

Chapter 6

Water Quality Test Data

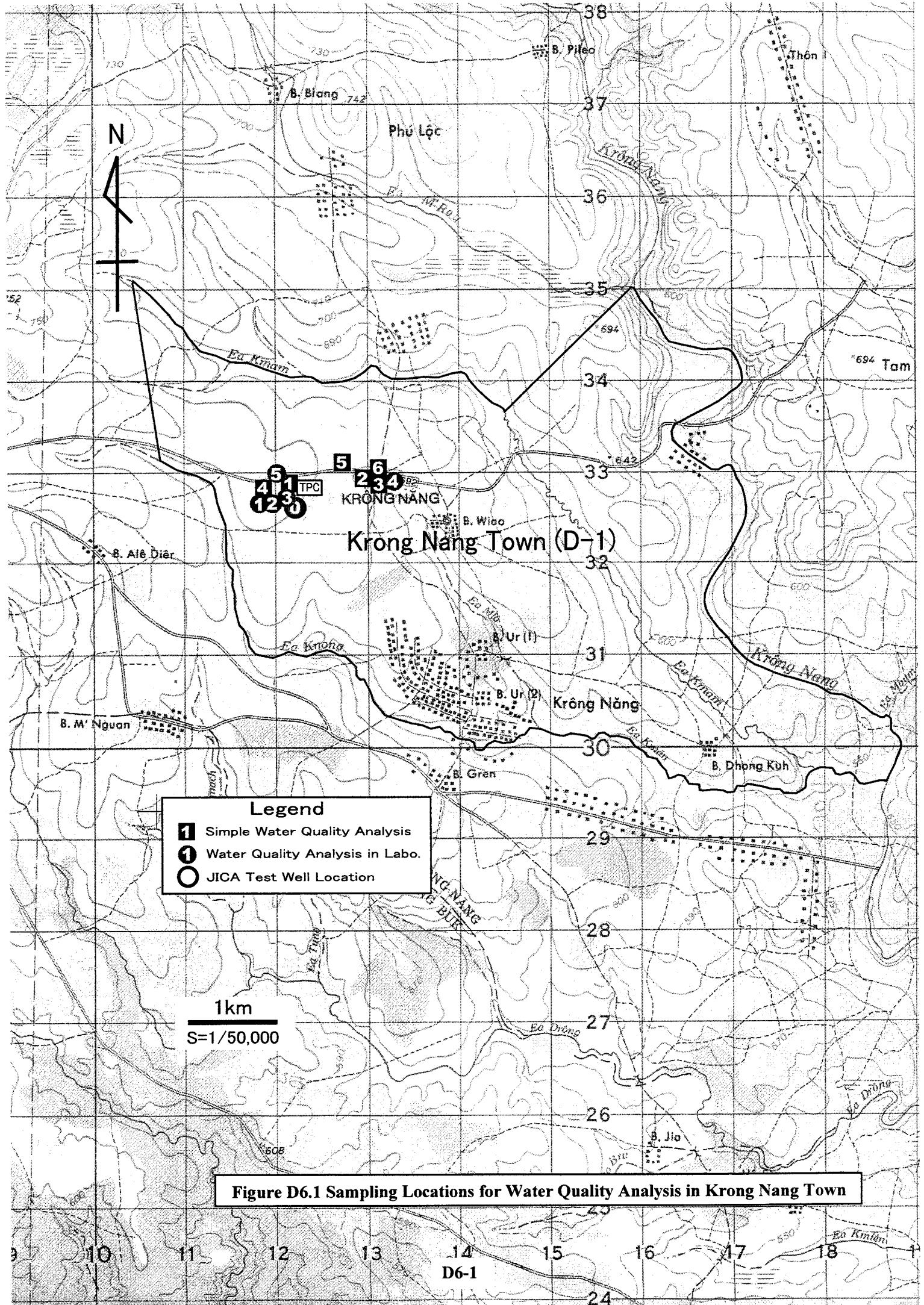


Table D6. 1 Data Sheet : Result of Water Quality Analysis

Location	Krong Nang Town (D-1)											
	D-1-0		D-1-1		D-1-2		D-1-3		D-1-4		D-1-5	
Sample No.	74		60		70		71		72		2	
Location No.	74		60		70		71		72		2	
Name	JICA D-1		Health S. Center		Mr. Thao		Mr. Ban		Spring		Mr. Dung	
Type	Drilling Well		Drilling Well		Dug Well		Dug Well		Spring		Dug Well	
Latitude / Longitude	12°56.948 / 108°20.607		12°56.937 / 108°20.306		12°56.952 / 108°20.324		12°56.947 / 108°20.585		12°57.043 / 108°21.160		12°57.251 / 108°20.602	
Elevation	703		704		704		704		675		699	
Date	31-May-01		4-May-01		4-May-01		4-May-01		24-May-01		24-May-01	
Time	7:30		15:00		15:20		15:40		13:30		14:00	
Flow Quantity	-		-		-		-		100 l/min		-	
Well Depth GL-(m)	140.0		85.0		19.20		18.80		17.50		14.22	
Groundwater Table GL-(m)	11.80		Pump Depth 75m		17.55		15.65		10.90		13.55	
Water Temperature (°C)	25.3		26.6		25.4		24.9		25.2		25.8	
pH	6.43		7.08		6.05		6.59		6.44		6.02	
Ec (μ S/cm)	153.0		180.0		59.0		111.3		112.4		49.2	
DO (mg/l)	2.63		3.55		3.31		3.31		2.91		2.09	
TDS (mg/l)	125.028		148.267		43.901		90.892		88.901		28.579	
