 13	02	
4	10	142	45			(11	35)	- 12	87	
12	40	154	85			(11	35)	- 12	87	
11	80	166	65			(12	13)	- 13	65	
4	30	170	95			(12	02)	- 13	54	
4	40	175	35			(11	47)	- 12	99	
9	40	184	75			(11	26)	- 12	78	
7	10	191	85			(11	42)	- 12	94	
3	50	195	35			(11	18)	- 12	70	

TABLE 9.5.3.1 (70)
MEASUREMENT RECORD OF SURVEY (NO.5)

PROJECT NAME	Sewerage Development M/P for Lower Chao Phraya River Basin
LOCATION	NO.5 CHAO PHRAYA RIVER : NONTHABURI (MAIN RIVER)
SURVEYOR	DR. SUKIT VISESHSIN

DISTANCE				HEIGHT				GROUND LEVEL		REMARK
SECTION		CUMULATION		B.S.		F.S.(DEPTH)		(RIVER BED L)		
10	10	205	45			(11	15)	- 12	67	
8	40	213	85			(10	65)	- 12	17	
15	70	229	55			(10	18)	- 11	70	
7	10	236	65			(9	41)	- 10	93	SOUNDING
8	90	245	55			(8	11)	- 9	63	
10	80	256	35			(4	98)	- 6	50	
6	50	262	85			(1	81)	- 3	33	
2	90	265	75			(1	16)	- 2	68	
18	80	284	55			(0	34)	- 1	86	
17	57	302	12			- 1	58	- 1	58	WL.= 0.06
4	34	306	46			- 1	10	- 1	10	
1	68	308	14			- 0	06	- 0	06	(R) Standard Point

TABLE 9.5.3.1 (71)
MEASUREMENT RECORD OF SURVEY (NO.6)

PROJECT NAME	Sewerage Development M/P for Lower Chao Phraya River Basin
LOCATION	NO.6 NOI RIVER : CHAINAT (TRIBUTARY)
SURVEYOR	DR. SUKIT VISESHSIN

DISTANCE				HEIGHT				GROUND LEVEL		REMARK
SECTION		CUMULATION		B.S.		F.S.(DEPTH)		(RIVER BED L)		
		0	00	0	00			0	00	(L) Standard Point
7	40	7	40			- 2	58	- 2	58	
1	70	9	10			- 4	21	- 4	21	
4	20	13	30			- 5	61	- 5	61	WL.= 0.00
3	91	17	21			(0	60)	- 6	21	
7	99	25	20			(2	32)	- 7	93	
3	66	28	86			(3	07)	- 8	68	
4	16	33	02			(2	92)	- 8	53	
1	93	34	95			(3	41)	- 9	02	SOUNDING
2	96	37	91			(3	17)	- 8	78	
2	56	40	47			(2	77)	- 8	38	
3	95	44	42			(2	13)	- 7	74	
4	26	48	68			(1	36)	- 6	97	
2	36	51	04			(1	13)	- 6	74	
3	79	54	83			- 5	61	- 5	61	WL.=0.00 (Post H= 0.19)
7	88	62	71			- 3	59	- 3	59	
2	58	65	29			- 1	06	- 1	06	
3	07	68	36			+ 0	15	+ 0	15	(R) Standard Point

TABLE 9.5.3.1 (72)
MEASUREMENT RECORD OF SURVEY (NO.7)

PROJECT NAME	Sewerage Development M/P for Lower Chao Phraya River Basin
LOCATION	NO.7 LOPBURI RIVER : LOPBURI (TRIBUTARY)
SURVEYOR	DR. SUKIT VISESHSIN

DISTANCE				HEIGHT				GROUND LEVEL		REMARK
SECTION		CUMULATION		B.S.		F.S.(DEPTH)		(RIVER BED L)		
		0	00	0	00			0	00	(L) Standard Point
18	71	18	71			- 4	98	- 4	98	WL.= 0.00 (Post H= 0.75)
2	00	20	71			(0	20)	- 5	18	
2	00	22	71			(0	41)	- 5	39	
2	00	24	71			(0	65)	- 5	63	
2	00	26	71			(0	77)	- 5	75	
2	00	28	71			(0	75)	- 5	73	
2	00	30	71			(0	71)	- 5	69	
2	00	32	71			(0	62)	- 5	60	
2	00	34	71			(0	74)	- 5	72	
2	00	36	71			(0	80)	- 5	78	
2	00	38	71			(0	83)	- 5	81	
2	00	40	71			(1	05)	- 6	03	
2	00	42	71			(1	26)	- 6	24	
2	00	44	71			(1	14)	- 6	12	
2	00	46	71			(1	01)	- 5	99	
2	00	48	71			(0	96)	- 5	94	
2	00	50	71			(0	80)	- 5	78	
2	00	52	71			(0	62)	- 5	60	
2	00	54	71			(0	51)	- 5	49	
2	00	56	71			(0	56)	- 5	54	
2	00	58	71			(0	56)	- 5	54	
2	00	60	71			(0	77)	- 5	75	
2	00	62	71			(0	80)	- 5	78	
2	00	64	71			(0	73)	- 5	71	
2	00	66	71			(0	58)	- 5	56	

TABLE 9.5.3.1 (73)
MEASUREMENT RECORD OF SURVEY (NO.7)

PROJECT NAME	Sewerage Development M/P for Lower Chao Phraya River Basin
LOCATION	NO.7 LOPBURI RIVER : LOPBURI (TRIBUTARY)
SURVEYOR	DR. SUKIT VISESHSIN

DISTANCE				HEIGHT				GROUND LEVEL		REMARK
SECTION		CUMULATION		B.S.		F.S.(DEPTH)		(RIVER BED L)		
2	00	68	71			(0	39)	- 5	37	
2	00	70	71			(0	25)	- 5	23	
1	64	72	35			- 4	98	- 4	98	WL.= 0.00
14	87	87	22			- 0	31	- 0	31	(R) Standard Point

TABLE 9.5.3.1 (74)
MEASUREMENT RECORD OF SURVEY (NO.8)

PROJECT NAME	Sewerage Development M/P for Lower Chao Phraya River Basin
LOCATION	NO.8 LOPBURI RIVER : AYUTHAYA (TRIBUTARY)
SURVEYOR	DR. SUKIT VISESHSIN

DISTANCE				HEIGHT				GROUND LEVEL		REMARK
SECTION		CUMULATION		B.S.		F.S.(DEPTH)		(RIVER BED L)		
		0	00	0	00			0	00	(L) Standard Point
1	42	1	42			- 0	78	- 0	78	
1	20	2	62			- 1	52	- 1	52	
2	60	5	22			- 2	01	- 2	01	WL.= 0.00 (Post H= 0.65)
1	96	7	18			(1	11)	- 3	12	
1	57	8	75			(1	36)	- 3	37	
3	18	11	93			(2	88)	- 4	89	
2	77	14	70			(3	50)	- 5	51	
2	97	17	67			(3	82)	- 5	83	
5	77	23	44			(3	86)	- 5	87	
3	73	27	17			(4	53)	- 6	54	SOUNDING
5	67	32	84			(4	50)	- 6	51	
2	19	35	03			(3	67)	- 5	68	
3	00	38	03			(3	02)	- 5	03	
4	31	42	34			(1	61)	- 3	62	
3	21	45	55			(1	25)	- 3	26	
5	98	51	53			(1	15)	- 3	16	
2	34	53	87			- 2	01	- 2	01	WL.= 0.00
2	69	56	56			- 0	87	- 0	87	
0	33	56	89			+ 0	36	+ 0	36	
3	46	60	35			+ 1	64	+ 1	64	(R) Standard Point

TABLE 9.5.3.1 (75)
MEASUREMENT RECORD OF SURVEY (NO.9)

PROJECT NAME	Sewerage Development M/P for Lower Chao Phraya River Basin
LOCATION	NO.9 PASAK RIVER : AYUTTHAYA (TRIBUTARY)
SURVEYOR	DR. SUKIT VISESHSIN

DISTANCE				HEIGHT				GROUND LEVEL		REMARK
SECTION		CUMULATION		B.S.		F.S.(DEPTH)		(RIVER BED L)		
		0	00	0	00			0	00	(L) Standard Point
5	09	5	09			- 3	57	- 3	57	
2	26	7	35			- 3	98	- 3	98	WL.= 0.00 (Post H= 0.95)
3	40	10	75			(1	28)	- 5	26	
8	58	19	33			(1	26)	- 5	24	
5	06	24	39			(1	55)	- 5	53	
4	93	29	32			(2	11)	- 6	09	
1	70	31	02			(2	06)	- 6	04	
4	85	35	87			(3	07)	- 7	05	
6	75	42	62			(3	81)	- 7	79	SOUNDING
6	39	49	01			(4	00)	- 7	98	
4	64	53	65			(5	12)	- 9	10	
1	66	55	31			(5	03)	- 9	01	
3	15	58	46			(5	31)	- 9	29	
5	72	64	18			(4	38)	- 8	36	
4	47	68	65			(4	22)	- 8	20	
7	84	76	49			(2	93)	- 6	91	
6	63	83	12			(2	89)	- 6	87	
2	28	85	40			(2	63)	- 6	61	
3	19	88	59			(2	06)	- 6	04	
4	55	93	14			- 3	98	- 3	98	WL.= 0.00
2	46	95	60			- 3	04	- 3	04	
3	15	98	75			- 1	31	- 1	31	(R) Standard Point

TABLE 9.5.3.1 (76)
MEASUREMENT RECORD OF SURVEY (NO.10)

PROJECT NAME	Sewerage Development M/P for Lower Chao Phraya River Basin
LOCATION	NO.10 NOI RIVER : AYUTTHAYA (TRIBUTARY)
SURVEYOR	DR. SUKIT VISESHSIN

DISTANCE				HEIGHT				GROUND LEVEL		REMARK
SECTION		CUMULATION		B.S.		F.S.(DEPTH)		(RIVER BED L)		
		0	00			- 1	49	- 1	49	(R) Standard Point
10	11	10	11			- 2	11	- 2	11	
6	07	16	18			- 2	25	- 2	25	WL.= 0.00
4	33	20	51			(0	10)	- 2	35	
10	00	30	51			(0	68)	- 2	93	
4	86	35	37			(0	96)	- 3	21	
10	00	45	37			(1	12)	- 3	37	
2	80	48	17			(1	17)	- 3	42	
2	55	50	72			(1	29)	- 3	54	
5	20	55	92			(2	64)	- 4	89	
7	39	63	31			(3	13)	- 5	38	
5	00	68	31			(4	09)	- 6	34	
7	30	75	61			(5	50)	- 7	75	
4	27	79	88			(6	13)	- 8	38	SOUNDING
4	48	84	36			(6	55)	- 8	80	
1	85	86	21			(7	03)	- 9	28	
3	62	89	83			(7	07)	- 9	32	
5	62	95	45			(6	19)	- 8	44	
6	54	101	99			(6	10)	- 8	35	
2	86	104	85			(6	05)	- 8	30	
8	52	113	37			(6	19)	- 8	44	
2	27	115	64			(5	89)	- 8	14	
10	00	125	64			(5	81)	- 8	06	
10	76	136	40			(5	73)	- 7	98	
10	00	146	40			(3	98)	- 6	23	
4	44	150	84			(3	20)	- 5	45	

TABLE 9.5.3.1 (77)
MEASUREMENT RECORD OF SURVEY (NO.10)

PROJECT NAME	Sewerage Development M/P for Lower Chao Phraya River Basin
LOCATION	NO.10 NOI RIVER : AYUTTHAYA (TRIBUTARY)
SURVEYOR	DR. SUKIT VISESHSIN

DISTANCE				HEIGHT				GROUND LEVEL		REMARK
SECTION		CUMULATION		B.S.		F.S.(DEPTH)		(RIVER BED L)		
6	17	157	01			(1	55)	- 3	80	↓
2	00	159	01			(1	25)	- 3	50	SOUNDING
10	00	169	01			(0	59)	- 2	84	↓
8	94	177	95			- 2	25	- 2	25	WL.= 0.00 (Post H= 0.80)
0	00	177	95			+ 0	05	+ 0	05	
0	20	178	15			+ 0	05	+ 0	05	
0	00	178	15			0	00	0	00	
0	10	178	25			0	00	0	00	
0	00	178	25			+ 0	50	+ 0	50	
0	15	178	40			+ 0	50	+ 0	50	
0	00	178	40			0	00	0	00	
0	35	178	75			0	00	0	00	(L) Standard Point

TABLE 9.5.3.1 (78)
MEASUREMENT RECORD OF SURVEY (NO.11)

PROJECT NAME	Sewerage Development M/P for Lower Chao Phraya River Basin
LOCATION	NO.11 DRAINAGE CHANNEL : ANGTHONG
SURVEYOR	DR. SUKIT VISESHSIN

DISTANCE				HEIGHT				GROUND LEVEL		REMARK
SECTION		CUMULATION		B.S.		F.S.(DEPTH)		(RIVER BED L)		
		0	00	1	14			+ 0	07	(R) Standard Point
2	45	2	45			2	84	- 1	63	WL.= 0.00
1	16	3	61			(0	49)	- 2	12	
1	00	4	61			(0	73)	- 2	36	
1	00	5	61			(0	86)	- 2	49	
1	00	6	61			(1	01)	- 2	64	
1	00	7	61			(1	03)	- 2	66	
1	00	8	61			(1	02)	- 2	65	
1	00	9	61			(0	99)	- 2	62	
1	00	10	61			(0	96)	- 2	59	
1	00	11	61			(0	97)	- 2	60	
1	00	12	61			(1	04)	- 2	67	
1	00	13	61			(0	98)	- 2	61	
1	00	14	61			(0	90)	- 2	53	
1	00	15	61			(0	83)	- 2	46	
1	00	16	61			(0	61)	- 2	24	
1	00	17	61			(0	41)	- 2	04	
1	00	18	61			2	84	- 1	63	WL.=0.00 (Post H= 0.65)
2	16	20	77			1	21	0	00	(L) Standard Point

TABLE 9.5.3.1 (79)
MEASUREMENT RECORD OF SURVEY (NO.12)

PROJECT NAME	Sewerage Development M/P for Lower Chao Phraya River Basin
LOCATION	NO.12 BANGBAN KLONG : AYUTHAYA
SURVEYOR	DR. SUKIT VISESHSIN

DISTANCE				HEIGHT				GROUND LEVEL		REMARK
SECTION		CUMULATION		B.S.		F.S.(DEPTH)		(RIVER BED L)		
		0	00	1	30			+ 0	23	(R) Standard Point
3	30	3	30			2	91	- 1	38	WL.= 0.00
0	00	3	30			(1	50)	- 2	88	
1	02	4	32			(2	15)	- 3	53	
2	00	6	32			(2	30)	- 3	68	
1	91	8	23			(2	45)	- 3	83	
2	31	10	54			(3	05)	- 4	43	
1	02	11	56			(3	80)	- 5	18	
1	73	13	29			(4	15)	- 5	53	SOUNDING
2	00	15	29			(4	10)	- 5	48	
2	00	17	29			(4	04)	- 5	42	
1	50	18	79			(4	00)	- 5	38	
2	00	20	79			(3	89)	- 5	27	
1	62	22	41			(3	80)	- 5	18	
2	00	24	41			(3	33)	- 4	71	
2	48	26	89			(2	75)	- 4	13	
2	55	29	44			(1	50)	- 2	88	
1	88	31	32			(1	10)	- 2	48	
2	23	33	55			2	91	- 1	38	WL.= 0.00 (Post H= 0.90)
9	81	43	36			1	53	0	00	(L) Standard Point

TABLE 9.5.3.1 (80)
MEASUREMENT RECORD OF SURVEY (NO.13)

PROJECT NAME	Sewerage Development M/P for Lower Chao Phraya River Basin
LOCATION	NO.13 MAKAM DRAINAGE CHANNEL : AYUTTHAYA
SURVEYOR	DR. SUKIT VISESHSIN

DISTANCE				HEIGHT				GROUND LEVEL		REMARK
SECTION		CUMULATION		B.S.		F.S.(DEPTH)		(RIVER BED L)		
		0	00	1	47			- 0	23	(R) Standard Point
7	12	7	12			4	51	- 3	27	WL.= 0.00 (Post H= 0.60)
0	87	7	90			4	64	- 3	40	
1	28	8	40			4	86	- 3	62	
0	50	8	90			4	86	- 3	62	
0	50	9	40			4	93	- 3	69	
0	50	9	90			4	90	- 3	66	
0	50	10	40			4	81	- 3	57	
0	50	10	90			4	84	- 3	60	
0	50	11	40			4	74	- 3	50	
0	50	11	90			4	51	- 3	27	WL.= 0.00
5	74	17	64			1	24	0	00	(L) Standard Point

TABLE 9.5.3.1 (81)
MEASUREMENT RECORD OF SURVEY (NO.14)

PROJECT NAME	Sewerage Development M/P for Lower Chao Phraya River Basin
LOCATION	NO.14 BAN PHO DRAINAGE CHANNEL : PATHUMTHANI
SURVEYOR	DR. SUKIT VISESHSIN

DISTANCE				HEIGHT				GROUND LEVEL		REMARK
SECTION		CUMULATION		B.S.		F.S.(DEPTH)		(RIVER BED L)		
		0	00	1	89			- 0	42	(R) Standard Point
4	00	4	00			2	97	- 1	50	
2	00	6	00			3	06	- 1	59	
2	00	8	00			3	05	- 1	58	
2	00	10	00			3	65	- 2	12	
2	00	12	00			3	76	- 2	29	
2	00	14	00			3	81	- 2	34	WL.= 0.00
2	50	16	50			4	06	- 2	59	
0	50	17	00			4	01	- 2	54	
0	50	17	50			4	06	- 2	59	
0	50	18	00			4	01	- 2	54	
0	50	18	50			3	81	- 2	34	WL.= 0.00 (Post H= 0.70)
2	85	21	35			3	08	- 1	61	
2	00	23	35			2	02	- 0	55	
2	00	25	35			1	72	- 0	25	
2	00	25	35			1	47	0	00	(L) Standard Point

TABLE 9.5.3.1 (82)
MEASUREMENT RECORD OF SURVEY (NO.15)

PROJECT NAME	Sewerage Development M/P for Lower Chao Phraya River Basin
LOCATION	NO.15 BANG KHWANG DRAINAGE CHANNEL : NONTHABURI
SURVEYOR	DR. SUKIT VISESHSIN

DISTANCE				HEIGHT				GROUND LEVEL		REMARK
SECTION		CUMULATION		B.S.		F.S.(DEPTH)		(RIVER BED L)		
		0	00	1	69			- 0	77	(R) Standard Point
0	00	0	00			0	92	0	00	
0	40	0	40			0	92	0	00	
0	00	0	40			2	14	- 1	22	
0	00	0	40			3	96	- 3	04	WL.= 0.00 (Post H= 3.04)
0	00	0	40			4	21	- 3	29	
0	40	0	80			4	21	- 3	29	
0	40	1	20			4	18	- 3	26	
0	40	1	60			4	22	- 3	30	
0	40	2	00			4	22	- 3	30	
0	40	2	40			4	26	- 3	34	
0	40	2	80			4	22	- 3	30	
0	00	2	80			0	92	0	00	
0	40	3	20			0	92	0	00	(L) Standard Point
0	00	3	20			1	38	- 0	46	

9.5.3.2 Cross Sectional Survey of Rivers

The data on flow rates of the Chao Phraya river and its tributaries are requisites for preparation of comprehensive basin-side plan for water pollution control. To obtain the basic information for calculation of flow rate, cross sectional survey of the rivers is required at the designated points along the river.

(1) Study area and Survey points

The study area is in the section between chai Nat and Nonthaburi, and the survey points are fifteen in a total as indicated in Figure 9.5.3.2 (1) and Table 9.5.3.2.

TABLE 9.5.3.2 LOCATION OF INVESTIGATION POINTS

No.	Main/Tributary	Location
1.	Chao Phraya River (Main)	Chai Nat, before branching to Noi river
2.	-ditto	Singburi, before branching to Lopburi river
3.	-ditto-	Ayutthaya, before junction with Pasak river
4.	-ditto-	Ayutthaya, after junction with Pasak river
5.	-ditto-	Nonthaburi, beside Provincial Office
6.	Tributary of Chao Phraya R.	Chai Nat, Noi river after branching from Chao Phraya
7.	-ditto-	Lop Buri, Lop Buri river
8.	-ditto-	Lop Buri, river, before junction with Pasak river
9.	-ditto-	Pasak river, before junction with Lop Buri river
10.	-ditto-	Noi river, before junction with Chao Phraya river
11.	Channels/	Angthong
12.	-ditto-	Ayutthaya
13.	-ditto-	Ayutthaya
14.	-ditto-	Pahtumthani
15.	-ditto-	Nonthaburi

(2) Results of the survey

The survey was conducted in the middle of June, 1992 and results are incorporated in this report (refer to Figure 9.5.3.2 (2) - 9.5.3.2 (16)).

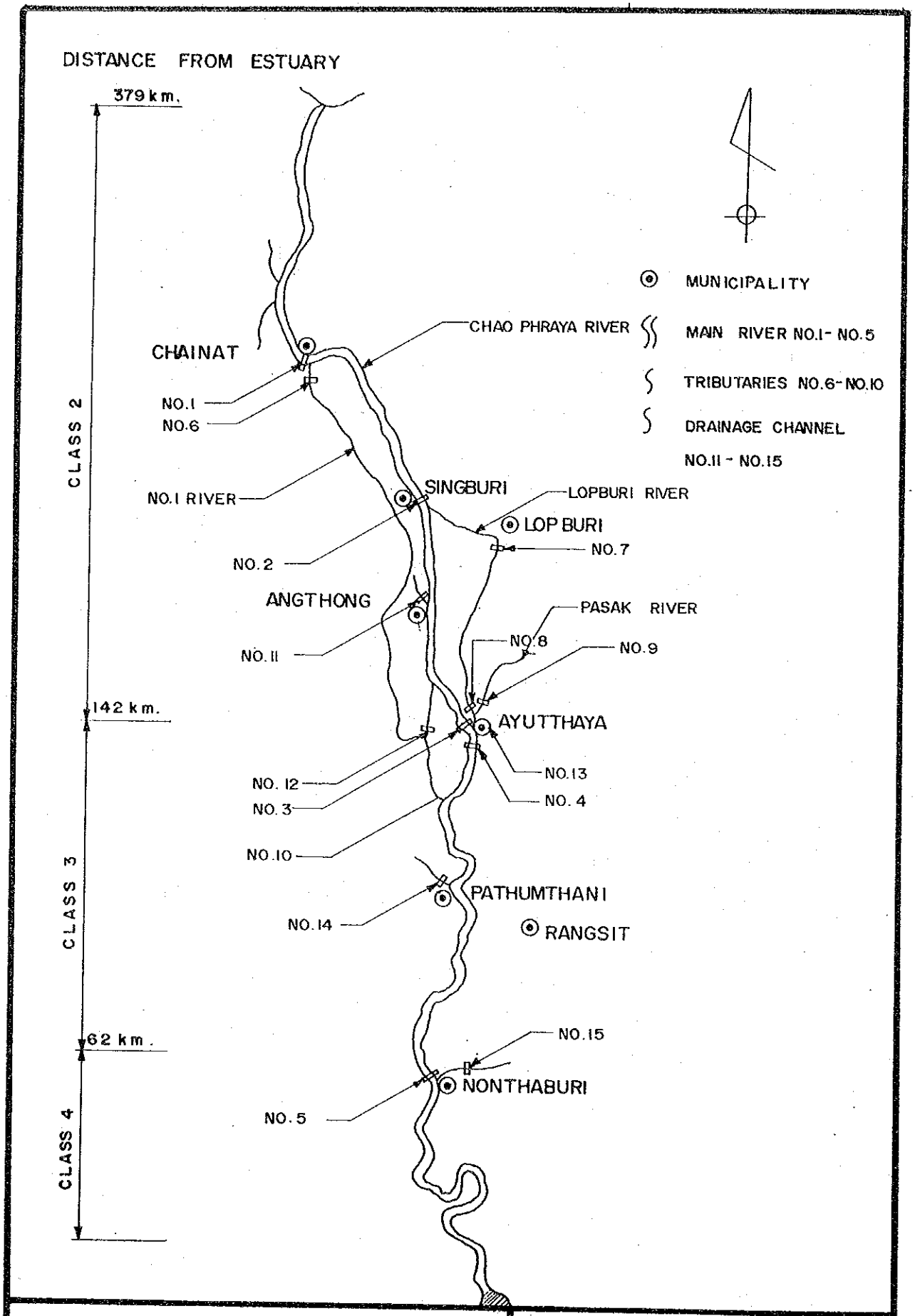


FIG. 9.5.3.2 (1) STUDY AREA AND INVESTIGATION POINT OF RIVER WATER

MASTER PLANNING FOR THE SEWERAGE DEVELOPMENT PROJECT FOR LOWER CHAO PHRAYA RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

FIG. 9.5.3.2 (2) CROSS SECTIONAL SURVEY

FIG. 9.5.3.2 (3) CROSS SECTIONAL SURVEY

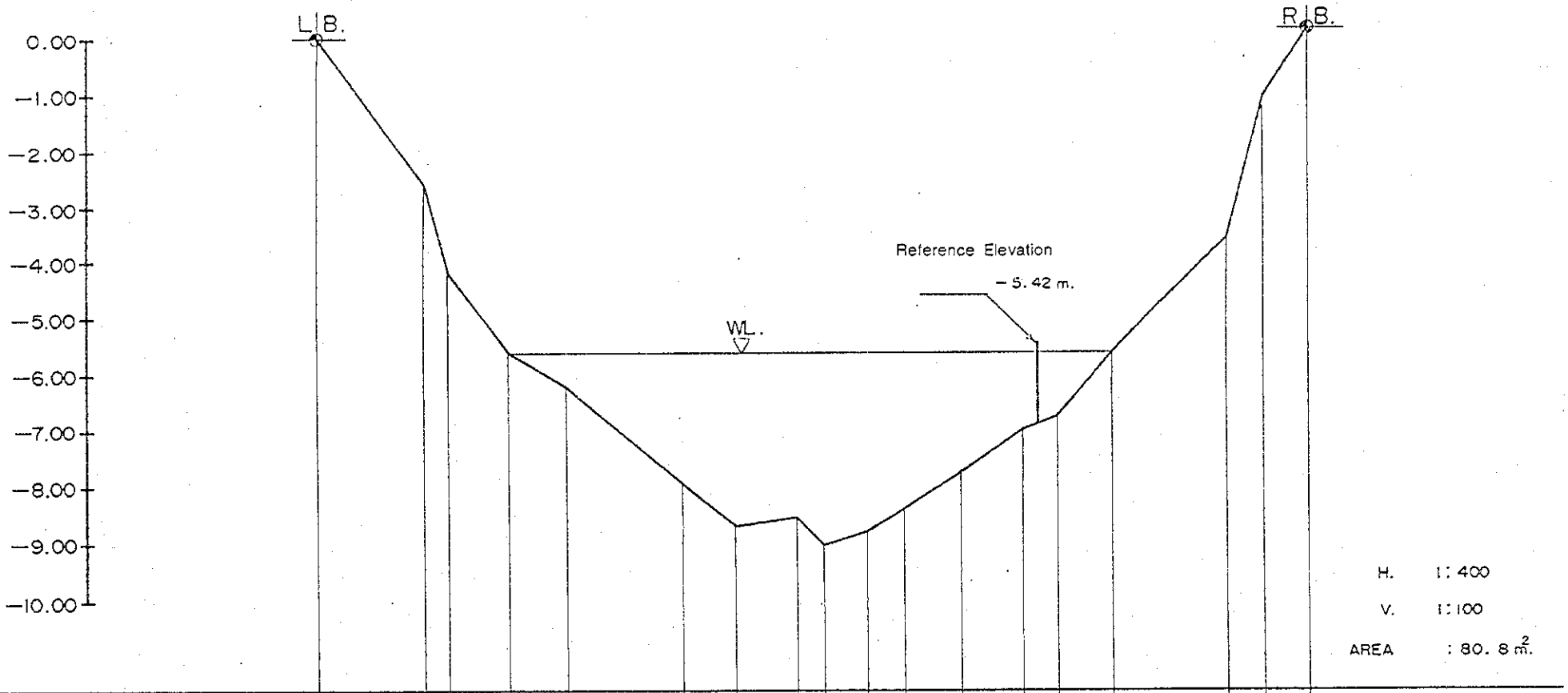
FIG. 9.5.3.2 (4) CROSS SECTIONAL SURVEY

DISTANCE	ELEVATION
0.00	0.00
0.80	0.00
1.10	-0.75
3.07	-1.75
9.66	-2.56
14.24	-4.16
21.01	-5.74
26.57	-6.11
32.38	-6.96
35.73	-6.97
37.77	-6.66
43.45	-7.95
47.05	-8.27
49.26	-8.06
50.28	-8.11
68.02	-9.27
76.12	-9.81
78.32	-9.51
87.82	-9.47
89.42	-9.90
96.12	-10.01
97.62	-10.36
101.02	-10.42
107.42	-9.66
109.52	-9.75
113.32	-10.38
129.52	-10.66
140.72	-9.46
149.62	-7.52
163.52	-5.32
166.42	-4.56
168.92	-2.51
172.52	-1.56
175.56	3.32

