Table 1 Average monthly meteorological variables within last 30 years (between 1971 and 2000)

Meteorological Variables	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Temperature (^{o}C)													
Average	25.5	28.2	30.3	31.5	30.2	29.5	29.0	28.3	27.9	27.6	26.3	24.6	28.2
Maximum average	32.7	35.1	36.9	38.0	36.0	34.8	34.2	33.4	32.8	32.3	31.7	31.2	34.1
Minimum average	18.8	21.8	24.5	25.9	25.6	25.3	24.9	24.6	24.3	23.8	21.4	18.4	23.3
Maximum value	37.4	39.7	41.4	42.4	42.6	40.0	39.5	38.6	36.1	36.1	36.4	36.1	42.6
Minimum value	8.9	12.0	14.1	20.3	21.2	22.0	20.9	21.4	21.0	16.2	11.9	7.7	7.7
Humidity (%)													
Average	63.0	60.0	60.0	62.0	71.0	73.0	74.0	78.0	82.0	81.0	74.0	67.0	70.0
Maximum average	85.0	85.0	86.0	85.0	88.0	89.0	90.0	92.0	95.0	95.0	92.0	88.0	89.0
Minimum average	39.0	36.0	36.0	40.0	50.0	54.0	56.0	60.0	64.0	62.0	53.0	43.0	49.0
Pan evaporation (mm)													
Average	144.0	174.3	233.2	243.5	206.8	179.5	169.5	151.0	130.1	126.6	126.5	133.0	2,018.0
Wind speed (knots)													
Average	2.0	3.8	5.4	5.0	3.6	3.8	3.3	2.8	1.6	1.5	1.7	1.8	3.0
Direction	E	S	S	S	S	S	S	S	S	NE	NE	NE	-
Maximum value	25.0	30.0	40.0	50.0	48.0	45.0	37.0	45.0	40.0	30.0	21.0	25.0	50.0
Rainfall (mm)													
Average	5.4	12.5	33.4	58.3	153.1	110.4	133.1	185.0	218.2	132.6	30.5	4.9	1,077.4
Raining day	1.0	1.4	2.7	5.1	12.7	13.2	15.5	18.6	18.3	13.9	3.5	0.9	106.8
Maximum rainfall depth within 24 hrs.	60.9	55.3	112.3	84.9	150.1	127.8	96.1	78.2	102.9	87.2	52.5	40.3	150.1

Source: Meteorological Department (2000)

Table 2 Average monthly and annual rainfall data located in Bung Boraphet catchment and nearby areas

	Rainfall Sta.	Station Code	Range of Available Data	Average monthly rainfall depth (millimeters)												Annual
				Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	mm.
1.	A. Muang, Nakhon Sawan	26013	1952-1999	61.53	137.76	116.76	134.21	179.11	234.17	134.47	27.21	5.27	6.89	13.54	31.70	1,082.6
2.	A. Payahakeree, Nakhon Sawan	26052	1952-1999	55.04	129.37	108.06	123.23	161.44	237.79	153.11	28.52	2.17	5.50	8.34	22.98	1,035.5
3.	A. Chumsang, Nakhon sawan	26022	1952-1999	59.88	135.43	105.99	137.11	159.29	262.04	135.93	23.62	2.12	5.22	10.77	28.84	1,066.2
4.	A. Nongbua, Nakhon Sawan	26102	1952-1999	66.08	157.96	140.30	145.70	200.91	241.34	126.95	25.67	4.91	3.05	11.09	29.32	1,153.3
5.	A. Paisaree Nakhon Sawan	26122	1952-1999	66.14	146.93	126.51	129.37	173.40	219.57	125.33	17.68	1.75	6.46	7.29	33.18	1,053.6
6.	A. Chondan, Phetchaboon	36052	1955-1999	66.88	161.74	193.01	190.67	242.20	247.46	119.78	16.17	1.34	4.63	10.94	31.00	1,285.8
7.	A. Taklee, Nakhon Sawan	26082	1952-1999	41.09	108.69	113.31	127.86	150.90	259.43	130.26	22.46	0.60	3.40	5.88	25.33	989.2
8.	A. Tatako, Nakhon Sawan	26032	1952-1999	68.63	133.47	136.32	138.45	168.29	220.08	128.87	22.35	5.99	8.26	17.40	38.20	1,086.3
9.	A.Bangmunnak, Pichit	38022	1975-1999	48.37	155.16	117.00	136.92	159.32	242.15	120.46	24.66	1.85	2.65	5.21	20.75	1,034.5
10.	A. Klokphra, Nakhon Sawan	26042	1955-1999	61.24	136.18	112.98	126.40	182.28	245.00	138.80	28.95	2.53	6.55	11.44	24.70	1,077.0
11.	A. Takfa, Nakhon Sawan	26142	1981-1999	71.58	145.26	151.98	131.25	195.92	225.58	148.36	16.28	1.91	2.34	12.29	37.76	1,140.5
12.	A. Nongpai, Phetchaboon	36092	1965-1999	69.83	173.99	154.81	167.58	229.38	223.97	113.70	13.28	2.87	3.57	12.12	43.87	1,209.0

Source: RID (2004)

Table 4 Average monthly runoff of three stations in the Nan River Basin nearby Bung Boraphet catchment

Runoff gauging station		Station Code	Range of Available Data	Average monthly runoff (MCM)												Annual (MCM)
				Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	
1.	A. Bangmunnak, Pichit	N.8	1955-2000	341	451	613	831	1,598	2,324	1,788	849	486	280	281	355	10,198
2.	A. Chumsang, Nakhon sawan	N.14A	1951-2000	520	690	892	983	1,621	2,203	1,993	1,109	631	314	410	553	11,919
3.	A. Chumsang, Nakhon sawan	N.37	1968-1996	502	639	869	1,121	1,832	2,352	2,407	1,497	687	270	287	435	13,575

Source: RID (2004)

Table 10 Details of water quality data collection for each time.