Ca ²⁺ (mg/l)	8.80		14.64		5.26		9.04		5.88		1.96	
Mg ²⁺ (mg/l)	7.946	3	8.141	2	3.062	2	7.047	2	8.870	-	2.867	1
Na ⁺ (mg/l)	9.66		9.20		2.53		4.83		3.45		1.61	
K ⁺ (mg/l)	1.833		1.677		0.468		0.897		1.092		0.156	
HCO ₃ ⁻ (mg/l)	93.88		108.03		25.86		64.11		65.45		17.20	
Cl ⁻ (mg/l)	1.407		1.347		1.489		1.560		1.420		1.136	
SO ₄ ²⁻ (mg/l)	1.50		5.23		5.23		3.41		2.74		3.65	
Total Fe (mg/l)	0.11	0.2	0.20	0.2	0.60	0.2	0.20	<0.2	0.15	-	0.37	0.2
NO ₂ -N (mg/l)	0.001	<0.02	0.005	<0.02	0.002	<0.02	0.002	<0.02	<0.001	-	<0.001	<0.02
NO ₃ -N (mg/l)	0.06	<1	0.18	<1	0.19	<1	0.11	<1	0.10	-	1.67	<1
NH ₄ ⁺ (mg/l)	0.035	0	0.010	0	0.010	0	0.020	0	0.018	-	0.025	-
PO ₄ ³⁻ (mg/l)	0.06	0.2	0.14	<0.2	0.09	<0.2	0.10	<0.2	0.13	-	0.13	-
COD/KMnO ₄ (mg/l)	0.079	5	0.472	5	0.157	5	0.472	20	0.236	-	1.338	50
F (mg/l)	0.1300	0	0.0214	0.5	0.0256	0	0.0657	0	0.0677	-	0.2015	-
As (mg/l)	0.0010	<0.2, (0.00)	0.0029	<0.2, (0.00)	0.0027	<0.2	0.0027	<0.2, (0.00)	0.0052	-	0.0045	<0.2
Mn ²⁺ (mg/l)	0.0111	<0.5	0.0020	<0.5	0.0020	<0.5	0.0020	<0.5	0.0617	-	0.0775	<0.5
Coliform (MPN/100ml)	33	0	0	-	920	-	23	-	330	-	1,600	-

*Left Column : by Laboratory Test, Right Column : by Simple Test **As () : by Hironaka Kit

