

**SUPPORTING  
REPORT S-6**

**HYDRAULIC ANALYSIS**

**S-6-1 Input Data**

**S-6-2 Outputs**

## **S-6-1 Input Data**





Node Name	District Name	Ground Elevation m	Domestic Customer					Large Water User				User's Name	Demand ⑤+⑨ (hourly ave.) m <sup>3</sup> /h	Demand ⑥+⑩ (hourly max.) m <sup>3</sup> /h	Hourly Factor	
			Served Population ① person	Per Capita Consumption ② m <sup>3</sup> /cap/day	Daily Consumption ③=① x ② m <sup>3</sup> /day	Daily Demand ④=③/0.6 (daily ave.) m <sup>3</sup> /day	Demand ⑤ (hourly ave.) m <sup>3</sup> /h	Demand ⑥=⑤x1.4 (hourly max.) m <sup>3</sup> /h	Daily Consumption ⑦ m <sup>3</sup> /day	Daily Demand ⑧=⑦/0.6 (daily ave.) m <sup>3</sup> /day	Demand ⑨ (hourly ave.) m <sup>3</sup> /h					Demand ⑩=⑨x1.3 (hourly max.) m <sup>3</sup> /h
KSP-06	Panatina	35	200	0.183	36.6	60.9	2.54	3.55						2.54	3.55	1.4
KSP-06A	Panatina	30	200	0.183	36.6	60.9	2.54	3.55						2.54	3.55	1.4
KSP-06B	Panatina	25	200	0.183	36.6	60.9	2.54	3.55						2.54	3.55	1.4
KSP-06C	Panatina	20	200	0.183	36.6	60.9	2.54	3.55						2.54	3.55	1.4
KSP-06D	Panatina	10	200	0.183	36.6	60.9	2.54	3.55						2.54	3.55	1.4
KSP-06E	Panatina	5	200	0.183	36.6	60.9	2.54	3.55						2.54	3.55	1.4
KSP-06F	Panatina	5	200	0.183	36.6	60.9	2.54	3.55	160.0	266.7	11.1	14.4	King G. VI School	13.65	18.00	1.319
KSP-07	Ranadi/Henderson	35	112	0.183	20.6	34.3	1.43	2.00						1.43	2.00	1.4
KSP-07A	Ranadi/Henderson	35	112	0.183	20.6	34.3	1.43	2.00						1.43	2.00	1.4
KSP-07B	Ranadi/Henderson	35	112	0.183	20.6	34.3	1.43	2.00						1.43	2.00	1.4
KSP-08	Ranadi/Henderson	35	112	0.183	20.6	34.3	1.43	2.00						1.43	2.00	1.4
KSP-09	Ranadi/Henderson	8	112	0.183	20.6	34.3	1.43	2.00						1.43	2.00	1.4
KSP-10	Kukum	3	178	0.183	32.5	54.2	2.26	3.16	330.0	550.0	22.9	29.8	SICHE Kukum	25.17	32.95	1.309
KSP-10A	Kukum	10	178	0.183	32.5	54.2	2.26	3.16						2.26	3.16	1.4
KSP-10B	Kukum	10	178	0.183	32.5	54.2	2.26	3.16						2.26	3.16	1.4
KSP-10C	Kukum	5	178	0.183	32.5	54.2	2.26	3.16						2.26	3.16	1.4
KSP-11	Kukum	5	178	0.183	32.5	54.2	2.26	3.16						2.26	3.16	1.4
KSP-12	Kukum	5	178	0.183	32.5	54.2	2.26	3.16						2.26	3.16	1.4
KSP-13	Kukum	5	178	0.183	32.5	54.2	2.26	3.16						2.26	3.16	1.4
KSP-14	Kukum	5	178	0.183	32.5	54.2	2.26	3.16	190.0	316.7	13.2	17.2	Casino Hotel	15.45	20.31	1.315
KSP-15	Kukum	5	178	0.183	32.5	54.2	2.26	3.16						2.26	3.16	1.4
KSP-16	Kukum	3	178	0.183	32.5	54.2	2.26	3.16						2.26	3.16	1.4
KSP-17	Kukum	4	178	0.183	32.5	54.2	2.26	3.16						2.26	3.16	1.4
KSP-17A	Kukum	15	178	0.183	32.5	54.2	2.26	3.16						2.26	3.16	1.4
KSP-18	Kukum	5	178	0.183	32.5	54.2	2.26	3.16						2.26	3.16	1.4
KSP-19	Ranadi/Henderson	3	112	0.183	20.5	34.2	1.43	2.00						1.43	2.00	1.4
KSP-20	Ranadi/Henderson	3	112	0.183	20.5	34.2	1.43	2.00						1.43	2.00	1.4
KSP-21	Ranadi/Henderson	3	112	0.183	20.5	34.2	1.43	2.00						1.43	2.00	1.4
KSP-22	Kukum	3	178	0.183	32.5	54.2	2.26	3.16						2.26	3.16	1.4
KSP-23	Ranadi/Henderson	3	112	0.183	20.6	34.3	1.43	2.00						1.43	2.00	1.4
KSP-23A	Ranadi/Henderson	3	112	0.183	20.6	34.3	1.43	2.00	300.0	500.0	20.8	27.1	Solblew	22.26	29.08	1.306
KSP-23B	Ranadi/Henderson	3	112	0.183	20.6	34.3	1.43	2.00	180.0	300.0	12.5	16.3	Ranadi Ind. Area-1	13.93	18.25	1.310
KSP-23C	Ranadi/Henderson	3	112	0.183	20.6	34.3	1.43	2.00	170.0	283.3	11.8	15.3	Ranadi Ind. Area-2	13.23	17.35	1.311
KSP-23D	Ranadi/Henderson	3	112	0.183	20.6	34.3	1.43	2.00	170.0	283.3	11.8	15.3	Ranadi Ind. Area-3	13.23	17.35	1.311
KSP-23E	Ranadi/Henderson	3	112	0.183	20.6	34.3	1.43	2.00	40.0	66.7	2.8	3.6	Solomon Soap	4.21	5.61	1.334
KSP-24	Ranadi/Henderson	3	112	0.183	20.6	34.3	1.43	2.00						1.43	2.00	1.4
KSP-24A	Ranadi/Henderson	10	112	0.183	20.6	34.3	1.43	2.00	330.0	550.0	22.9	29.8	SICHE Panatina	24.34	31.79	1.306
KSP-24B	Ranadi/Henderson	20	112	0.183	20.6	34.3	1.43	2.00						1.43	2.00	1.4
KSP-25	Ranadi/Henderson	3	112	0.183	20.6	34.3	1.43	2.00						1.43	2.00	1.4
KSP-26	Ranadi/Henderson	3	112	0.183	20.6	34.3	1.43	2.00						1.43	2.00	1.4
KSP-27	Ranadi/Henderson	3	112	0.183	20.6	34.3	1.43	2.00						1.43	2.00	1.4
KSP-27A	Ranadi/Henderson	5	112	0.183	20.6	34.3	1.43	2.00						1.43	2.00	1.4
KSP-27B	Ranadi/Henderson	3	112	0.183	20.6	34.3	1.43	2.00	160.0	266.7	11.1	14.4	Betikama H. School	12.54	16.44	1.311
KSP-28	Ranadi/Henderson	5	112	0.183	20.6	34.3	1.43	2.00						1.43	2.00	1.4
KSP-28A	Ranadi/Henderson	10	112	0.183	20.6	34.3	1.43	2.00						1.43	2.00	1.4
KSP-29	Ranadi/Henderson	5	112	0.183	20.6	34.3	1.43	2.00						1.43	2.00	1.4
KSP-30	Ranadi/Henderson	3	112	0.183	20.6	34.3	1.43	2.00	200.0	333.3	13.9	18.1	Henderson Airport	15.32	20.05	1.3
KSP-31	Ranadi/Henderson	3	112	0.183	20.6	34.3	1.43	2.00						1.43	2.00	1.400
KSP-32	Ranadi/Henderson	3	112	0.183	20.6	34.3	1.43	2.00						1.43	2.00	1.4
KSP-32A	Ranadi/Henderson	3	112	0.183	20.6	34.3	1.43	2.00						1.43	2.00	1.4
KSP-32B	Ranadi/Henderson	3	112	0.183	20.6	34.3	1.43	2.00						1.43	2.00	1.4
KSP-33	Baranaba	25	149	0.183	27.3	45.5	1.89	2.65						1.89	2.65	1.4
KSP-33A	Baranaba	25	149	0.183	27.3	45.5	1.89	2.65						1.89	2.65	1.4
KSP-33B	Baranaba	25	149	0.183	27.3	45.5	1.89	2.65						1.89	2.65	1.4
KSP - Total			8,612		1,576.4	2,627.3	109.5	153.26	2,230.0	3,716.7	154.9	201.3		264.33	354.58	
Grand Total			46,221	0.164	7,596	12,661	528	739	7,835	13,062	544	682		1,072	1,421	