Time	Date	Collected location in Bung Boraphet	Collected location in the tributaries	Collected water quality parameters
1	10/12/2002	Loc. 1, 8, 13, and 15	17, and 18	DO, BOD, SS, Turbidity, TP, TN, Phosphate, TKN, Chla, Temperature, Nitrate, pH
2	6/02/2003	Loc. 1 and 13	18	DO, BOD, SS, Turburbidity, TP, TN TKN, Chla, Temperature, Nitrate, Conductivity
3	10/02/2003	Loc. 1, 8, 15, 13 and 16	17, 19,and 20	DO,BOD,SS, Turbidity, TP, TN, Phosphate, TKN, Chla, Nitrate
4	27/04/2003	Loc. 8, 13 และ 15	-	DO, BOD, SS, Turbidity, TP, TN, Phosphate, TKN, Chla, Nitrate

Table 10 (Continued)

Time	Date	Collected location in Bung Boraphet	Collected location in the tributaries	Collected water quality parameters
5	22/05/2003	Loc. 1, 8, 13 and 15	17, 18, 19 and 20	DO, Temperature, Secchi Depth , Water depth
6	10/07/2003	Loc. 1, 3, 6, 7 and 8	17, 18, and 19	DO, Temperature, Secchi Depth , Water Depth
7	22/08/2003	Loc. 7, 8, 15, 13 and 16	17, 18, 19 and 20	DO, BOD, SS, Turbid, TP, TN, TKN, Chla, Temperature, Conductivity, Phospate, Nitrate Secchi, Water Depth
8	24/09/2003	Loc. 1, 3, 4, 6, 7, 8 12, 13, 15 and 16	17, 18, 19 and 20	DO, BOD,SS Turb, TP, TN,TKN, Chla, Temperature, Conductivity, Nitrate, Phosphate, Secchi, Water Depth

Table 10 (Continued)

Time	Date	Collected location in Bung Boraphet	Collected location in the tributaries	Collected water quality parameters
9	1/12/2003	Loc. 1, 2, 3, 4, 5, 6, 7, 8, 9,10,11,12, 13, 14, 15,and 16	17, 18, 19 and 20	DO, BOD,SS Turb,TP, TN,TKN, Chla, Temp,Conductivity, Nitrate, Phosphate, Secchi, Water Depth
10	1/2/2004	Loc. 1, 2, 3, 4, 5, 6, 7, 8, 9,10,11,12, 13, 14, 15,and 16	17, 18, 19 and 20	DO, BOD,SS Turb,TP, TN,TKN, Chla, Temp,Conductivity, Nitrate, Phosphate, Secchi, Water Depth
11	6/5/2004	Loc. 1, 2, 3, 4, 5, 6, 7, 8, 11,and returen flow from dredging operation	-	DO, BOD,SS Turb,TP, TN,TKN, Chla, Temp,Conductivity, Nitrate, Phosphate, Secchi, Water Depth
12	12/10/25004 -14/10/004	Loc. 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 24 and n	17, 18, 19 and 20	DO, BOD,SS Turb,TP, TN,TKN, Chla, Temp,Conductivity, Nitrate, Phosphate, Secchi, Water Depth

Table 11 Water quality parameters in Bung Boraphet and the Tributaries from the data collection

No.	Date	Time	Location	Regions	Water Quality Parameters													
					DO (mg/L)	BOD (mg/L)	SS (mg/L)	Turbid (NTU)	Secchi Depth (cm)	Water Depth (cm)	TP (mg/L)	TN (mg/L)	Phosphate (mg/L)	Nitrate (mg/L)	TKN (mg/L)	Chla (ug/L)	pH	Temp (C)
	10/12/02		13	BB	4.10	4.0	6.80	3.88	-	-	-	1.72	-	0.04	1.64	22.96	7.39	29.5
	10/12/02		8	BB	6.60	3.3	9.20	7.38	-	-	-	1.8	0.03	0.05	1.72	23.76	7.60	28
	10/12/02		17	Tributary	0.90	2.5	434	1,332.0	-	-	0.09	2.5	0.04	0.04	2.4	13	7.17	27
	10/12/02		18	Tributary	3.40	1.6	24	47.00	-	-	0.05	1.44	0.04	0.02	1.39	18	7.26	29
1	10/12/02	2:00	15	BB	4.30	2.9	6.30	6.70	-	-	0.06	1.5	0.02	0.02	1.44	3.92	7.40	27.5
	10/12/02	10:30	15	BB	5.80	2.6	9.30	10.20	-	-	0.02	2.98	0.01	1.64	1.25	5.97	7.53	28
	10/12/02	16:10	15	BB	5.20	3.0	11.7	11.20	-	-	0.04	1.46	0.01	0.02	1.42	9.35	7.57	29.2
	10/12/02	22:10	15	BB	4.50	2.6	8.00	7.02	-	-	0.04	1.45	0.01	0.02	1.4	6.41	7.52	28
	10/12/02	18:10	16	BB	3.20	2.4	20.5	62.80	-	-	0.04	1.4	0.02	0.04	1.36	7.12	7.39	28
	10/12/02		1	BB	6.60	2.8	14.4	9.32	-	-	0.06	0.54	0.03	0.02	0.51	24.03	7.81	29
	6/2/03		13	BB	7.60	2.0	13.0	8.96	-	-	0.02	1.22	0.01	0.02	1.2	-	-	26
	6/2/03		C1(N0629886,E1735502)	BB	6.60	3.2	25.5	30.70	-	-	0.03	1.11	0.01	0.04	1.06	-	8.80	24
2	6/2/03		C2(N0629840,E1735698)	BB	7.10	3.5	25.5	33.10	-	-	0.03	1.02	0.01	0.1	0.92	-	-	24
	6/2/03		18	Tributary	7.30	2.5	11	9.18	-	-	0.03	1.18	0.02	0.01	1.06	-	-	26
	6/2/03		1	BB	8.10	4.7	18.5	18.20	-	-	0.04	1.18	0.01	0.05	1.12	-	8.30	24
	10/2/03	10:30	13	BB	4.70	3.2	9.00	8.16	-	-	-	0.91	-	0.01	0.85	15.35	-	-
	10/2/03	13:20	8	BB	11.5	5.8	11.0	12.30	-	-	-	0.86	0.01	0.01	0.82	38.72	-	-
3	10/2/03	19:37	8	BB	11.6	5.4	12.0	11.30	-	-	-	1.46	0.02	0.01	1.42	29.90	-	-
	10/2/03	12:30	15	BB	2.10	5.3	12.5	12.00	-	-	0.03	2.03	0.01	0.43	1.6	25.37	-	-