Table D6. 2 Data Sheet : Result of Water Quality Analysis

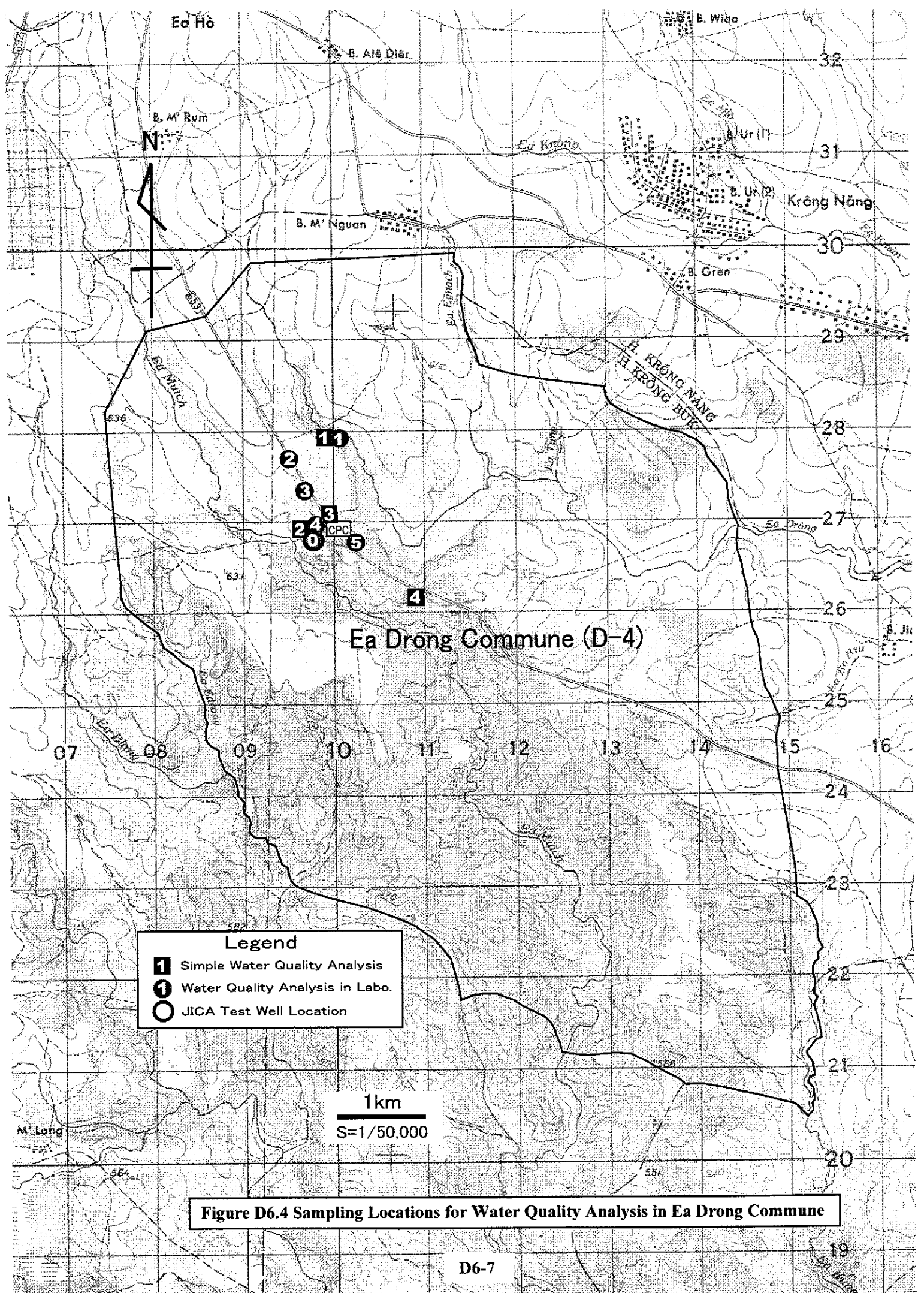
Location	Ea Drang Town (D-2)											
	D-2-0		D-2-1		D-2-2		D-2-3		D-2-4		D-2-5	
Sample No.	75		73		54		11		32		58	
Location No.	75		73		54		11		32		58	
Name	JICA D-2		Rubber Co. No.2		Ms. Hung		Ms. Hang		Ms. Du		Mr. Hai	
Type	Drilling Well		Drilling Well		Dug Well + Drilling Well		Drilling Well		Dug Well + Drilling Well		Dug Well	
Latitude / Longitude	13°12.443 / 108°12.041		13°12.179 / 108°12.136		13°12.294 / 108°12.413		13°13.119 / 108°12.260		13°12.025 / 108°13.006		13°12.358 / 108°12.072	
Elevation	627		620		616		620		573		628	
Date	23-Jun-01		4-Apr-01		4-Apr-01		4-Apr-01		4-Apr-01		23-May-01	
Time	9:30		14:00		14:30		14:50		15:20		16:40	
Flow Quantity	-		-		-		-		-		-	
Well Depth GL-(m)	180.0		127.0		70.0		70.0		70.0		23.38	
Groundwater Table GL-(m)	-		Pump Depth 87m		Pump Depth 45m		Pump Depth 50m		Pump Depth 55m		22.18	
Water Temperature (°C)	26.4		26.1		25.7		25.7		26.1		25.3	
pH	6.42		7.37		6.89		6.91		6.82		5.26	
Ec (μ S/cm)	100.6		175.7		135.1		112.1		250		13.84	
DO (mg/l)	2.56		5.40		3.67		3.55		3.01		2.95	
TDS (mg/l)	64.614		159.110		118.320		94.130		208.310		9.529	
Ca ²⁺ (mg/l)	4.92		30.80		24.80		20.40		48.00		0.44	
Mg ²⁺ (mg/l)	3.900	2	8.74	-	5.22	1.5	5.10	1.5	11.54	1.5	1.118	0.5
Na ⁺ (mg/l)	5.29		6.67		4.83		3.68		8.05		0.46	
K ⁺ (mg/l)	1.599		2.820		1.560		1.400		2.730		0.078	
HCO ₃ ⁻ (mg/l)	39.10		108.39		81.31		61.30		109.55		4.39	
Cl ⁻ (mg/l)	0.780		0.560		0.490		1.130		6.480		0.497	
SO ₄ ²⁻ (mg/l)	9.02		1.10		0.10		1.10		21.93		2.54	
Total Fe (mg/l)	0.39	0.2	0.37	-	0.09	0.2	0.37	0.2	0.39	0.2	0.06	0.2
NO ₂ -N (mg/l)	0.002	<0.02	<0.001	-	<0.001	<0.02	<0.001	<0.02	0.050	0.05	<0.001	<0.02
NO ₃ -N (mg/l)	0.02	<1	0.01	-	<0.01	<1	0.05	<1	4.50	7	0.04	<1
NH ₄ ⁺ (mg/l)	0.049	0.3	0.010	-	0.020	0	0.010	0	0.010	0	0.018	-
PO ₄ ³⁻ (mg/l)	0.12	0.6	0.10	-	0.17	0.20	0.19	0.50	0.17	0.50	0.04	-
COD/KMnO ₄ (mg/l)	0.157	-	0.150	-	0.150	5	0.150	10	0.200	5	0.472	5
F (mg/l)	<0.0001	0	0.0100	-	0.0100	0	0.0100	0.5	0.0100	0.5	0.0845	-
As (mg/l)	0.0010	<0.2, (0.00)	0.0017	-	0.0024	<0.2, (0.00)	0.0031	<0.2	0.0035	<0.2, (0.00)	0.0041	<0.2
Mn ²⁺ (mg/l)	0.0410	<0.5	0.0040	-	0.0320	<0.5	0.0260	<0.5	0.0230	<0.5	0.0675	<0.5
Coliform (MPN/100ml)	49	100	540	-	5,400	-	2	-	33	-	340	-