FIG. 9.5.3.2 (5) CROSS SECTIONAL SURVEY

FIG. 9.5.3.2 (6) CROSS SECTIONAL SURVEY

NO.6 NOI RIVER : CHAINAT



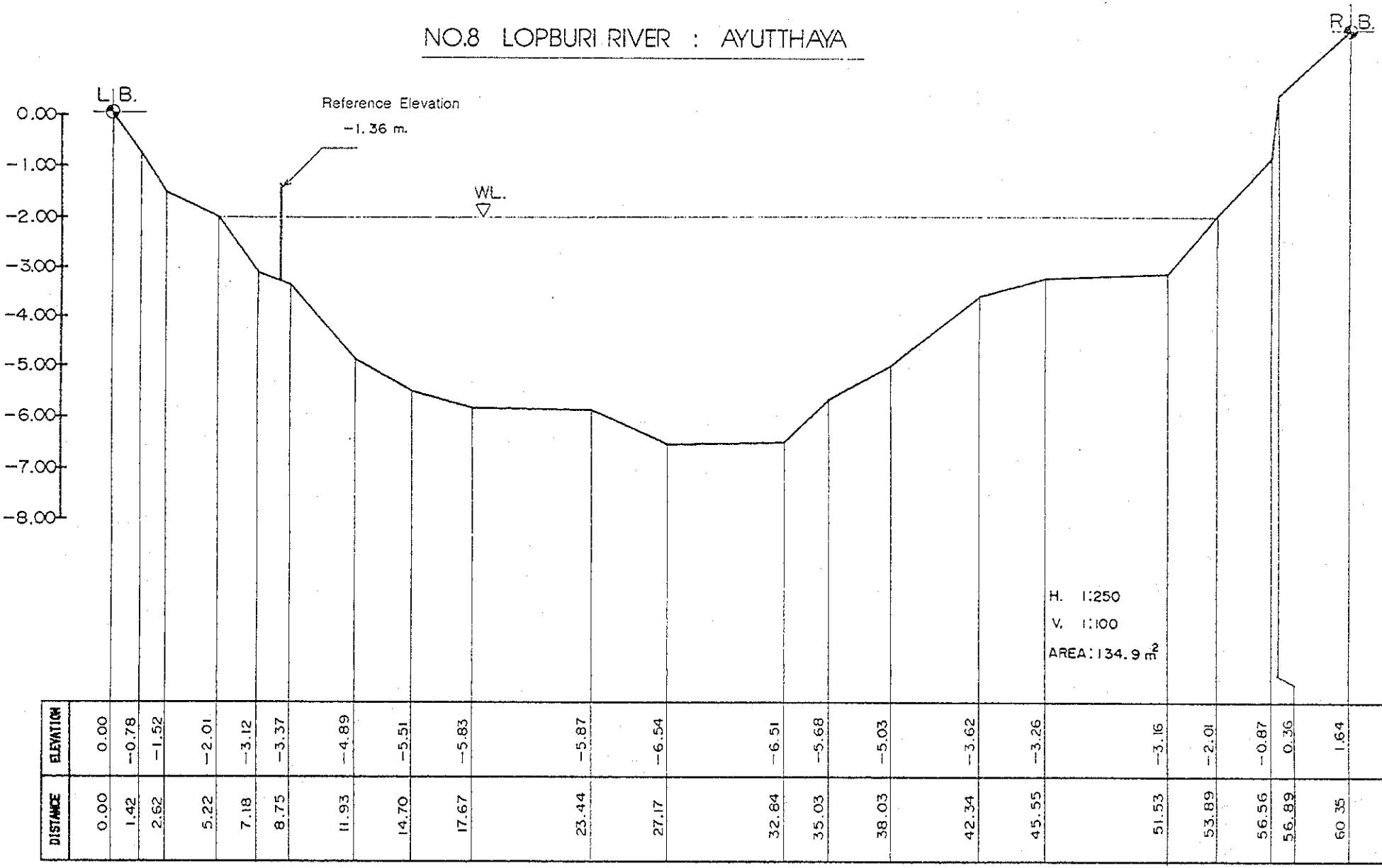
DISTANCE	0.00	7.40	9.10	13.30	17.21	25.20	28.86	33.02	34.95	37.91	40.47	44.42	48.68	51.04	54.83	62.71	65.29	68.36
ELEVATION	0.00	-2.58	-4.21	-5.61	-6.21	-7.93	-8.68	-8.53	-9.02	-8.78	-8.38	-7.74	-6.97	-6.74	-5.61	-3.59	-1.06	0.15

FIG. 9.5.3.2 (7) CROSS SECTIONAL SURVEY

DISTANCE	ELEVATION
0.00	0.00
18.71	-4.98
20.71	-5.18
22.71	-5.39
24.71	-5.63
26.71	-5.75
28.71	-5.73
30.71	-5.69
32.71	-5.60
34.71	-5.72
36.71	-5.78
38.71	-5.81
40.71	-6.03
42.71	-6.24
44.71	-6.12
46.71	-5.99
48.71	-5.94
50.71	-5.78
52.71	-5.60
54.71	-5.49
56.71	-5.54
58.71	-5.54
60.71	-5.75
62.71	-5.78
64.71	-5.71
66.71	-5.56
68.71	-5.37
70.71	-5.23
72.35	-4.98
87.22	-0.31

FIG. 9.5.3.2 (8) CROSS SECTIONAL SURVEY

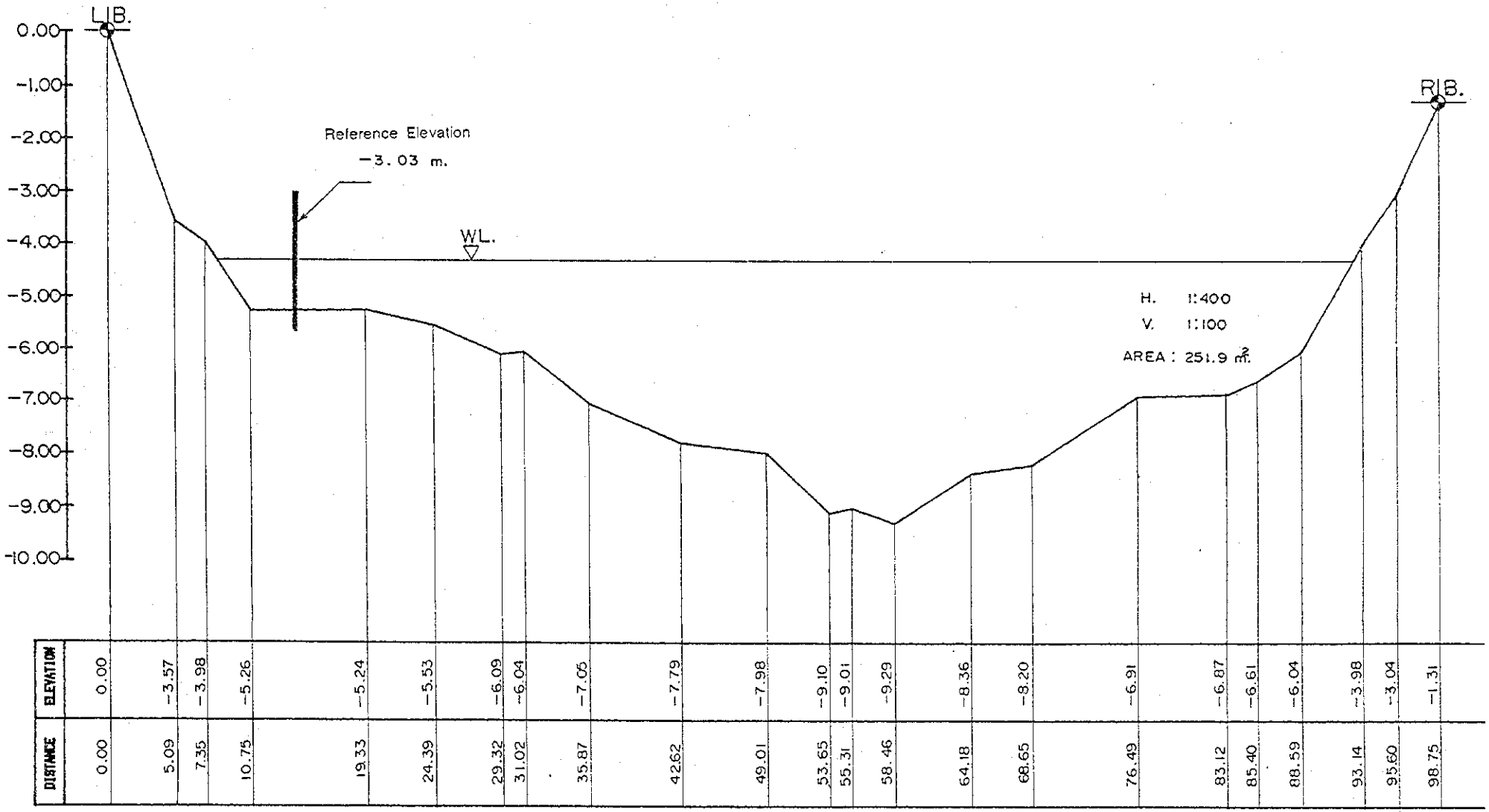
NO.8 LOPBURI RIVER : AYUTTHAYA



DISTANCE	ELEVATION
0.00	0.00
1.42	-0.78
2.62	-1.52
5.22	-2.01
7.18	-3.12
8.75	-3.37
11.93	-4.89
14.70	-5.51
17.67	-5.83
23.44	-5.87
27.17	-6.54
32.64	-6.51
35.03	-5.68
38.03	-5.03
42.34	-3.62
45.55	-3.26
51.53	-3.16
53.89	-2.01
56.56	-0.87
56.89	0.36
60.35	1.64

FIG. 9.5.3.2 (9) CROSS SECTIONAL SURVEY

NO.9 PASAK RIVER : AYUTTHAYA

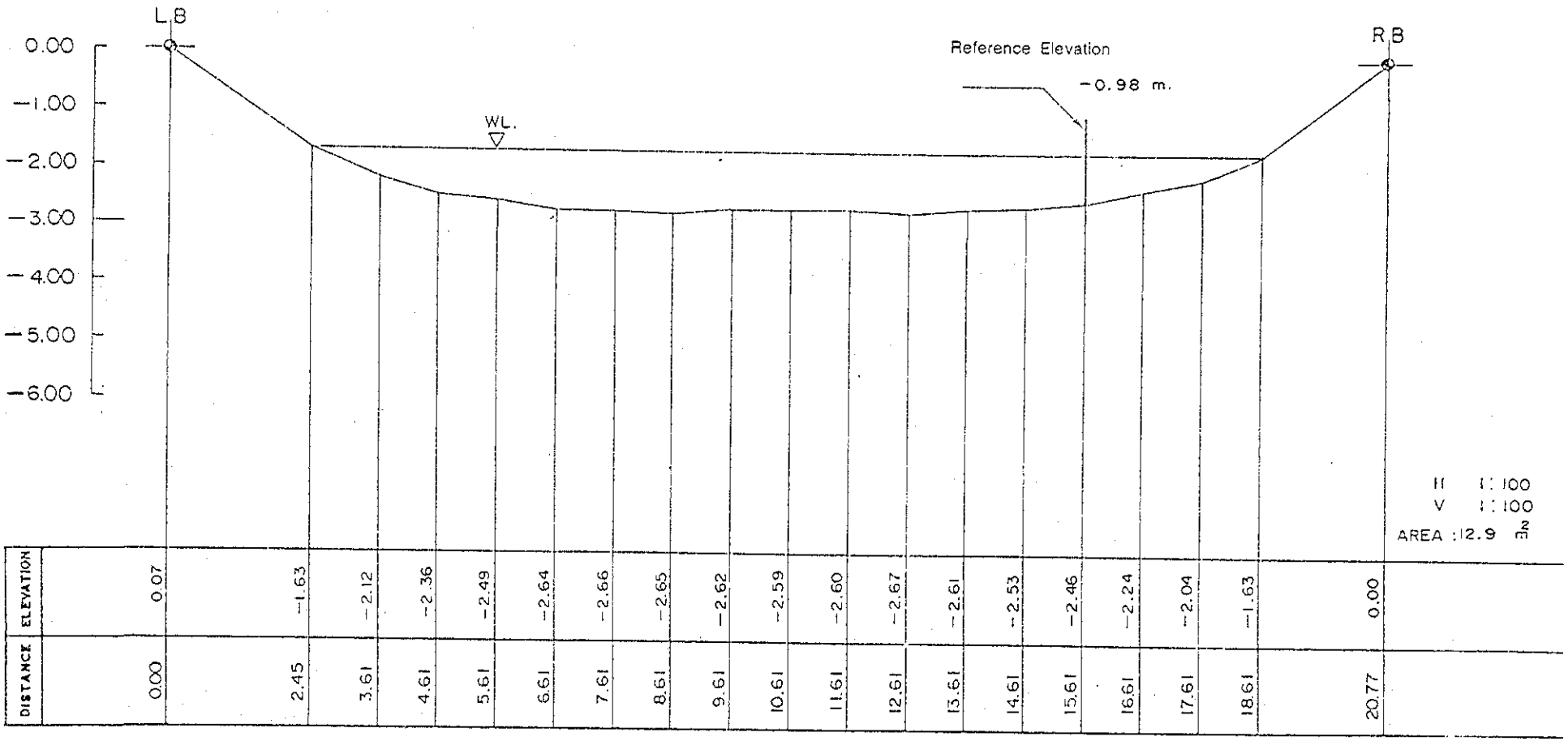


DISTANCE	0.00	5.09	7.35	10.75	19.33	24.39	29.32	31.02	35.87	42.62	49.01	53.65	55.31	58.46	64.18	68.65	76.49	83.12	85.40	88.59	93.14	95.60	98.75
ELEVATION	0.00	-3.57	-3.98	-5.26	-5.24	-5.53	-6.09	-6.04	-7.06	-7.79	-7.98	-9.10	-9.01	-9.29	-8.36	-8.20	-6.91	-6.87	-6.61	-6.04	-3.98	-3.04	-1.31

FIG. 9.5.3.2 (10) CROSS SECTIONAL SURVEY

FIG. 9.5.3.2 (11) CROSS SECTIONAL SURVEY

NO.11 DRAINAGE CHANNEL : ANGTHONG



DISTANCE	0.00	2.45	3.61	4.61	5.61	6.61	7.61	8.61	9.61	10.61	11.61	12.61	13.61	14.61	15.61	16.61	17.61	18.61	20.77
ELEVATION	0.07	-1.63	-2.12	-2.36	-2.49	-2.64	-2.66	-2.65	-2.62	-2.59	-2.60	-2.67	-2.61	-2.53	-2.46	-2.24	-2.04	-1.63	0.00

FIG. 9.5.3.2 (12) CROSS SECTIONAL SURVEY

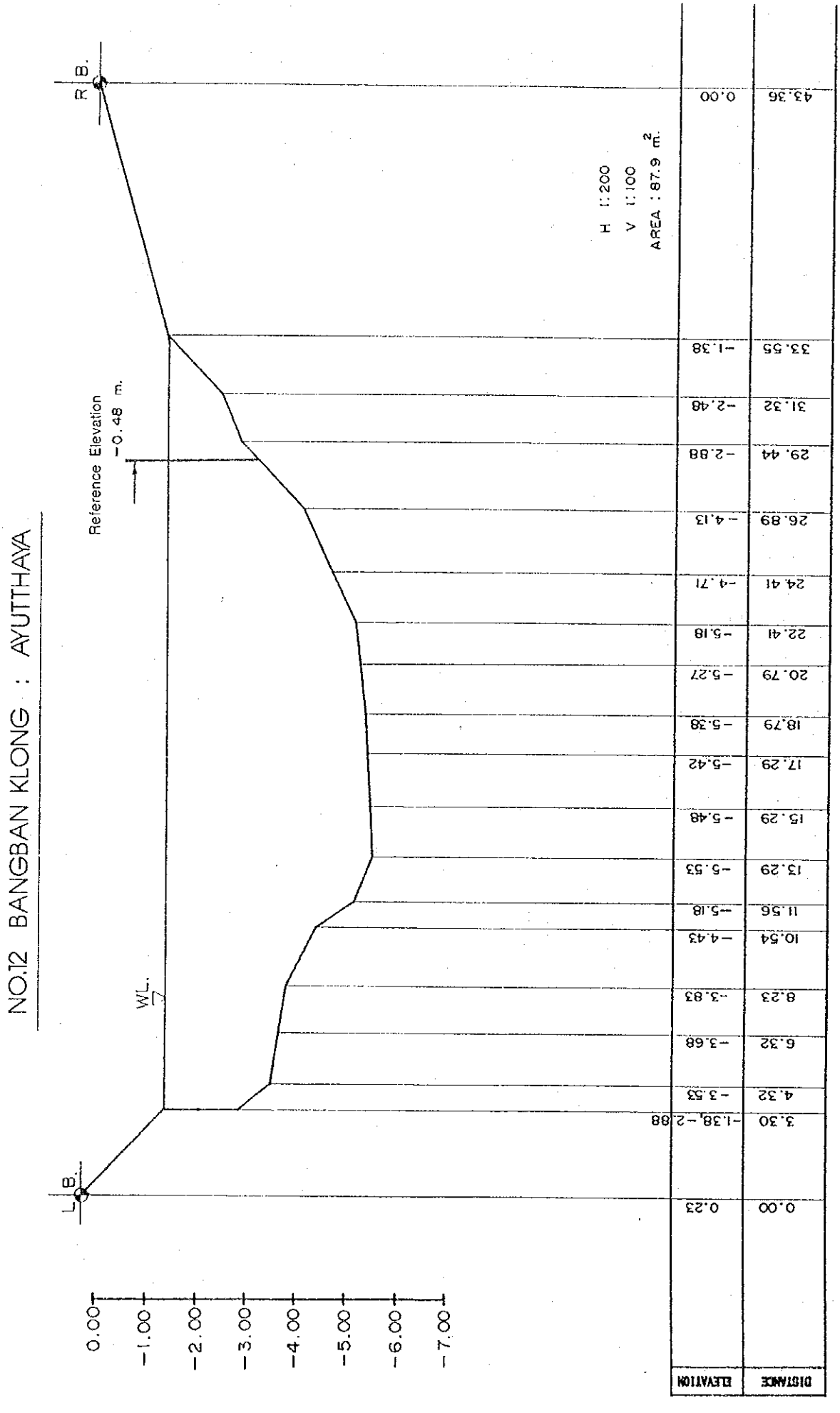
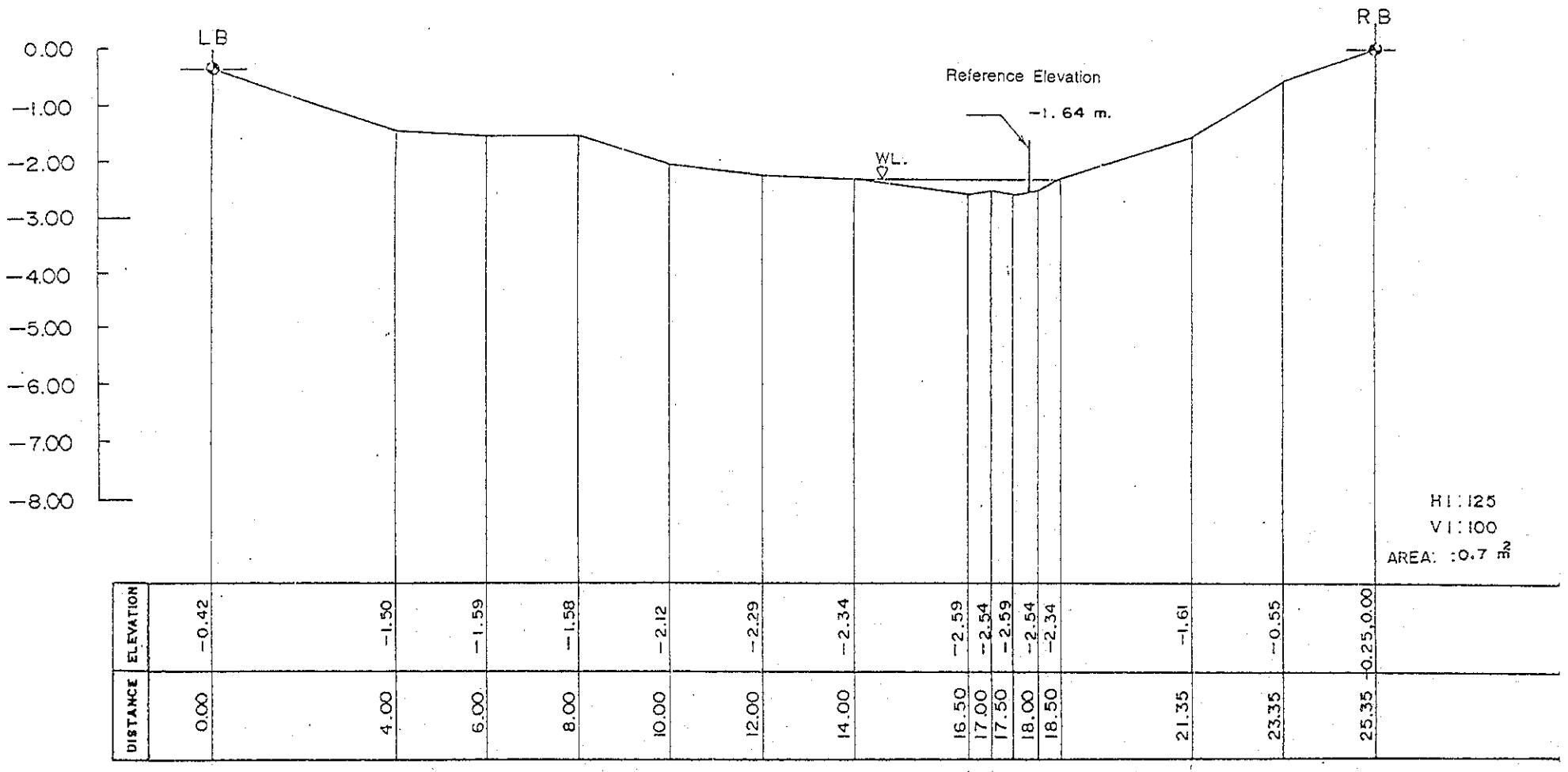


FIG. 9.5.3.2 (13) CROSS SECTIONAL SURVEY

FIG. 9.5.3.2 (14) CROSS SECTIONAL SURVEY

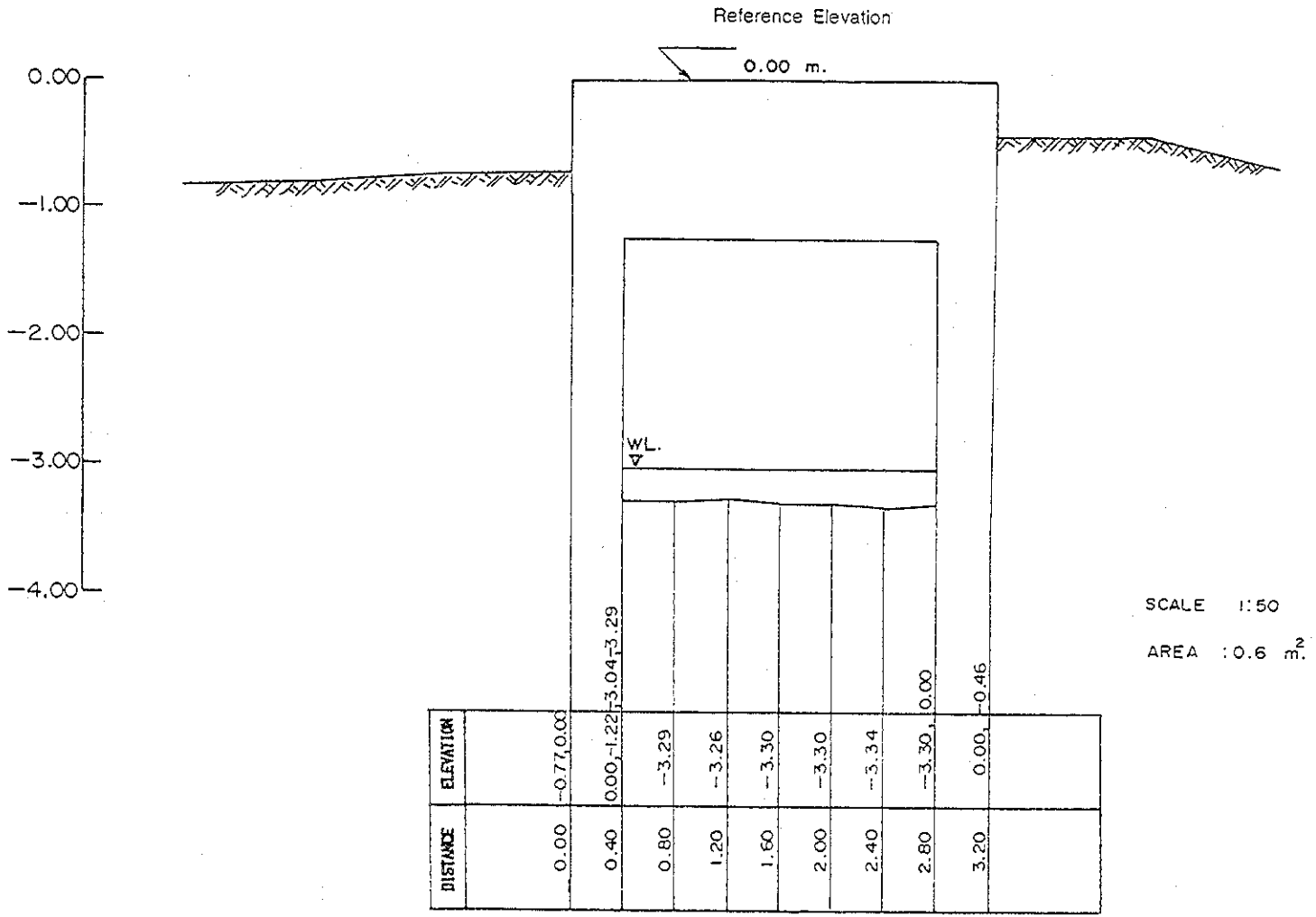
NO.14 BAN PHO DRAINAGE CHANNEL : PATHUMTHANI



DISTANCE	0.00	4.00	6.00	8.00	10.00	12.00	14.00	16.50	17.00	17.50	18.00	18.50	21.35	23.35	25.35
ELEVATION	-0.42	-1.50	-1.59	-1.58	-2.12	-2.29	-2.34	-2.59	-2.54	-2.59	-2.54	-2.34	-1.61	-0.55	-0.25,0.00