Table 11 (Continued)

No.	Date	Time	Location	Regions	Water Quality Parameters													
					DO (mg/L)	BOD (mg/L)	SS (mg/L)	Turbidity (NTU)	Secchi Depth (cm)	Water Depth (cm)	TP (mg/L)	TN (mg/L)	Phosphate (mg/L)	Nitrate (mg/L)	TKN (mg/L)	Chla (ug/L)	pH	Temp (C)
3	10/2/03	18:40	15	BB	4.20	4.5	14.0	9.03	-	-	0.03	1.15	0.02	0.01	1.12	30.71	-	-
	10/2/03	18:10	16	BB	7.50	3.2	9.00	7.28	-	-	0.02	1.02	0.01	0.01	0.98	16.91	-	-
	10/2/03	16:30	1	BB	13.2	6.9	16.0	18.20	-	-	0.05	1.75	0.03	0.28	1.46	10.76	-	-
	11/2/03	13:25	8	BB	10.8	4.4	11.5	11.50	-	-	-	1.64	0.01	0.01	1.59	41.83	-	-
	11/2/03	10:50	8	BB	9.70	5.7	10.5	10.90	-	-	-	1.53	0.02	0.29	1.24	35.24	-	-
	11/2/03	14:00	17	Tributary	4.90	3.8	37	35.10	-	-	0.3	1.2	0.27	0.02	1.16	28	-	-
	11/2/03	13:08	20	Tributary	6.60	3.5	24	18.40	-	-	0.03	1.17	0.01	0.01	1.14	25	-	-
	11/2/03	12:30	19	Tributary	5.30	5.6	26	17.50	-	-	0.05	0.93	0.03	0.01	0.88	27	-	-
	11/2/03	0:06	15	BB	3.10	4.1	9.00	8.84	-	-	-	1.03	-	0.01	0.98	44.06	-	-
	11/2/03	11:52	19	BB	2.10	5.0	31.0	16.50	-	-	0.05	1.52	0.03	0.01	1.46	29.84	-	-
	27/4/03	10:45	13	BB	2.80	3.2	8.00	5.88	-	-	0.03	1.5	0.01	0.01	1.3	8.39	-	-
4	27/4/03	11:15	8	BB	5.10	4.0	12.8	10.80	-	-	-	1.6	0.02	0.1	1.4	20.25	-	-
	27/4/03	12:00	15	BB	3.20	6.0	16.7	14.40	-	-	0.04	1.8	0.02	0.02	1.7	47.73	-	-
	22/5/03	17.12	18	Tributary	6.49	-	-	-	-	-	-	-	-	-	-	-	-	32.5
	22/5/03	11.36	17	Tributary	5.26	-	-	-	-	-	-	-	-	-	-	-	-	32.2
	22/5/03	14.55	20	Tributary	8.25	-	-	-	-	-	-	-	-	-	-	-	-	29.8
	22/5/03	13.49	19	Tributary	10.7	-	-	-	-	-	-	-	-	-	-	-	-	35.4
5	22/5/03	11.00	13	BB	8.15	-	-	-	>60.5	60.5	-	-	-	-	-	-	-	31.6
	23/5/03	10.30	8	BB	6.39	-	10.0	-	85.50	201.5	-	-	-	-	-	-	-	32.4
	23/5/03	10.32	15	BB	12.9	-	38.0	-	38.50	59.5	-	-	-	-	-	-	-	33.5
	23/5/03	9.30	1	BB	6.10	-	34.0	-	42.50	329.5	-	-	-	-	-	-	-	30.4
	10/7/46		18	Tributary	9.01	-	-	-	28	-	-	-	-	-	-	-	-	-
6	10/7/46		17	Tributary	3.49	-	-	-	10	-	-	-	-	-	-	-	7.04	31.5
	10/7/46		19	Tributary	3.61	-	-	-	-	-	-	-	-	-	-	-	8.29	33.2