*Left Column : by Laboratory Test, Right Column : by Simple Test **As () : by Hironaka Kit

Table D6. 3 Data Sheet : Result of Water Quality Analysis

Location	Krong Buk Commune (D-3)											
	D-3-0		D-3-1		D-3-2		D-3-3		D-3-4		D-3-5	
Sample No.	87		74		23		35		37		47	
Location No.	87		74		23		35		37		47	
Name	JICA D-3		Army Coffee Farm		Mr. Chin		Mr. Chung		Mr. Son		Mr. Thanh	
Type	Drilling Well		Drilling Well		Dug Well		Dug Well		Dug Well		Dug Well	
Latitude / Longitude	12°46.100 / 108°23.368		12°46.406 / 108°24.330		12°46.406 / 108°24.331		12°46.201 / 108°23.401		12°46.148 / 108°23.610		12°46.112 / 108°23.394	
Elevation	475		480		475		477		468		475	
Date	12-Jun-01		14-Apr-01		5-May-01		5-May-01		5-May-01		5-May-01	
Time	16:00		15:30		13:50		14:10		14:30		14:50	
Flow Quantity	-		-		-		-		-		-	
Well Depth GL-(m)	140.0		43.0		10.76		13.98		7.20		7.72	
Groundwater Table GL-(m)	10.10		Pump Deth 35m		8.00		10.22		4.10		4.53	
Water Temperature (°C)	26.5		26.3		25.2		26.4		26.5		25.7	
pH	7.99		7.41		6.44		6.22		6.13		6.21	
Ec (μ S/cm)	553		356		387		412		256		397	
DO (mg/l)	1.77		1.92		2.65		2.97		2.42		3.25	
TDS (mg/l)	495.166		149.066		200.081		206.346		131.646		202.580	
Ca ²⁺ (mg/l)	3.98		10.34		30.96		32.88		16.80		29.04	
Mg ²⁺ (mg/l)	3.159	2	8.724	7	3.135	5	11.057	5	7.600	5	17.350	5
Na ⁺ (mg/l)	126.50		12.65		12.08		12.65		12.08		12.65	
K ⁺ (mg/l)	1.443		2.145		4.407		3.627		1.989		5.850	
HCO ₃ ⁻ (mg/l)	309.88		106.93		102.18		84.12		44.71		51.42	
Cl ⁻ (mg/l)	0.284		0.213		18.044		38.782		14.712		42.398	
SO ₄ ²⁻ (mg/l)	13.92		8.06		29.28		23.23		33.70		43.87	
Total Fe (mg/l)	0.12	0.2	2.50	0.2	0.40	0.2	0.20	0.2	0.10	0.2	0.10	0.2
NO ₂ -N (mg/l)	<0.001	<0.02	<0.001	<0.02	0.050	0.075	0.010	<0.02	<0.001	<0.02	<0.001	<0.02
NO ₃ -N (mg/l)	0.60	2	0.03	<1	6.68	7	8.84	7	8.16	7	10.00	10
NH ₄ ⁺ (mg/l)	0.103	0	0.010	0	0.003	0	0.010	0.000	0.007	0	0.009	0
PO ₄ ³⁻ (mg/l)	0.08	0.5	0.10	0.2	0.11	0.2	0.21	0.5	0.05	<0.2	0.11	0.2
COD/KMnO ₄ (mg/l)	0.551	-	0.157	5	0.393	10	0.236	5	0.157	5	0.079	10
F (mg/l)	0.2800	0.3	0.0225	0	0.0224	0.5	0.1452	1	0.0326	0	0.0298	0
As (mg/l)	0.0060	<0.2, (0.00)	0.0025	<0.2, (0.00)	0.0032	<0.2	0.0025	<0.2	0.0031	<0.2, (0.00)	0.0028	<0.2
Mn ²⁺ (mg/l)	0.0120	<0.5	0.0022	<0.5	0.0130	<0.5	0.0040	<0.5	0.0050	<0.5	0.0010	<0.5
Coliform (MPN/100ml)	49	100	94	-	350	-	180	-	540	-	540	-