25,719 m<sup>3</sup>/day

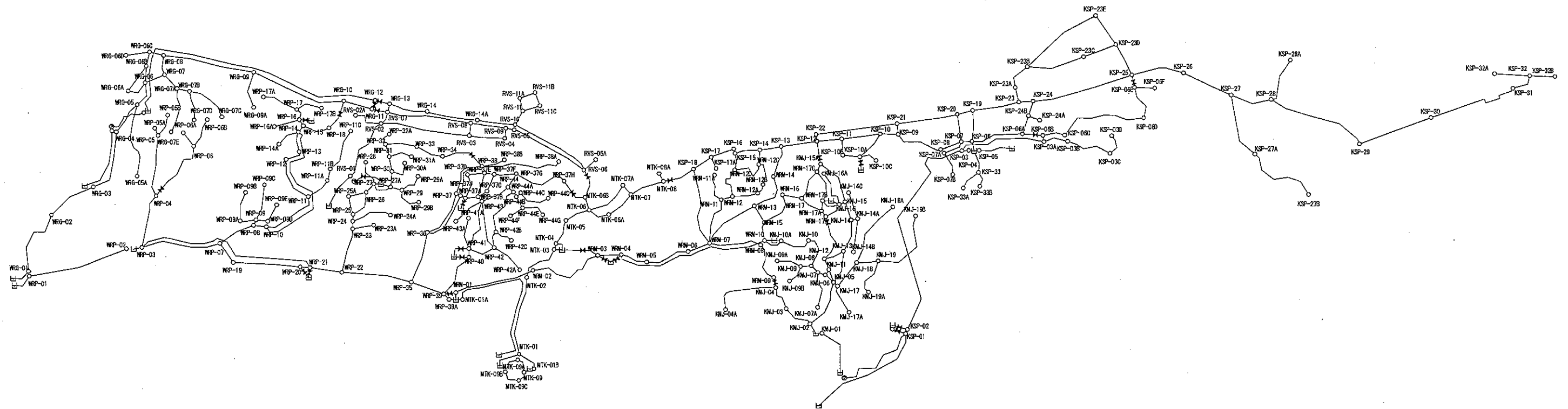


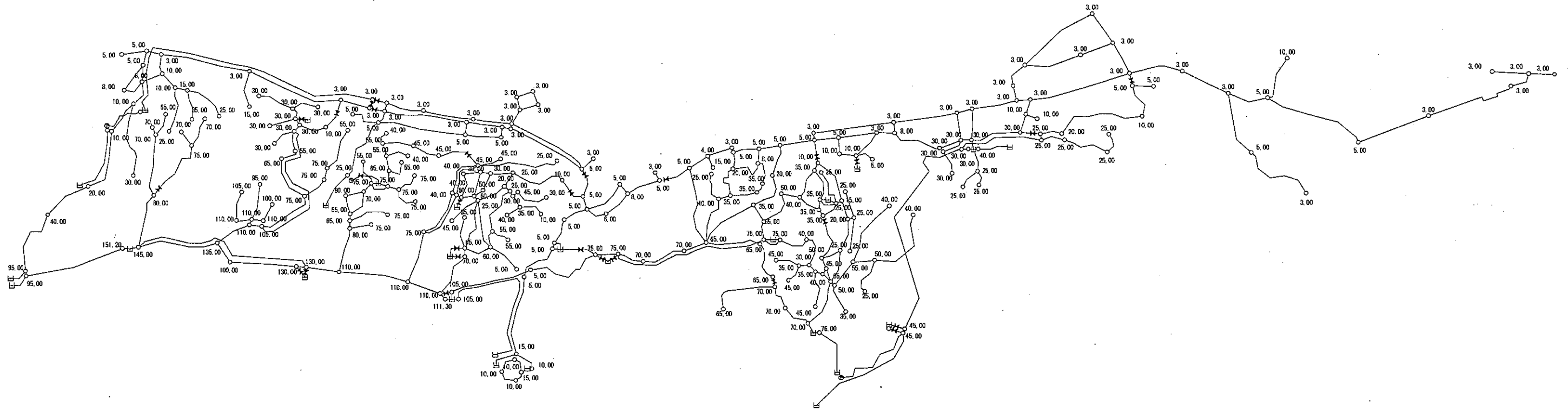


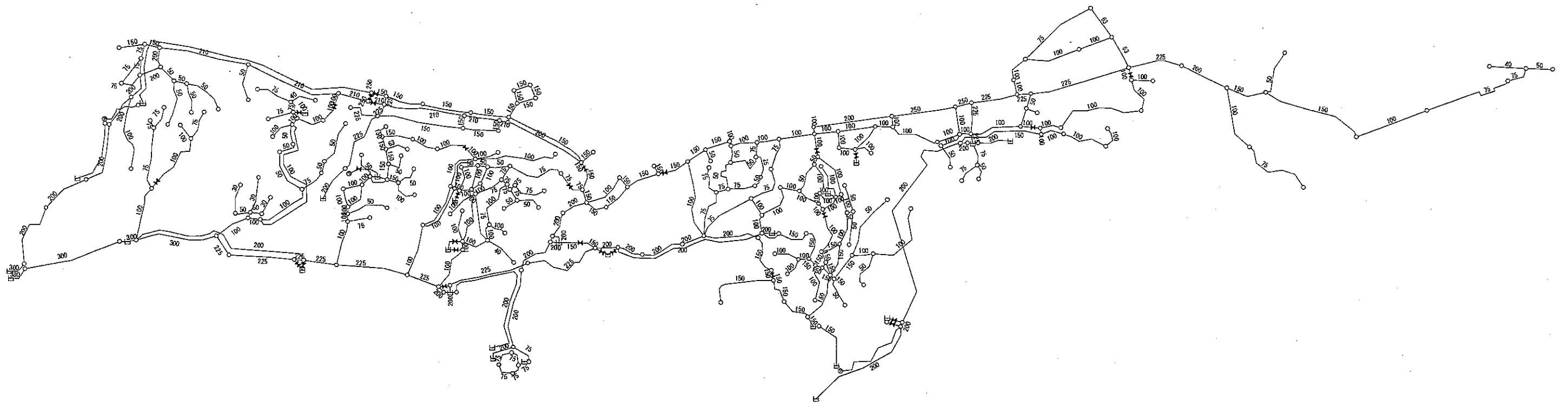
Node Name (2010)	District Name	Ground Elevation m	Served Population ① (2005)	Served Population ①' (2010)	Domestic Customer					Large Water User					User's Name	Demand ⑤+⑨ (hourly ave.) m <sup>3</sup> /h	Demand ⑥+⑩ (hourly max.) m <sup>3</sup> /h	Hourly Factor
					Per Capita Consumption ② m <sup>3</sup> /cap/dav	Daily Consumption ③=①' x ② m <sup>3</sup> /dav	Daily Demand ④=③/0.6 (daily ave.) m <sup>3</sup> /h	Demand ⑤ (hourly ave.) m <sup>3</sup> /h	Demand ⑥=⑤x1.4 (hourly max.) m <sup>3</sup> /h	Daily Consumption ⑦ m <sup>3</sup> /dav	Daily Demand ⑧=⑦/0.6 (daily ave.) m <sup>3</sup> /dav	Demand ⑨ (hourly ave.) m <sup>3</sup> /h	Demand ⑩=⑨x1.3 (hourly max.) m <sup>3</sup> /h					
6BDR-36	Kombito	30	0	0	0.163	0.0	0.0	0.00	0.00							0.00	0.00	
6BDR-36A	Kombito	30	0	0	0.163	0.0	0.0	0.00	0.00							0.00	0.00	
6BDR-36B	Kombito	25	0	0	0.163	0.0	0.0	0.00	0.00							0.00	0.00	
6BDR-37	Kukum	5	178	236	0.183	43.3	72.1	3.01	4.21							3.01	4.21	1.4
6BDR-38	Kukum	3	178	236	0.183	43.3	72.1	3.01	4.21							3.01	4.21	1.4
6BDR-39	Kukum	5	178	236	0.183	43.3	72.1	3.01	4.21							3.01	4.21	1.4
6BDR-39A	Kukum	10	178	236	0.183	43.3	72.1	3.01	4.21							3.01	4.21	1.4
6BDR-40	Kukum	3	178	236	0.183	43.3	72.1	3.01	4.21	346.8	578.1	24.1	31.3	SICHE Kukum	27.09	35.52	1.311	
6BDR-40A	Kukum	10	178	236	0.183	43.3	72.1	3.01	4.21							3.01	4.21	1.4
6BDR-40B	Kukum	5	178	236	0.183	43.3	72.1	3.01	4.21							3.01	4.21	1.4
6BDR-41	Ranadi/Henderson	8	116	154	0.183	28.3	47.1	1.96	2.75							1.96	2.75	1.4
6BDR-42	Ranadi/Henderson	3	116	154	0.183	28.3	47.1	1.96	2.75							1.96	2.75	1.4
7 Borderline New Bores			10,083	13,421		2,126.3	3,543.9	147.66	206.73	346.8	578.1	24.1	31.3		171.75	238.04		
7PAN-W1		30																1
7PAN-W2		40																1
7PAN-01	Panatina	35	200	266	0.185	49.1	81.8	3.41	4.77							3.41	4.77	1.4
7PAN-02	Ranadi/Henderson	35	116	154	0.185	28.5	47.5	1.98	2.77							1.98	2.77	1.4
7PAN-02A	Ranadi/Henderson	35	116	154	0.185	28.5	47.5	1.98	2.77							1.98	2.77	1.4
7PAN-02B	Ranadi/Henderson	35	116	154	0.185	28.5	47.5	1.98	2.77							1.98	2.77	1.4
7PAN-03	Ranadi/Henderson	35	116	154	0.185	28.5	47.5	1.98	2.77							1.98	2.77	1.4
7PAN-04	Baranada	25	149	198	0.185	36.6	61.1	2.54	3.56							2.54	3.56	1.4
7PAN-04A	Baranada	25	149	198	0.185	36.6	61.1	2.54	3.56							2.54	3.56	1.4
7PAN-04B	Baranada	25	149	198	0.185	36.6	61.1	2.54	3.56							2.54	3.56	1.4
7PAN-05	Ranadi/Henderson	3	116	154	0.185	28.5	47.5	1.98	2.77							1.98	2.77	1.4
7PAN-06	Ranadi/Henderson	3	116	154	0.185	28.5	47.5	1.98	2.77							1.98	2.77	1.4
7PAN-07	Ranadi/Henderson	3	116	154	0.185	28.5	47.5	1.98	2.77							1.98	2.77	1.4
7PAN-08	Ranadi/Henderson	3	116	154	0.185	28.5	47.5	1.98	2.77							1.98	2.77	1.4
7PAN-08A	Ranadi/Henderson	20	116	154	0.185	28.5	47.5	1.98	2.77	346.8	578.1	24.1	31.3	SICHE Panatina	26.07	34.09	1.308	
7PAN-08B	Ranadi/Henderson	10	116	154	0.185	28.5	47.5	1.98	2.77							1.98	2.77	1.4
7PAN-09	Panatina	30	200	266	0.185	49.1	81.8	3.41	4.77							3.41	4.77	1.4
7PAN-10	Panatina	25	200	266	0.185	49.1	81.8	3.41	4.77							3.41	4.77	1.4
7PAN-11	Panatina	20	200	266	0.185	49.1	81.8	3.41	4.77							3.41	4.77	1.4
7PAN-12	Panatina	10	200	266	0.185	49.1	81.8	3.41	4.77							3.41	4.77	1.4
7PAN-13	Panatina	5	200	266	0.185	49.1	81.8	3.41	4.77							3.41	4.77	1.4
7PAN-14	Panatina	5	200	266	0.185	49.1	81.8	3.41	4.77	168.2	280.3	11.7	15.2	King G. VI School	15.09	19.96	1.323	
7PAN-15	Panatina	25	200	266	0.185	49.1	81.8	3.41	4.77							3.41	4.77	1.4
7PAN-16	Panatina	25	200	266	0.185	49.1	81.8	3.41	4.77							3.41	4.77	1.4
7PAN-17	Panatina	25	200	266	0.185	49.1	81.8	3.41	4.77							3.41	4.77	1.4
7PAN-18	Panatina	25	200	266	0.185	49.1	81.8	3.41	4.77							3.41	4.77	1.4
7PAN-19	Ranadi/Henderson	3	116	154	0.185	28.5	47.5	1.98	2.77	315.3	525.5	21.9	28.5	Solblew	23.88	31.24	1.308	
7PAN-20	Ranadi/Henderson	3	116	154	0.185	28.5	47.5	1.98	2.77	189.2	315.3	13.1	17.1	Ranadi Intl. Area-1	15.12	19.85	1.313	
7PAN-21	Ranadi/Henderson	3	116	154	0.185	28.5	47.5	1.98	2.77	178.7	297.8	12.4	16.1	Ranadi Intl. Area-2	14.39	18.90	1.314	
7PAN-22	Ranadi/Henderson	3	116	154	0.185	28.5	47.5	1.98	2.77	178.7	297.8	12.4	16.1	Ranadi Intl. Area-3	14.39	18.90	1.314	
7PAN-23	Ranadi/Henderson	3	116	154	0.185	28.5	47.5	1.98	2.77	42.0	70.1	2.9	3.8	Solomon Soap	4.90	6.57	1.340	
7PAN-24	Ranadi/Henderson	3	116	154	0.185	28.5	47.5	1.98	2.77							1.98	2.77	1.4
7PAN-25	Ranadi/Henderson	3	116	154	0.185	28.5	47.5	1.98	2.77							1.98	2.77	1.4
7PAN-25A	Ranadi/Henderson	5	116	154	0.185	28.5	47.5	1.98	2.77							1.98	2.77	1.4
7PAN-25B	Ranadi/Henderson	3	116	154	0.185	28.5	47.5	1.98	2.77	168.2	280.3	11.7	15.2	Botikama H. School	13.66	17.96	1.315	
7PAN-26	Ranadi/Henderson	5	116	154	0.185	28.5	47.5	1.98	2.77							1.98	2.77	1.4
7PAN-26A	Ranadi/Henderson	10	116	154	0.185	28.5	47.5	1.98	2.77							1.98	2.77	1.4
7PAN-27	Ranadi/Henderson	5	116	154	0.185	28.5	47.5	1.98	2.77							1.98	2.77	1.4
7PAN-28	Ranadi/Henderson	3	116	154	0.185	28.5	47.5	1.98	2.77	210.2	350.4	14.6	19.0	Henderson Airport	16.58	21.75	1.312	
7PAN-29	Ranadi/Henderson	3	116	154	0.185	28.5	47.5	1.98	2.77							1.98	2.77	1.4
7PAN-30	Ranadi/Henderson	3	116	154	0.185	28.5	47.5	1.98	2.77							1.98	2.77	1.4
7PAN-30A	Ranadi/Henderson	3	116	154	0.185	28.5	47.5	1.98	2.77							1.98	2.77	1.4
7PAN-30B	Ranadi/Henderson	3	116	154	0.185	28.5	47.5	1.98	2.77							1.98	2.77	1.4
8 Panatina Existing Bores			5,894	7,844		1,448.9	2,414.8	100.62	140.86	1,797.3	2,995.5	124.8	162.3		225.43	303.12		
Total			46,221	61,520	0.1645	10,117.3	16,862.1	702.59	983.62	8,235.0	13,725.0	571.9	717.2		1,274.46	1,700.78		
										30,587.1					30,587.08			