Table 11 (Continued)

No.	Date	Time	Location	Regions	Water Quality Parameters													
					DO (mg/L)	BOD (mg/L)	SS (mg/L)	Turbidity (NTU)	Secchi Depth (cm)	Water Depth (cm)	TP (mg/L)	TN (mg/L)	Phosphate (mg/L)	Nitrate (mg/L)	TKN (mg/L)	Chla (ug/L)	pH	Temp (C)
	10/7/46		20	Tributary	9.43	-	-	-	-	-	-	-	-	-	-	-	7.62	35.9
	11/7/46		7	BB	6.89	-	-	-	33	78	-	-	-	-	-	-	8.30	32.1
6	11/7/46		8	BB	6.36	-	-	-	116	156	-	-	-	-	-	-	8.29	31.7
	11/7/46		3	BB	4.92	-	-	-	17	50	-	-	-	-	-	-	9.50	32.3
	11/7/46		6	BB	5.16	-	-	-	12	53	-	-	-	-	-	-	8.02	31.1
	11/7/46		1	BB	6.70	-	-	-	28	120	-	-	-	-	-	-	8.50	30.0
	22/8/46	11:54	17	Tributary+ D2	0.79	5.2	46.5	88.90	22.00	108.00	0.04	1.98	0.03	0.66	1.3	-	-	-
	22/8/46	11:58	17(*)	Tributary	0.79	5.2	52	84.00	22.00	108.00	0.05	1.87	0.03	0.64	1.2	-	-	-
	22/8/46	15:40	20	Tributary	3.83	5.4	71	123.00	14.50	240.00	0.01	1.43	0.01	0.73	1.4	-	-	-
	22/8/46	14:50	19	Tributary	2.67	6.4	91	180.00	14.50	95.00	0.01	2.69	0.01	0.87	1.8	-	-	-
7	23/8/46	14:10	7	BB	7.30	5.2	15.7	17.30	42.00	390.00	0.02	0.52	0.01	0.01	0.5	13.35	-	-
	23/8/46	14:15	7*	BB	-	-	-	-	42.00	390.00	-	-	-	-	-	8.41	-	-
	23/8/46	12:35	13	BB	5.65	3.8	2.50	1.38	>65	65.00	0.01	1.08	0.01	0.55	0.5		-	-
	23/8/46	13:12	8	BB	7.76	4.2	6.30	5.96	87.00	128.00	-	0.53	0.01	0.01	0.4	7.21	-	-
	23/8/46	11:55	18	Tributary	4.40	4.9	10	19.70	52.00	130.00	0.01	0.95	0.005	0.43	0.5	-	-	-
	23/8/46	10:55	15	BB	2.85	4.6	3.30	5.14	>103	103.00	0.03	0.88	0.01	0.46	0.4	4.81	-	-
	23/8/46	10:35	16	BB	4.00	4.0	2.50	4.80	62.00	62.00	0.01	0.33	0.01	0.02	0.3	4.45	-	-
	24/9/46	16.16	7	BB	9.15	-	12.0	14.3	52	530	-	-	-	-	-	-	8.66	29.7
	24/9/46	15.39	13	BB	6.30	3.1	2.00	4.60	116	221	0.08	0.32	0.06	0.02	0.3	8.79	7.53	29.6
	24/9/46	15.53	8	BB	9.54	3.6	3.80	5.42	111	440	-	0.65	-	0.54	0.1	10.47	8.59	28.5
8	24/9/46	12.37	4	BB	6.92	-	35.5	36.80	31	254	-	-	-	-	-	-	8.24	32.8
	24/9/46	12.5	6	BB	7.80	-	27.0	30.60	35	300	-	-	-	-	-	-	8.41	30.6
	24/9/46	17.23	Regulator	Tributary	4.83	3.4	35	113.0	21	-	0.04	0.7	0.02	0.02	0.48	-	-	28.3
	24/9/46	15.1	18	Tributary	2.46	-	8	12.00	90	293	-	-	-	-	-	-	7.36	29.7

Table 11 (Continued)