*Left Column : by Laboratory Test, Right Column : by Simple Test **As () : by Hironaka Kit



Legend

- 1** Simple Water Quality Analysis
- 0** Water Quality Analysis in Labo.
- JICA Test Well Location

1km
S=1/50,000

Figure D6.4 Sampling Locations for Water Quality Analysis in Ea Drong Commune

Table D6. 4 Data Sheet : Result of Water Quality Analysis

Location	Ea Drong Commune (D-4)											
	D-4-0		D-4-1		D-4-2		D-4-3		D-4-4		D-4-5	
Sample No.	66		44		67		3		49		35	
Location No.	66		44		67		3		49		35	
Name	JICA D-4		Spring-1		Mr. Binh		Mr. Minh		Mr. Y Si		Mr. Y Lue	
Type	Drilling Well		Spring		Dug Well		Dug Well		Dug Well		Dug Well	
Latitude / Longitude	12°53.819 / 108°19.268		12°54.373 / 108°19.289		12°54.273 / 108°19.067		12°54.055 / 108°19.199		12°53.838 / 108°19.286		12°53.695 / 108°19.508	
Elevation	613		610		625		620		615		615	
Date	23-Jun-01		24-May-01		24-May-01		24-May-01		24-May-01		24-May-01	
Time	11:00		9:30		9:50		10:20		10:50		11:20	
Flow Quantity	-		40~50 l/min		-		-		-		-	
Well Depth GL-(m)	180.0		-		12.85		4.80		9.35		10.00	
Groundwater Table GL-(m)	-		-		10.70		3.80		8.20		5.70	
Water Temperature (°C)	25.9		25.5		26.0		25.2		25.9		25.4	
pH	7.85		6.33		6.44		6.53		6.27		6.02	
Ec (μ S/cm)	401		179.1		153.4		213		243		370	
DO (mg/l)	1.59		2.34		2.49		2.46		1.96		1.67	
TDS (mg/l)	335.710		125.115		116.676		127.810		174.509		202.296	
Ca ²⁺ (mg/l)	2.52		11.98		9.80		13.22		16.78		19.68	
Mg ²⁺ (mg/l)	0.620	0	9.854	-	11.214	5	12.004	7	13.851	5	23.17	-
Na ⁺ (mg/l)	94.30		5.06		4.60		5.52		6.21		7.36	
K ⁺ (mg/l)	3.354		0.780		0.780		1.170		1.716		2.340	
HCO ₃ ⁻ (mg/l)	215.70		84.24		81.92		58.62		112.42		73.14	
Cl ⁻ (mg/l)	3.332		3.408		1.207		10.011		7.065		28.223	
SO ₄ ²⁻ (mg/l)	15.897		9.79		7.15		27.26		16.46		48.38	
Total Fe (mg/l)	3.76	1.5	0.28	-	2.44	0.2	0.27	0.2	0.41	0.2	0.22	-
NO ₂ -N (mg/l)	0.080	0.07	<0.001	-	<0.001	<0.02	0.010	<0.02	0.010	<0.02	<0.001	-
NO ₃ -N (mg/l)	0.12	1	3.42	-	1.98	3	0.41	5	0.14	7	2.28	-
NH ₄ ⁺ (mg/l)	0.071	0.3	0.042	-	0.033	-	0.025	0	0.037	-	0.026	-
PO ₄ ³⁻ (mg/l)	0.14	0.6	0.04	-	0.11	-	0.08	0.2	0.16	-	0.13	-
COD/KMnO ₄ (mg/l)	0.630	-	0.551	-	0.472	50	1.338	5	1.889	50	0.787	-
F (mg/l)	0.6700	0.5	0.1070	-	0.0977	-	0.0747	0.5	0.0777	-	0.0875	-
As (mg/l)	0.0010	<0.2, (0.00)	0.0046	-	0.0051	<0.2, (0.00)	0.0042	<0.2	0.0049	<0.2	0.0048	-
Mn ²⁺ (mg/l)	0.0390	<0.5	0.0877	-	0.0955	<0.5	0.0922	<0.5	0.0470	<0.5	0.0455	-
Coliform (MPN/100ml)	130	0	541	-	920	-	220	-	180	-	350	-