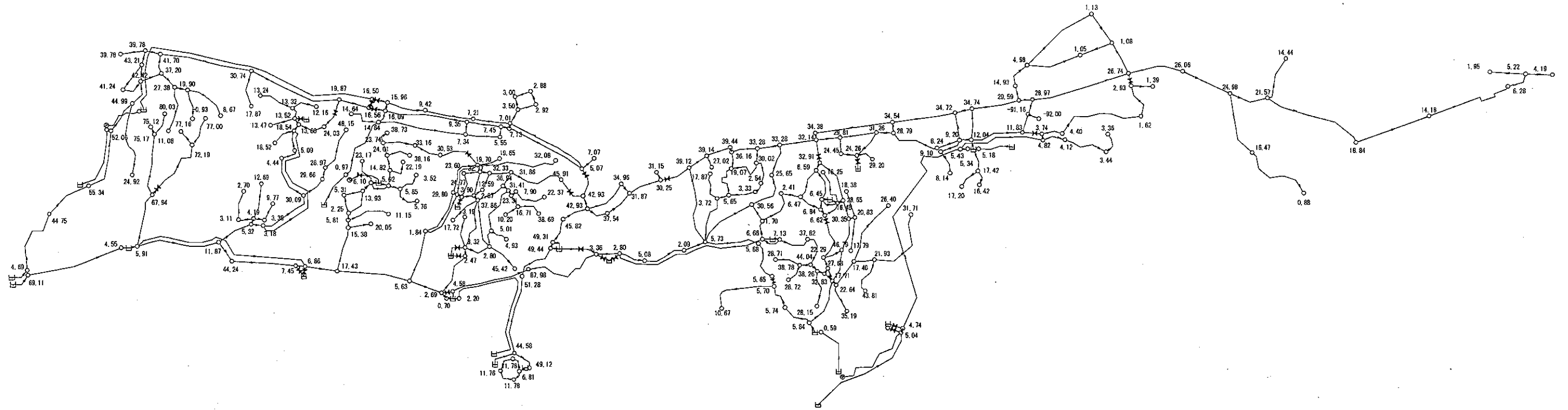


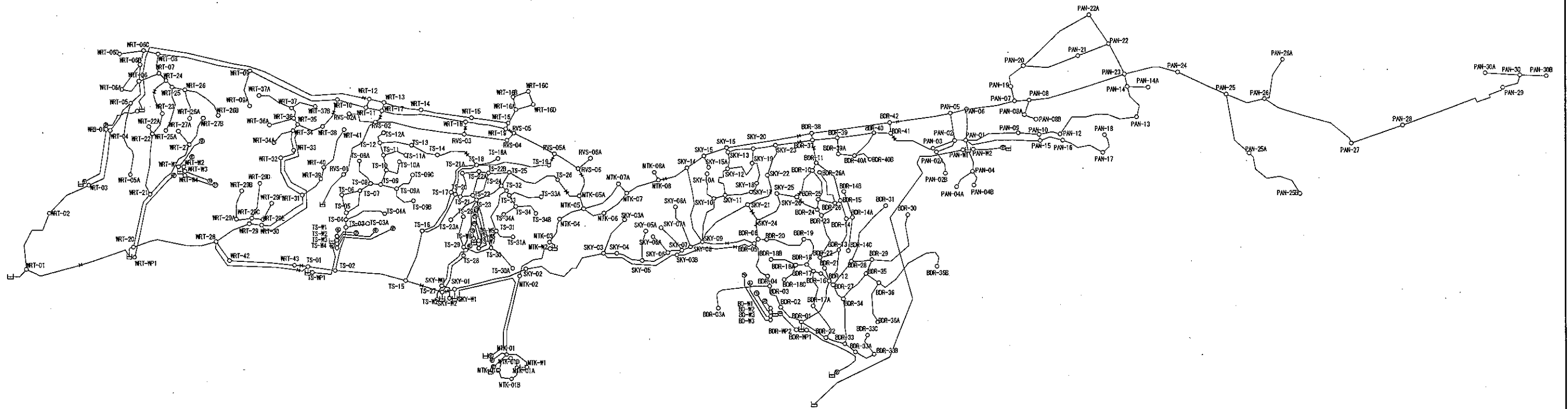
## **S-6-2 Outputs**

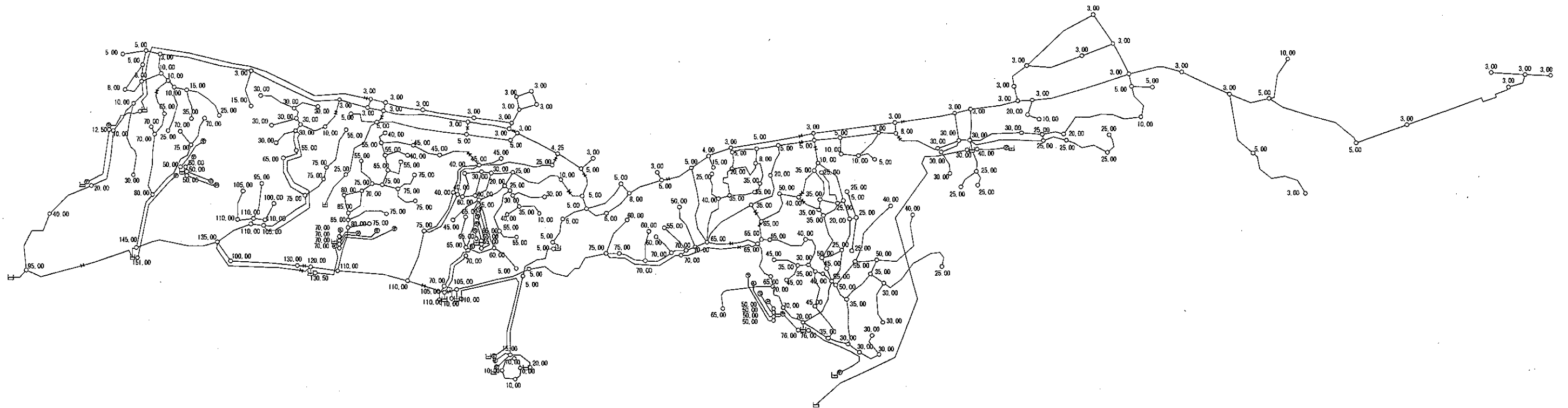


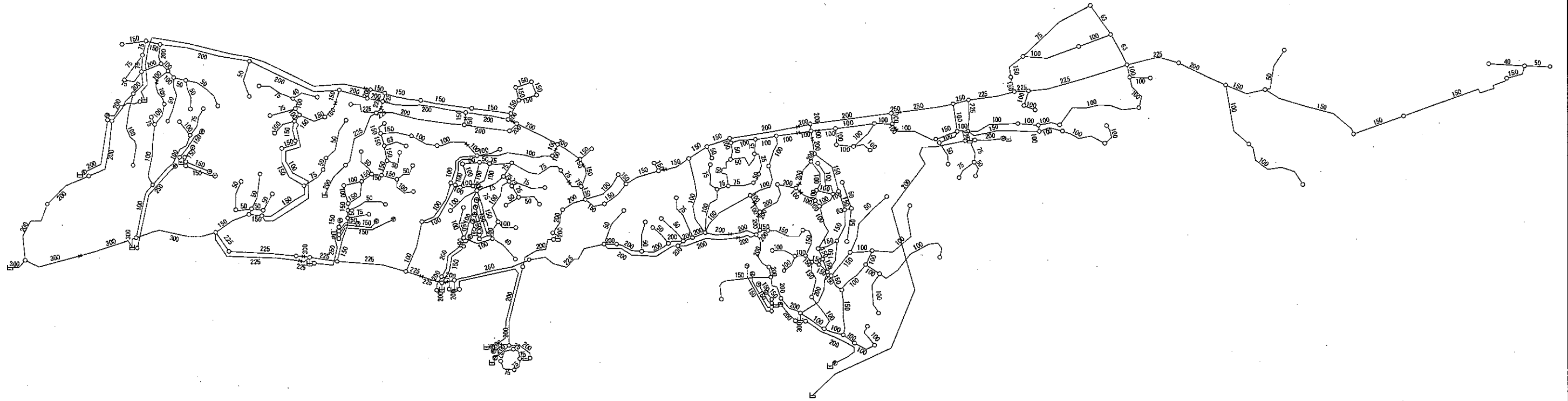




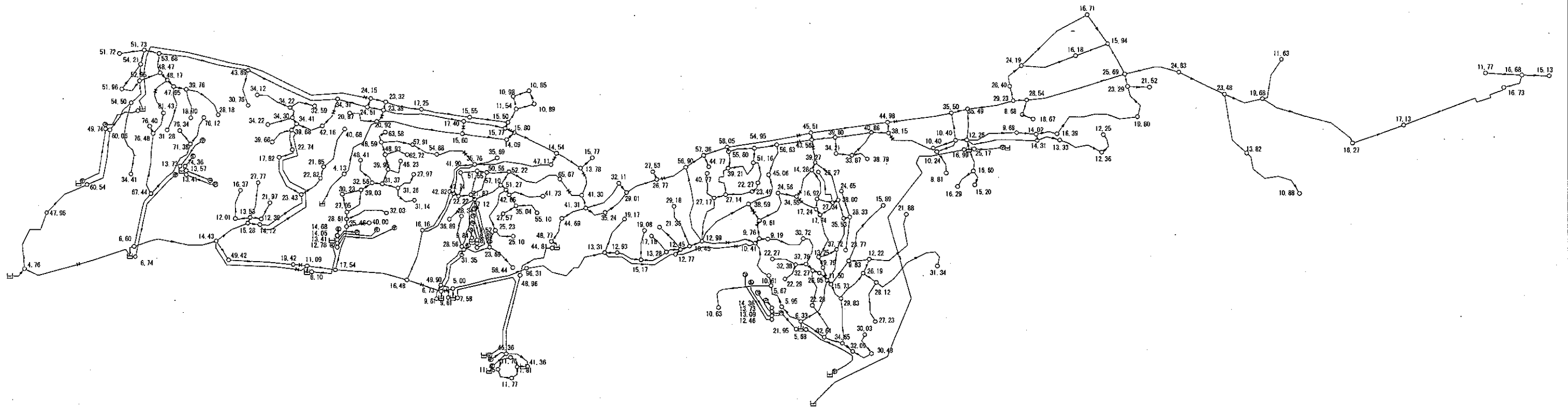


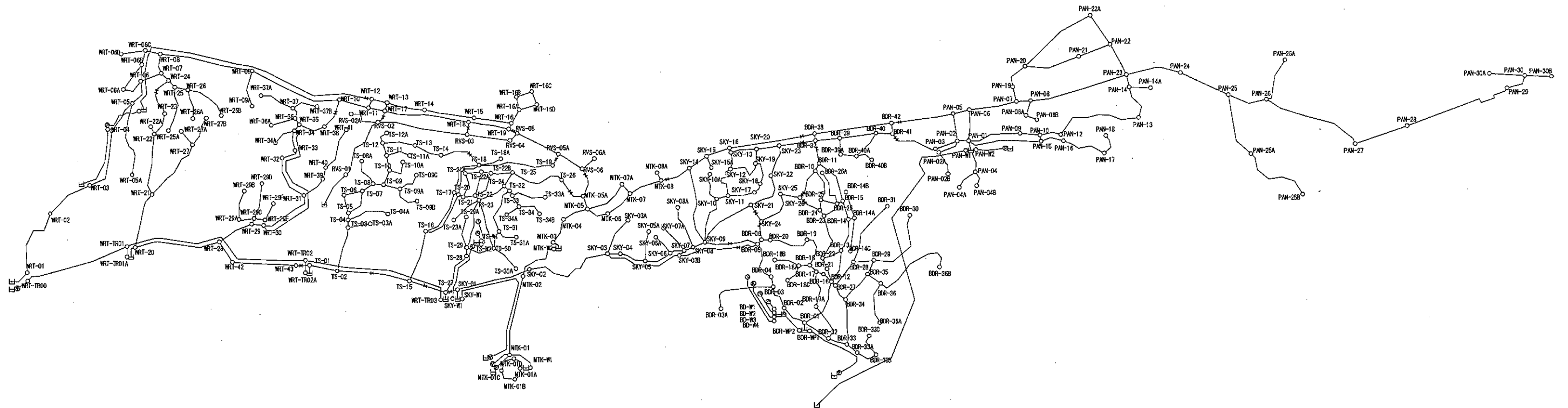


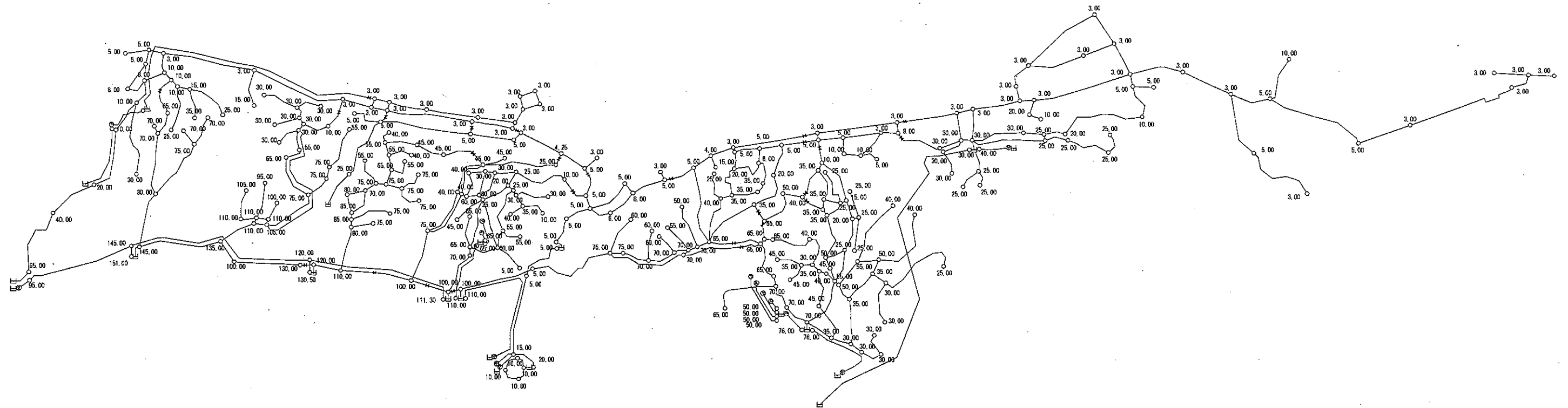


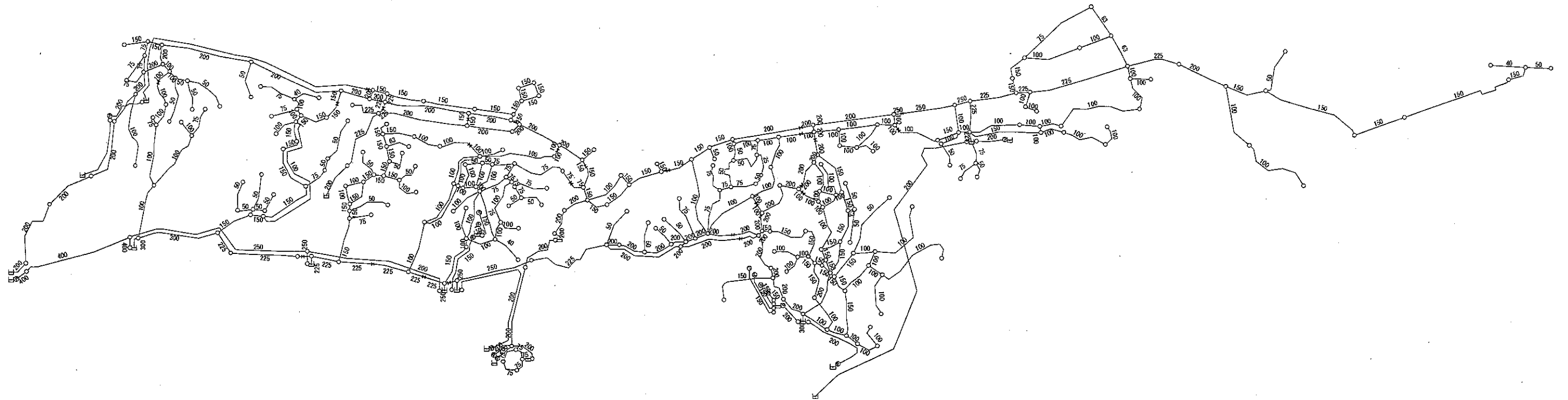


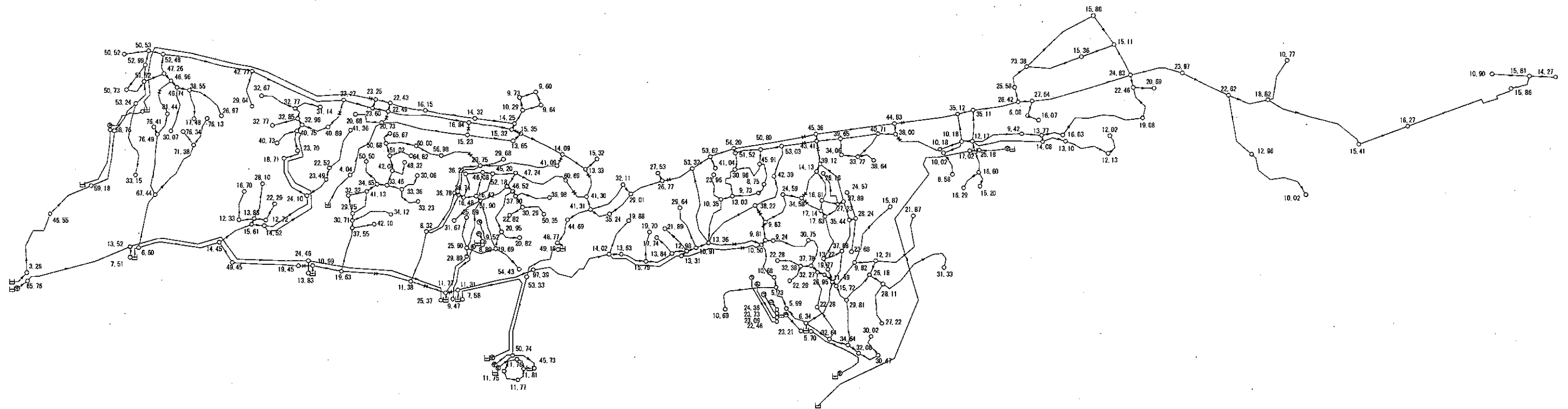


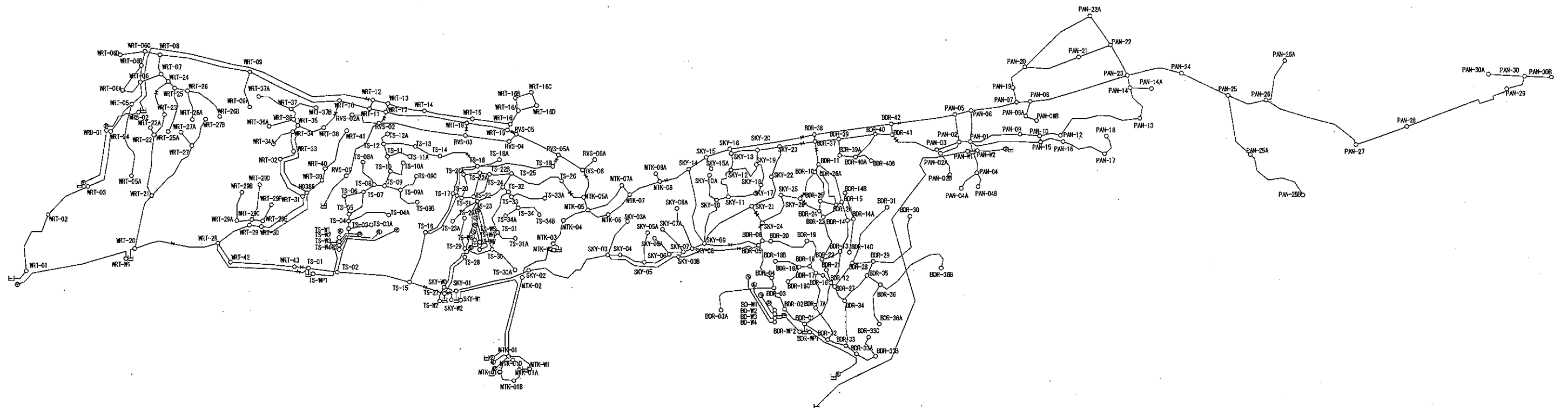


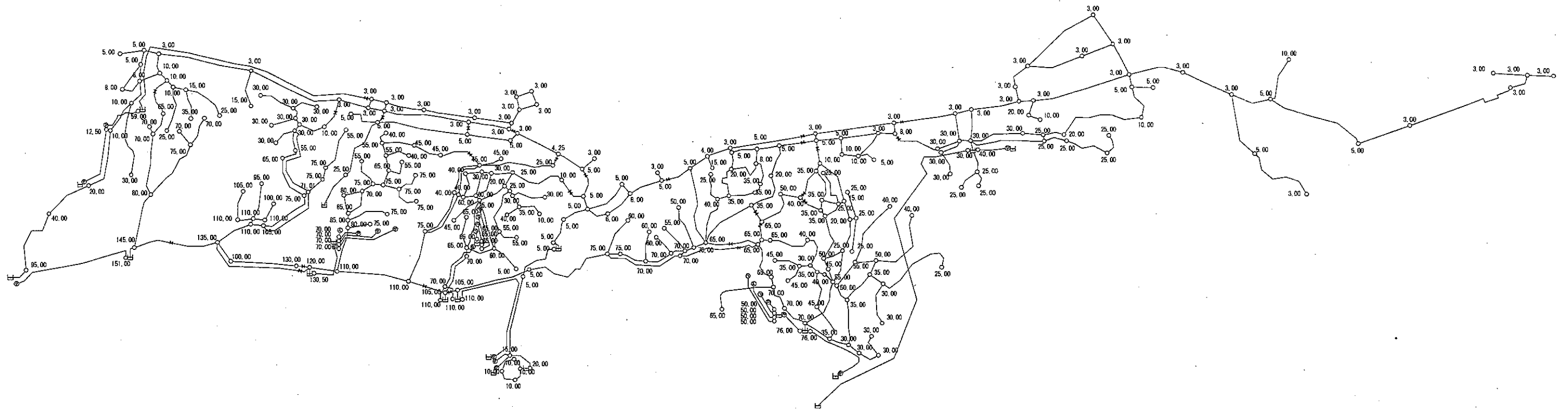


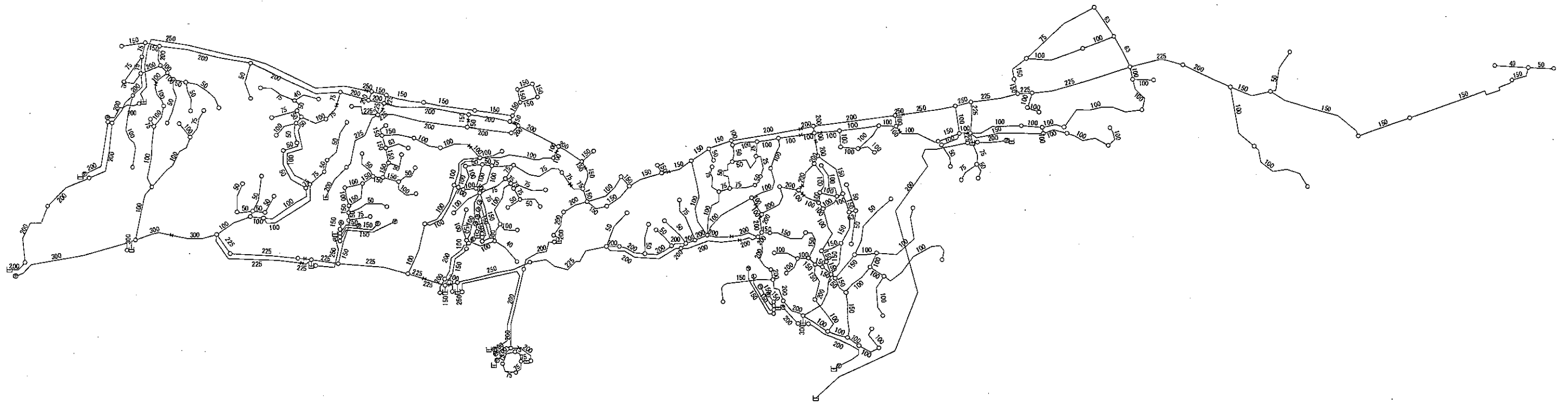




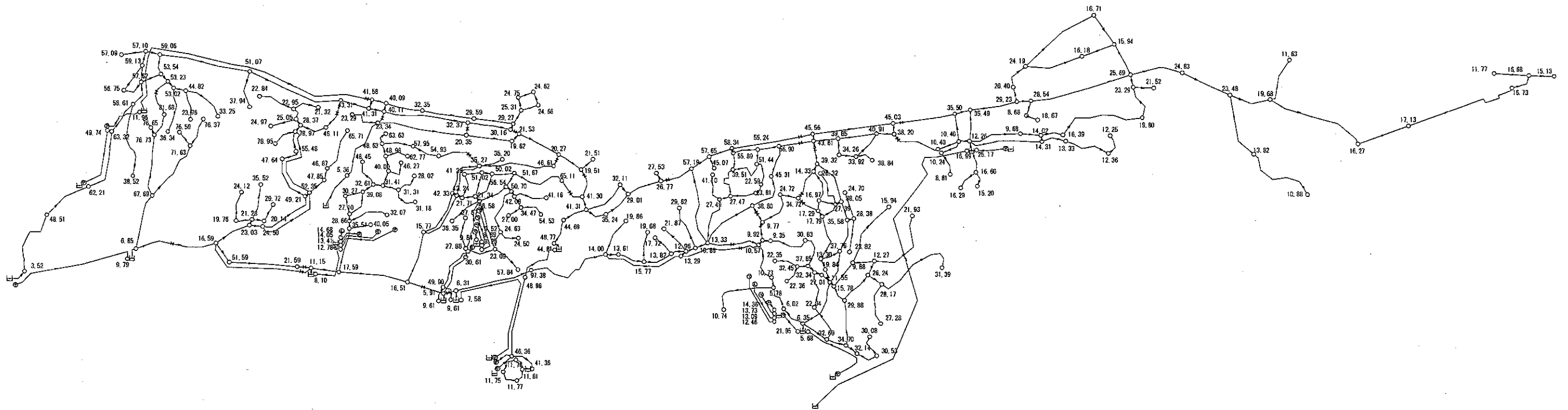












**SUPPORTING  
REPORT S-7 COST ESTIMATION**

**S-7-1 Capital Cost**

**S-7-2 Operation Cost**

### Capital Costs and Operation Costs for Each Option

Option	Capital Cost (US\$)	Operation Cost (US\$/year)	Description
Option A	\$ 10,794,790	\$ 1,901,760	Konglai Spring pumping system is canceled and the pumped water from Konglai Spring is transferred to the new storage dam in the Rove Valley. Moreover, new groundwater source (11 bores) is developed in Mataniko River Valley.
Option B1	\$ 11,366,780	\$ 2,385,856	Konglai Spring source is canceled and new groundwater source (27 bores) is developed in Mananiko area.
Option B2	\$ 10,575,730	\$ 2,143,808	Konglai Spring source is canceled and new surface water from Mataniko river will be treated in the new water treatment plant.
Option C	---	---	Not considered in the comparison because of the following reasons. Almost the same as the existing facilities. Only 2 new groundwater wells will be developed as the additional facilities.