FIG. 9.5.3.2 (15) CROSS SECTIONAL SURVEY

NO.15 BANG KHWANG DRAINAGE CHANNEL : NONTHABURI



DISTANCE	0.00	0.40	0.80	1.20	1.60	2.00	2.40	2.80	3.20	
ELEVATION	-0.77	0.00	-3.29	-3.26	-3.30	-3.30	-3.34	-3.30	0.00	

-1.22 -3.04 -3.29 0.00 -0.46

FIG. 9.5.3.2 (16) CROSS SECTIONAL SURVEY

PART 2

SEWERAGE MASTER PLAN FOR THE EIGHT MUNICIPALITIES/AREAS

2.3.7 Topographic Survey Along Sewer Routes and at Wastewater Treatment Plant Site

Table 2.3.7.1 (1) Location of Bench Marks (Levelling Survey)

B.M.No.	Elevation	Marking	Location	Remarks
Chai Nat				
B.M. 281-A	16.592	Highway Dept.	in front of the main entrance of a technical college	above msl.
T.B.M.-1	19.010	red paint	near the beginning of the road to Khao Tha Phra	- do -
T.B.M.-2	17.653	red paint	at Wang Toh Crossing	- do -
T.B.M.-3	17.239	red paint	Tambon Khao Tha Phra, Amphoe Muang	- do -
T.B.M.-4	16.684	bolt in an electric pole	in front of the proposed treatment plant	- do -
Sing Buri				
B.M. 38	13.480	Highway Dept.	Tambon Ban Mai, Amphoe Muang	above msl.
T.B.M.-1	11.876	red paint	near Wat Hua Now, Tambon Bang Man, Amphoe Muang	- do -
T.B.M.-2	12.544	red paint	a bridge across Klong Muang Mu Ban, Amphoe Muang	- do -
T.B.M.-3	12.609	red paint	in front of the main entrance of the new Sing Buri Fresh Water Fishery Station	- do -
T.B.M.-4	12.521	red paint	a bridge across RID Channel at Ban Muang Mu, Amphoe Muang	- do -
T.B.M.-5	12.525	bolt in an electric pole	Tambon Ban Tan Pun, Amphoe Muang	- do -
T.B.M.-6	12.419	red paint	Tambon Ban Huai, Amphoe Muang	- do -
T.B.M.-7	10.933	red paint	at Vilaichit and Sri Bua Thong road crossing	- do -
T.B.M.-8	9.430	red paint	near a slaughterhouse, in a Soi about 500 m. from the main road	- do -
T.B.M.-9	11.903	red paint	at the beginning of Wat Klong Choosri Charoen Suk	- do -
T.B.M.-10	11.661	red paint	at the beginning of a road to Amphoe Bang Rachan	- do -
Lop Buri				
B.M.	16.010	Highway Dept.	Pra Narai Palace, 15 m. on the right from Surasak Road	above msl.
T.B.M.-1	15.557	bolt on a high pole	a column in Pra Narai Rotary in Phaholyothin road side	- do -
T.B.M.-4	15.249	JICA bolt	HWY.3016, left side of a bridge across RID channel from Lop Buri	- do -
T.B.M.-10	9.948	JICA bolt	at Kanchanakom and Pha Too Chai road Crossing	- do -
T.B.M.-11	11.960	JICA bolt	at Prommart Bridge across Lop Buri River	- do -

Table 2.3.7.1 (2) Location of Bench Marks (Levelling Survey)

B.M.No.	Elevation	Marking	Location	Remarks
Ang Thong				
B.M.470	7.136	RID	a tree inside RID's Ang Thong Local Section 2	above msl.
T.B.M.-2	9.932	JICA pin	at left side of a bridge across C.Phraya R., in front of Ang Thong public building	- do -
T.B.M.-5	7.727	JICA pin	3rd house along RID channel from Patamroj school	- do -
T.B.M.-6	8.113	JICA pin	left side of a bridge across RID channel in front of Local Government school	- do -
Pa Mok				
B.M.474	5.294	RID	in front of the entrance of RID's Pa Mok office	above msl.
T.B.M.-4	5.793	JICA pin		- do -
T.B.M.-6	7.490	JICA pin	left side of a bridge across Klong Koi along HYW.309	- do -
T.B.M.-8/1	5.249	JICA pin	inside a chicken farm	- do -
T.B.M.-9	5.356	JICA pin	inside Wat Pa Mok School	- do -
T.B.M.-11	7.473	JICA pin	right side of Bang Pa Kod irrigation gate	- do -
Sena				
B.M.	6.158		left side of the first bridge across RID channel along HYW.3263 from Sena to Suphanburi	above msl. - do -
T.B.M.-3	3.882	JICA pin	at an electric pole, on the right side of a small canal along Wat Ban Phan Road	- do -
T.B.M.-5	6.164	JICA pin	left side of the first bridge across RID channel along the road from Sena to Jao Jed	- do -
Pathum Thani (Khu Khot)				
B.M.-314	5.538	Bangkok B.M.	left side of the bridge across Klong Song along HYW.3312 from Lam Look Ka	above msl.
T.B.M.-1	2.129	JICA pin	left side of the road to Garden Home Village from Phahol Yothin road	- do -
T.B.M.-8	2.751	JICA pin	right side of the road to Sivaree	- do -

Table 2.3.7.1 (3) Location of Bench Marks (Levelling Survey)

B.M.No.	Elevation	Marking	Location	Remarks
Pathum Thani (Prachatipat)				
T.B.M.-01	4.696	JICA pin	left side of the bridge across Klong Nung along HYW.305 from Rangsit	above msl.
T.B.M.-02	5.224	JICA pin	left side of the bridge across Klong Sam along HYW.305 from Rangsit	- do -
T.B.M.-03	1.704	JICA pin	left side of the bridge across Klong Nung from Boonya Rattana Crossing	- do -
T.B.M.-04	2.385	JICA pin	an electric pole in Sai Panya School in Rangsit	- do -
Bang Bua Thong				
B.M.-314	1.8533	RID	inside RID Local Office, from HYW. 3215	above msl.
T.B.M.-1	1.878	JICA pin	a tree on the right side in Soi Uthismatri from HYW.3215	- do -
T.B.M.-2	2.103	JICA pin	on the pavement in front of Bang Bua Thong Municipality Office along HYW.3215	- do -
T.B.M.-3	4.712	JICA pin	left side of the bridge across Klong Phra Pimon along HYW.3215	- do -
T.B.M.-4	2.506	JICA pin	at a telephone manhole, right side Rattana Thibet and Taung Thong village crossing	- do -
T.B.M.-6	4.512	JICA pin	at the bridge across Klong Ban Klual along Taling Chan road to Taling Chan	- do -
T.B.M.-7	3.619	JICA pin	at the bridge across Klong Ban Phraek along Taling Chan road to Taling Chan	- do -

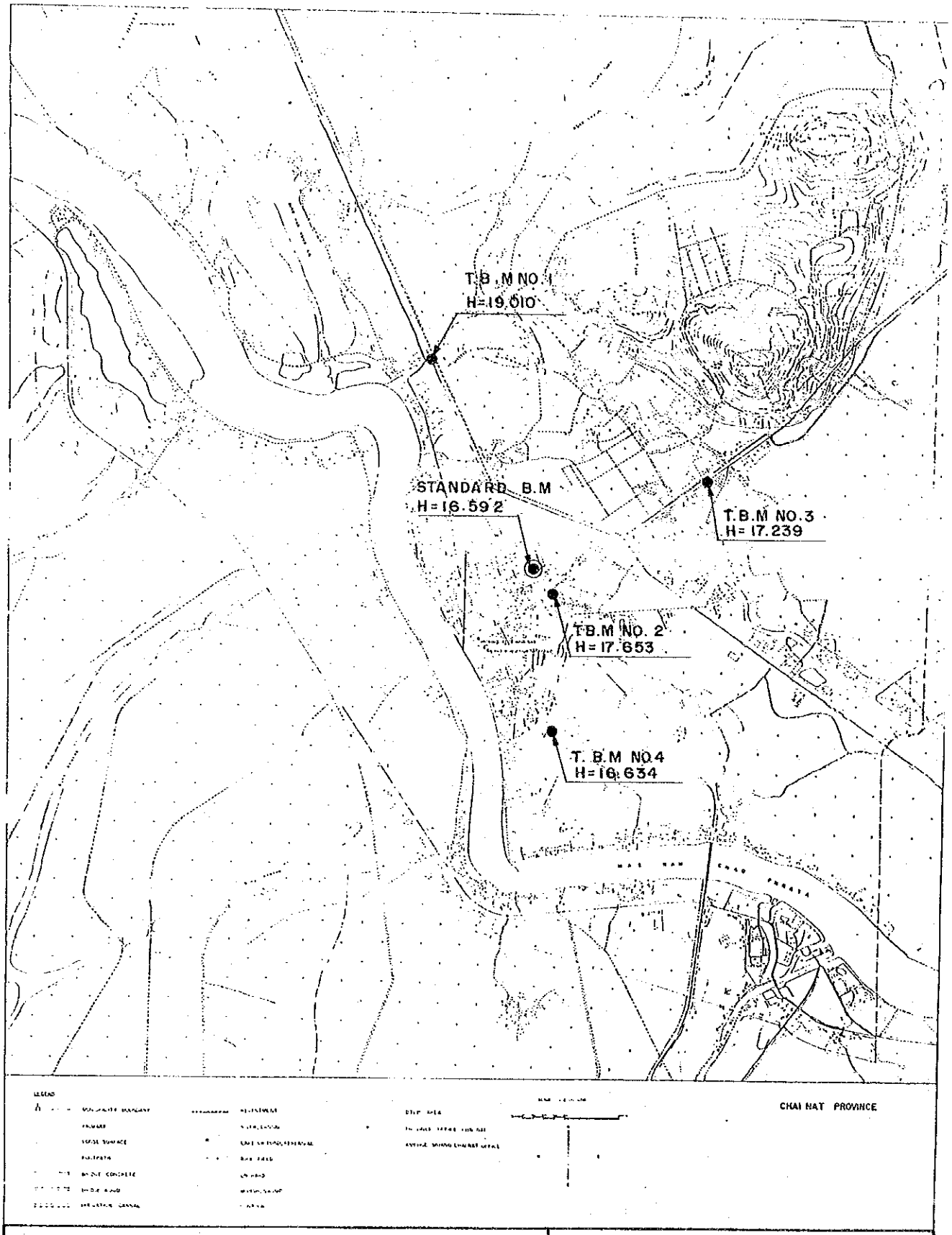


FIG. 2.3.7.1 (1) LOCATION OF BENCH MARKS
(CHAI NAT MUNICIPALITY)

MASTER PLANNING FOR THE SEWERAGE DEVELOPMENT PROJECT FOR LOWER CHAO PHRAYA RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

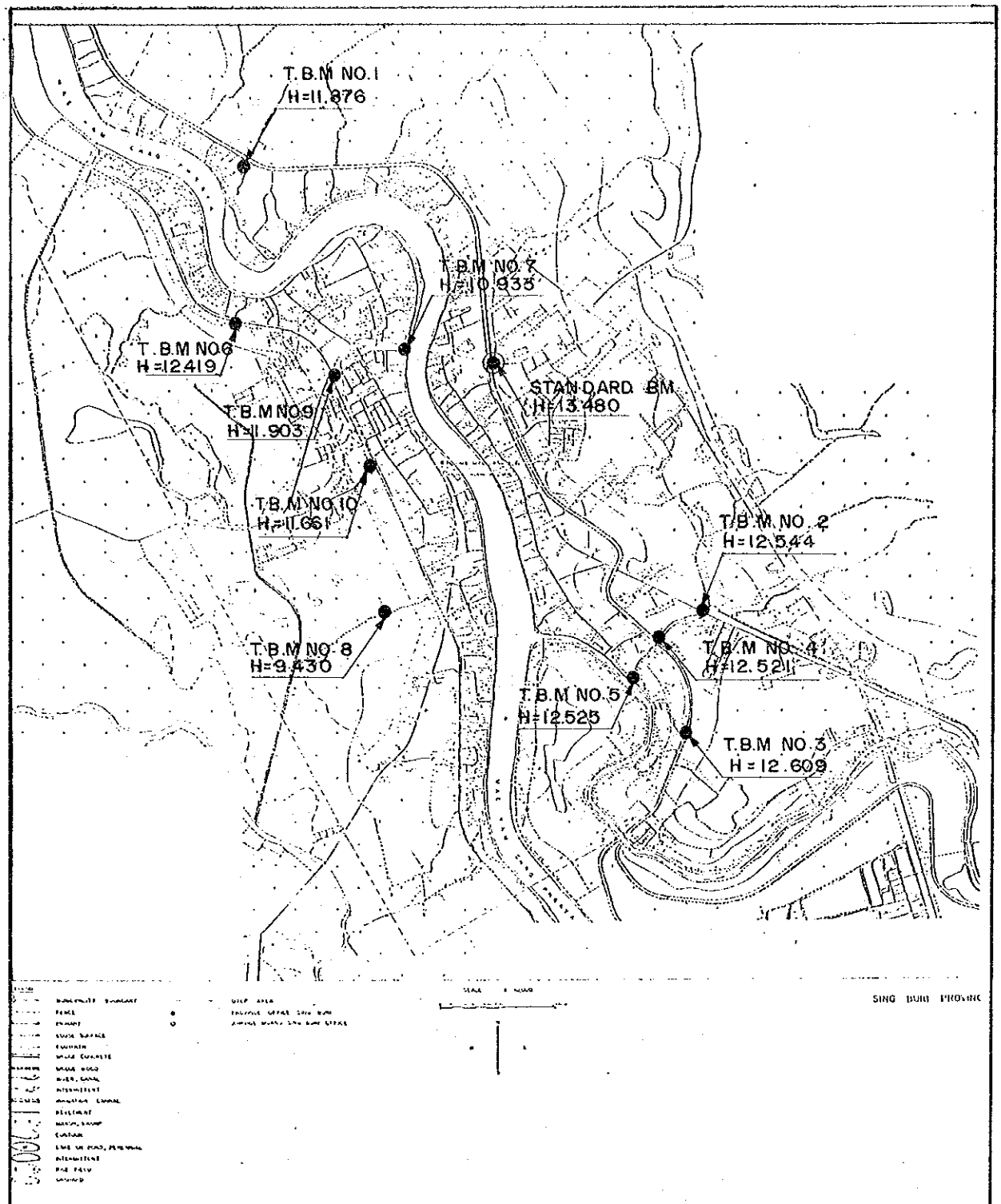


FIG. 2.3.7.1 (2) LOCATION OF BENCH MARKS
(SING BURI MUNICIPALITY)

MASTER PLANNING FOR THE SEWERAGE DEVELOPMENT PROJECT FOR LOWER CHAO PHRAYA RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

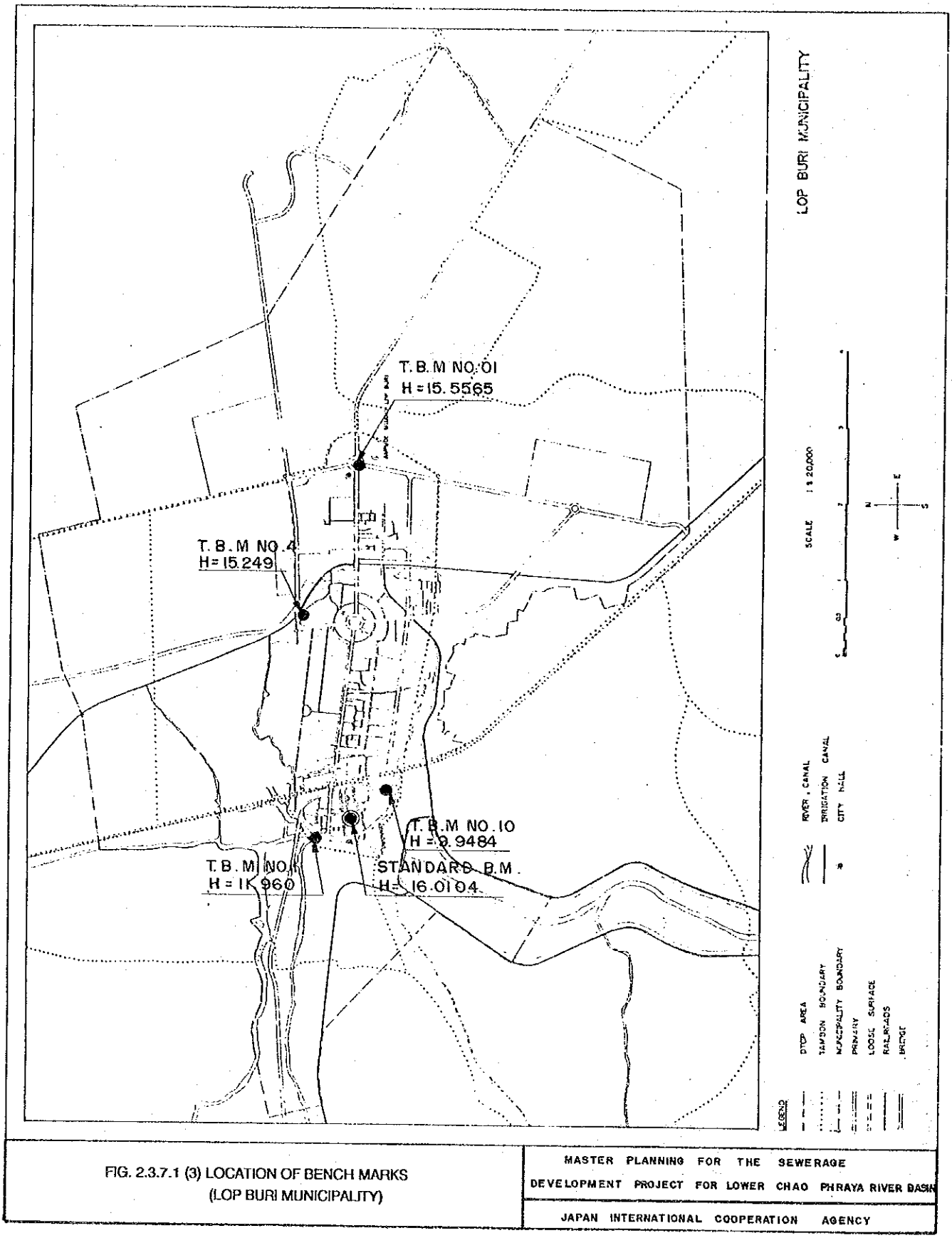
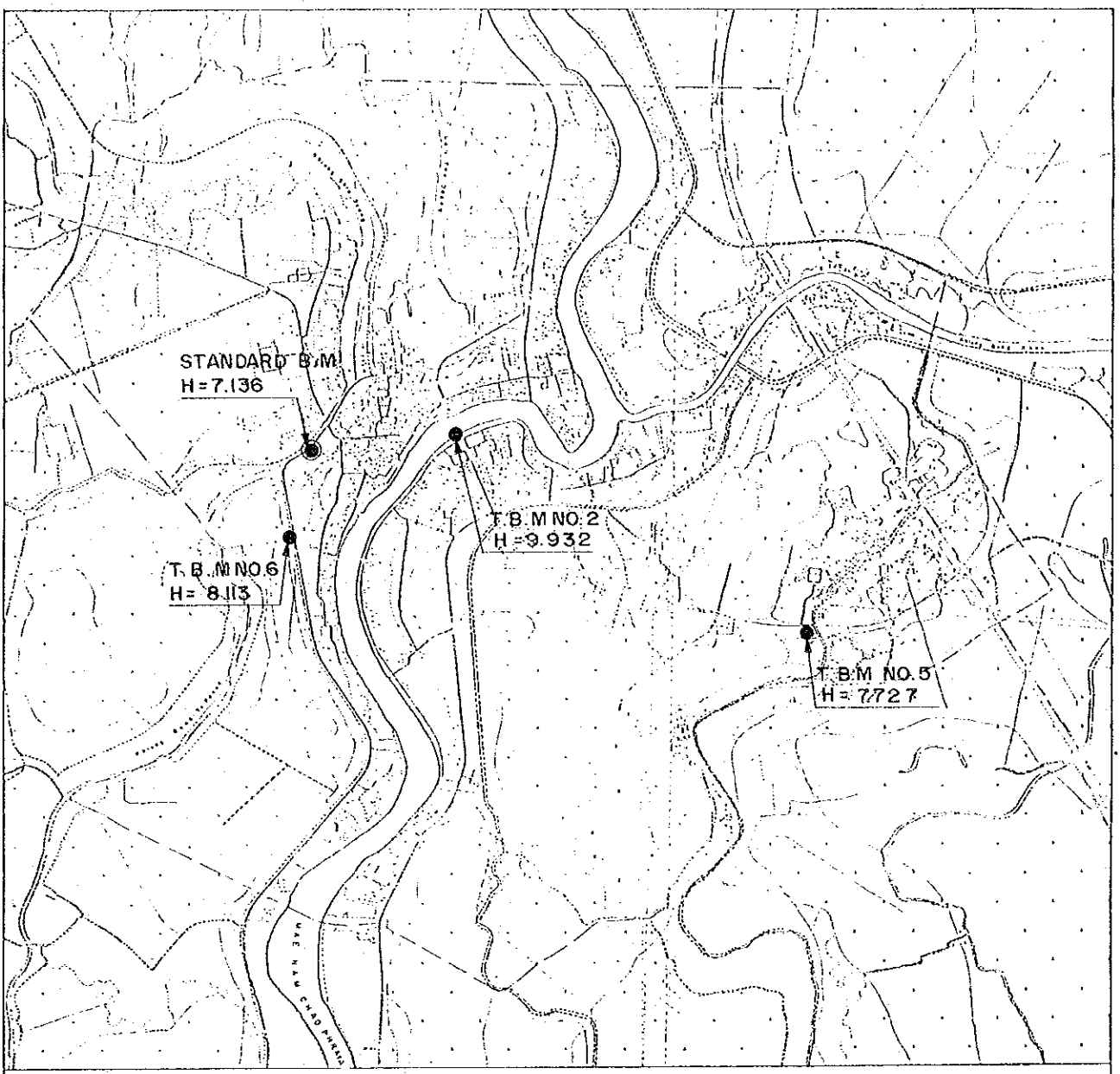


FIG. 2.3.7.1 (3) LOCATION OF BENCH MARKS
(LOP BURI MUNICIPALITY)

MASTER PLANNING FOR THE SEWERAGE DEVELOPMENT PROJECT FOR LOWER CHAO PHRAYA RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY



LEGEND

- STUDY AREA
- MUNICIPALITY BOUNDARY
- PRIMARY
- LOOSE SURFACE
- FOOTPATH
- FUTURE ROAD
- BRIDGE CONCRETE
- BRIDGE WOOD
- IRRIGATION CANAL
- RIVER, CANAL
- INTERMITTENT
- LAKE OR POND, RESERVOIR
- RICE FIELD
- MARSH, SWAMP
- CONTOUR

SCALE 1 : 10,000

N
W — E
S

ANG THONG PROVINCE

FIG. 2.3.7.1 (4) LOCATION OF BENCH MARKS
(ANG THONG MUNICIPALITY)

MASTER PLANNING FOR THE SEWERAGE
DEVELOPMENT PROJECT FOR LOWER CHAO PHRAYA RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

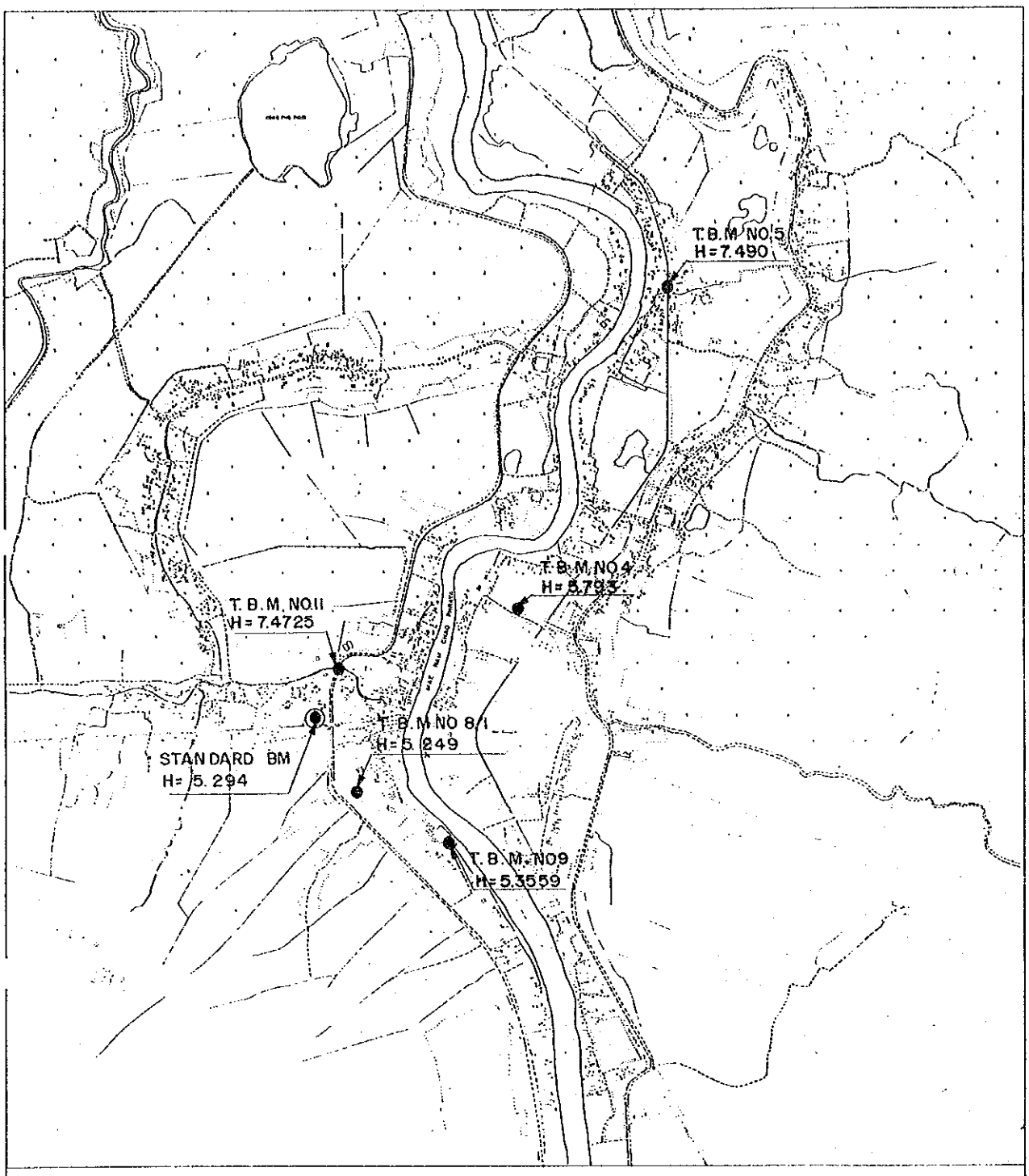
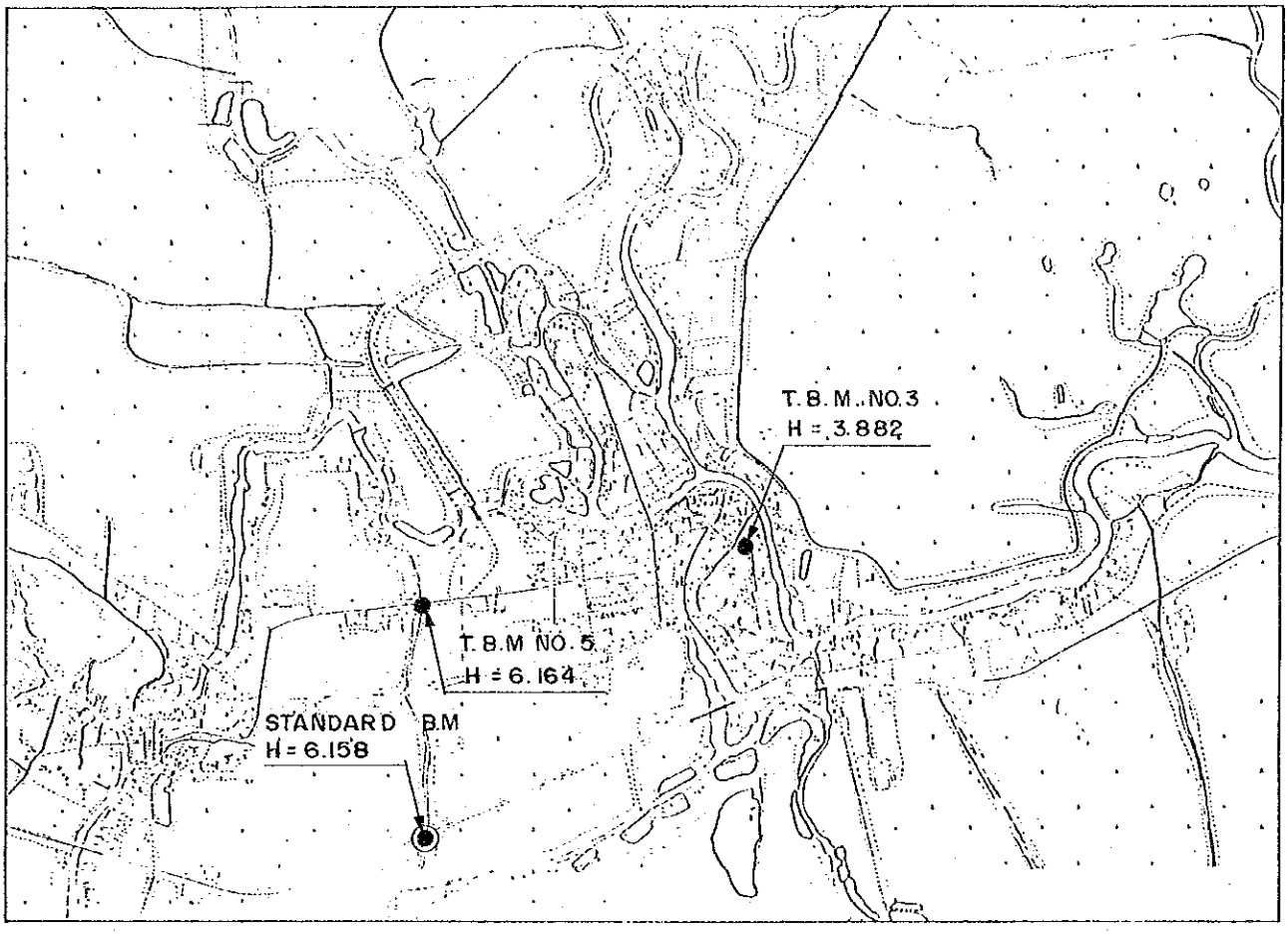