*Left Column : by Laboratory Test, Right Column : by Simple Test **As () : by Hironaka Kit

Table D6. 5 Data Sheet : Result of Water Quality Analysis

Location	Ea Wer Commune (D-5)											
	D-5-0		D-5-1		D-5-2		D-5-3		D-5-4		D-5-5	
Sample No.	91		5		20		38		50		90	
Location No.	91		5		20		38		50		90	
Name	JICA D-5		Mr. Thuc		Mr. Lan		Deep Well		Mr. Vien		Mr. H Yly	
Type	Drilling Well		Drilling Well		Drilling Well		Drilling Well		Dug Well + Drilling Well		Dug Well	
Latitude / Longitude	12°50.407 / 107°52.040		12°51.530 / 107°50.432		12°51.149 / 107°51.140		12°50.309 / 107°51.790		12°50.031 / 107°52.411		12°50.386 / 107°52.015	
Elevation	209		198		209		211		211		209	
Date	21-Jun-01		11-Apr-01		11-Apr-01		11-Apr-01		11-Apr-01		6-May-01	
Time	14:30		10:00		10:20		10:50		11:15		10:30	
Flow Quantity	-		-		-		-		-		-	
Well Depth GL-(m)	150.0		45.0		38.0		70.0		39.0		2.10	
Groundwater Table GL-(m)			Pump Depth 17.5m		Pump Depth 29.3m		Pump Depth 50.0m		Pump Depth 39.0m		0.83	
Water Temperature (°C)	27.7		28.1		28.6		28.6		28.3		31.0	
pH	6.93		6.80		6.77		6.89		6.97		6.35	
Ec (μ S/cm)	558		810		756		643		775		123.7	
DO (mg/l)	2.35		2.58		2.38		3.12		2.42		3.93	
TDS (mg/l)	340.127		695.098		613.138		553.904		613.946		60.473	
Ca ²⁺ (mg/l)	70.96		71.00		77.80		39.80		71.00		6.48	
Mg ²⁺ (mg/l)	6.051	5	8.262	5	15.552	5	35.429	10	28.674	10	5.796	5
Na ⁺ (mg/l)	12.88		92.00		52.90		37.95		40.25		2.76	
K ⁺ (mg/l)	1.356		0.702		0.858		4.602		7.020		2.028	
HCO ₃ ⁻ (mg/l)	240.65		509.59		454.27		425.23		454.88		4.94	
Cl ⁻ (mg/l)	0.355		1.064		1.773		1.773		1.418		5.637	
SO ₄ ²⁻ (mg/l)	7.873		12.48		9.98		9.12		10.70		32.83	
Total Fe (mg/l)	0.82	0.6	0.20	0.2	0.40	0.2	2.00	0.2	0.30	0.2	0.70	0.2
NO ₂ -N (mg/l)	0.020	<0.02	<0.001	<0.02	<0.001	<0.02	<0.001	<0.02	<0.001	<0.02	0.010	<0.02
NO ₃ -N (mg/l)	0.06	<1	0.03	<1	0.03	<1	<0.01	<1	0.18	<1	7.70	5
NH ₄ ⁺ (mg/l)	0.233	0.3	0.040	0	0.020	0	0.040	0	0.100	0	0.009	0
PO ₄ ³⁻ (mg/l)	0.06	0.7	0.05	0.2	0.05	<0.2	0.09	0.5	0.09	<0.2	0.05	<0.2
COD/KMnO ₄ (mg/l)	0.236	-	0.157	10	0.236	10	0.157	10	0.157	10	0.551	5
F (mg/l)	<0.0001	0.5	0.0405	0.5	0.1423	0.5	0.0455	0.5	0.0203	0.3	0.0505	1
As (mg/l)	0.0040	<0.2, (0.00)	0.0081	<0.2, (0.00)	0.0045	<0.2	0.0039	<0.2, (0.00)	0.0097	<0.2	0.0030	<0.2
Mn ²⁺ (mg/l)	1.1110	<0.5	0.0040	<0.5	0.0340	<0.5	0.0210	<0.5	0.0370	<0.5	0.0040	<0.5
Coliform (MPN/100ml)	240	100	0	-	1,600	-	540	-	46	-	350	-