No.	Date	Time	Location	Regions	Water Quality Parameters													
					DO (mg/L)	BOD (mg/L)	SS (mg/L)	Turbidity (NTU)	Secchi Depth (cm)	Water Depth (cm)	TP (mg/L)	TN (mg/L)	Phosphate (mg/L)	Nitrate (mg/L)	TKN (mg/L)	Chla (ug/L)	pH	Temp (C)
	24/9/46	14.43	11	BB	8.26	-	4.50	4.76	190	262	-	-	-	-	-	-	8.19	30.3
	24/9/46	14.22	14	BB	8.82	-	2.50	5.49	117	117	-	-	-	-	-	-	7.81	29.3
	24/9/46	14.03	15	BB	1.68	3.2	13.0	10.30	62	119	0.02	0.3	0.01	0.02	0.28	7.29	7.14	30.4
8	24/9/46	12.11	3	BB	6.50	-	28.5	30.00	32	145	-	-	-	-	-	-	8.06	32.2
	25/9/46	9.04	17	Tributary	0.68	3.4	13	21.6	36	245	0.04	0.58	0.01	0.39	0.18	-	7.15	31.2
	24/9/46	11:15	1	BB	6.40	-	14.00	15.50	46.2	409	-	-	-	-	-	-	7.75	31.6
	25/9/46	10.45	20	Tributary	3.04	4.1	25	28.1	42	125	0.05	0.48	0.02	0.34	0.12	-	7.25	29.8
	25/9/46	9.51	19	Tributary	2.82	4.2	14	29.4	35	112	0.05	0.44	0.02	0.26	0.17	-	6.97	31.9
	1/12/46	11.57	17	Tributary	0.21	2.40	7	9.73	94	280	0.05	0.24	0.04	0.01	0.22	-	6.74	29.6
	1/12/46	14.04	20	Tributary	1.56	3.20	11	11.70	84	189	0.04	0.31	0.03	0.02	0.28	-	7.27	30.2
	1/12/46	13.23	19	Tributary	4.01	2.60	23	70.10	28	93	0.08	0.42	0.05	0.01	0.39	-	7.25	30.2
	2/12/46	10.45	7	BB	7.68	2.9	18.8	16.70	61	500	0.04	0.22	0.03	0.02	0.2	24.03	8.03	27
	2/12/46	11.12	8	BB	8.44	3.4	5.2	5.42	84	327	0.03	0.24	0.02	0.03	0.2	20.03	8.12	26.7
	2/12/46	15.17	10	BB	8.63	3.2	4.7	4.61	97	368	0.04	0.33	0.02	0.02	0.3	17.80	8.28	27.1
	2/12/46	10.04	4	BB	7.41	2.8	37.6	31.80	35	337	0.05	0.24	0.04	0.01	0.22	24.92	7.70	26.5
	2/12/46	10.18	6	BB	5.92	-	21.6	17.10	42	313	-	-	-	-	-	-	7.95	26.3
9	2/12/46	13.21	18	Tributary	1.15	2.4	6	4.32	107	398	0.06	0.22	0.04	0.01	0.22	-	7.22	27.7
	2/12/46	9.51	5	BB	7.26	3.4	24.4	18.60	55	204	0.06	0.24	0.04	0.03	0.19	19.71	7.79	26.4
	2/12/46	14.42	11	BB	8.93	3.7	4.8	4.43	86	345	0.03	0.38	0.02	0.04	0.31	16.51	8.28	27
	2/12/46	11.32	9	BB	7.70	2.4	32.2	57.00	31	310	0.04	0.38	0.02	0.01	0.36	19.58	7.89	26.3
	2/12/46	14.26	14	BB	8.67	4.1	6	4.95	81	355	0.03	0.56	0.02	0.04	0.5	27.23	8.24	27.3
	2/12/46	9.26	2	BB	7.24	3.0	20.4	16.90	65	199	0.05	0.33	0.03	0.03	0.3	24.03	7.86	26.6
	2/12/46	14.09	15	BB	6.94	5.0	4.8	6.05	76	332	0.03	0.45	0.02	0.05	0.38	25.51	7.82	28.5
	2/12/46	9.32	3	BB	6.51	-	27.8	25.60	39	231	-	-	-	-	-	-	7.79	27.1
	2/12/46	14.55	12	BB	9.68	4.8	4.8	4.70	92	272	0.04	0.34	0.03	0.05	0.28	21.85	8.22	26.8

Table 11 (Continued)

No.	Date	Time	Location	Regions	Water Quality Parameters													
					DO (mg/L)	BOD (mg/L)	SS (mg/L)	Turbidity (NTU)	Secchi Depth (cm)	Water Depth (cm)	TP (mg/L)	TN (mg/L)	Phosphate (mg/L)	Nitrate (mg/L)	TKN (mg/L)	Chla (ug/L)	pH	Temp (C)
	1/2/47	12.07	7	BB	6.75	1.2	27.5	29.2	44.0	403	0.03	0.31	0.02	0.01	0.28	25	-	31.5
	1/2/47	12.35	8	BB	9.74	1.4	7.6	7.0	107.0	178	0.04	0.31	0.02	0.02	0.26	10	-	27.5
	1/2/47	16.07	10	BB	8.60	1.0	5.2	4.6	106.0	283	0.02	0.28	0.01	0.02	0.25	11	-	27.1
	1/2/47	11.48	4	BB	7.28	1.3	39.0	35.3	47.0	237	0.07	0.4	0.06	0.03	0.36	28	-	28.1
	1/2/47	11.56	6	BB	8.31	1.0	24.0	33.6	43.0	228	0.05	0.26	0.04	0.02	0.24	15	-	27.5
	1/2/47	14.29	18	Tributary	5.06	2.4	6.8	6.8	93.0	226	0.04	0.35	0.02	0.01	0.31	10	-	28.4
	1/2/47	15.48	11	BB	9.32	1.4	6.0	6.1	77.0	310	0.02	0.32	0.01	0.01	0.29	12	-	27.7
	1/2/47	11.3	2	BB	8.17	1.6	25.0	23.5	42.0	136	0.04	0.34	0.03	0.02	0.32	23	-	27.6
	1/2/47	12.26	9	BB	9.09	1.0	22.0	28.0	51.0	229	0.04	0.27	0.03	0.03	0.22	12	-	27.6
10	1/2/47	15.30	14	BB	9.25	1.2	7.6	5.6	78.0	239	0.01	0.34	0.01	0.02	0.3	10	-	27.9
	1/2/47	11.11	2	BB	7.80	1.0	14.5	16.0	52.0	114	0.04	0.29	0.03	0.01	0.28	25	-	27.6
	1/2/47	15.14	15	BB	13.13	1.6	6.4	4.4	74.0	125	0.02	0.42	0.01	0.01	0.4	12	-	28.8
	1/2/47	11.19	3	BB	7.20	-	20.8	22.0	50.0	138	-	-	-	-	-	-	-	27.5
	1/2/47	15.55	12	BB	10.06	1.5	6.8	5.9	86.0	195	0.02	0.31	0.01	0.01	0.28	10	-	27.5
	1/2/47	11.03	1	BB	6.79	2.3	16.5	17.8	47.0	404	0.03	0.37	0.02	0.01	0.35	25	-	28.3
	2/2/47	9.30	17	Tributary	0.64	1.2	7.0	8.2	92.0	233	0.02	0.39	0.02	0.02	0.35	-	-	28.2
	2/2/47	11.35	20	Tributary	4.07	1.8	52.0	35.9	45.0	112	0.05	0.45	0.04	0.03	0.4	-	-	28.3
	2/2/47	10.35	19	Tributary	3.57	1.2	146.9	75.1	99.0	99	0.07	0.37	0.06	0.04	0.3	-	-	28.6
	6/5/47	15.58	1	BB	5.52	2.9	29.2	38.4	40	287	0.03	0.49	-	0.01	-	12.46	-	30.3
	6/5/47	16.10	2	BB	6.31	3.5	91.0	91.5	23	56	0.04	0.48	-	0.01	-		-	31.3
	6/5/47	16.20	3	BB	6.12	4.2	117.	139.0	18	65	0.05	0.72	-	0.03	-		-	32.6
11	6/5/47	16.39	2*	BB	7.15	3.6	134.5	150.0	22	115	0.05	0.65	-	0.02	-		-	30.8
	6/5/47	14.26	3*	BB	5.57	3.3	91.0	116.0	12	112	0.05	0.48	-	0.02	-		-	29.7
	6/5/47	15.09	6	BB	5.03	3.1	124.0	153.0	11	98	0.07	0.7	-	0.04	-	25.36	-	30.1
	6/5/47	14.11	7	BB	4.83	3.0	39.5	52.8	79	307	0.05	0.67	-	0.03	-	13.88	-	30.5