FIG. 2.3.7.1 (5) LOCATION OF BENCH MARKS
(AMPHOE PA MOD MUNICIPALITY)

MASTER PLANNING FOR THE SEWERAGE
DEVELOPMENT PROJECT FOR LOWER CHAO RIVER BASIN
JAPAN INTERNATIONAL COOPERATION AGENCY



LEGEND

- MUNICIPALITY BOUNDARY
- CTCP AREA
- PRIMARY
- FOOTPATH
- CONTOUR
- LOOSE SURFACE
- FUTURE ROAD
- BRIDGE CONCRETE
- BRIDGE WOOD
- RIVER, CANAL
- INTERMITTENT
- IRRIGATION CANAL
- LAKE OR POND, PERENNIAL
- RICE FIELD
- MARSH, SWAMP

SCALE 1 : 10,000

N
W E
S

LOCATION OF BENCH MARKS

(SE NA)

FIG. 2.3.7.1 (6) LOCATION OF BENCH MARKS
(AMPHOE SE NA MUNICIPALITY)

MASTER PLANNING FOR THE SEWERAGE DEVELOPMENT PROJECT FOR LOWER CHAO PHRAYA RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

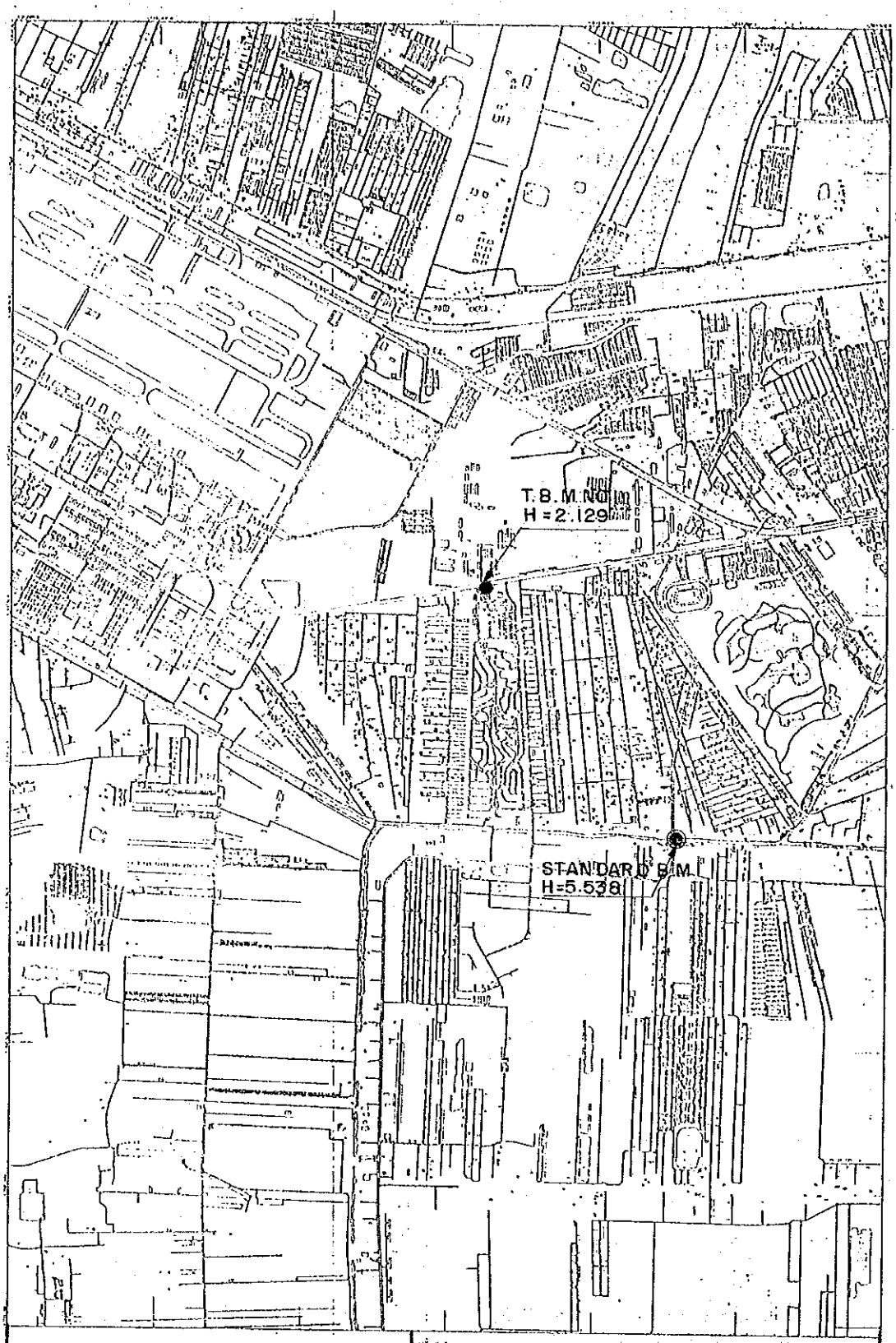


FIG. 2.3.7.1 (7) LOCATION OF BENCH MARKS
(KHU KHOT S.D)

MASTER PLANNING FOR THE SEWERAGE
DEVELOPMENT PROJECT FOR LOWER CHAO PHRAYA RIVER BASIN
JAPAN INTERNATIONAL COOPERATION AGENCY

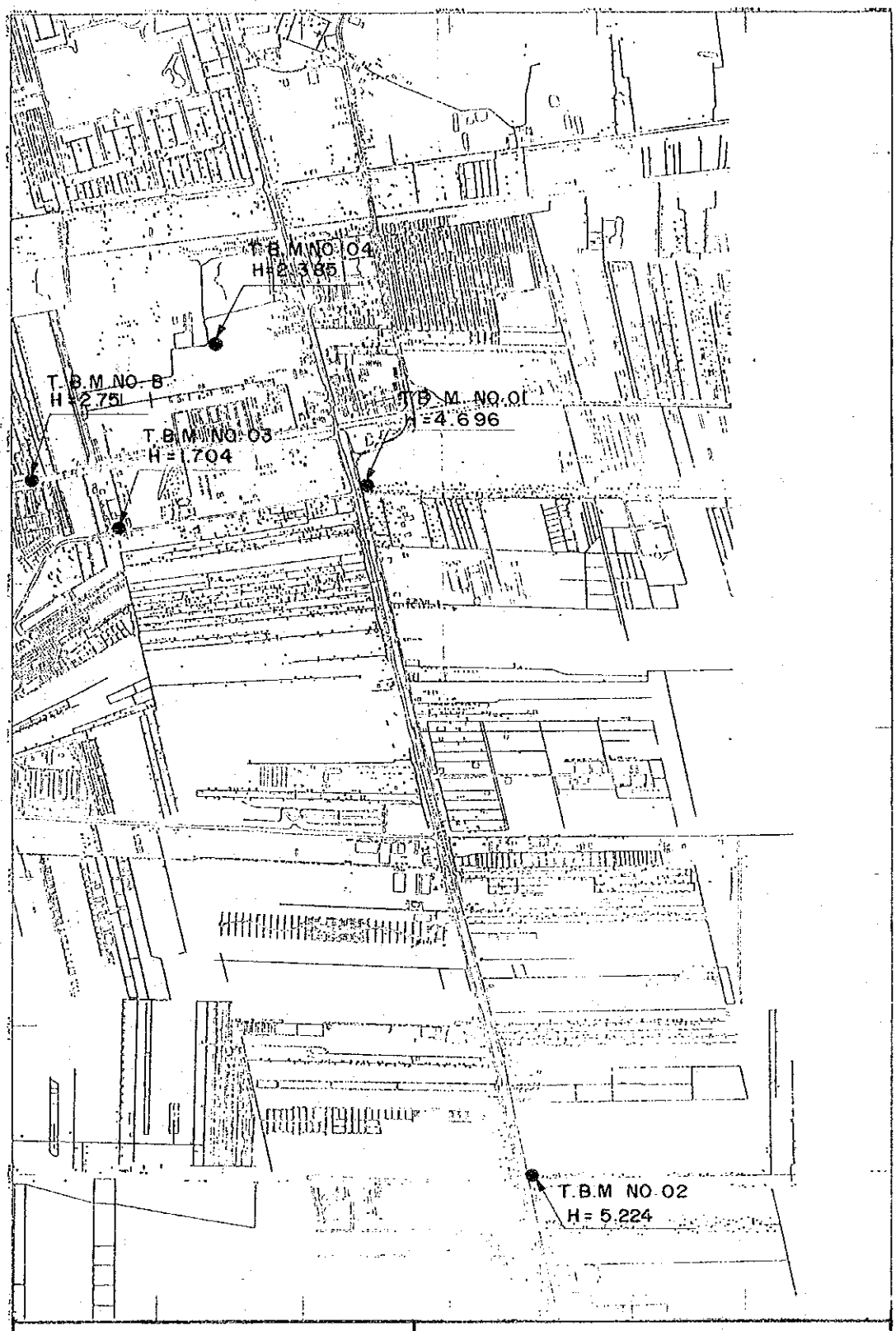


FIG. 2.3.7.1 (8) LOCATION OF BENCH MARKS (PRACHA TIPAT S.D)

MASTER PLANNING FOR THE SEWERAGE DEVELOPMENT PROJECT FOR LOWER CHAO PHRAYA RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

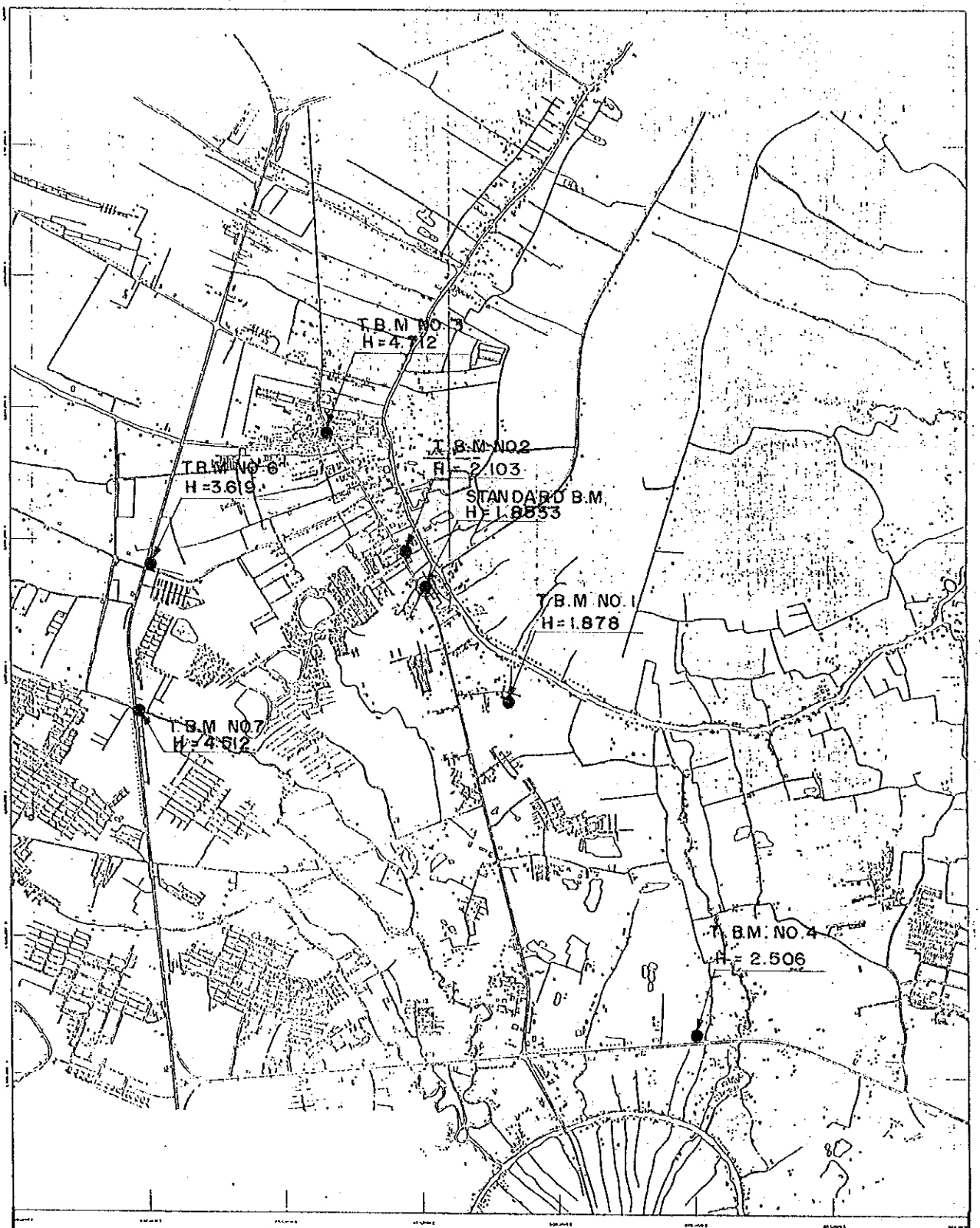


FIG. 2.3.7.1 (9) LOCATION OF BENCH MARKS
(BANG BUA THONG MUNICIPALITY)

MASTER PLANNING FOR THE SEWERAGE DEVELOPMENT PROJECT FOR LOWER CHAO PHRAYA RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

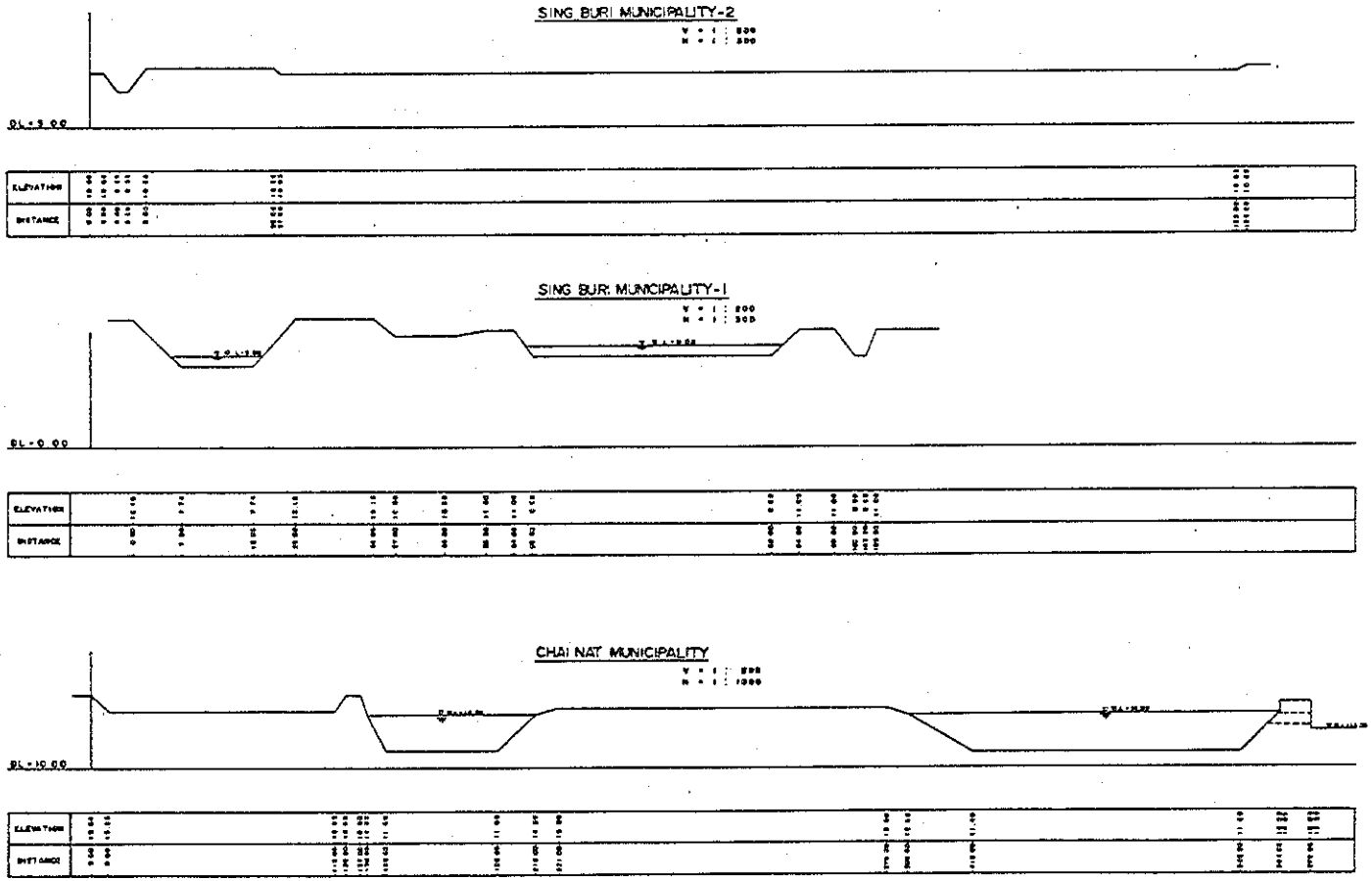


FIG. 2.3.7.1 (10) PLAN AND CROSS SECTION OF SEWERAGE TREATMENT PLANT SITE

STUDY ON MASTER PLANNING FOR THE SEWERAGE DEVELOPMENT PROJECT FOR LOWER CHAO PHRAYA RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

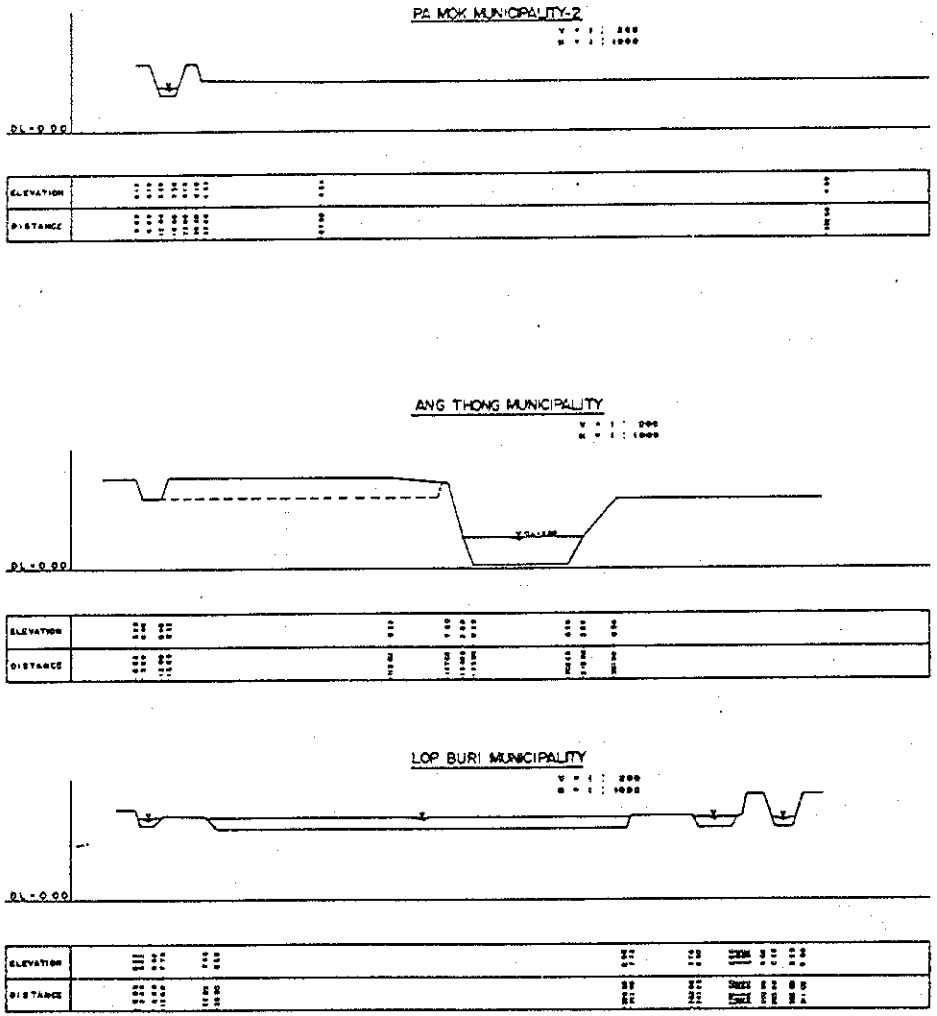


FIG. 2.3.7.1 (11) PLAN AND CROSS SECTION OF SEWERAGE TREATMENT PLANT SITE

STUDY ON MASTER PLANNING FOR THE SEWERAGE DEVELOPMENT PROJECT FOR LOWER CHAO PHRAYA RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