Option D1	\$ 9,906,380	\$ 2,321,775	This option is similar in principle to Option B1, except that water from White River JICA borefield is used to partially supply the western high level area rather than the western low level area.
Option D2	\$ 10,514,880	\$ 2,196,278	This option is similar in principle to Option B2, except that the extent of borefield development required in the Mataniko River valley is offset by additional headworks at Rove Spring to make full use of this sources.
<b>Option J-1</b>	<b>\$ 7,236,306</b>	<b>\$ 1,565,209</b>	Konglai Spring pumped system will be canceled. Therefore, about 65% of the Konglai Spring source can be reduced. Instead, new groundwater sources (total 16 bores) will be developed in four different places as in Tasahe (4 bores), Titinge (4 bores), Sky
<b>Option J-2</b>	<b>\$ 6,097,485</b>	<b>\$ 1,485,724</b>	Konglai Spring pumped system will be utilized as it is. In order to cover the water demand for the year 2010, new groundwater sources (total 6 bores) will be developed in two different places as in Skyline (2 bores) and Borderline (4 bores).
<b>Option J-3</b>	<b>\$ 6,514,158</b>	<b>\$ 1,623,045</b>	This option is similar in principle to Option J-1, except that White River JICA borefield and some of Konglai spring pumped system are utilized. In order to cover the water demand for the year 2010, new groundwater sources (total 12 bores) will be de

Note : Options A to D2 are proposed by AusAID report.