Table 11 (Continued)

No.	Date	Time	Location	Regions	Water Quality Parameters													
					DO (mg/L)	BOD (mg/L)	SS (mg/L)	Turbidity (NTU)	Secchi Depth (cm)	Water Depth (cm)	TP (mg/L)	TN (mg/L)	Phosphate (mg/L)	Nitrate (mg/L)	TKN (mg/L)	Chla (ug/L)	pH	Temp (C)
11	6/5/47	12.07	14	BB	9.32	1.2	1.5	2.5	>124	124	0.03	0.42	-	0.02	-	1.47	-	31.5
	6/5/47	12.40	11	BB	8.66	-	1.0	2.2	172	198	-	-	-	-	-	-	-	30.0
	6/5/47	12.20	5	BB	7.95	-	1.0	2.4	>41	41	-	-	-	-	-	-	-	31.1
	6/5/47	13.41	8	BB	9.87	-	9.5	13.8	87	101	-	-	-	-	-	-	-	32.3
	6/5/47		Return flow from Dred Oper.	BB	5.21	-	3240	28700.	17	89	-	-	-	-	-	-	-	-
12	12/10/47	13.05	20	Tributary	2.06	1.2	11.0	11.8	116	217	0.02	0.28	-	0.02	-	-	7.00	33.2
	12/10/47	17.5	19	Tributary	0.77	3.8	14.5	17.5	69	262	0.04	0.4	-	0.03	-	-	7.13	32.8
	12/10/47	15.08	8	BB	3.45	2.4	2.0	6.0	138	331	0.05	0.32	-	0.03	-	4.62	7.26	31.3
	12/10/47	16.10	10	BB	3.18	3.1	2.4	4.5	135	290	0.01	0.16	-	0.01	-	9.79	7.09	30.5
	12/10/47	15.54	18	Tributary	1.41	1.9	5.5	6.0	142	406	0.03	0.3	-	0.02	-	-	7.21	31.2
	12/10/47	14.25	11	BB	1.83	2.9	4.0	5.4	128	370	0.05	0.31	-	0.02	-	8.01	7.18	33.2
	12/10/47	14.57	9	BB	4.01	1.6	2.0	11.9	125	391	0.03	-	-	-	-	1.33	7.13	31.9
	12/10/47	14.04	14	BB	5.59	2.5	4.0	3.5	178	364	0.02	0.2	-	0.01	-	5.34	7.13	32.8
	12/10/47	13.31	15	BB	0.61	3.2	1.0	4.3	128	261	0.04	0.4	-	0.03	-	6.05	7.05	32.2
	12/10/47	14.43	12	BB	1.97	2.5	7.0	11.3	103	276	0.03	0.29	-	0.04	-	9.61	7.25	33.4
	13/10/47	13.25	17	Tributary	-	1.9	8.4	12.1	-	-	0.03	0.32	-	0.02	-	-	-	-
	13/10/47	10.5	7	BB	4.87	1.7	6.5	7.3	128	521	0.02	0.18	-	0.01	-	4.27	7.27	30.4
	13/10/47	11.40	1	BB	5.55	1.9	15.0	16.6	86	320	0.02	0.2	-	0.01	-	2.14	7.40	30.7
	13/10/47	11.36	3	BB	5.43	-	11.0	11.3	95	303	-	-	-	-	-	4.93	7.37	30.7
	14/10/47	11.10	2	BB	4.69	1.3	7.5	11.0	103	374	0.01	0.15	-	0.02	-	7.39	7.36	31.5
	14/10/47	11.00	6	BB	4.76	1.3	6.0	7.5	112	373	0.02	0.2	-	0.01	-	5.34	7.34	31.3
	14/10/47	11.20	5	BB	4.81	1.9	8.0	9.7	100	276	0.03	0.25	-	0.02	-	6.48	7.29	30.9