*Left Column : by Laboratory Test, Right Column : by Simple Test **As () : by Hironaka Kit

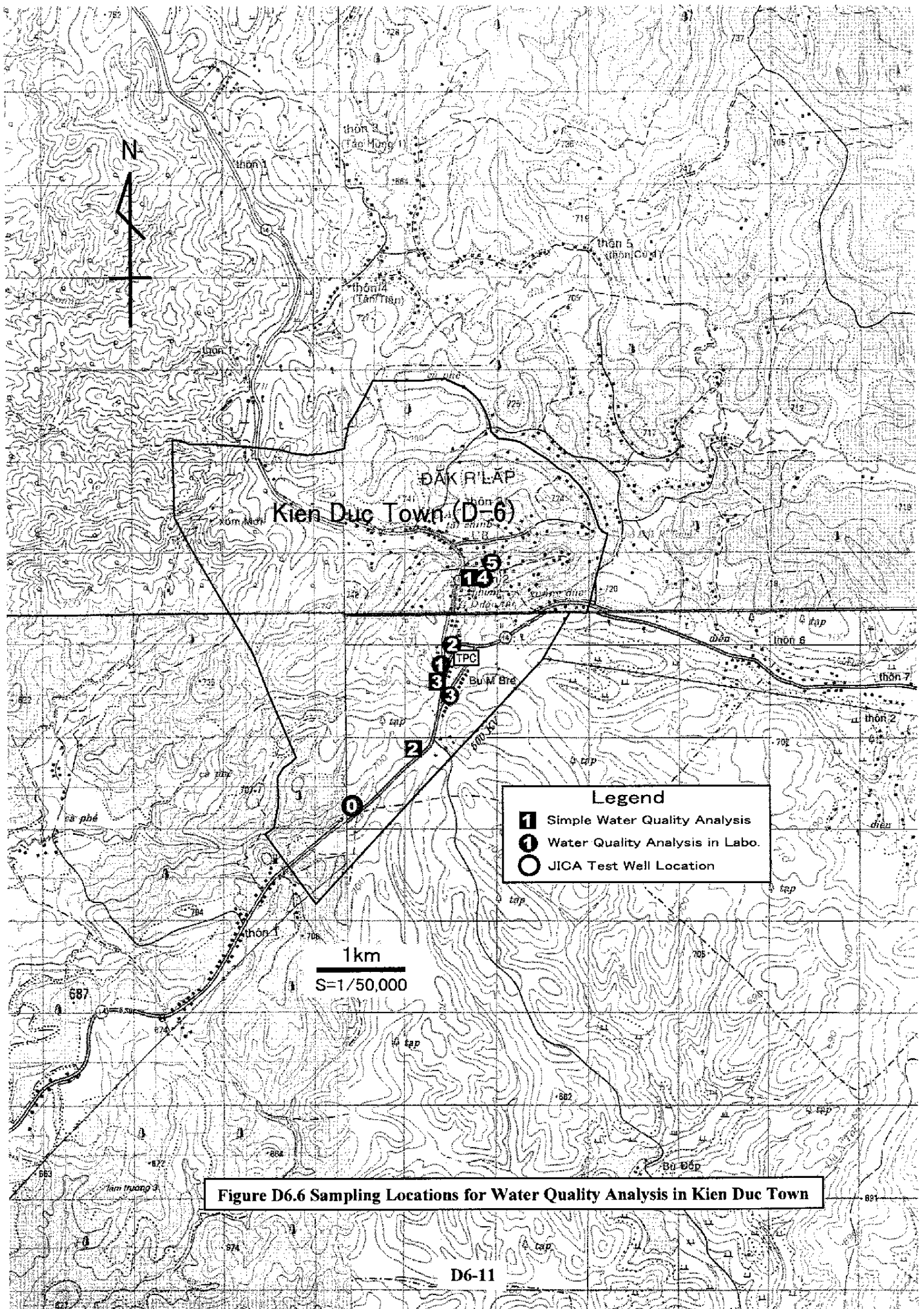


Figure D6.6 Sampling Locations for Water Quality Analysis in Kien Duc Town

Table D6. 6 Data Sheet : Result of Water Quality Analysis

Location	Kien Duc Town (D-6)											
	D-6-0		D-6-1		D-6-2		D-6-3		D-6-4		D-6-5	
Sample No.	19		4		6		3		13		14	
Location No.	19		4		6		3		13		14	
Name	JICA D-6		Mr. Loc		Tax Office		Mr. Gap		WS-2		WS-1	
Type	Drilling Well		Drilling Well		Drilling Well		Drilling Well		Drilling Well		Drilling Well	
Latitude / Longitude	11°58.802 / 107°30.021		11°59.648 / 107°30.720		11°59.779 / 107°30.701		11°59.628 / 107°30.716		12°00.015 / 107°30.702		12°00.105 / 107°30.861	
Elevation	670		715		728		715		688		685	
Date	1-Jun-01		28-Mar-01		28-Mar-01		28-Mar-01		28-Mar-01		28-Mar-01	
Time	10:00		14:00		15:50		16:20		16:35		17:00	
Flow Quantity	-		-		-		-		-		-	
Well Depth GL-(m)	170.00		141		162		154		145.0		150	
Groundwater Table GL-(m)	30.00		Pump Depth 80m		Pump Depth 70m		Pump Depth 70m		Pump Depth 68m		-	
Water Temperature (°C)	28.0		26.7		25.6		26.1		26.7		26.5	
pH	6.23		7.28		7.22		6.40		6.79		7.45	
Ec (μ S/cm)	145.6		189.1		140.0		142.3		147.6		195.0	
DO (mg/l)	1.92		2.88		3.18		1.57		2.01		1.67	