## **S-7-1 Capital Cost**

**Cost Estimation for Water Supply Facility Improvement in Honiara : Option J-1**

**Total Capital Cost** 7,236,306

System Component	Location	Item	Qty	Unit	Rate	Total		
<b>Source Development</b>						<b>2,262,418</b>		
Tasashe New Borefield (800m <sup>3</sup> /day x 4 bores = 3,200m <sup>3</sup> /day)	Tasashe New Borefield	Mobilise drill rig to site	1	each	18,255	18,255		
		Production bores, each 100m deep x 200mm casing	4	each	58,903	235,611		
		Submercible bore pumps, 800m <sup>3</sup> /day x 45m head each, 7.5kW	5	each	17,525	87,624		
		300mm dia PVC main (bore to receiving tank)	0	m	72.92	0		
		250mm dia PVC main (bore to receiving tank)	0	m	58.93	0		
		200mm dia PVC main (bore to receiving tank)	0	m	41.55	0		
		150mm dia PVC main (bore to receiving tank)	1,550	m	27.50	42,632		
		100mm dia PVC main (bore to receiving tank)	0	m	17.84	0		
		Pipe fitting allowance : 5% of the pipe laying work cost	1	each		2,132		
		Borefield collector tank, 150m <sup>3</sup>	1	each	36,510	36,510		
		Borefield access road	1,550	m	73	113,181		
		High voltage transmission lines	1,550	m	12	18,864		
		Power transformer, 200kVA	1	each	8,641	8,641		
		General site works at bore compounds (fencing bores, etc.)	4	each	183	730		
		Titiage New Borefield (800m <sup>3</sup> /day x 4 bores = 3,200m <sup>3</sup> /day)	Titiage New Borefield	Mobilise drill rig to site	1	each	18,255	18,255
				Production bores, each 100m deep x 200mm casing	4	each	58,903	235,611
Submercible bore pumps, 800m <sup>3</sup> /day x 45m head each, 7.5kW	5			each	17,525	87,624		
300mm dia PVC main (bore to receiving tank)	0			m	72.92	0		
250mm dia PVC main (bore to receiving tank)	0			m	58.93	0		
200mm dia PVC main (bore to receiving tank)	0			m	41.55	0		
150mm dia PVC main (bore to receiving tank)	1,600			m	27.50	44,007		
100mm dia PVC main (bore to receiving tank)	0			m	17.84	0		
Pipe fitting allowance : 5% of the pipe laying work cost	1			each		2,200		
Borefield collector tank, 150m <sup>3</sup>	1			each	36,510	36,510		
Borefield access road	1,600			m	73	116,832		
High voltage transmission lines	1,600			m	12	19,472		
Power transformer, 200kVA	1			each	8,641	8,641		
General site works at bore compounds (fencing bores, etc.)	4			each	183	730		
Skyline New Borefield (800m <sup>3</sup> /day x 4 bores = 3,200m <sup>3</sup> /day)	Skyline New Borefield			Mobilise drill rig to site	1	each	18,255	18,255
				Production bores, each 100m deep x 200mm casing	4	each	58,903	235,611
		Submercible bore pumps, 800m <sup>3</sup> /day x 45m head each, 7.5kW	5	each	17,525	87,624		
		300mm dia PVC main (bore to receiving tank)	0	m	72.92	0		
		250mm dia PVC main (bore to receiving tank)	0	m	58.93	0		
		200mm dia PVC main (bore to receiving tank)	0	m	41.55	0		
		150mm dia PVC main (bore to receiving tank)	1,100	m	27.50	30,255		
		100mm dia PVC main (bore to receiving tank)	0	m	17.84	0		
		Pipe fitting allowance : 5% of the pipe laying work cost	1	each		1,513		
		Borefield collector tank, 150m <sup>3</sup>	1	each	36,510	36,510		
		Borefield access road	1,100	m	73	80,322		
		High voltage transmission lines	1,100	m	12	13,387		
		Power transformer, 200kVA	1	each	8,641	8,641		
		General site works at bore compounds (fencing bores, etc.)	4	each	183	730		

**Cost Estimation for Water Supply Facility Improvement in Honiara : Option J-1**

**Total Capital Cost**

**7,236,306**

System Component	Location	Item	Qty	Unit	Rate	Total
Borderline New Borefield (800m <sup>3</sup> /day x 4 bores = 3,200m <sup>3</sup> /day)	Borderline New Borefield	Mobilise drill rig to site	1	each	18,255	18,255
		Production bores, each 100m deep x 200mm casing	4	each	58,903	235,611
		Submersible bore pumps, 800m <sup>3</sup> /day x 45m head each, 7.5kW	5	each	17,525	87,624
		300mm dia PVC main (bore to receiving tank)	0	m	72.92	0
		250mm dia PVC main (bore to receiving tank)	0	m	58.93	0
		200mm dia PVC main (bore to receiving tank)	0	m	41.55	0
		150mm dia PVC main (bore to receiving tank)	2,000	m	27.50	55,008
		100mm dia PVC main (bore to receiving tank)	0	m	17.84	0
		Pipe fitting allowance : 5% of the pipe laying work cost	1	each		2,750
		Borefield collector tank, 150m <sup>3</sup>	1	each		36,510
		Borefield access road	2,000	m		73
		High voltage transmission lines	2,000	m		12
Power transformer, 200kVA	1	each		8,641		
General site works at bore compounds (fencing bores, etc.)	4	each		183		
						730
<b>Water Treatment</b>						
<b>1,285,882</b>						
Tasafe New Borefield	Tasafe	Disinfection plant, 3,850m <sup>3</sup> /day (3,200m <sup>3</sup> x 120%)	1	each	52,331	52,331
Titinge New Borefield	Titinge	Disinfection plant, 3,850m <sup>3</sup> /day (3,200m <sup>3</sup> x 120%)	1	each	52,331	52,331
Skyline New Borefield	Skyline	Disinfection plant, 3,850m <sup>3</sup> /day (3,200m <sup>3</sup> x 120%)	1	each	52,331	52,331
Borderline New Borefield	Borderline	Disinfection plant, 3,850m <sup>3</sup> /day (3,200m <sup>3</sup> x 120%)	1	each	52,331	52,331
Mataniko borefield	Mataniko	Disinfection plant, 3,100m <sup>3</sup> /day (2,570m <sup>3</sup> x 120%)	1	each	47,463	47,463
Kombito EU borefield	Borderline	Disinfection plant, 2,400m <sup>3</sup> /day (1,930m <sup>3</sup> x 120%)	1	each	45,029	45,029
Panatina borefield	Panatina	Disinfection plant, 4,400m <sup>3</sup> /day (3,660m <sup>3</sup> x 120%)	1	each	57,199	57,199
Konglai Spring Gravity System	Konglai Spring	Intermediate water treatment facility, 4,300m <sup>3</sup> /day	1	each	419,865	419,865
Rove Spring	Rove Spring	Intermediate water treatment facility, 2,000m <sup>3</sup> /day	1	each	253,501	253,501
Kombito Spring	Panatina	Intermediate water treatment facility, 2,000m <sup>3</sup> /day	1	each	253,501	253,501
<b>Pumping Station</b>						
<b>435,829</b>						
Tasafe New Borefield	Tasafe	Pumps 1,600m <sup>3</sup> /day (18.5L/s) x 80m head each, 30kW	3	each	25,000	75,000
		Pump station building	1	each	7,911	7,911
		General siteworks at pump station	1	each	3,651	3,651
		High voltage transmission lines	1,500	m	12	18,255
Power transformer, 200kVA	1	each	8,641	8,641		
Titinge New Borefield	Titinge	Pumps 1,600m <sup>3</sup> /day (18.5L/s) x 60m head each, 18.5kW	3	each	23,000	69,000
		Pump station building	1	each	7,911	7,911
		General siteworks at pump station	1	each	3,651	3,651
		High voltage transmission lines	1,500	m	12	18,255
Power transformer, 200kVA	1	each	8,641	8,641		
Skyline New Borefield	Skyline	Pumps 1,600m <sup>3</sup> /day (18.5L/s) x 60m head each, 18.5kW	3	each	23,000	69,000
		Pump station building	1	each	7,911	7,911
		General siteworks at pump station	1	each	3,651	3,651
		High voltage transmission lines	1,500	m	12	18,255
Power transformer, 200kVA	1	each	8,641	8,641		

Cost Estimation for Water Supply Facility Improvement in Honiara : Option J-1

Total Capital Cost

7,236,306

System Component	Location	Item	Qty	Unit	Rate	Total
Borderline New Borefield	Borderline	Pumps 1,600m <sup>3</sup> /day (18.5L/s) x 40m head each, 15kW	3	each	23,000	69,000
		Pump station building	1	each	7,911	7,911
		General site works at pump station	1	each	3,651	3,651
		High voltage transmission lines	1,500	m	12	18,255
		Power transformer, 200kVA	1	each	8,641	8,641
<b>Distribution Storage</b>						
Upper Tasabe reservoir	Tasabe	Storage (in addition to the existing) : 1,600m <sup>3</sup>	1	each	152,125	152,125
Tiunge reservoir	Tiunge	Storage (replacing the existing) : 1,400m <sup>3</sup>	1	each	127,785	127,785
Skyline SIWA reservoir	Skyline	Storage (in addition to the existing) : 1,550m <sup>3</sup>	1	each	139,955	139,955
Lower West Kolaa reservoir	Matamiko	Storage (replacing the existing) : 455m <sup>3</sup>	1	each	48,680	48,680
Panatina reservoir	Panatina	Storage (in addition to the existing) : 2,000m <sup>3</sup>	1	each	231,230	231,230
<b>Distribution Mains</b>						
Tasabe bore to Tasabe reservoir rising main	Tasabe	250mm dia PVC main	950	m	58.93	55,981
Tasabe distribution main		150mm dia PVC main	2,610	m	27.50	71,786
Tasabe distribution main		100mm dia PVC main	1,410	m	17.84	25,156
Tasabe distribution main		50mm dia PVC main	860	m	12.17	10,466
Tiunge bore to Tiunge reservoir rising main	Tiunge	250mm dia PVC main	700	m	58.93	41,249
Skyline bore to Skyline reservoir rising main		200mm dia PVC main	800	m	41.55	33,239
Tiunge distribution main		200mm dia PVC main	50	m	41.55	2,077
Tiunge distribution main		150mm dia PVC main	1,510	m	27.50	41,531
Tiunge distribution main		100mm dia PVC main	100	m	17.84	1,784
Rove Spring distribution main	Rove Spring	200mm dia PVC main	1,530	m	41.55	63,569
Skyline distribution main	Skyline	250mm dia PVC main	970	m	58.93	57,159
Skyline distribution main		200mm dia PVC main	1,520	m	41.55	63,154
Skyline distribution main		100mm dia PVC main	2,000	m	17.84	35,682
Skyline distribution main		50mm dia PVC main	300	m	12.17	3,651
Borderline New Borefield to Borderline reservoir rising main	Borderline	200mm dia PVC main	300	m	41.55	12,465
Borderline distribution main		300mm dia PVC main	130	m	72.92	9,480
Borderline distribution main		200mm dia PVC main	2,520	m	41.55	104,702
Borderline distribution main		150mm dia PVC main	1,600	m	27.50	44,007
Borderline distribution main		100mm dia PVC main	3,700	m	17.84	66,013
Borderline distribution main		50mm dia PVC main (for branch lines)	1,500	m	12.17	18,255
Panatina distribution main	Panatina	150mm dia PVC main	2,310	m	27.50	63,535
Panatina distribution main		100mm dia PVC main	870	m	17.84	15,522
		Distribution mains (except reservoir rising main) Pipe fitting allowance : 5% of the pipe laying work cost	25,490	each		42,023
Total Cost						5,566,389
Engineering						834,958
Contingency						834,958
						<b>7,236,306</b>

Note : Inflation ratio (4 %/year) is considered in the rate of the year 2000 applied in the AusAID report.