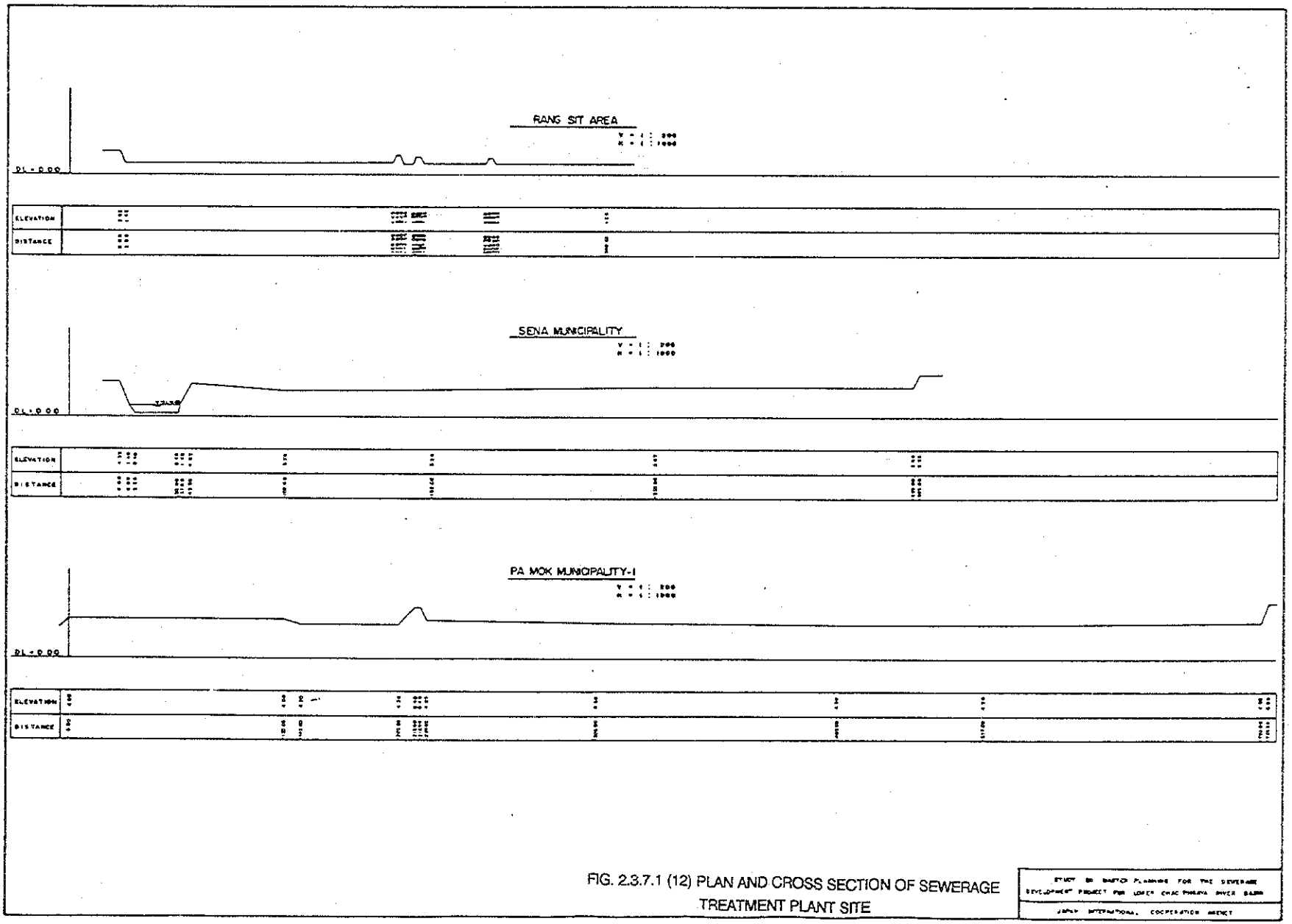


FIG. 2.3.7.1 (12) PLAN AND CROSS SECTION OF SEWERAGE TREATMENT PLANT SITE

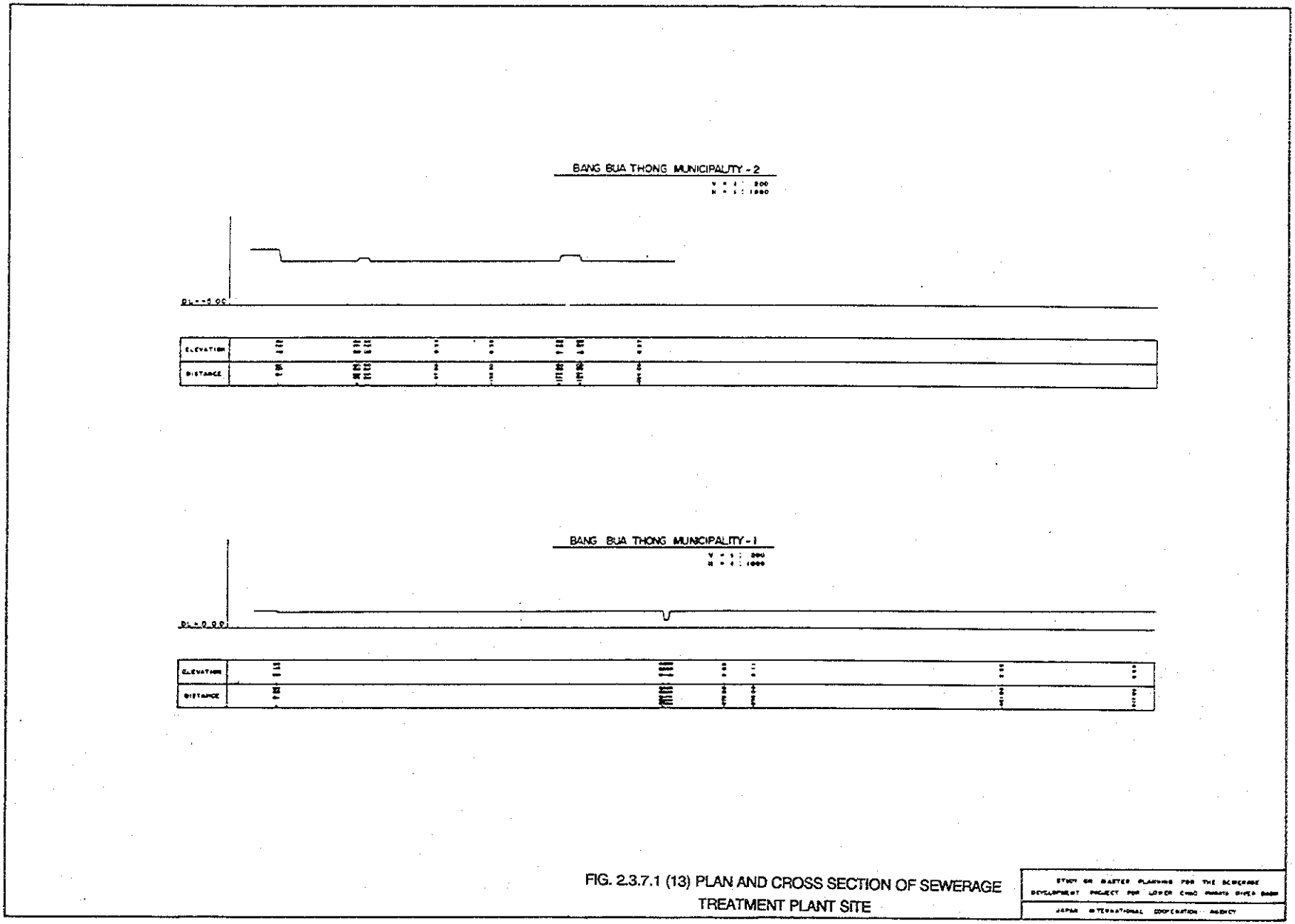


FIG. 2.3.7.1 (13) PLAN AND CROSS SECTION OF SEWERAGE TREATMENT PLANT SITE

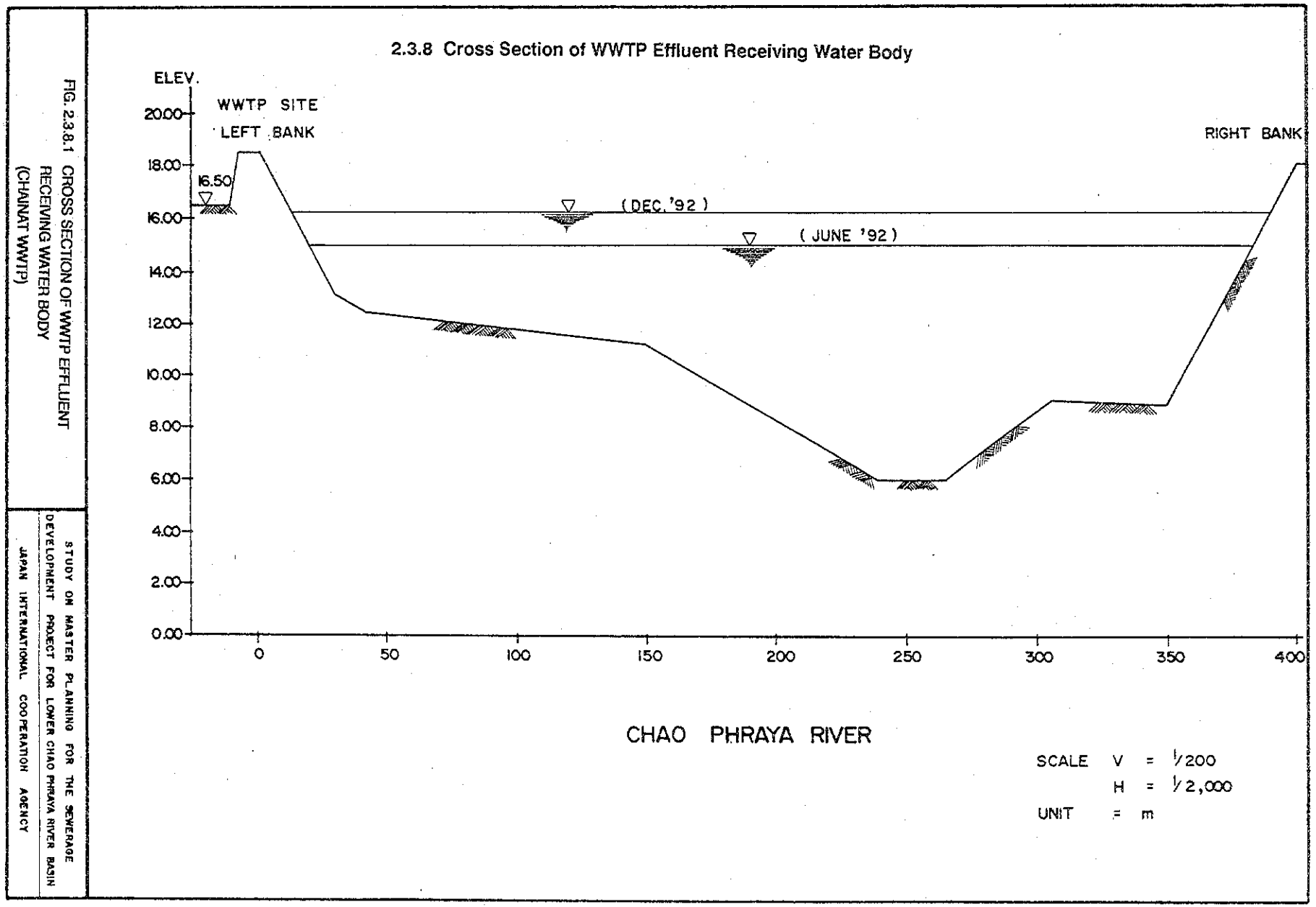


FIG. 2.3.8.1 CROSS SECTION OF WWTP EFFLUENT RECEIVING WATER BODY (CHAINAT WWTP)

STUDY ON MASTER PLANNING FOR THE SEWERAGE DEVELOPMENT PROJECT FOR LOWER CHAO PHRAYA RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

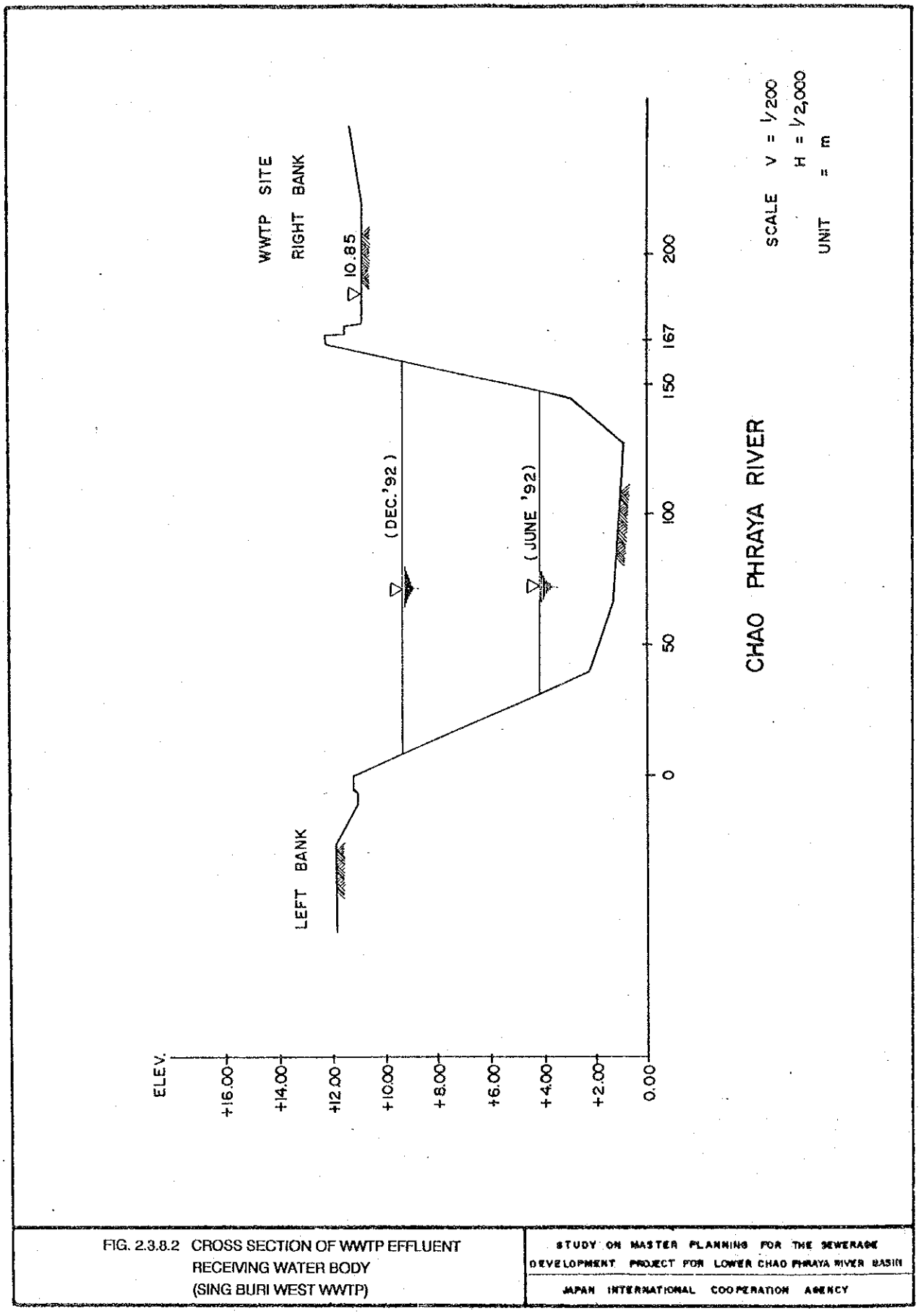


FIG. 2.3.8.2 CROSS SECTION OF WWTP EFFLUENT RECEIVING WATER BODY (SING BURI WEST WWTP)

STUDY ON MASTER PLANNING FOR THE SEWERAGE DEVELOPMENT PROJECT FOR LOWER CHAO PHRAYA RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

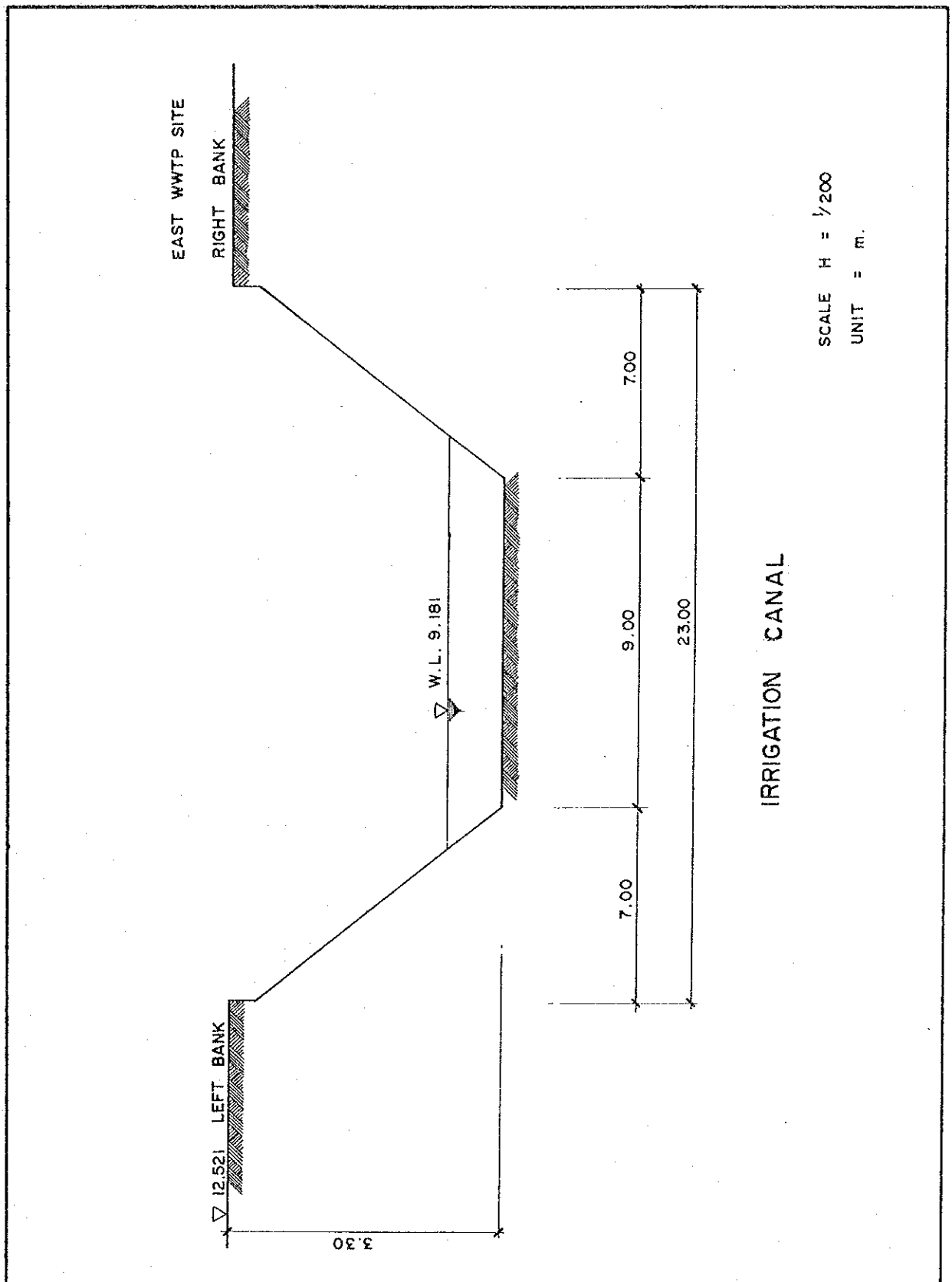


FIG. 2.3.8.3 CROSS SECTION OF WWTP EFFLUENT RECEIVING WATER BODY (SING BURI EAST WWTP)

STUDY ON MASTER PLANNING FOR THE SEWERAGE DEVELOPMENT PROJECT FOR LOWER CHAO PHRAYA RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

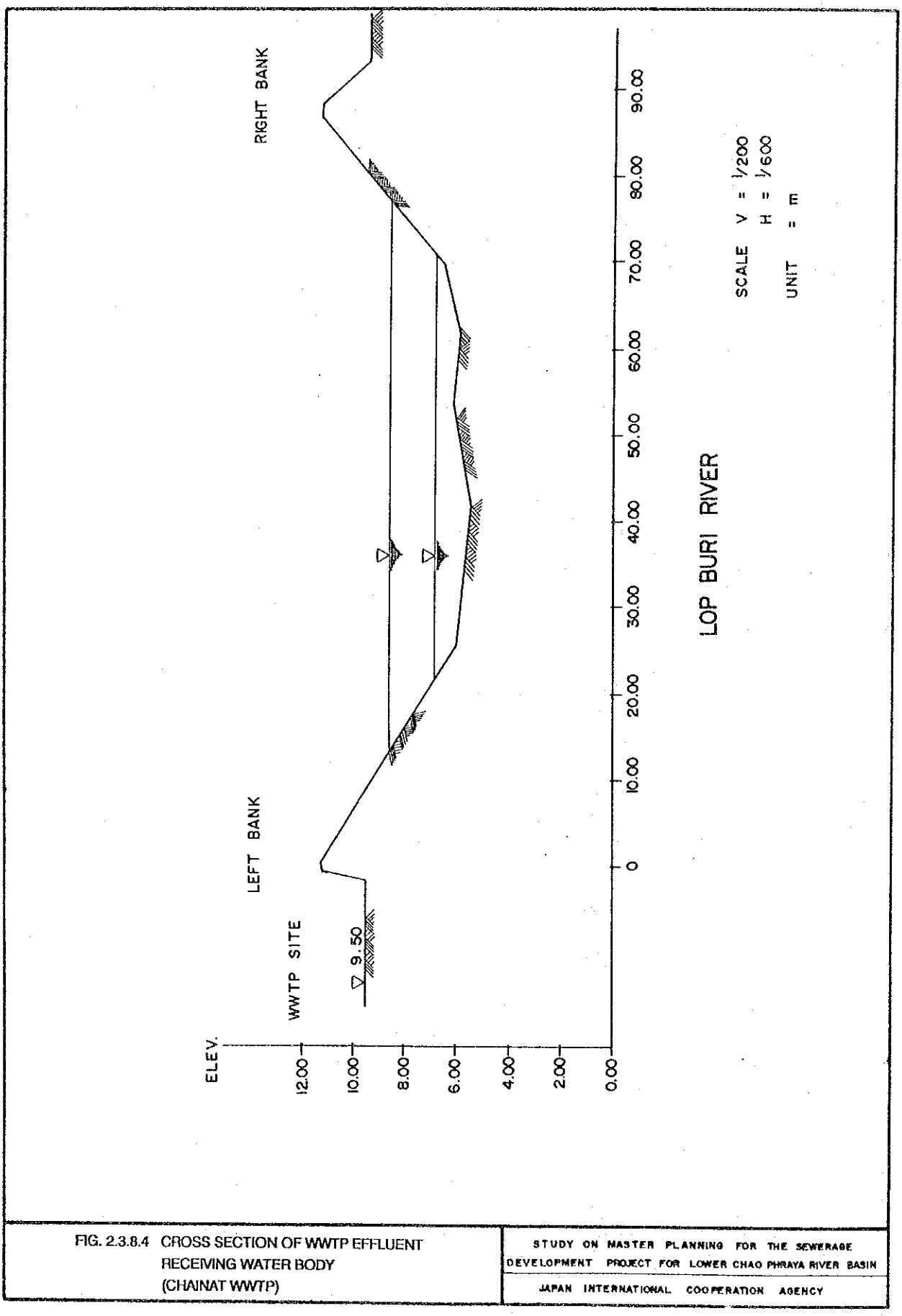


FIG. 2.3.8.4 CROSS SECTION OF WWTP EFFLUENT RECEIVING WATER BODY (CHAINAT WWTP)

STUDY ON MASTER PLANNING FOR THE SEWERAGE DEVELOPMENT PROJECT FOR LOWER CHAO PHRAYA RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

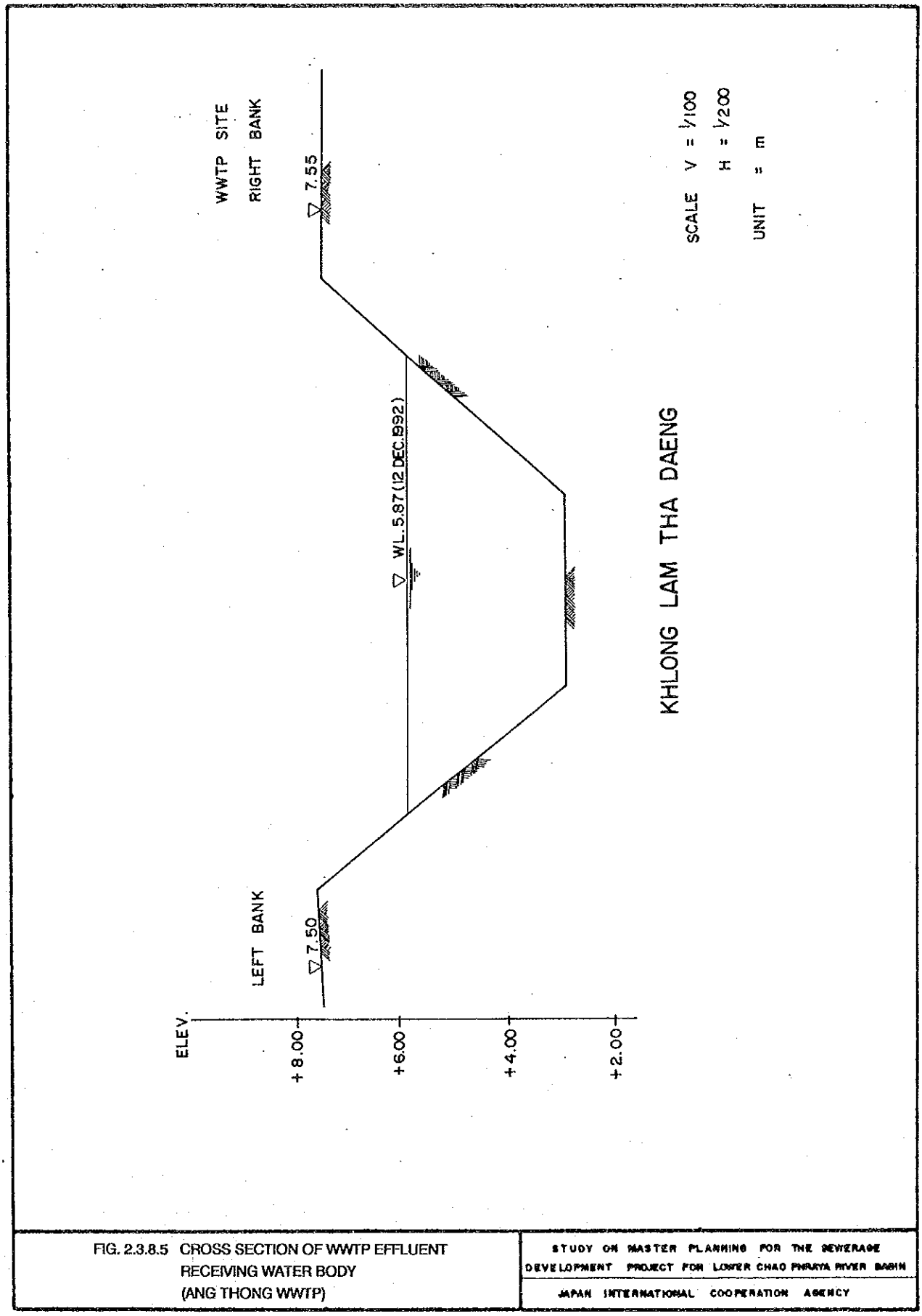


FIG. 2.3.8.5 CROSS SECTION OF WWTP EFFLUENT RECEIVING WATER BODY (ANG THONG WWTP)

STUDY ON MASTER PLANNING FOR THE SEWERAGE DEVELOPMENT PROJECT FOR LOWER CHAO PHRAYA RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

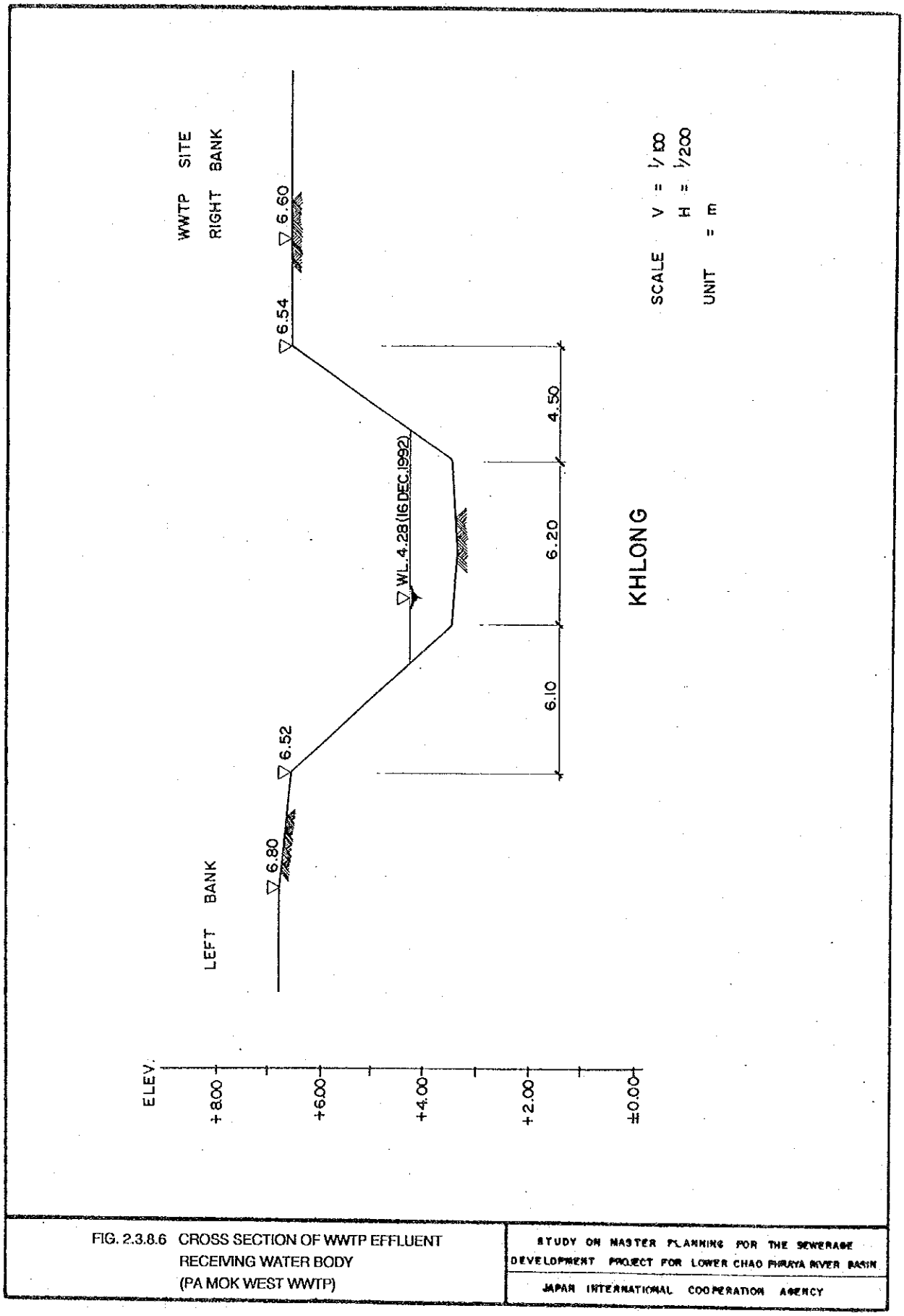


FIG. 2.3.8.6 CROSS SECTION OF WWTP EFFLUENT RECEIVING WATER BODY (PA MOK WEST WWTP)

STUDY ON MASTER PLANNING FOR THE SEWERAGE DEVELOPMENT PROJECT FOR LOWER CHAO PHRAYA RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