Table 19 Annual summary of hydrological budget component of Bung Boarphet

Year	Inflow /Outflow period[1]	Comp. Period	No. of comp. point (days)	Outflow Storages (MCM)									Inflow Storages (MCM)						
				Evap	Seepag	Klong Bon	Klong Tatak	Irri. Canal 1	Irri. Canal 2	Weir	Reg. Out	Total Outflow	Direct Rainfall	Nan River	Klong Bon	Klong Tatako	Irri. Canal 1	Irri. Canal 2	Total Inflow
				(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
2002 - 2003	1-2 (Out F. period)	11/12/02 – 14/7/03	210	53.6 (37.1)	0.098 (0.07)	30.33 (21.0)	45.58 (31.5)	11.82 (8.2)	3.10 (2.1)	-	-	144.6 (100)	21.33 (100)		-	-	-	-	21.34 (100)
2003	2-11[2] (In F. period)	15/7/03 - 22/10/03	99	27.26 (99.8)	0.049 (0.2)	-	-	-	-	-	-	27.31 (100)	28.49 (16.6)	3.95 (2.3)	36.05 (21.0)	99.92 (58.3)	1.46 (0.85)	1.44 (0.84)	171.3 (100)
2003 - 2004	3-4 (Out F. period)	10/11/03 – 23/5/04	195	56.84 (39.0)	0.100 (0.07)	30.78 (21.1)	44.81 (30.7)	10.50 (7.2)	2.70 (1.8)	-	-	145.7 (100)	4.86 (100)	-	-	-	-	-	4.860 (100)
2004	4-5 (In F. period)	24/5/04 -23/9/04	123	52.36 (88.2)	0.087 (0.15)	-	-	-	-	5.705 (9.6)	1.178 (2.05)	59.33 (100)	86.96 (37.2)	1.84 (0.79)	40.46 (17.3)	97.90 (41.9)	4.809 (2.1)	1.567 (0.67)	233.5 (100)
2004 2005	5-12[3] (Out F. P)	24/9/04 -13/5/05	232	82.33 (47.2)	0.142 (0.08)	22.89 (13.1)	45.15 (25.9)	9.37 (5.4)	2.46 (1.4)	8.662 (5.0)	3.540 (1.92)	174.5 (100)	7.12 (100)	-	-	-	-	-	7.12 (100)

Table 19 (Continued)

Year	Inflow /Outflow period[1]	Comp. Period	No. of comp. point (days)	Outflow Storages (MCM)									Inflow Storages (MCM)						
				Evap (%)	Seepag (%)	Klong Bon (%)	Klong Tatak (%)	Irri. Canal 1 (%)	Irri. Canal 2 (%)	Weir (%)	Reg. Out (%)	Total Outflow (%)	Direct Rainfall (%)	Nan River (%)	Klong Bon (%)	Klong Tatako (%)	Irri. Canal 1 (%)	Irri. Canal 2 (%)	Total Inflow (%)
2004 - 2005	5-12[3] (Out F. period)	24/9/04 -13/5/05	232	82.33 (47.2)	0.142 (0.08)	22.89 (13.1)	45.15 (25.9)	9.37 (5.4)	2.46 (1.4)	8.662 (5.0)	3.540 (1.92)	174.5 (100)	7.12 (100)	-	-	-	-	-	7.12 (100)
2005	6-7 (In F. period)	26/8/05 - 13/11/05	80	25.87 (89.3)	0.048 (0.15)	-	-	-	-	2.36 (8.2)	0.67 (2.35)	28.95 (100)	63.71 (26.7)	-	49.75 (20.9)	120.6 (50.6)	3.132 (1.3)	1.204 (0.5)	238.4 (100)
2005 – 2006	7-13 (In F. period)	14/11/05 - 19/5/06	187	60.5 (43.9)	0.11 (0.08)	23.48 (17.0)	38.75 (28.1)	8.28 (6.0)	2.22 (1.62)	3.46 (2.53)	1.06 (0.77)	137.86 (100)	5.44 (58.6)	-	-	-	-	-	5.44 (100)
Average values n Inflow period (%)			302	35.17 (92.4)	0.06 (0.16)	-	-	-	-	2.69 (5.94)	0.62 (1.47)	38.54 (100%)	59.72 (27.7)	2.89 (1.34)	42.09 (19.5)	106.1 (49.3)	3.13 (1.45)	1.40 (0.65)	215.3 (100)
Average values in outflow period (%)			824	63.34 (42.04)	0.11 (0.07)	26.87 (17.83)	43.57 (28.91)	9.99 (6.63)	2.62 (1.74)	3.03 (2.02)	1.15 (0.76)	150.68 (100)	9.69 (100)	-	-	-	-	-	9.69 (100)