Cost Estimation for Water Supply Facility Improvement in Honiara : Option J-2

Total Capital Cost

6,097,485

System Component	Location	Item	Qty	Unit	Rate	Total		
<b>Source Development</b>								
Skyline New Borefield (800m <sup>3</sup> /day x 2 bores = 1,600m <sup>3</sup> /day)	Konglai Spring	Mobilise drill rig to site	1	each	18,255	18,255		
		Production bores, each 100m deep x 200mm casing	2	each	58,903	117,806		
		Submersible bore pumps, 800m <sup>3</sup> /day x 45m head each, 7.5kW	3	each	17,525	52,574		
		300mm dia PVC main (bore to receiving tank)	0	m	72.92	0		
		250mm dia PVC main (bore to receiving tank)	0	m	58.93	0		
		200mm dia PVC main (bore to receiving tank)	0	m	41.55	0		
		150mm dia PVC main (bore to receiving tank)	500	m	27.50	13,752		
		100mm dia PVC main (bore to receiving tank)	0	m	17.84	0		
		Pipe fitting allowance : 5% of the pipe laying work cost	1	each	688	688		
		Borefield collector tank, 100m <sup>3</sup>	1	each	24,340	24,340		
		Borefield access road	500	m	73	36,510		
		High voltage transmission lines	500	m	12	6,085		
		Power transformer, 200kVA	1	each	8,641	8,641		
		General site works at bore compounds (fencing bores, etc.)	2	each	183	365		
		Borderline New Borefield (800m <sup>3</sup> /day x 4 bores = 3,200m <sup>3</sup> /day)	Borderline	Mobilise drill rig to site	1	each	18,255	18,255
				Production bores, each 100m deep x 200mm casing	4	each	58,903	235,611
				Submersible bore pumps, 800m <sup>3</sup> /day x 45m head each, 7.5kW	5	each	17,525	87,624
300mm dia PVC main (bore to receiving tank)	0			m	72.92	0		
250mm dia PVC main (bore to receiving tank)	0			m	58.93	0		
200mm dia PVC main (bore to receiving tank)	0			m	41.55	0		
150mm dia PVC main (bore to receiving tank)	2,000			m	27.50	55,008		
100mm dia PVC main (bore to receiving tank)	0			m	17.84	0		
Pipe fitting allowance : 5% of the pipe laying work cost	1			each	2,750	2,750		
Borefield collector tank, 150m <sup>3</sup>	1			each	36,510	36,510		
Borefield access road	2,000			m	73	146,040		
High voltage transmission lines	2,000			m	12	24,340		
Power transformer, 200kVA	1			each	8,641	8,641		
General site works at bore compounds (fencing bores, etc.)	5			each	183	913		
<b>Water Treatment</b>								
Skyline New Borefield	Konglai Spring			Disinfection plant, 1,950m <sup>3</sup> /day (1,600m <sup>3</sup> x 120%)	1	each	46,246	46,246
	Borderline			Disinfection plant, 3,850m <sup>3</sup> /day (3,200m <sup>3</sup> x 120%)	1	each	52,331	52,331
Matamiko borefield	Matamiko	Disinfection plant, 3,100m <sup>3</sup> /day (2,570m <sup>3</sup> x 120%)	1	each	47,463	47,463		
	Borderline	Disinfection plant, 2,400m <sup>3</sup> /day (1,930m <sup>3</sup> x 120%)	1	each	45,029	45,029		
	Panatina	Disinfection plant, 4,400m <sup>3</sup> /day (3,660m <sup>3</sup> x 120%)	1	each	57,199	57,199		
	Konglai Spring	Intermediate water treatment facility, 4,300m <sup>3</sup> /day	1	each	419,865	419,865		
White River Gravity System	Konglai Spring	Intermediate water treatment facility, 7,900m <sup>3</sup> /day	1	each	535,480	535,480		
	Rove Spring	Intermediate water treatment facility, 2,000m <sup>3</sup> /day	1	each	253,501	253,501		
	Panatina	Intermediate water treatment facility, 2,000m <sup>3</sup> /day	1	each	253,501	253,501		
White River Pumping System	Konglai Spring	Pumps 800m <sup>3</sup> /day (9.3L/s) x 60m head each, 11kW	3	each	15,000	45,000		
	Panatina	Pump station building	1	each	7,911	7,911		
Rove Spring	Pantatina	General siteworks at pump station	1	each	3,651	3,651		
		High voltage transmission lines	1,500	m	12	18,255		
		Power transformer, 200kVA	1	each	8,641	8,641		
Kombito Spring	Pantatina	High voltage transmission lines	12	m	12	18,255		
		Power transformer, 200kVA	1	each	8,641	8,641		
<b>Pumping Station</b>								
Skyline New Borefield	Konglai Spring	Pumps 800m <sup>3</sup> /day (9.3L/s) x 60m head each, 11kW	3	each	15,000	45,000		
		Pump station building	1	each	7,911	7,911		
Konglai Spring	Pantatina	General siteworks at pump station	1	each	3,651	3,651		
		High voltage transmission lines	1,500	m	12	18,255		
Rove Spring	Pantatina	High voltage transmission lines	12	m	12	18,255		
		Power transformer, 200kVA	1	each	8,641	8,641		
<b>Total</b>								
						<b>1,710,615</b>		
						<b>190,914</b>		



**Cost Estimation for Water Supply Facility Improvement in Honiara : Option J-2**

**Total Capital Cost**

**6,097,485**

System Component	Location	Item	Qty	Unit	Rate	Total
Borderline New Borefield	Borderline	Pumps 1,600m <sup>3</sup> /day (18.5L/s) x 40m head each, 15kW	each	3	23,000	69,000
		Pump station building	each	1	7,911	7,911
		General site works at pump station	each	1	3,651	3,651
		High voltage transmission lines	m	1,500	12	18,255
		Power transformer, 200kVA	each	1	8,641	8,641
<b>Distribution Storage</b>						
Upper Tasashe reservoir	Konglai Spring	Storage (in addition to the existing) : 1,600m <sup>3</sup>	each	1	152,125	152,125
Titinge reservoir	Konglai Spring	Storage (replacing the existing) : 1,400m <sup>3</sup>	each	1	127,785	127,785
Skyline SIWA reservoir	Skyline	Storage (in addition to the existing) : 1550m <sup>3</sup>	each	1	139,955	139,955
Lower West Kolaa reservoir	Mataniko	Storage (replacing the existing) : 455m <sup>3</sup>	each	1	48,680	48,680
Panatina reservoir	Panatina	Storage (in addition to the existing) : 2,000m <sup>3</sup>	each	1	231,230	231,230
<b>Distribution Mains</b>						
<b>1,194,360</b>						
Konglai Spring to Tasashe reservoir rising main	Konglai Spring	400mm dia DI main	m	1,350	120,69	162,931
Konglai Spring to Titinge reservoir rising main	Konglai Spring	250mm dia PVC main	m	1,870	58,93	110,194
Konglai Spring to Skyline reservoir rising main	Konglai Spring	200mm dia PVC main	m	3,110	41,55	129,215
Tasashe distribution main	Konglai Spring	150mm dia PVC main	m	4,430	27,50	121,844
Tasashe distribution main	Konglai Spring	100mm dia PVC main	m	1,510	17,84	26,940
Tasashe distribution main	Konglai Spring	50mm dia PVC main	m	860	12,17	10,466
Rove Spring distribution main	Rove Spring	200mm dia PVC main	m	1,530	41,55	63,569
Skyline bore to Skyline reservoir rising main	Skyline	150mm dia PVC main	m	680	27,50	18,703
Skyline distribution main	Skyline	250mm dia PVC main	m	970	58,93	57,159
Skyline distribution main	Skyline	200mm dia PVC main	m	1,520	41,55	63,154
Skyline distribution main	Skyline	100mm dia PVC main	m	2,000	17,84	35,682
Skyline distribution main	Skyline	50mm dia PVC main	m	300	12,17	3,651
Borderline New Borefield to Borderline reservoir rising main	Borderline	200mm dia PVC main	m	300	41,55	12,465
Borderline distribution main	Borderline	300mm dia PVC main	m	130	72,92	9,480
Borderline distribution main	Borderline	200mm dia PVC main	m	2,520	41,55	104,702
Borderline distribution main	Borderline	150mm dia PVC main	m	1,600	27,50	44,007
Borderline distribution main	Borderline	100mm dia PVC main	m	3,700	17,84	66,013
Borderline distribution main	Borderline	50mm dia PVC main (for branch lines)	m	1,500	12,17	18,255
Panatina distribution main	Panatina	150mm dia PVC main	m	2,310	27,50	63,535
Panatina distribution main	Panatina	100mm dia PVC main	m	870	17,84	15,522
		Distribution mains (except reservoir rising main)	m	25,750		
		Pipe fitting allowance : 5% of the pipe laying work cost	each	1		56,874

Note : Inflation ratio (4 %/year) is considered in the rate of the year 2000 applied in the AusAID report.

Total Cost	4,690,373
Engineering	703,556
Contingency	703,556
<b>Total</b>	<b>6,097,485</b>

Cost Estimation for Water Supply Facility Improvement in Honiara : Option J-3

Total Capital Cost

6,514,158

System Component	Location	Item	Qty	Unit	Rate	Total		
<b>Source Development</b>								
Titinge New Borefield (800m <sup>3</sup> /day x 4 bores = 3,200m <sup>3</sup> /day)	Titinge/Skyline	Mobilise drill rig to site	1	each	18,255	18,255		
		Production bores, each 100m deep x 200mm casing	4	each	58,903	235,611		
		Submersible bore pumps, 800m <sup>3</sup> /day x 45m head each, 7.5kW	5	each	17,525	87,624		
		300mm dia PVC main (bore to receiving tank)	0	m	72.92	0		
		250mm dia PVC main (bore to receiving tank)	0	m	58.93	0		
		200mm dia PVC main (bore to receiving tank)	0	m	41.55	0		
		150mm dia PVC main (bore to receiving tank)	1,600	m	27.50	44,007		
		100mm dia PVC main (bore to receiving tank)	0	m	17.84	0		
		Pipe fitting allowance : 5% of the pipe laying work cost	1	each	2,200	2,200		
		Borefield collector tank, 150m <sup>3</sup>	1	each	36,510	36,510		
		Borefield access road	1,600	m	73	116,832		
		High voltage transmission lines	1,600	m	12	19,472		
		Power transformer, 200kVA	1	each	8,641	8,641		
		General site works at bore compounds (fencing bores, etc.)	4	each	183	730		
		<b>Skyline New Borefield</b>						
		(800m <sup>3</sup> /day x 4 bores = 3,200m <sup>3</sup> /day)	Titinge/Skyline	Mobilise drill rig to site	1	each	18,255	18,255
				Production bores, each 100m deep x 200mm casing	4	each	58,903	235,611
Submersible bore pumps, 800m <sup>3</sup> /day x 45m head each, 7.5kW	5			each	17,525	87,624		
300mm dia PVC main (bore to receiving tank)	0			m	72.92	0		
250mm dia PVC main (bore to receiving tank)	0			m	58.93	0		
200mm dia PVC main (bore to receiving tank)	0			m	41.55	0		
150mm dia PVC main (bore to receiving tank)	1,100			m	27.50	30,255		
100mm dia PVC main (bore to receiving tank)	0			m	17.84	0		
Pipe fitting allowance : 5% of the pipe laying work cost	1			each	1,513	1,513		
Borefield collector tank, 150m <sup>3</sup>	1			each	36,510	36,510		
Borefield access road	1,100			m	73	80,322		
High voltage transmission lines	1,100			m	12	13,387		
Power transformer, 200kVA	1			each	8,641	8,641		
General site works at bore compounds (fencing bores, etc.)	3			each	183	548		
<b>Borderline New Borefield</b>								
(800m <sup>3</sup> /day x 4 bores = 3,200m <sup>3</sup> /day)	Borderline			Mobilise drill rig to site	1	each	18,255	18,255
				Production bores, each 100m deep x 200mm casing	4	each	58,903	235,611
		Submersible bore pumps, 800m <sup>3</sup> /day x 45m head each, 7.5kW	5	each	17,525	87,624		
		300mm dia PVC main (bore to receiving tank)	0	m	72.92	0		
		250mm dia PVC main (bore to receiving tank)	0	m	58.93	0		
		200mm dia PVC main (bore to receiving tank)	0	m	41.55	0		
		150mm dia PVC main (bore to receiving tank)	2,000	m	27.50	55,008		
		100mm dia PVC main (bore to receiving tank)	0	m	17.84	0		
		Pipe fitting allowance : 5% of the pipe laying work cost	1	each	2,750	2,750		
		Borefield collector tank, 150m <sup>3</sup>	1	each	36,510	36,510		
		Borefield access road	2,000	m	73	146,040		
		High voltage transmission lines	2,000	m	12	24,340		
		Power transformer, 200kVA	1	each	8,641	8,641		
		General site works at bore compounds (fencing bores, etc.)	4	each	183	730		
		<b>Water Treatment</b>						
		<b>1,416,101</b>						
		Titinge New Borefield Skyline New Borefield Borderline New Borefield	Titinge/Skyline	Disinfection plant, 3,850m <sup>3</sup> /day (3,200m <sup>3</sup> x 120%)	1	each	52,331	52,331
Titinge/Skyline	Disinfection plant, 3,850m <sup>3</sup> /day (3,200m <sup>3</sup> x 120%)		1	each	52,331	52,331		
Borderline	Disinfection plant, 3,850m <sup>3</sup> /day (3,200m <sup>3</sup> x 120%)		1	each	52,331	52,331		