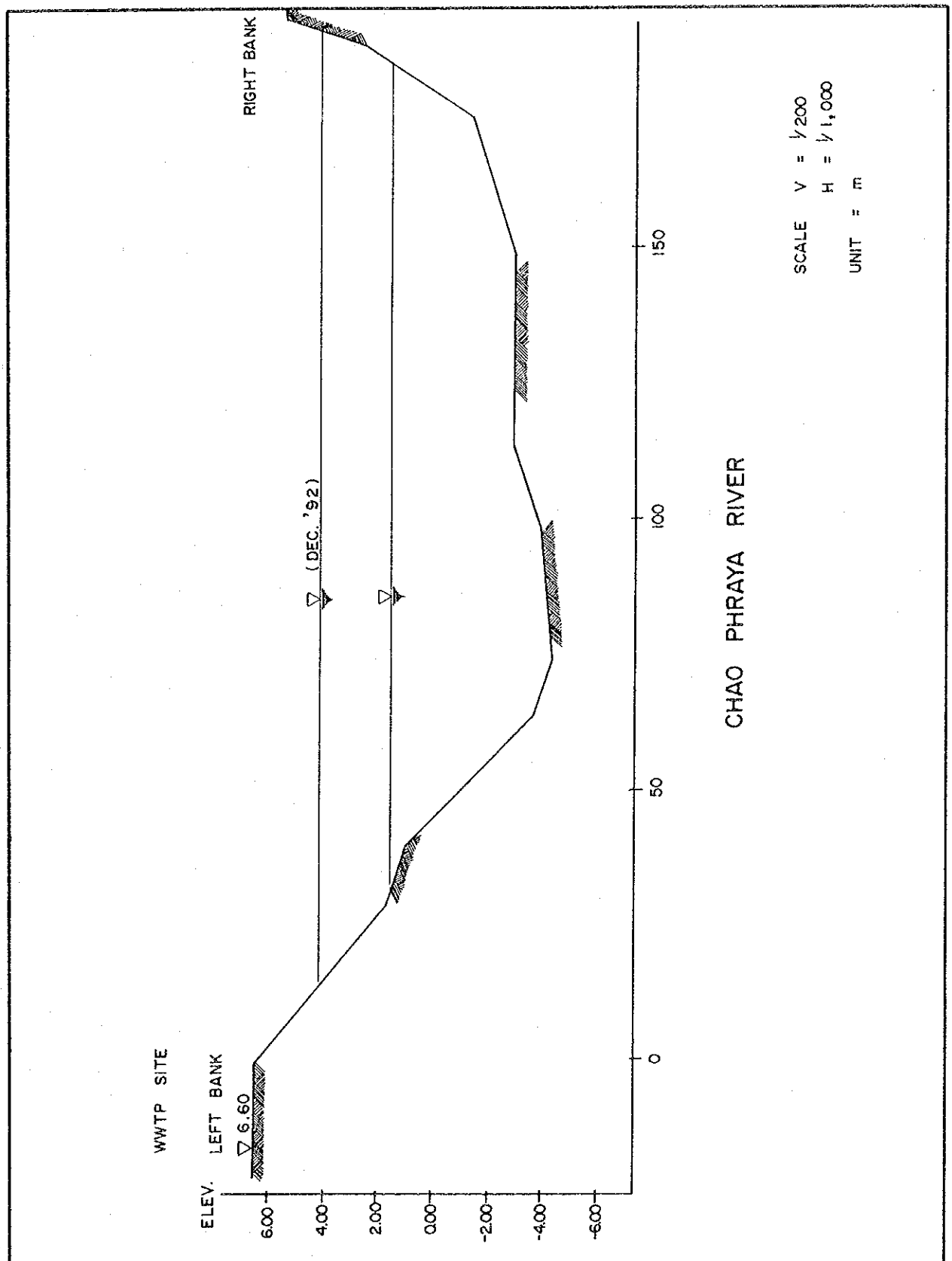


FIG. 2.3.8.7 CROSS SECTION OF WWTP EFFLUENT RECEIVING WATER BODY (PA MOK EAST WWTP)

STUDY ON MASTER PLANNING FOR THE SEWERAGE DEVELOPMENT PROJECT FOR LOWER CHAO PHRAYA RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

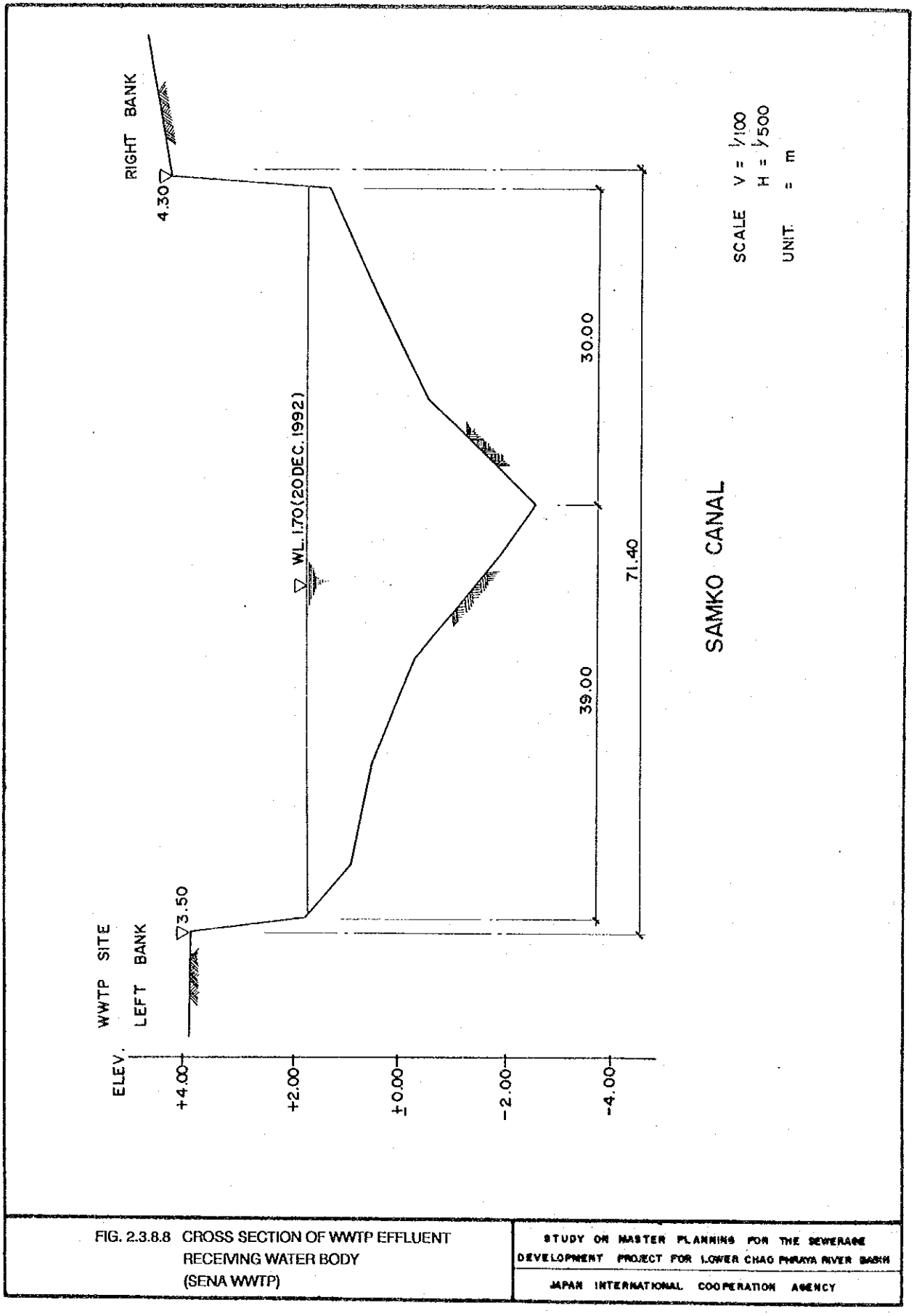


FIG. 2.3.8.8 CROSS SECTION OF WWTP EFFLUENT RECEIVING WATER BODY (SENA WWTP)

STUDY ON MASTER PLANNING FOR THE SEWERAGE DEVELOPMENT PROJECT FOR LOWER CHAO PHRAYA RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

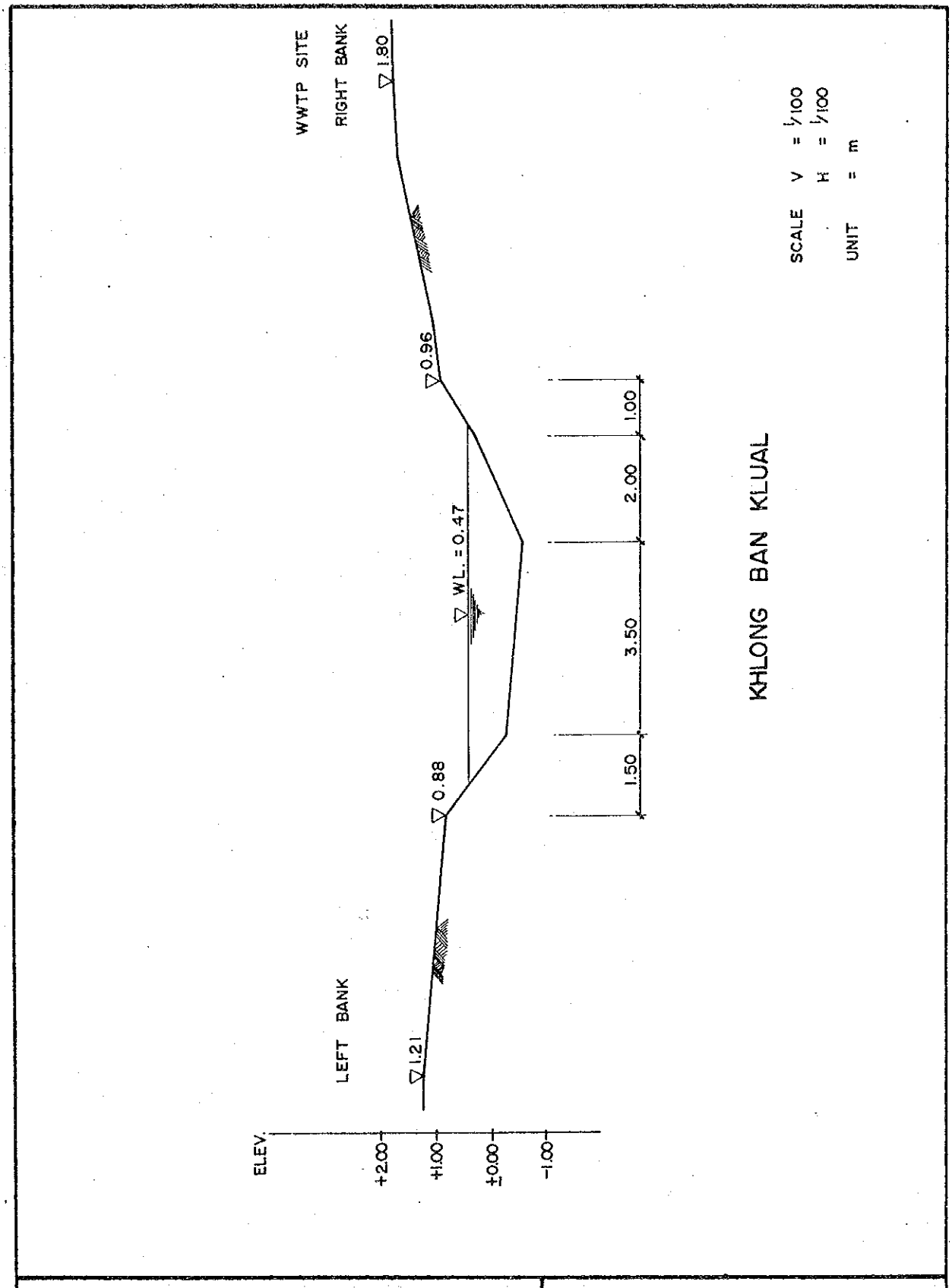


FIG. 2.3.8.9 CROSS SECTION OF WWTP EFFLUENT RECEIVING WATER BODY (BAN BUA THONG WEST WWTP)

STUDY ON MASTER PLANNING FOR THE SEWERAGE DEVELOPMENT PROJECT FOR LOWER CHAO PHRAYA RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

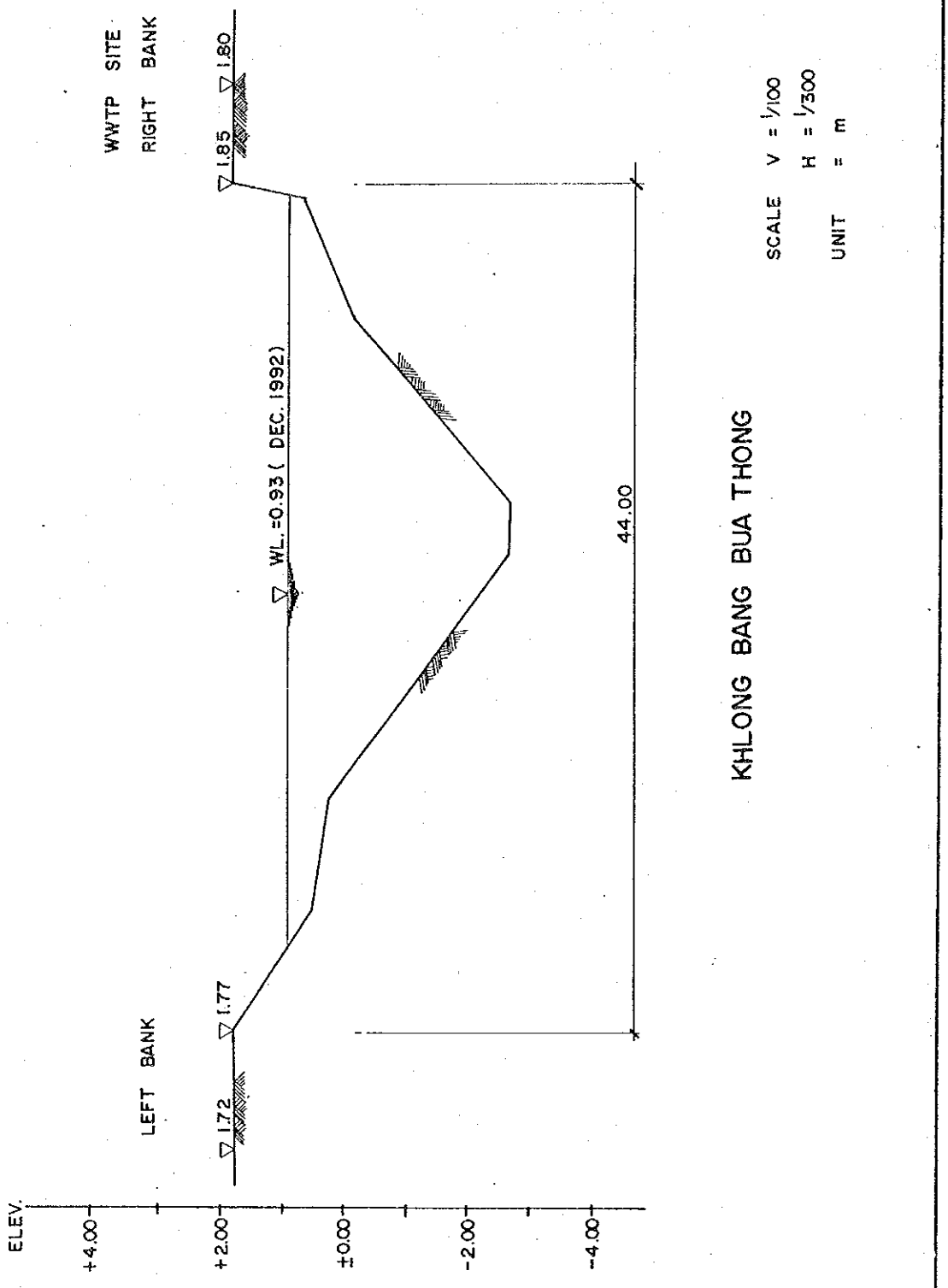


FIG. 2.3.8.10 CROSS SECTION OF WWTP EFFLUENT RECEIVING WATER BODY (BAN BUA THONG EAST WWTP)

STUDY ON MASTER PLANNING FOR THE SEWERAGE DEVELOPMENT PROJECT FOR LOWER CHAO PHRAYA RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

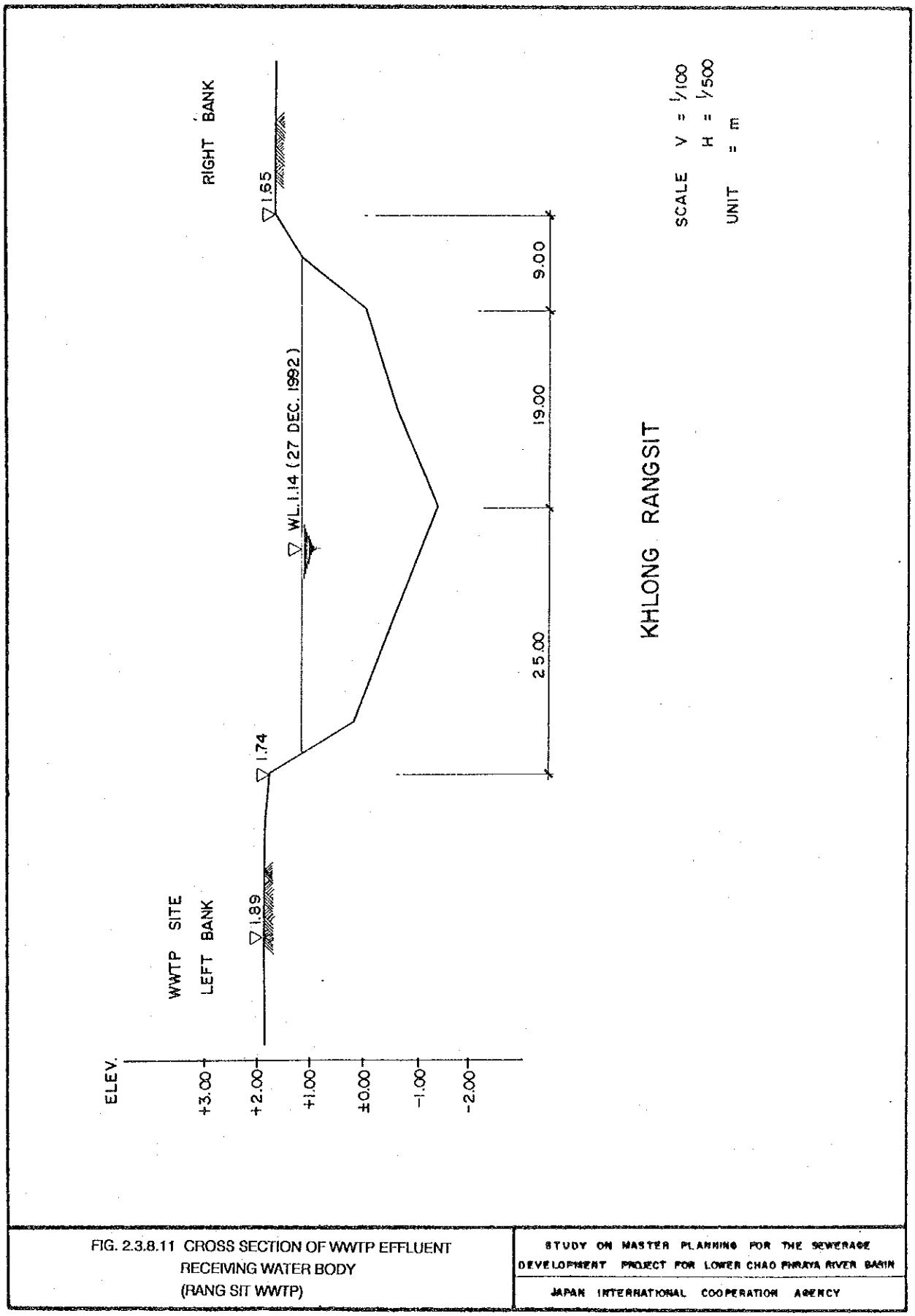


FIG. 2.3.8.11 CROSS SECTION OF WWTP EFFLUENT RECEIVING WATER BODY (RANG SIT WWTP)

STUDY ON MASTER PLANNING FOR THE SEWERAGE DEVELOPMENT PROJECT FOR LOWER CHAO PHRAYA RIVER BASIN

JAPAN INTERNATIONAL COOPERATION AGENCY

2.3.9 DATA ON FLUCTUATION OF WATER SUPPLY APPLIED IN PWA PROJECTS

Four Provincial Cities Water Supply Project, 1992 PWA

Study Area	Served Population		Daily Maximum	Hourly Maximum	H.M.
	1990	2010	Daily Average	Daily Maximum	D.A.
Suphanburi	27,940	34,110	1.35	1.4	1.89
Pattaya	40,550	99,410	1.25 (domestic)		1.5
			1.4 (tourist)	1.2	1.68
Ubon Ratchathani & Warin Chamrap	79,400	129,200	1.3	1.4	1.82
Chiangmai	114,200	192,000	1.25	1.3	1.625

Provincial Cities Water Supply Project, 1989 JICA

Study Area	Served Population	Daily Maximum	Hourly Maximum	H.M.
	2011	Daily Average	Daily Maximum	D.A.
Pathum Thani & Prachatipat	559,909	1.2	1.32	1.584
Phuket	146,468	1.3	1.3	1.69
Phang Nga	15,832	1.3	1.3	1.69
Takua Pa	16,967	1.35	1.25	1.6875
Thung Song	37,840	1.3	1.25	1.625
Su Ngai Golok	58,355	1.3	1.4	1.82

PWD Standard

Daily Maximum	Hourly Maximum	H.M.
Daily Average	Daily Maximum	D.A.
1.3	1.2	1.56

Table 2.3.9.1 (1) Monthly Fluctuation of Water Production & Water Sale in MWA in Fiscal Year 1991

Month	Water Production (million m3/month)	Water Sale (million m3/month)	Daily Water Sale (million m3/month)	No. of Consumer	Daily Water Consumption By Consumer (m3/d)
Oct-90	89.464	64.403	2.078	956,442	2.173
Nov-90	87.554	59.578	1.986	963,648	2.061
Dec-90	90.216	63.052	2.034	970,687	2.095
Jan-91	91.454	61.451	1.982	976,132	2.030
Feb-91	84.167	57.883	2.067	982,635	2.104
Mar-91	94.990	64.494	2.080	988,045	2.105
Apr-91	93.249	66.469	2.216	993,720	2.230
May-91	96.892	70.557	2.276	1,001,392	2.273
Jun-91	93.708	68.613	2.287	1,007,459	2.270
Jul-91	96.647	69.721	2.249	1,015,183	2.215
Aug-91	97.178	68.947	2.224	1,021,133	2.178
Sep-91	93.685	64.266	2.142	1,027,623	2.084
Total	1,109.204	779.434	25.621	11,904,099	2.152

Table 2.3.9.1 (2) Hourly Fluctuation of Water Distribution in MWA on October 16, 1992

Pump Station / Hour	Hourly Water Distribution Amount (m3)									
	Sam Sen	Bang Kaen	Paholyotin	Lumpini	Khlong Toey	Tha Pra	Sam Rong	Lad Phrao	Ton Buri	Total
1	19,601	19,625	3,667	6,979	5,610	13,103	4,370	4,000	4,914	81,869
2	19,239	19,125	3,833	6,909	5,610	12,208	4,240	4,000	5,040	80,204
3	20,149	18,792	3,667	6,840	5,580	12,250	4,280	4,027	5,166	80,751
4	19,400	18,792	3,833	6,909	5,480	12,243	4,300	4,027	5,166	80,150
5	20,132	20,542	4,000	7,048	5,450	13,625	4,350	4,027	5,166	84,340
6	29,221	27,583	4,000	12,187	11,372	19,410	13,380	10,693	7,938	135,784
7	32,158	29,667	9,833	14,200	14,896	20,569	17,020	14,200	10,710	163,253
8	32,319	29,708	10,999	16,145	14,499	21,292	17,650	14,613	10,962	168,187
9	31,722	28,917	11,000	16,249	15,133	21,354	17,400	14,533	10,584	166,892
10	30,507	28,875	10,833	14,409	14,306	21,201	17,160	14,293	8,190	159,774
11	28,877	28,250	10,499	14,305	13,670	18,986	12,990	14,159	8,190	149,926
12	27,051	26,083	8,500	14,235	13,456	18,535	12,610	12,280	7,938	140,688
13	27,186	25,792	8,333	14,200	12,176	18,507	11,930	11,920	7,938	137,982
14	26,693	25,667	8,166	14,096	11,323	18,055	11,830	11,760	7,938	135,528
15	26,445	25,708	8,000	13,367	11,183	18,034	11,750	11,599	7,938	134,024
16	26,558	25,667	8,000	13,263	11,316	17,666	11,680	11,506	7,812	133,468
17	27,519	26,375	8,000	13,506	11,693	17,951	11,850	13,093	7,938	137,925
18	29,145	28,875	9,666	14,895	13,156	19,673	16,040	13,173	10,332	154,955
19	32,744	28,500	9,333	15,034	13,510	20,632	16,280	13,440	10,332	159,805
20	30,633	27,625	9,500	15,068	13,720	20,667	16,300	13,453	10,080	157,046
21	30,097	26,125	9,833	14,791	12,456	20,722	16,170	13,413	9,954	153,561
22	24,946	25,042	6,333	13,159	11,106	19,230	11,050	13,333	8,190	132,389
23	24,817	23,458	6,666	12,221	11,593	18,556	5,630	12,306	7,686	122,933
24	23,834	22,458	6,666	7,048	8,193	17,312	5,760	10,645	6,552	108,468
Total (m3/d)	640,993	607,251	183,160	297,063	266,487	431,781	276,020	264,493	192,654	3,159,902
Average (m3/hr)	26,708	25,302	7,632	12,378	11,104	17,991	11,501	11,021	8,027	131,663
Hourly Max.Ratio	1.23	1.17	1.44	1.31	1.36	1.19	1.53	1.33	1.37	1.28