TDS (mg/l)	208.916		159.310		142.460		129.340		136.480		187.180	
Ca ²⁺ (mg/l)	21.60		16.80		17.20		27.60		20.40		40.80	
Mg ²⁺ (mg/l)	11.676	3	5.220	-	5.100	-	5.100	-	4.370	-	7.040	-
Na ⁺ (mg/l)	9.20		20.24		14.95		7.59		15.18		10.58	
K ⁺ (mg/l)	2.652		2.220		2.180		2.060		2.020		2.840	
HCO ₃ ⁻ (mg/l)	155.37		113.46		101.68		85.64		91.86		124.19	
Cl ⁻ (mg/l)	0.213		0.210		0.280		0.280		0.280		0.700	
SO ₄ ²⁻ (mg/l)	8.21		1.15		1.05		1.05		2.35		1.01	
Total Fe (mg/l)	0.65	<0.2	0.01	<0.2	0.01	<0.2	0.02	<0.2	0.08	<0.2	0.02	<0.2
NO ₂ -N (mg/l)	0.010	<0.02	<0.001	<0.02	<0.001	<0.02	<0.001	<0.02	<0.001	<0.02	<0.001	<0.02
NO ₃ -N (mg/l)	0.02	<1	0.02	<1	0.06	<1	0.02	<1	0.01	<1	0.01	<1
NH ₄ ⁺ (mg/l)	0.072	0	0.003	0	0.010	0	0.003	-	0.010	-	0.010	-
PO ₄ ³⁻ (mg/l)	<0.01	<0.2	0.16	<0.2	0.07	<0.2	0.08	<0.2	0.02	<0.2	0.04	<0.2
COD/KMnO ₄ (mg/l)	0.630	30	0.150	-	0.230	-	0.230	-	0.150	-	0.230	-
F (mg/l)	0.0857	0	0.0100	0	0.0100	0	0.0100	0	0.0100	0	0.0100	0
As (mg/l)	0.0046	<0.2, (0.00)	0.0001	<0.2, (0.00)	0.0011	<0.2	0.0017	<0.2, (0.00)	0.0014	<0.02	0.0020	<0.2
Mn ²⁺ (mg/l)	0.0755	<0.5	0.0100	<0.5	0.0190	<0.5	0.0350	<0.5	0.0140	<0.5	0.0140	<0.5
Coliform (MPN/100ml)	140		17		13		920		23		0	

*Left Column : by Laboratory Test, Right Column : by Simple Test **As () : by Hironaka Kit