**Cost Estimation for Water Supply Facility Improvement in Honiara : Option J-3**

**Total Capital Cost**

**6,514,158**

System Component	Location	Item	Qty	Unit	Rate	Total
Matamiko borefield	Matamiko	Disinfection plant, 3,100m <sup>3</sup> /day (2,570m <sup>3</sup> x 120%)	each	1	47,463	47,463
Kombito EU borefield	Borderline	Disinfection plant, 2,400m <sup>3</sup> /day (1,930m <sup>3</sup> x 120%)	each	1	45,029	45,029
Panatina borefield	Panatina	Disinfection plant, 4,400m <sup>3</sup> /day (3,660m <sup>3</sup> x 120%)	each	1	57,199	57,199
White River Gravity System	Konglai Spring	Intermediate water treatment facility, 4,300m <sup>3</sup> /day	each	1	419,865	419,865
White River Pumping System	Konglai Spring	Intermediate water treatment facility, 1,100m <sup>3</sup> /day	each	1	182,550	182,550
Rove Spring	Rove Spring	Intermediate water treatment facility, 2,000m <sup>3</sup> /day	each	1	253,501	253,501
Kombito Spring	Panatina	Intermediate water treatment facility, 2,000m <sup>3</sup> /day	each	1	253,501	253,501
<b>Pumping Station</b>						
Konglai Spring	Konglai Spring	Pumps, 500m <sup>3</sup> /day (5.8L/s) x 65m head each, 11kW	each	3	15000	45,000
Titinge New Borefield	Titinge/Skyline	Pumps 1,600m <sup>3</sup> /day (18.5L/s) x 60m head each, 18.5kW	each	3	23,000	69,000
		Pump station building	each	1	7,911	7,911
		General site works at pump station	each	1	3,651	3,651
		High voltage transmission lines	each	1,500	12	18,255
Power transformer, 200kVA	each	1	8,641	8,641		
Skyline New Borefield	Titinge/Skyline	Pumps 1,600m <sup>3</sup> /day (18.5L/s) x 60m head each, 18.5kW	each	3	23,000	69,000
		Pump station building	each	1	7,911	7,911
		General site works at pump station	each	1	3,651	3,651
		High voltage transmission lines	m	1,500	12	18,255
Power transformer, 200kVA	each	1	8,641	8,641		
Borderline New Borefield	Borderline	Pumps 1,600m <sup>3</sup> /day (18.5L/s) x 40m head each, 15.0kW	each	3	23,000	69,000
		Pump station building	each	1	7,911	7,911
		General site works at pump station	each	1	3,651	3,651
		High voltage transmission lines	m	1,500	12	18,255
Power transformer, 200kVA	each	1	8,641	8,641		
<b>Distribution Storage</b>						
White River JICA reservoir	Konglai Spring	Storage (in addition to the existing) : 2,000m <sup>3</sup>	each	1	231,230	231,230
Titinge reservoir	Titinge/Skyline	Storage (replacing the existing) : 1,400m <sup>3</sup>	each	1	127,785	127,785
Skyline SIWA reservoir	Titinge/Skyline	Storage (in addition to the existing) : 1550m <sup>3</sup>	each	1	139,955	139,955
Lower West Kolaa reservoir	Matamiko	Storage (replacing the existing) : 455m <sup>3</sup>	each	1	48,680	48,680
Panatina reservoir	Panatina	Storage (in addition to the existing) : 2,000m <sup>3</sup>	each	1	231,230	231,230
<b>Distribution Mains</b>						
Tasabe distribution main	Konglai Spring	100mm dia PVC main	m	1,410	17,84	25,156
Tasabe distribution main		50mm dia PVC main	m	860	12.17	10,466
Rove Spring distribution main	Rove Spring	200mm dia PVC main	m	1,530	41.55	63,569
Titinge New Borefield to Titinge reservoir rising main	Titinge/Skyline	250mm dia PVC main	m	700	58.93	41,249
Skyline New Borefield to Skyline reservoir rising main		200mm dia PVC main	m	800	41.55	33,239
Titinge distribution main		150mm dia PVC main	m	1,660	27.50	45,657
Titinge distribution main		100mm dia PVC main	m	100	17.84	1,784
<b>Summary</b>						
						<b>367,372</b>
						<b>778,880</b>
						<b>750,481</b>

**Cost Estimation for Water Supply Facility Improvement in Honiara : Option J-3**

**Total Capital Cost 6,514,158**

System Component	Location	Item	Qty	Unit	Rate	Total
Skyline distribution main	Skyline	250mm dia PVC main	m	970	58.93	57,159
Skyline distribution main	Skyline	200mm dia PVC main	m	1,520	41.55	63,154
Skyline distribution main	Skyline	100mm dia PVC main	m	2,000	17.84	35,682
Skyline distribution main	Skyline	50mm dia PVC main	m	300	12.17	3,651
Borderline New Borefield to Borderline reservoir rising main	Borderline	200mm dia PVC main	m	300	41.55	12,465
Borderline distribution main	Borderline	300mm dia PVC main	m	130	72.92	9,480
Borderline distribution main	Borderline	200mm dia PVC main	m	2,520	41.55	104,702
Borderline distribution main	Borderline	150mm dia PVC main	m	1,600	27.50	44,007
Borderline distribution main	Borderline	100mm dia PVC main	m	3,700	17.84	66,013
Borderline distribution main	Borderline	50mm dia PVC main (for branch lines)	m	1,500	12.17	18,255
Panatina distribution main	Panatina	150mm dia PVC main	m	2,310	27.50	63,535
Panatina distribution main	Panatina	100mm dia PVC main	m	870	17.84	15,522
		Distribution mains (except reservoir rising main)	m	22,980		
		Pipe fitting allowance : 5% of the pipe laying work cost	each	1		

Note : Inflation ratio (4 %/year) is considered in the rate of the year 2000 applied in the AusAID report.

Total Cost 5,010,891  
 Engineering 751,634  
 Contingency 751,634  
**6,514,158**

## **S-7-2 Operation Cost**

# YEAR 2010 OPERATIONS AND MAINTENANCE COSTS

## OPTION J-1

## Annual Operations & Maintenance

### Annual Pumping Costs

Pumping Station	Existing or Planned	Flow (ML/D)	Flow (L/sec)	Head (m)	Design Power (kW)	Efficiency	Effect. Power (kW)	Power Tariff (US\$/kWh)	Da ( )
White River JICA Borefield* <sup>1</sup>	Existing	3.5	40.5	80	52	0.70	41.00	0.238	\$
Mataniko SIWA Borefield	Existing	2.1	24.3	45	30	0.65	18.62	0.238	\$
Mataniko JICA Borefield	Existing	2.6	30.1	70	44	0.70	32.28	0.238	\$
Gilbert Camp Borefield (Kombito JICA/EU)	Existing	2.0	23.1	80	26	0.70	26.00	0.238	\$
Panatama Borefield	Existing	3.7	42.8	85	59	0.65	54.36	0.238	\$
White River Pumped System	Existing (Not Used)								
White River JICA Collector - JICA Tank* <sup>1</sup>	Existing	3.5	40.5	80	37	0.65	36.72	0.238	\$
Mataniko - Skyline	Existing	2.6	30.1	100	74	0.65	45.14	0.238	\$
Mataniko - Lower West Kolaa	Existing	3.1	35.9	50	30	0.65	27.58	0.238	\$
Tasahe Borefield	Planned	3.2	37.0	45	30	0.70	27.68	0.238	\$
Titinge Borefield	Planned	3.2	37.0	45	30	0.70	27.68	0.238	\$
Skyline Borefield	Planned	3.2	37.0	45	30	0.70	27.68	0.238	\$
Borderline Borefield	Planned	3.2	37.0	45	30	0.70	27.68	0.238	\$
Tasahe Borefield - Tasahe Tank	Planned	3.2	37.0	80	60	0.65	52.96	0.238	\$
Titinge Borefield - Titinge Tank	Planned	3.2	37.0	60	44	0.65	39.72	0.238	\$
Skyline Borefield - Skyline Tank	Planned	3.2	37.0	60	44	0.65	39.72	0.238	\$
Borderline Borefield - Borderline (EU) Tank	Planned	3.2	37.0	40	30	0.65	26.48	0.238	\$
							551.30		

Note 1 : These pumps are to be used only for emergency case. It is assumed that they will be operated twice a month.

### Annual Treatment Costs:

Water Treatment Plant	Flow (ML/D)	Flow (L/sec)	Process
Tasahe Borefield	3.2	37.0	Disinfection plant
Titinge Borefield	3.2	37.0	Disinfection plant
Skyline Borefield	3.2	37.0	Disinfection plant
Borderline Borefield	3.2	37.0	Disinfection plant
Mataniko Borefield	2.6	30.1	Disinfection plant
Kombito EU Borefield	1.9	22.0	Disinfection plant
Panatama Borefield	3.7	42.8	Disinfection plant
White River Gravity System	4.3	49.8	Intermediate WTP
Rove Spring	1.8	20.8	Intermediate WTP
Kombito Spring	1.6	18.5	Intermediate WTP
			Total Annual Treatm

**Annual Maintenance Costs**

Item	Capital Cost (US\$)	Maintenance:Capital Ratio
Bores (Civil)	\$ 944,000	1.0%
Dams & Weirs	\$ -	1.0%
Mechanical & Electrical	\$ 850,500	2.0%
Other Civil (roads, fences, buildings)	\$ 505,620	1.0%
Pipes	\$ 1,063,000	0.5%
Storage Tanks	\$ 845,800	1.0%
Water Treatment Plants	\$ 1,285,900	2.0%
<b>Total Annual Maintenanar</b>		

**Year 2005 Base Level Maintenance Costs**

Maintenance of Year 2005 existing assets, wages, vehicles etc.

# YEAR 2010 OPERATIONS AND MAINTENANCE COSTS

## OPTION J-2

## Annual Operations & Maintenance

Annual Pumping Costs		Existing or Planned	Flow (ML/D)	Flow (L/sec)	Head (m)	Design Power (kW)	Efficiency	Effect. Power (kW)	Power Tariff (US\$/kWh)	Da ( )
Pumping Station										
White River JICA Bores*1		Existing	3.5	40.5	80	52	0.70	41.00	0.238	\$
Mataniko SIWA Borefield		Existing	2.1	24.3	45	30	0.65	18.62	0.238	\$
Mataniko JICA Borefield		Existing	2.6	30.1	70	44	0.70	32.28	0.238	\$
Gilbert Camp Borefield (Kombito JICA/EU)		Existing	2.0	23.1	80	26	0.70	26.00	0.238	\$
Panatina Bores		Existing	3.7	42.8	85	59	0.65	54.36	0.238	\$
White River Pumped System		Existing	7.9	91.4	65	110	0.65	89.32	0.238	\$
White River JICA Collector - JICA Tank*1		Existing	3.5	40.5	80	37	0.65	36.72	0.238	\$
Mataniko - Skyline		Existing	2.6	30.1	100	74	0.65	45.14	0.238	\$
Mataniko - Lower West Kolaa		Existing	3.1	35.9	50	30	0.65	27.58	0.238	\$
Skyline Bores		Planned	1.6	18.5	45	15	0.70	13.84	0.238	\$
Borderline Bores		Planned	3.2	37.0	45	30	0.70	27.68	0.238	\$
Skyline Bores - Skyline Tank		Planned	1.6	18.5	60	22	0.65	39.72	0.238	\$
Borderline Bores - Borderline (EU) Tank		Planned	3.2	37.0	40	30	0.65	26.48	0.238	\$
								478.74		

Note 1 : These pumps are to be used only for emergency case. It is assumed that they will be operated twice a month.

### Annual Treatment Costs:

Water Treatment Plant	Flow (ML/D)	Flow (L/sec)	Process
Skyline Borefield	1.6	18.5	Disinfection plant
Borderline Borefield	3.2	37.0	Disinfection plant
Mataniko Borefield	4.6	53.2	Disinfection plant
Kombito EU Borefield	2.0	23.1	Disinfection plant
Panatina Borefield	3.7	42.8	Disinfection plant
White River Gravity System	4.3	49.8	Intermediate WTP
White River Pumping System	7.8	90.3	Intermediate WTP
Rove Spring	1.8	20.8	Intermediate WTP
Kombito Spring	1.6	18.5	Intermediate WTP
			Total Annual Treatm



<b>Annual Maintenance Costs</b>		
Item	Capital Cost (US\$)	Maintenance:Capital Ratio
Bores (Civil)	\$ 353,800	1.0%
Dams & Weirs	\$ -	1.0%
Mechanical & Electrical	\$ 241,600	2.0%
Other Civil (roads, fences, buildings)	\$ 206,970	1.0%
Pipes	\$ 1,266,700	0.5%
Storage Tanks	\$ 760,600	1.0%
Water Treatment Plants	\$ 1,710,600	2.0%
<b>Total Annual Maintenanar</b>		