Figure 2.3.9.1 (1) Hourly Fluctuation of Water Distribution by MWA

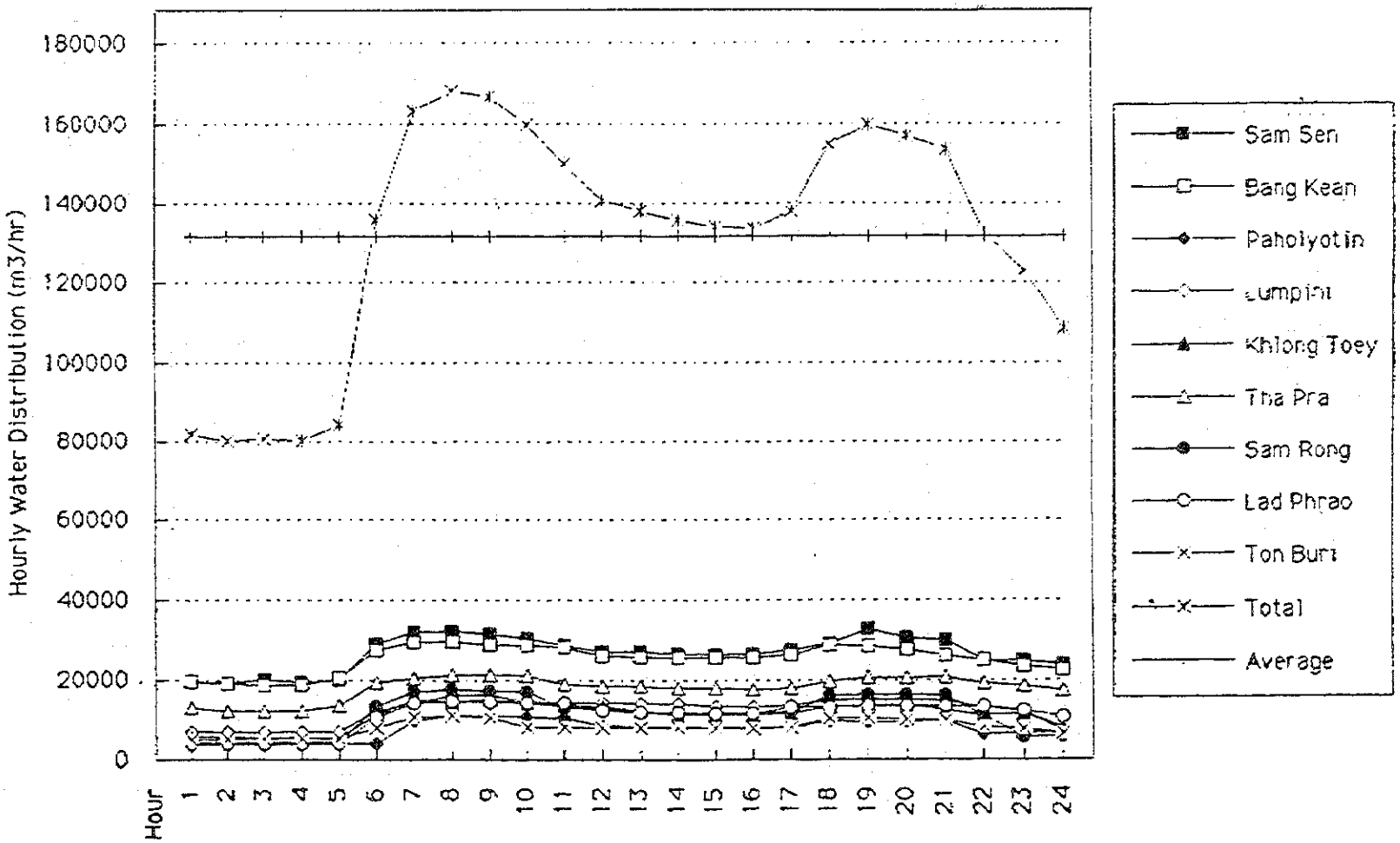
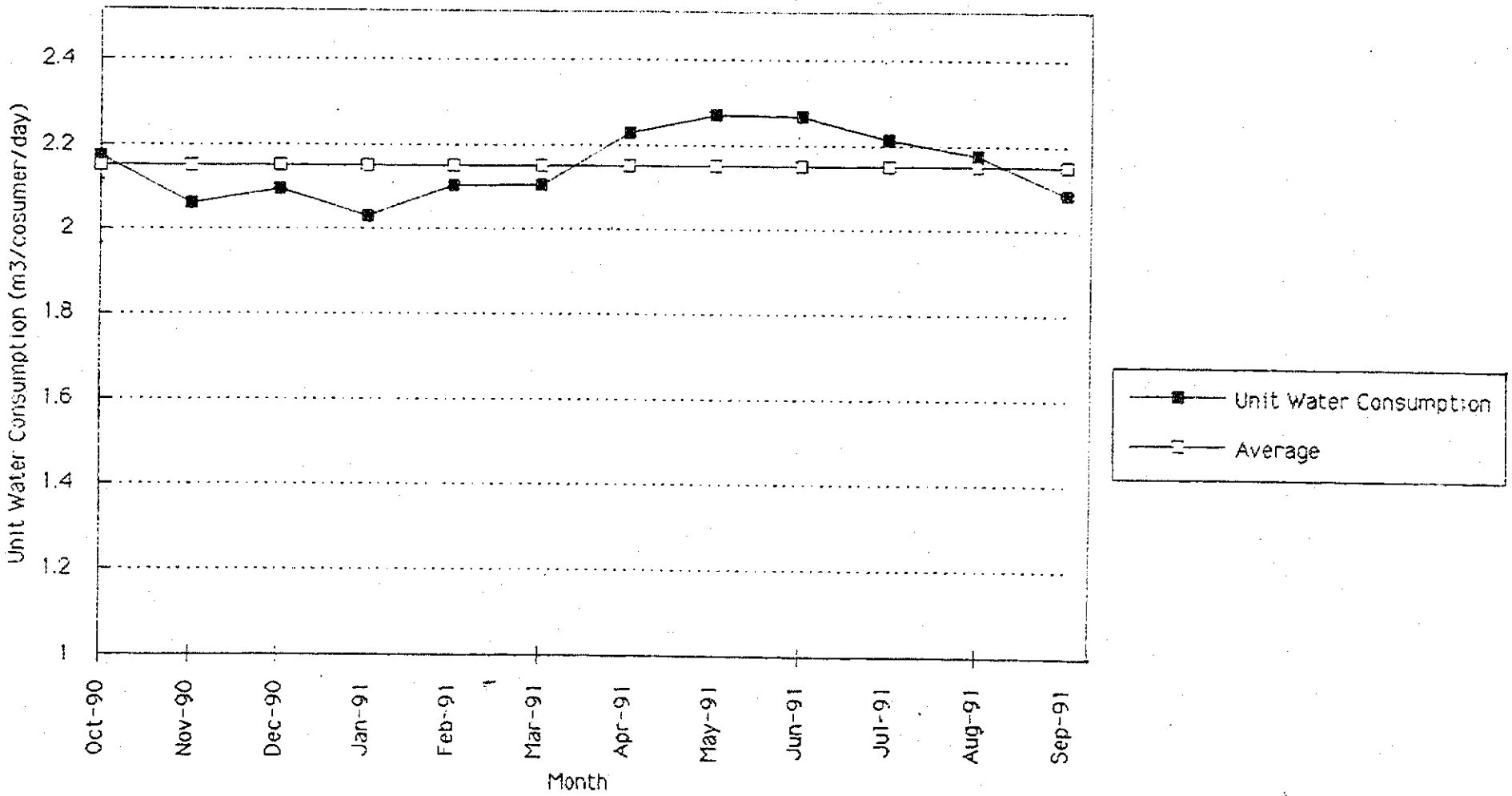


Figure 2.3.9.1 (2) Seasonal Fluctuation of Daily Water Consumption in MWA



3.7.5 Industrial Wastewater Quantity, BOD and SS in Rangsit Area

Table 3.7.5.1 Data of Khukot

No.	Business Name	Products	Location (Moo No.)	Ind.Type Category	Number of Workers Man	Woman	Total	WW. Qt'ty (m3/d) per cap.	Total	BOD Load (kg/d) per cap.	Total	SS Load (kg/d) per cap.	Total
1	Agro-business Co.	Remove peanut cover	8	F	0	15	15	0.124	1.9	0.031	0.5	0.035	0.5
2	GM Ishihara Co	Seed crushing	8	A	9	8	17	2.776	47.2	3.122	53.1	1.014	17.2
3	Sang Fha Co.	Juice	4	A	2	3	5	2.776	13.9	3.122	15.6	1.014	5.1
4	Yod Kafae Thai Co., Ltd.	Coffee	8	A	0	9	9	2.776	25.0	3.122	28.1	1.014	9.1
5	Chakkawal Ice Cube Co., Ltd.	Ice cube making	7	F	8	0	8	0.124	1.0	0.031	0.2	0.035	0.3
6	Leather Line Co., Ltd.	Leather	8	B	3	27	30	2.078	62.3	0.788	23.6	0.145	4.4
7	T.V.R International Co.	Garment	-	B	0	35	35	2.078	72.7	0.788	27.6	0.145	5.1
8	Rangsit Footware Co., Ltd.	Shoe	8	F	0	756	756	0.124	93.7	0.031	23.4	0.035	26.5
9	Prasit Porn Construction Co.	Wood	5	F	0	5	5	0.124	0.6	0.031	0.2	0.035	0.2
10	Payongkij Co.	Wood	5	F	13	0	13	0.124	1.6	0.031	0.4	0.035	0.5
11	Thai Wood Box Factory	Wood box	8	F	7	0	7	0.124	0.9	0.031	0.2	0.035	0.2
12	V & S Paper Box Co.	Paper box	8	B	55	25	80	2.078	166.2	0.788	63.0	0.145	11.6
13	Chaiyasit Banchuphan Co., Ltd.	Paper box	8	B	10	14	24	2.078	49.9	0.788	18.9	0.145	3.5
14	Phasuk International Co.	Paper box	5	B	9	2	11	2.078	22.9	0.788	8.7	0.145	1.6
15	Moreland Co.	Salt	8	C	7	0	7	0.656	4.6	0.117	0.8	0.118	0.8
16	Holland Import Part. Ltd.	Paint	4	C	11	0	11	0.656	7.2	0.117	1.3	0.118	1.3
17	Karkua Lab. Co., Ltd.	Cosmetic and shampoo	8	A	5	15	20	2.776	55.5	3.122	62.4	1.014	20.3
18	Inter Ink Co., Ltd.	Ink	8	F	12	0	12	0.124	1.5	0.031	0.4	0.035	0.4
19	Ung Yong Lee Part.	Chinese stick	4	F	5	0	5	0.124	0.6	0.031	0.2	0.035	0.2
20	Ben Trading Co., Ltd.	Rubber product	9	C	5	0	5	0.656	3.3	0.117	0.6	0.118	0.6
21	Plastic Bag Co., Ltd.	Rubber bag	5	C	7	8	15	0.656	9.8	0.117	1.8	0.118	1.8
22	Precious Box Co., Ltd.	Jewelly box	18	C	0	315	315	0.656	206.6	0.117	36.9	0.118	37.2
23	P & S Trading Co., Ltd.	Plastic	4	C	8	12	20	0.656	13.1	0.117	2.3	0.118	2.4
24	Siripaiboon Plastic Co.	Plastic bottle	9	C	5	0	5	0.656	3.3	0.117	0.6	0.118	0.6
25	Aree Boonsub Co., Ltd.	Cement Block	5	D	17	0	17	0.642	10.9	0.149	2.5	3.093	52.6
26	Thai Granit Co., Ltd.	Marble	8	D	97	0	97	0.642	62.3	0.149	14.5	3.093	300.0
27	Material Testing Equipment Co.	Engineering tool reparing	8	F	10	0	10	0.124	1.2	0.031	0.3	0.035	0.4
28	Tatsuno Engineering Co.	Gas station	4	F	20	10	30	0.124	3.7	0.031	0.9	0.035	1.1
29	Tan Furniture Co.	Aluminum	4	D	13	0	13	0.642	8.3	0.149	1.9	3.093	40.2
30	Thai Lift Industries Co., Ltd.	Elevator	8	D	58	0	58	0.642	37.2	0.149	8.6	3.093	179.4
31	Alloy & Steel Co.	Door and window	4	D	8	0	8	0.642	5.1	0.149	1.2	3.093	24.7
32	J.C. Engineering Part.	Structural steel	8	D	150	200	350	0.642	224.7	0.149	52.2	3.093	1,082.6
33	Saha Siam Valve Supply Part.	Water valve	8	D	12	0	12	0.642	7.7	0.149	1.8	3.093	37.1
34	Technocrat Co., Ltd.	Lathe & Turn & welding	8	D	5	0	5	0.642	3.2	0.149	0.7	3.093	15.5
35	Toyota Pathum Thani Co.	Engine repair	8	D	14	0	14	0.642	9.0	0.149	2.1	3.093	43.3
36	G.M. Hishihara Co.,	Spare part	8	D	8	0	8	0.642	5.1	0.149	1.2	3.093	24.7
37	Nam Charoen Tractor Part.	Engine repair	8	D	8	0	8	0.642	5.1	0.149	1.2	3.093	24.7
38	Seagate Technology Co.	Electronic Equipment	8	E	0	3,475	3,475	0.196	681.1	0.048	166.8	0.036	125.1
39	Inchalok Technology Co.	Computer Parts	8	E	43	156	199	0.196	39.0	0.048	9.6	0.036	7.2
40	G.S.S. Electronics Co.	Electronic parts	8	E	76	367	443	0.196	86.8	0.048	21.3	0.036	15.9
41	Micro Polis Corp., Co.	Electronic parts	8	E	10	100	110	0.196	21.6	0.048	5.3	0.036	4.0
42	Thai Thavee Industrial Co.	Weighting	8	E	8	15	23	0.196	4.5	0.048	1.1	0.036	0.8
43	Thai Agency Engineering Co.	Machine	8	F	25	0	25	0.124	3.1	0.031	0.8	0.035	0.9
44	C.Y. Tech Co., Ltd.	I.C parts	8	E	13	73	86	0.196	16.9	0.048	4.1	0.036	3.1
45	G.S.S. Electronics Co.	Electronic part	8	E	167	200	367	0.196	71.9	0.048	17.6	0.036	13.2
46	S. New Light Halogen Lab. Co.	Ha Logen lamp	18	E	15	21	36	0.196	7.1	0.048	1.7	0.036	1.3
47	Safety Plus Co.,, Ltd.	Car decoration part	8	D	36	0	36	0.642	23.1	0.149	5.4	3.093	111.3
48	Bover Medical Industry Co.	Glucose line	4	F	0	145	145	0.124	18.0	0.031	4.5	0.035	5.1
49	Car Repair & Painting Co.	Car paint shop	7	D	8	0	8	0.642	5.1	0.149	1.2	3.093	24.7
50	Newuan Co., Ltd.	Car paint shop	8	D	35	0	35	0.642	22.5	0.149	5.2	3.093	108.3
51	Plastic Co.,	Plastic	8	C	6	1	7	0.656	4.6	0.117	0.8	0.118	0.8
52	Unic Gas Co.	Gass fill	8				n.a.		0.0		0.0		0.0
53	Mitsuji Co.	Motorcycle chain	8				n.a.		0.0		0.0		0.0
54	Sri Thammarat Packing Co.	Engine repair	8				n.a.		0.0		0.0		0.0
55	Yan Huan Co.	Sport apparatus	8				n.a.		0.0		0.0		0.0
56	Siam Richwood Co.	Wood carvubg	8				n.a.		0.0		0.0		0.0
57	T.V.R. International Co.	Sport wear	8				n.a.		0.0		0.0		0.0
58	Westcon Hydrology Co.	Water well drilling	8				n.a.		0.0		0.0		0.0
59	Jesada Transport & Construction Co.	Construction	8				n.a.		0.0		0.0		0.0
									0.0		0.0		0.0
60	Yeensflora Karnasat Co.	Agriculture product	15				n.a.		0.0		0.0		0.0
61	Kent Knitter Co.	Cloths	18				n.a.		0.0		0.0		0.0
62	Chareonthai Miller	Rice miller	3	A	3	0	3	2.776	8.3	3.122	9.4	1.014	3.0
63	Quick Pace Pacific Co., Ltd.	Plastic shoping bag	3	C	0	20	20	0.656	13.1	0.117	2.3	0.118	2.4
64	Siam System Built Co., Ltd	Concrete product	-	D	60	40	100	0.642	64.2	0.149	14.9	3.093	309.3
65	Upco Co., Ltd.	Concrete product	-	D	75	105	180	0.642	115.6	0.149	26.8	3.093	556.7
66	UD Industry Co., Ltd.	Gas stove	6	D	24	0	24	0.642	15.4	0.149	3.6	3.093	74.2
67	Shh Palace	Wood box	-	F	6	2	8	0.124	1.0	0.031	0.2	0.035	0.3
TOTAL					1,211	6,179	7,390	0.335	2,472.0	0.103	762.5	0.453	3,345.1

Table 3.7.5.2 (1) Data of Prachatipat

No.	Business Name	Products	Location (MooNo.)	Ind.Type Category	Number of Workers	WW. Q'ty (m3/d) per cap.	WW. Q'ty (m3/d) Total	BOD Load (kg/d) per cap.	BOD Load (kg/d) Total	SS Load (kg/d) per cap.	SS Load (kg/d) Total
1	Hoya Lense Co., Ltd.	Spectacle lense	2	F	1,015	0.124	125.9	0.031	31.5	0.035	35.5
2	T.T.I. Industrial Co., Ltd.	Textile	3	B	351	2.078	729.4	0.788	276.6	0.145	50.9
3	Enove Rubber Co., Ltd.	Tire, Tube	6	C	800	0.656	524.8	0.117	93.6	0.118	94.4
4	Bangkok Can Manufacturing Co., Ltd.	Can	5	D	194	0.642	124.5	0.149	28.9	3.093	600.0
5	Fajeeb Co., Ltd.	Bottle cover	5	C	330	0.656	216.5	0.117	38.6	0.118	38.9
6	Sunko Fastem Co., Ltd.	Bolt & Nut, screw	2	D	170	0.642	109.1	0.149	25.3	3.093	525.8
7	Siam Synthetics Industry Co., Ltd.	Cloth printing	4	F	688	0.124	85.3	0.031	21.3	0.035	24.1
8	Siam Textile Co., Ltd.	Textile	4	B	502	2.078	1,043.2	0.788	395.6	0.145	72.8
9	Green Sport Co., Ltd.	Beverage	5	F	200	0.124	24.8	0.031	6.2	0.035	7.0
10	Poduland Print Co., Ltd.	Cloth printing	1	F	35	0.124	4.3	0.031	1.1	0.035	1.2
11	Thai Wood Production Co., Ltd.	Wood carving	4	F	96	0.124	11.9	0.031	3.0	0.035	3.4
12	Thaipim Text Industry Co., Ltd.	Cloth printing	6	F	36	0.124	4.5	0.031	1.1	0.035	1.3
13	United Motorworks (Siam) Co., Ltd.	Motor reparing	1	D	38	0.642	24.4	0.149	5.7	3.093	117.5
14	United Aparele Co., Ltd.	Cloth	6	B	156	2.078	324.2	0.788	122.9	0.145	22.6
15	Asia Mill Industry Co., Ltd.	Rice miller	5	A	24	2.776	66.6	3.122	74.9	1.014	24.3
16	Yanhee Industry Co., Ltd.	Paper box	5	B	70	2.078	145.5	0.788	55.2	0.145	10.2
17	Tang-ar Minsae Co., Ltd.	Matches	4	F	210	0.124	26.0	0.031	6.5	0.035	7.4
18	Thai Laisart Co., Ltd.	Zinc oxide	1	E	18	0.196	3.5	0.048	0.9	0.036	0.6
19	Uni Thai Oxide Co., Ltd.	Zinc oxide	1	E	47	0.196	9.2	0.048	2.3	0.036	1.7
20	General Garment Co., Ltd.	Garment	2	B	100	2.078	207.8	0.788	78.8	0.145	14.5
21	Sang Soong Ice Co., Ltd.	Ice	1	F	17	0.124	2.1	0.031	0.5	0.035	0.6
22	Wag Nohow Co., Ltd.	Cleaning tool	4	F	13	0.124	1.6	0.031	0.4	0.035	0.5
23	Chin Yang Co., Ltd.	Nylon tent	2	F	104	0.124	12.9	0.031	3.2	0.035	3.6
24	Contract Rubber Part.	Rubber furniture	4	C	45	0.656	29.5	0.117	5.3	0.118	5.3
25	Super Line Metal Co., Ltd.	Plastic lining	3	D	20	0.642	12.8	0.149	3.0	3.093	61.9
26	Aluminium (Mrs. Somchit S.)	Aluminium frame	-	D	5	0.642	3.2	0.149	0.7	3.093	15.5
27	Porn Charoen	Shallac, paint	6	C	1	0.656	0.7	0.117	0.1	0.118	0.1
28	Boonchareon Pokkaphan	Bean curd	6	A	12	2.776	33.3	3.122	37.5	1.014	12.2
29	Low Seng Heng Part.	Noodle	2	A	10	2.776	27.8	3.122	31.2	1.014	10.1
30	Rang Rit Bakery Co.	Bakery	6	A	31	2.776	86.1	3.122	96.8	1.014	31.4
31	Mun Kong Tawom Part.	Noodle	6	A	11	2.776	30.5	3.122	34.3	1.014	11.2
32	Eastern Ham Ltd.,Part.	Sausage	-	A	14	2.776	38.9	3.122	43.7	1.014	14.2
33	Thai Heng Panich	Rice miller	3	A	4	2.776	11.1	3.122	12.5	1.014	4.1
34	Kij Charoen Miller	Rice miller	3	A	3	2.776	8.3	3.122	9.4	1.014	3.0
35	Miss Aree Thammaraktanont	Bean curd	6	A	15	2.776	41.6	3.122	46.8	1.014	15.2
36	Chok Anmuay Noodle	Noodle	6	A	4	2.776	11.1	3.122	12.5	1.014	4.1
37	Namprik Klong Rangsit (Lek)	Chiltee paste	2	A	10	2.776	27.8	3.122	31.2	1.014	10.1
38	Rangsit Knitting	Cloth	2	B	60	2.078	124.7	0.788	47.3	0.145	8.7
39	Charoenkit Calender Ltd.,Part.	Cloth	1	B	110	2.078	228.6	0.788	86.7	0.145	16.0
40	Grace Garment Co., Ltd.	Cloth	2	B	77	2.078	160.0	0.788	60.7	0.145	11.2
41	Dee Lak Aparele	Cloth	2	B	110	2.078	228.6	0.788	86.7	0.145	16.0
42	Fortune Bag Industry Co., Ltd.	Leather bag	-	F	48	0.124	6.0	0.031	1.5	0.035	1.7
43	Sin Tai Development Co., Ltd.	Leather products	1	F	7	0.124	0.9	0.031	0.2	0.035	0.2
44	Thai Sanho Industry Co., Ltd.	Sport shoes' part	2	F	97	0.124	12.0	0.031	3.0	0.035	3.4
45	Sport Focus Co., Ltd.	Shoes part	2	F	226	0.124	28.0	0.031	7.0	0.035	7.9
46	To Rung Ruengsin Ka Mai Ltd.,Part.	Plane wood	4	F	8	0.124	1.0	0.031	0.2	0.035	0.3

Table 3.7.5.2 (2) Data of Prachatipat

No.	Business Name	Products	Location (MooNo.)	Ind.Type Category	Number of Workers	WW. Q'ty (m3/d)		BOD Load (kg/d)		SS Load (kg/d)	
						per cap.	Total	per cap.	Total	per cap.	Total
47	Ka Mai Thai Ltd., Part.	Plane wood	4	F	5	0.124	0.6	0.031	0.2	0.035	0.2
48	Arun Roj Co., Ltd.	Plane wood	2	F	5	0.124	0.6	0.031	0.2	0.035	0.2
49	Ka Mai Poolsin Ltd., Part.	Plane wood	2	F	5	0.124	0.6	0.031	0.2	0.035	0.2
50	Kitchai Sricharoen Co., Ltd.	Door-window frame	2	F	5	0.124	0.6	0.031	0.2	0.035	0.2
51	T-ruler & circle ruler Co.	T-ruler	4	F	5	0.124	0.6	0.031	0.2	0.035	0.2
52	Waterwheel parts Co.	Waterwell parts	2	D	5	0.642	3.2	0.149	0.7	3.093	15.5
53	T & N Wood Furniture Co., Ltd.	Wood products	4	F	205	0.124	25.4	0.031	6.4	0.035	7.2
54	Rangsit Furniture	Furniture	6	F	45	0.124	5.6	0.031	1.4	0.035	1.6
55	Damreng Kit Furniture	Wood furniture	2	F	8	0.124	1.0	0.031	0.2	0.035	0.3
56	C.K Bhanchuphan Co., Ltd.	Paper box	–	B	5	2.078	10.4	0.788	3.9	0.145	0.7
57	Minsae Co., Ltd.	Matches	4	F	110	0.124	13.6	0.031	3.4	0.035	3.9
58	Seafood Container Co.	Container	4	C	18	0.656	11.8	0.117	2.1	0.118	2.1
59	Miss Marisa Pohbai	Concrete product	2	D	20	0.642	12.8	0.149	3.0	3.093	61.9
60	Nam Heng (Rangsit) Co.	Repair cement mix equipment	1	D	7	0.642	4.5	0.149	1.0	3.093	21.7
61	Sakda Lohakit Co., Ltd.	Steel door/window	2	D	6	0.642	3.9	0.149	0.9	3.093	18.6
62	B.H.P Laisart Co.,Ltd.	Steel roof, wall	2	D	25	0.642	16.1	0.149	3.7	3.093	77.3
63	Mr. Soradom Loh	Steel door/window	2	D	3	0.642	1.9	0.149	0.4	3.093	9.3
64	Charoenchai Lohakit Ltd., Part.	Steel furniture	6	D	6	0.642	3.9	0.149	0.9	3.093	18.6
65	Semkit Co.	Turn iron, knot	2	D	3	0.642	1.9	0.149	0.4	3.093	9.3
66	Micron Tech Ltd.,Part.	Knot, screw	1	D	3	0.642	1.9	0.149	0.4	3.093	9.3
67	Jung Fo Engineering Ltd., Part.	Turn iron	1	D	7	0.642	4.5	0.149	1.0	3.093	21.7
68	Jo Prasertkon Karnchang	Turn, ream engine	2	D	2	0.642	1.3	0.149	0.3	3.093	6.2
69	Yava Karnchang	Motor repair	2	D	10	0.642	6.4	0.149	1.5	3.093	30.9
70	Prasert Diesel	Car pump check	1	D	9	0.642	5.8	0.149	1.3	3.093	27.8
71	So Karnchang	Motor repair	2	D	9	0.642	5.8	0.149	1.3	3.093	27.8
72	Tong Kee Engineering	Turn iron	2	D	20	0.642	12.8	0.149	3.0	3.093	61.9
73	M.T.W Industrial Co., Ltd.	Car spare part	–	D	8	0.642	5.1	0.149	1.2	3.093	24.7
74	Mrs. Pranee Kaewwongvattana	Motor repair	2	D	6	0.642	3.9	0.149	0.9	3.093	18.6
75	Charoenpol Plow Car	Plow car	6	D	5	0.642	3.2	0.149	0.7	3.093	15.5
76	Pompat Kollakarn	Engine parts	1	D	9	0.642	5.8	0.149	1.3	3.093	27.8
77	Cilicin Co., Ltd.	VDO tape rewinder	2	F	13	0.124	1.6	0.031	0.4	0.035	0.5
78	Car leaf spring	Car leaf spring	1	D	5	0.642	3.2	0.149	0.7	3.093	15.5
79	Somchai Service	Truck repair	1	D	40	0.642	25.7	0.149	6.0	3.093	123.7
80	Sin Nakorn Karnchang	Car exhaust pipe	1	D	6	0.642	3.9	0.149	0.9	3.093	18.6
81	Taveep Header	Car exhaust pipe	1	D	2	0.642	1.3	0.149	0.3	3.093	6.2
82	Cafe Art	Ornamental	2	D	65	0.642	41.7	0.149	9.7	3.093	201.0
83	Rangsit Industrian Gray Co., Ltd.	Oxigen Filler	–	D	5	0.642	3.2	0.149	0.7	3.093	15.5
84	Mr. Samarn Damsrinuan	Car's equipment repair	1	D	5	0.642	3.2	0.149	0.7	3.093	15.5
TOTAL					6,862	0.764	5,240	0.291	1,994	0.414	2,840