Appendix Table 1 Water Quality data collected by PCD

Station	Date	Temp(w)	pH	tur	DO	BOD	Tot Coli	Fecal Coli	TP	NO3-N	NO2-N	NH3-N	SS	TS	TDS
BP01	12/11/2003	27.4	8.1	13	7.6	1.8	40	<2	0.04	0.01	0.01	0.31	24	175	151
BP02	12/11/2003	27.6	8.4	4	7.5	2.1	20	<2	0.03	0.01	0.01	0.32	7	184	177
BP03	12/11/2003	27.6	8.2	5	7.5	2.3	<2	<2	0.06	0.01	0.01	0.32	51	170	119
BP04	12/11/2003	27.3	8.5	6	6.7	2.1	<2	<2	0.04	0.01	0.01	0.31	9	144	135
BP05	12/11/2003	27.3	7.8	14	7.7	1.7	40	20	0.05	0.01	0.01	0.33	24	156	132
BP01	9/10/2003	30.0	8.3	65	7.0	<0.60	<2	<2	0.03	0.01	0.01	<0.01	41	280	139
BP02	9/10/2003	30.0	8.3	20	7.6	<0.60	<2	<2	0.04	0.01	0.01	0.04	16	238	222
BP03	9/10/2003	30.0	8.8	35	8.3	<0.60	<2	<2	0.03	0.01	0.01	<0.01	<2	200	198
BP04	9/10/2003	30.0	9.0	4	9.2	<0.60	<2	<2	0.02	<0.01	<0.01	<0.01	<2	206	204
BP05	9/10/2003	31.2	7.9	38	6.5	<0.60	40	<2	0.06	<0.01	<0.01	0.06	34	246	212
BP01	6/17/2003	31.0	8.1	97	7.7	1.7	40	20	0.07	0.04	0.04	<0.01	56	268	212
BP02	6/17/2003	31.2	8.2	15	7.3	<0.60	<2	<2	0.04	<0.01	<0.01	<0.01	7	196	189
BP03	6/17/2003	31.6	8.5	8	8.8	<0.60	<2	<2	0.03	0.01	0.01	<0.01	2	194	192
BP04	6/17/2003	32.1	8.1	16	7.5	<0.60	<2	<2	0.04	0.01	0.01	<0.01	10	200	190
BP05	6/17/2003	30.9	7.8	91	5.8	<0.60	40	20	0.07	0.03	0.03	0.07	56	266	210
BP01	3/18/2003	28.7	8.1	47	6.7	3.5	90	<2	0.06	0.01	0.01	0.05	30	220	190
BP02	3/18/2003	29.0	8.4	20	5.0	3.4	130	<2	0.08	<0.01	<0.01	0.02	173	206	33
BP03	3/18/2003	29.9	8.6	22	7.0	3.0	110	<2	0.07	<0.01	<0.01	0.03	92	202	110
BP04	3/18/2003	30.4	8.4	16	5.7	3.1	20	<2	0.06	<0.01	<0.01	0.02	85	190	105
BP05	3/18/2003	29.5	8.1	61	4.5	4.3	110	<2	0.05	0.01	0.01	0.02	42	228	186
BP01	12/17/2002	31.5	7.5	11	6.7	2.9	170	170	-	<0.01	<0.01	0.05	-	-	-
BP02	12/17/2002	31.3	7.5	9	7.2	2.8	<2	<2	-	<0.01	<0.01	0.05	-	-	-
BP03	12/17/2002	31.1	7.7	10	8.4	2.7	<2	<2	-	<0.01	<0.01	0.04	-	-	-
BP04	12/17/2002	31.3	7.4	12	7.9	2.7	<2	<2	-	<0.01	<0.01	0.05	-	-	-
BP05	12/17/2002	31.2	7.3	13	7.8	3.5	<2	<2	-	<0.01	<0.01	0.05	-	-	-
BP01	8/29/2002	29.2	8.2	173	6.0	1.3	4,300	43	-	-	-	-	-	-	-
BP02	8/29/2002	30.0	8.1	3	6.2	2.4	43	4	-	-	-	-	-	-	-
BP03	8/29/2002	29.4	8.0	2	6.4	1.0	4	4	-	-	-	-	-	-	-
BP04	8/29/2002	30.0	8.2	5	7.7	2.7	23	23	-	-	-	-	-	-	-
BP05	8/29/2002	29.3	7.9	37	6.0	1.7	240	93	-	-	-	-	-	-	-
BP01	6/25/2002	29.0	8.6	64	7.0	4.0	93	9	-	-	-	-	-	-	-

Appendix Table 1 (Continued)

Station	Date	Temp(w)	pH	tur	DO	BOD	Tot Coli	Fecal Coli	TP	NO3-N	NO2-N	NH3-N	SS	TS	TDS
BP02	6/25/2002	28.0	8.7	8	6.6	3.6	43	ND	-	-	-	-	-	-	-
BP03	6/25/2002	28.0	9.9	2	9.0	3.0	900	ND	-	-	-	-	-	-	-
BP04	6/25/2002	29.0	9.0	13	8.0	<1.0	43	23	-	-	-	-	-	-	-
BP05	6/25/2002	28.0	8.3	23	6.7	4.7	210	39	-	-	-	-	-	-	-
BP01	3/20/2002	31.1	8.8	2	8.0	1.1	<2	<2	-	<0.01	<0.01	0.12	<2	174	172
BP02	3/20/2002	31.9	8.7	7	8.2	1.3	<2	<2	-	<0.01	<0.01	0.2	5	176	171
BP03	3/20/2002	31.4	9.2	2	8.3	1.0	<2	<2	-	<0.01	<0.01	0.19	4	146	142
BP04	3/20/2002	31.7	9.0	3	7.7	0.9	40	<2	-	<0.01	<0.01	0.21	2	154	152
BP05	3/20/2002	31.9	7.5	8	7.0	1.1	<2	<2	-	<0.01	<0.01	0.18	6	174	168