PART 3

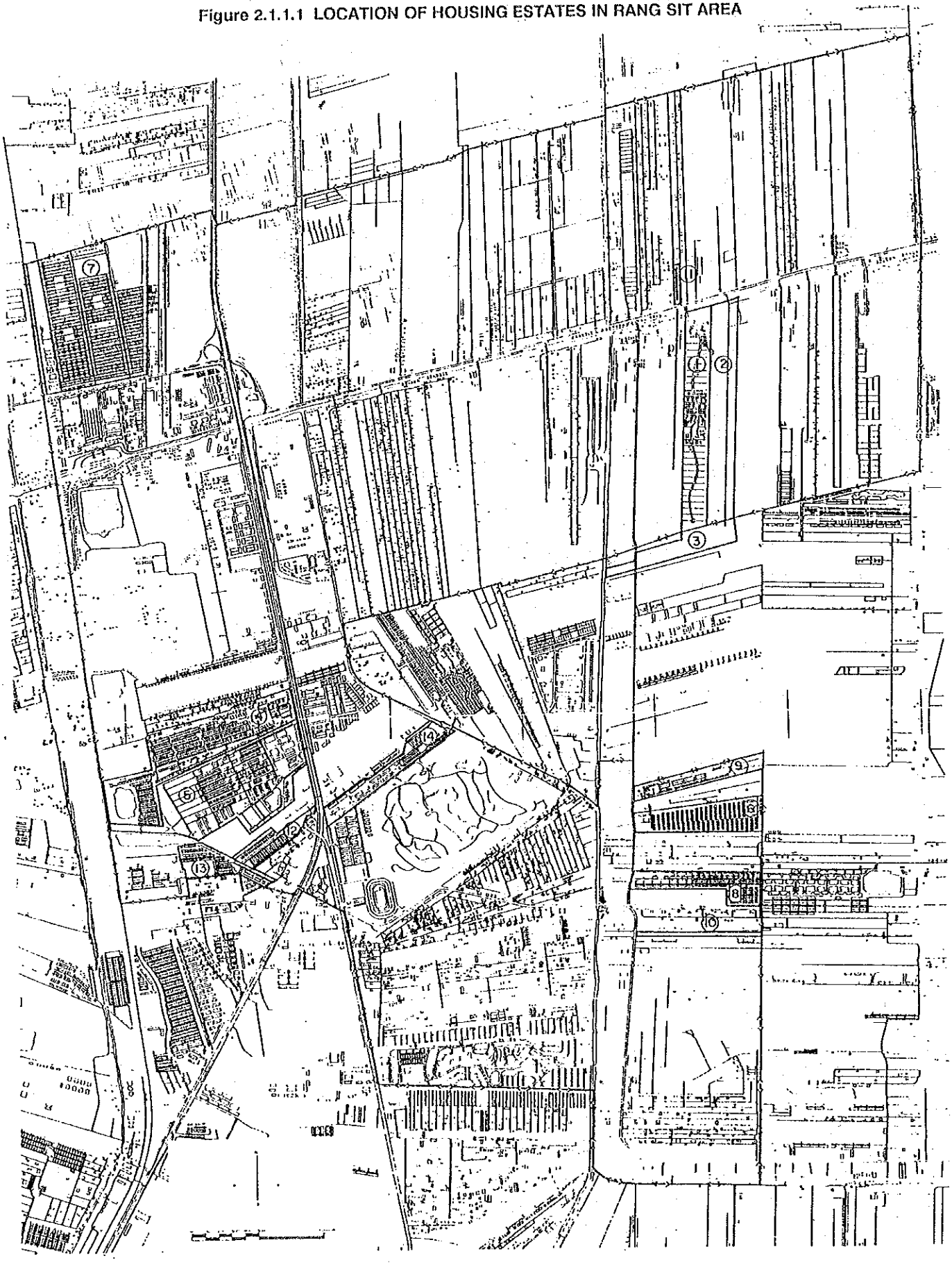
PRELIMINARY ENGINEERING DESIGN OF SEWERAGE SYSTEMS FOR RANGSIT AREA AND BANG BUA THONG MUNICIPALITY

2.1.1 Housing Estates in Rang Sit Area

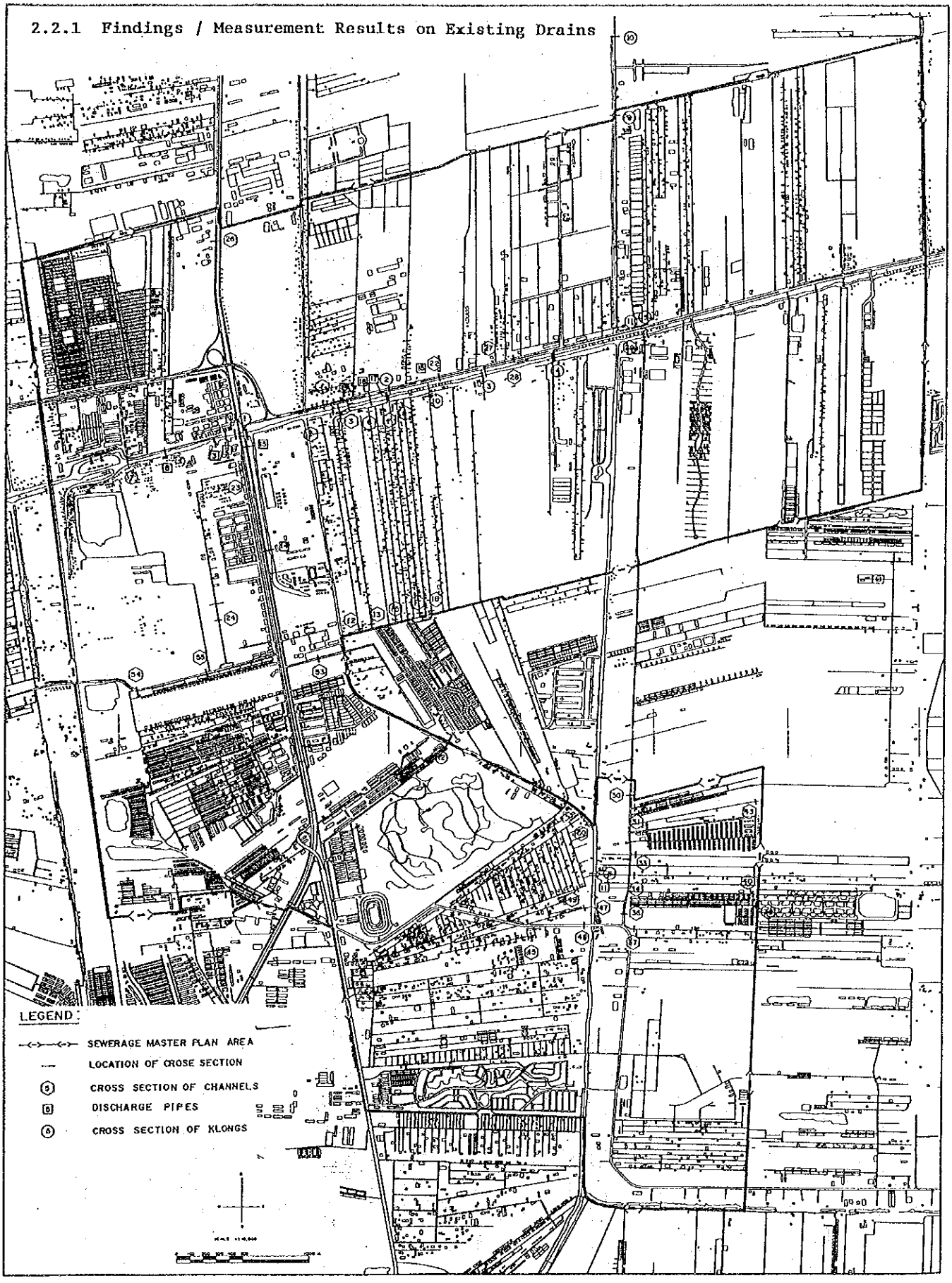
Table 2.1.1.1 Existing Housing Estates

No.	Name of H.C	No. of H.H.	Population	Pop. Density (per./ha)	Area Coverage (ha)	No. of S.T.P	Remarks
1.	Sriwalee--1	560	2,240	82	27.2	None	
2.	Sriwalee--2 (Planned)	1,200	4,800	86	56.0	1	
3.	Busarin (Planned)	593	2,372	98	25.6	1	
4.	Sriwalee	800	3,200	100	32.0	3	
5.	Rattana	2,000	8,000	250	32.0	1	
6.	Semafahkram (No Company)	700	2,800	100	24.0	None (1--Planned)	
7.	Rattanakosin	3,000	12,000	140	85.6	None (1--Planned)	
8.	Rom Yen	700	2,800	250	11.2	None	
9.	Cho Fah--1	500	2,000	167	12.0	None	
10.	Cho Fah--2 (Planned)	100	400	50	8.0	None	
11.	Ronnachal (Under Construction)	50	200	42	4.8	None	
12.	Ronnachal--2	150	600	125	4.8	None	
13.	Wang Tong--1	300	1,200	250	4.8	None	
14.	Wang Tong--2	300	1,200	300	4.0	None	

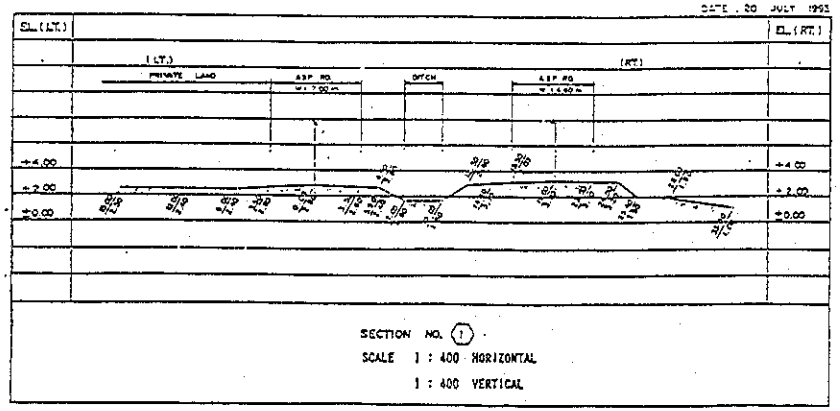
Figure 2.1.1.1 LOCATION OF HOUSING ESTATES IN RANG SIT AREA



2.2.1 Findings / Measurement Results on Existing Drains



(1) Cross Section of Channels



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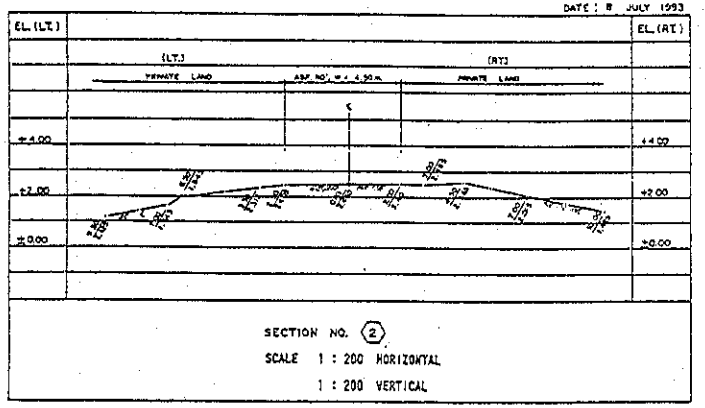

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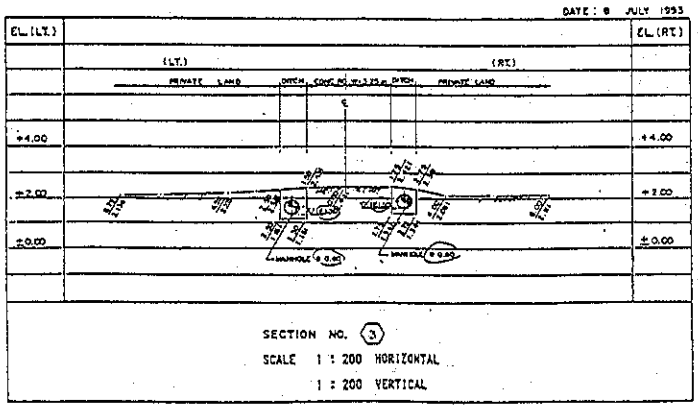

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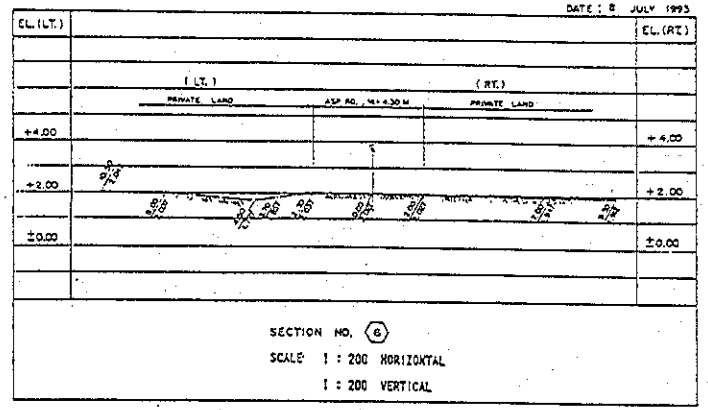

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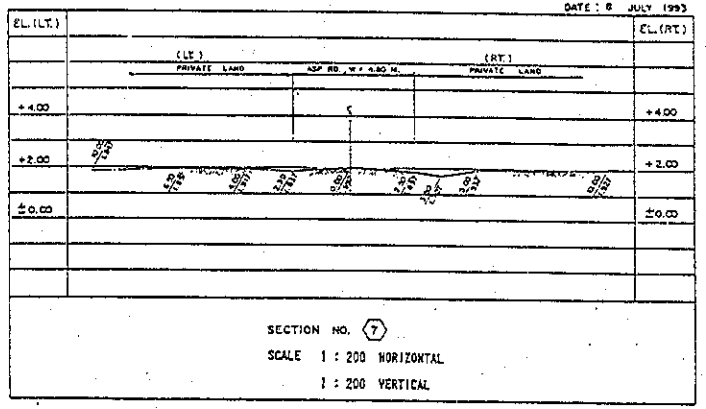

SECTION NO. ⑦
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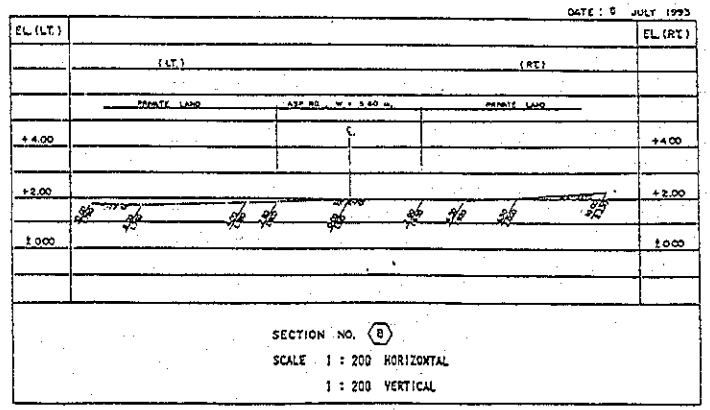

SECTION NO. ⑧
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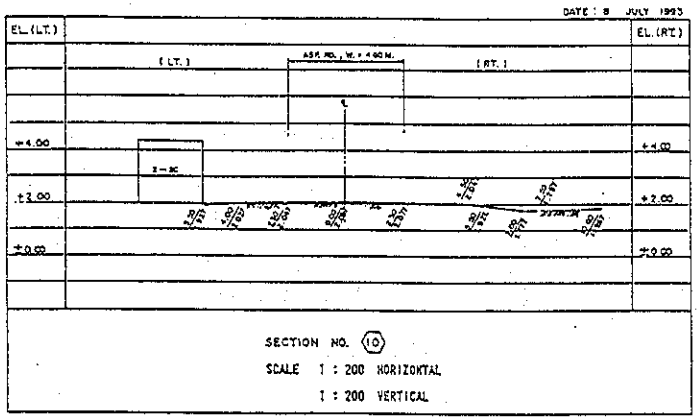
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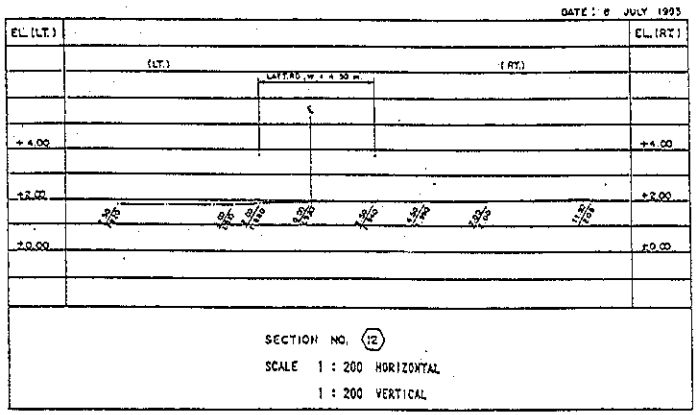
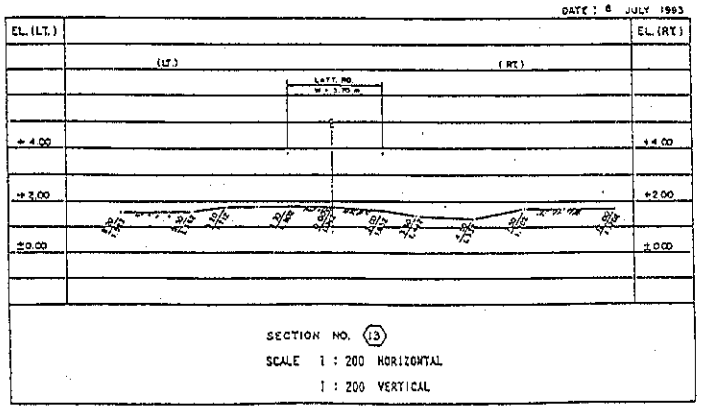
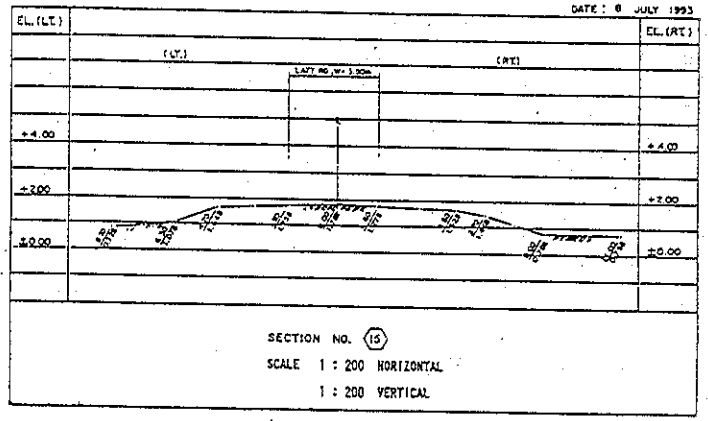
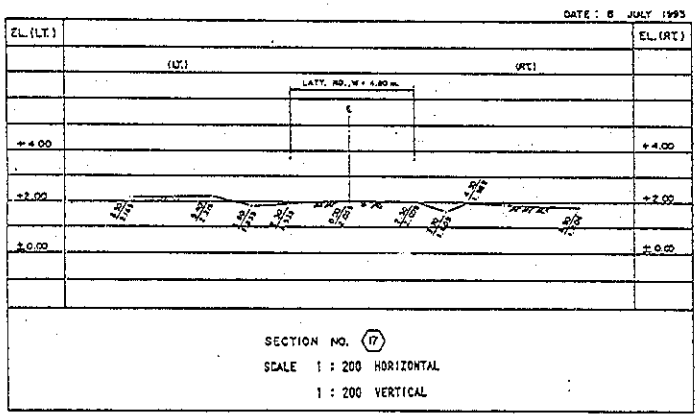
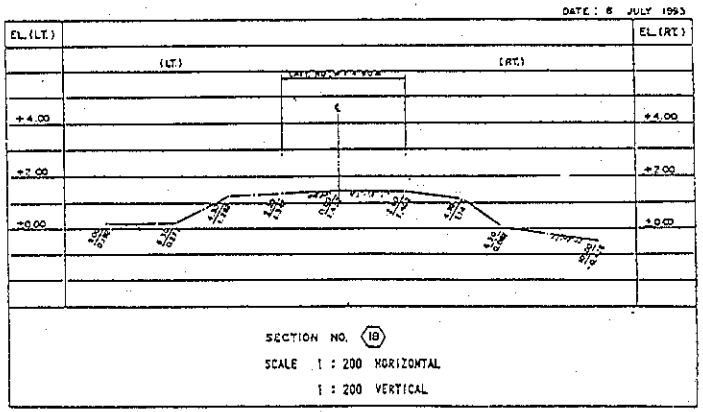
EL. (RT.)
(LT.)
ASP. RD., W. = 4.60 M.
(RT.)
+4.00
+2.00
±0.00
2-3C
SECTION NO. (10)
SCALE 1 : 200 HORIZONTAL
1 : 200 VERTICAL

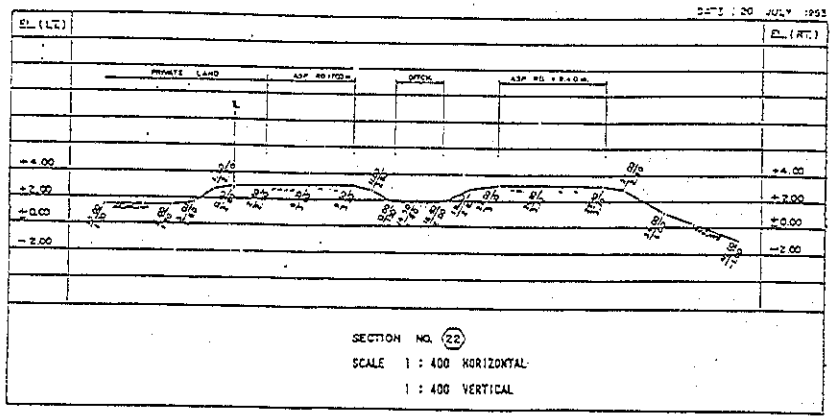

DATE : 8 JULY 1993
EL. (LT.)
EL. (RT.)
(LT.)
LATT. RD., W. = 4.55 m.
(RT.)
+4.00
+2.00
±0.00
SECTION NO. (12)
SCALE 1 : 200 HORIZONTAL
1 : 200 VERTICAL


DATE : 8 JULY 1993
EL. (LT.)
EL. (RT.)
(LT.)
(RT.)
+4.00
+2.00
±0.00
SECTION NO. (13)
SCALE 1 : 200 HORIZONTAL
1 : 200 VERTICAL

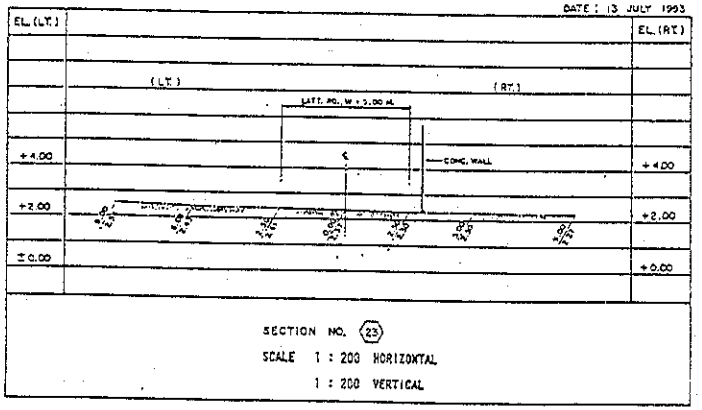

DATE : 8 JULY 1993
EL. (LT.)
EL. (RT.)
(LT.)
(RT.)
+4.00
+2.00
±0.00
SECTION NO. (15)
SCALE 1 : 200 HORIZONTAL
1 : 200 VERTICAL


DATE : 8 JULY 1993
EL. (LT.)
EL. (RT.)
(LT.)
(RT.)
+4.00
+2.00
±0.00
SECTION NO. (17)
SCALE 1 : 200 HORIZONTAL
1 : 200 VERTICAL

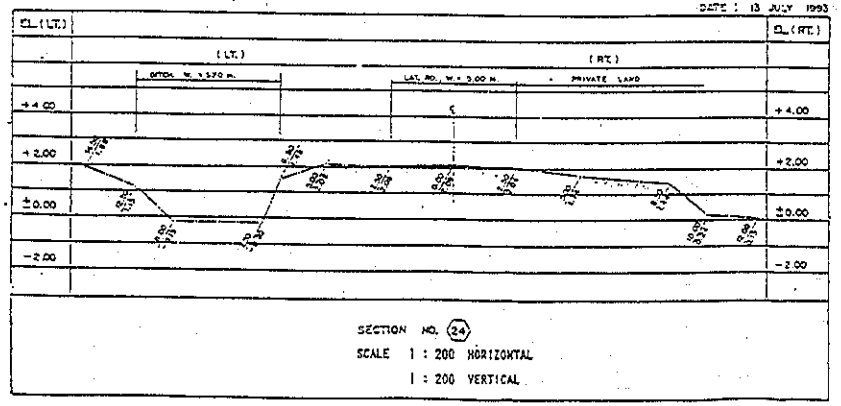

DATE : 8 JULY 1993
EL. (LT.)
EL. (RT.)
(LT.)
(RT.)
+4.00
+2.00
±0.00
SECTION NO. (18)
SCALE 1 : 200 HORIZONTAL
1 : 200 VERTICAL



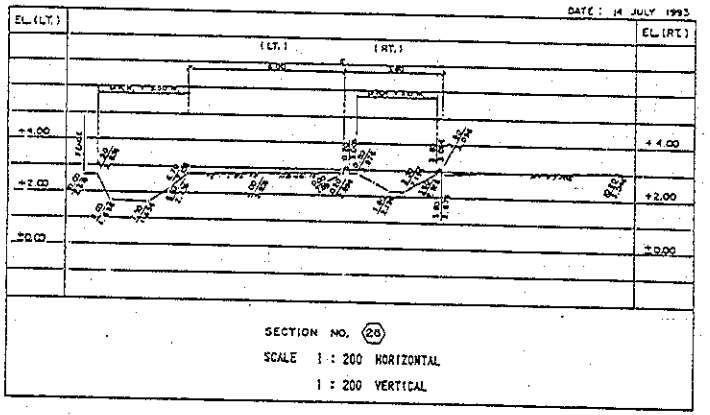
SECTION NO. (22)
SCALE 1 : 400 HORIZONTAL
1 : 400 VERTICAL



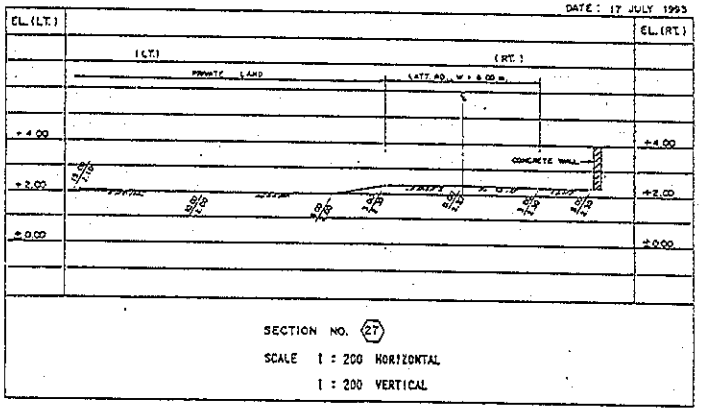
SECTION NO. (23)
SCALE 1 : 200 HORIZONTAL
1 : 200 VERTICAL



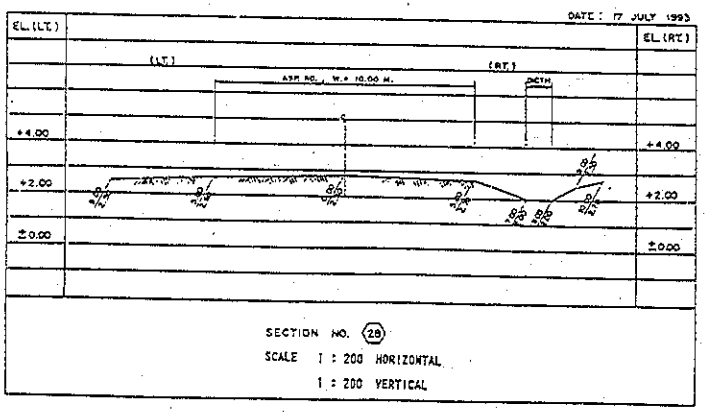
SECTION NO. (24)
SCALE 1 : 200 HORIZONTAL
1 : 200 VERTICAL



SECTION NO. (26)
SCALE 1 : 200 HORIZONTAL
1 : 200 VERTICAL



SECTION NO. (27)
SCALE 1 : 200 HORIZONTAL
1 : 200 VERTICAL



SECTION NO. (28)
SCALE 1 : 200 HORIZONTAL
1 : 200 VERTICAL