**Year 2005 Base Level Maintenance Costs**  
Maintenance of Year 2005 existing assets, wages, vehicles etc.

# YEAR 2010 OPERATIONS AND MAINTENANCE COSTS

## OPTION J-3

## Annual Operations & Maintenance

### Annual Pumping Costs

Pumping Station	Existing or Planned	Flow (ML/D)	Flow (L/sec)	Head (m)	Design Power (kW)	Efficiency	Effect Power (kW)	Power Tariff (US\$/kWh)	Da ( )
White River JICA Bores	Existing	3.5	40.5	80	52	0.70	41.00	0.238	\$
Mataniko SIWA Borefield	Existing	2.1	24.3	45	30	0.65	18.62	0.238	\$
Mataniko JICA Borefield	Existing	2.6	30.1	70	44	0.70	32.28	0.238	\$
Gilbert Camp Borefield (Kombito JICA/EU)	Existing	2.0	23.1	80	26	0.70	26.00	0.238	\$
Panatina Bores	Existing	3.7	42.8	85	59	0.65	54.36	0.238	\$
White River Pumped System	Existing	1.0	11.6	65	22	0.55	16.92	0.238	\$
White River JICA Collector - JICA Tank	Existing	3.5	40.5	80	37	0.65	36.72	0.238	\$
Mataniko - Skyline	Existing	2.6	30.1	100	74	0.65	45.14	0.238	\$
Mataniko - Lower West Kolaa	Existing	3.1	35.9	50	30	0.65	27.58	0.238	\$
Titinge Borefield	Planned	3.2	37.0	45	30	0.70	27.68	0.238	\$
Skyline Borefield	Planned	3.2	37.0	45	30	0.70	27.68	0.238	\$
Borderline Borefield	Planned	3.2	37.0	45	30	0.70	27.68	0.238	\$
Tasahe Bores - Tasahe Tank	Planned	1.0	11.6	65	22	0.55	16.92	0.238	\$
Titinge Bores - Titinge Tank	Planned	3.2	37.0	60	44	0.65	39.72	0.238	\$
Skyline Bores - Skyline Tank	Planned	3.2	37.0	60	44	0.65	39.72	0.238	\$
Naha/Vura Bores - Borderline (EU) Tank	Planned	3.2	37.0	40	15	0.65	26.48	0.238	\$
							504.50		

### Annual Treatment Costs:

Water Treatment Plant	Flow (ML/D)	Flow (L/sec)	Process
Titinge Borefield	3.2	37.0	Disinfection plant
Skyline Borefield	3.2	37.0	Disinfection plant
Borderline Borefield	3.2	37.0	Disinfection plant
Mataniko Borefield	4.6	53.2	Disinfection plant
Kombito EU Borefield	2.0	23.1	Disinfection plant
Panatina Borefield	3.7	42.8	Disinfection plant
White River Gravity System	4.3	49.8	Intermediate WTP
White River Pumping System	1.0	11.6	Intermediate WTP
Rove Spring	1.8	20.8	Intermediate WTP
Kombito Spring	1.6	18.5	Intermediate WTP
			Total Annual Treatm

<b>Annual Maintenance Costs</b>		
Item	Capital Cost (US\$)	Maintenance:Capital Ratio
Bores (Civil)	\$ 706,800	1.0%
Dams & Weirs	\$ -	1.0%
Mechanical & Electrical	\$ 597,920	2.0%
Other Civil (roads, fences, buildings)	\$ 379,910	1.0%
Pipes	\$ 886,300	0.5%
Storage Tanks	\$ 888,400	1.0%
Water Treatment Plants	\$ 1,416,100	2.0%
		<b>Total Annual Maintenan</b>

**Year 2005 Base Level Maintenance Costs**  
Maintenance of Year 2005 existing assets, wages, vehicles etc.

**SUPPORTING DATA FOR FOLLOW-UP  
REPORT S-8 COOPERATION**

- S-8-1 Current Situations of the Facilities Constructed  
by the Original Project**
- S-8-2 SIWA's Priority for the Follow-up Cooperation**
- S-8-3 Equipment Specifications for the Follow-up Cooperation  
(Draft Request for Quotation)**
- S-8-4 Cost Breakdown of the Major Equipment  
for the Follow-up Cooperation**
- S-8-5 Results of Pumping Test**

**S-8-1 Current Situations of the Facilities Constructed  
by the Original Project**

## Current Situations of the facilities constructed by the Original Project

Bores Location	Facility Classification	Facility	Status	Damaged by	Situation	Necessity of Repair/Restore	Follow-up Request	Remark
White River	Water Source	W-1 Bore	Not in use	-	Bore hole is believed to have the original designed pumping capacity.	No	No	
		Submergible Pump Facility	Damaged Not in use	Ethnic Tension / Electrical Breakdown	Pump has been stopping since the electric power cable breakdown in around 1999. During the ethnic tension, some part of piping was destroyed. The submersible pump was removed by SIWA to transfer to other bore.	Yes	Yes	
		Control Facility	Damaged Not in use	Ethnic Tension / Electrical Breakdown	Equipment has been stopping since the electric power cable breakdown in around 1999. During the ethnic tension, control panel was destroyed.	Yes	Yes	
		Fence	Damaged Not in use	Ethnic Tension	It was destroyed by the ethnic tension.	Yes	No	
		W-2 Bore	Not in use	-	Bore hole is believed to have the original designed pumping capacity.	No	No	
		Submergible Pump Facility	Damaged Not in use	Ethnic Tension / Electrical Breakdown	Pump has been stopping since the electric power cable breakdown in around 1999. During the ethnic tension, some part of piping was destroyed. The submersible pump was removed by SIWA to transfer to other bore.	Yes	Yes	
		Control Facility	Damaged Not in use	Ethnic Tension / Electrical Breakdown	Equipment has been stopping since the electric power cable breakdown in around 1999. During the ethnic tension, control panel was destroyed.	Yes	Yes	
		Fence	Damaged Not in use	Ethnic Tension	It was destroyed by the ethnic tension.	Yes	No	
		W-3 Bore	Not in use	-	As long as SIWA's test done in December 2004, the bore condition is in operable level.	No	No	
		Submergible Pump Facility	Damaged Not in use	Breakdown	Equipment has been stopping since the electric power cable breakdown in around 1999. Long stopping period deteriorated the equipment condition. The submersible pump was broken down.	Yes	Yes	
Control Facility	Damaged Not in use	Mischief	Equipment has been stopping since the electric power cable breakdown in around 1999. Meter of control panel was destroyed probably by mischief of residents. The control panel is not in appropriate condition for safe operation.	Yes	Yes			

## Current Situations of the facilities constructed by the Original Project

Bores Location	Facility Classification	Facility	Status	Damaged by	Situation	Necessity of Repair/Restore	Follow-up Request	Remark
		Fence	In use	-	There is no remarkable damage.	No	No	
		W-4 Bore	Not in use	-	Bore hole is believed to have the original designed pumping capacity.	No	No	
		Submergible Pump Facility	Damaged Not in use	Ethnic Tension/ Electrical Breakdown	Equipment has been stopping since the electric power cable breakdown in around 1999. Long stopping period deteriorated the equipment condition. The submersible pump was broken down.	Yes	Yes	
		Control Facility	Damaged Not in use	Ethnic Tension/ Electrical Breakdown	Equipment has been stopping since the electric power cable breakdown in around 1999. Meter of control panel was destroyed probably by mischief of residents. The control panel is not in appropriate condition for safe operation.	Yes	Yes	
		Fence	In use	-	There is no remarkable damage.	No	No	
		Electric Power Facility	Damaged Not in use	Ethnic Tension/ Electrical Breakdown	Power receiving/distributing panel was destroyed by the ethnic tension. Power cables for W-1, W-2 and W-4 were broken-down physically around 1999 before the ethnic tension. The cable for W-3 can conduct the electricity, however it may be in unstable condition. Since the physical breakdown of the cables, all bores and transmission pumps have been stopping.	Yes	Yes	
	Water Conveyance	Water Conveyance Pipeline	Not in use	-	There is no remarkable damage in visual inspection.	No	No	
	Water Receiving Tank	Water Receiving Tank	Not in use	Ethnic Tension	There is no remarkable damage for structure. Level switch was broken by the ethnic tension.	No	No	Level switch is managed by submersible pump control.
	Water Transmission	Transmission Pump Facility	Damaged Not in use	Ethnic Tension/ Electrical Breakdown	All pumps and panels were destroyed by the ethnic tension. The equipment has been stopping since the physical breakdown of the cables. As the stopping period is long, the equipment is so rusted and corroded and it is not under bore condition for safe operation. set of pump facility was reassembled with temporary substitutes for testing. Some parts were transferred to Mataniko for repairing Mataniko's facility.	Yes	Yes	
		Water Transmission Pipeline	Not in use	-	There is no remarkable damage in visual inspection.	No	No	
	Water Distribution	White River Tank	Not in use	-	There is no structural damage in visual inspection. Level switch is broken.	No	Yes	Level switch is managed by transmission pump control.

## Current Situations of the facilities constructed by the Original Project

Bores Location	Facility Classification	Facility	Status	Damaged by	Situation	Necessity of Repair/Restore	Follow-up Request	Remark	
		Water Distribution Pipeline	Not in use	-	There is no remarkable damage in visual inspection.	No	No		
	Disinfection	Chlorinating Facility	Damaged Not in use	Ethnic Tension	The Facility was destroyed by the ethnic tension. Actually, temporary facility is installed for testing.	Yes	Yes		
	Building	Transmission Pump Room and Chlorinating Room	In use	Ethnic Tension	Doors were destroyed by the ethnic tension. The doors are repaired by SIWA. There is no other damage.	No	No		
Matamiko	Water Source	M-1 Bore	In use	-	There is no remarkable damage.	No	No		
		Submergible Pump Facility	In use	-	There is no remarkable damage in visual inspection.	No	No	Necessary to change riser pipe	
			Control Facility	In use	-	Equipment has been operated without remarkable trouble. Replacing the control panel with more protective type against rain is desirable.	No	No	
			Fence	In use	-	There is no remarkable damage.	No	No	
			M-2 Bore	In use	-	There is no remarkable damage.	No	No	
			Submergible Pump Facility	In use	-	There is no remarkable damage in visual inspection.	No	No	Necessary to change riser pipe
			Control Facility	In use	-	Equipment has been operated without remarkable trouble. Replacing the control panel with more protective type against rain is desirable.	No	No	
			Fence	In use	-	There is no remarkable damage.	No	No	
			M-3 Bore	In use	-	There is no remarkable damage.	No	No	
			Submergible Pump Facility	In use	-	There is no remarkable damage in visual inspection.	No	No	Necessary to change riser pipe
			Control Facility	In use	-	Equipment has been operated without remarkable trouble. Replacing the control panel with more protective type against rain is desirable.	No	No	
			Fence	In use	-	There is no remarkable damage.	No	No	
			M-4 Bore	Not in use	Naturally	Groundwater level is low. It is recommendable to stop operating.	No	No	
			Submergible Pump Facility	Not in use	Poor bore condition	SIWA is not planning to utilize the bore, so that the equipment was transferred to other bore.	No	No	
			Control Facility	Not in use	Poor bore condition	SIWA is not planning to utilize the bore, so that the equipment (parts of control panel) was transferred to other bore.	No	No	
			Fence	In use	-	There is no remarkable damage.	No	No	



## Current Situations of the facilities constructed by the Original Project

Bores Location	Facility Classification	Facility	Status	Damaged by	Situation	Necessity of Repair/Restore	Follow-up Request	Remark
		M-5 Bore	In use	-	There is no remarkable damage.	No	No	
		Submergible Pump Facility	In use	-	There is no remarkable damage in visual inspection.	No	No	Necessary to change riser pipe
		Control Facility	In use	-	Equipment has been operated without remarkable trouble. Replacing the control panel with more protective type against rain is desirable.	No	No	
		Fence	In use	-	There is no remarkable damage.	No	No	
		Electric Power Facility	In use	-	There is no remarkable damage in visual inspection.	No	No	
	Water Conveyance	Water Conveyance Pipeline	In use	-	There is no remarkable damage in visual inspection.	No	No	
	Water Receiving Tank	Water Receiving Tank	In use	-	There is no remarkable damage in visual inspection.	No	No	
	Water Transmission	Transmission Pump Facility	In use	-	1 of 3 sets of valves were mechanically broken. The broken parts were replaced with ones of White River. There is no other remarkable damage.	No	No	
	Water Distribution	Water Transmission Pipeline	In use	-	There is no remarkable damage in visual inspection.	No	No	
	Water Distribution	Skyline Tank	Damaged Not in use	Mischief and/or water steal	SIWA is not using because of much water leakage. Reason of the leakage is supposed bolts loosened by residents.	Yes	Yes	
	Disinfection	Water Distribution Pipeline	Not in use	-	There is no remarkable damage in visual inspection.	No	No	
	Disinfection	Chlorinating Facility	In use	-	As equipment were broken-down and corroded, the facility were repaired with substitutes, which are able to be purchased locally.	No	No	
	Building	Transmission Pump Room and Chlorinating Room	In use	-	There is no remarkable damage in visual inspection.	No	No	
Kombito	Water Source	K-1 Bore	In use	-	Bore hole is believed to have the original designed pumping capacity.	No	No	
		Submergible Pump Facility	In use	-	Although the facility was destroyed by the ethnic tension, SIWA restored in December 2004 with newly procured equipment.	No	No	Necessary to change riser pipe
		Control Facility	In use	-	Although the facility was destroyed by the ethnic tension, SIWA restored in December 2004 with newly procured equipment.	No	No	

## Current Situations of the facilities constructed by the Original Project

Bores Location	Facility Classification	Facility	Status	Damaged by	Situation	Necessity of Repair/Restore	Follow-up Request	Remark
		Fence	In use	-	SIWA expanded the original one when they restored the pump facility.	No	No	
		K-2 Bore	In use	-	Bore hole is believed to have the original designed pumping capacity.	No	No	
		Submergible Pump Facility	In use	-	Although the facility was destroyed by the ethnic tension, SIWA restored in December 2004 with newly procured equipment.	No	No	Necessary to change riser pipe
		Control Facility	In use	-	Although the facility was destroyed by the ethnic tension, SIWA restored in December 2004 with newly procured equipment.	No	No	
		Fence	In use	-	SIWA expanded the original one when they restored the pump facility.	No	No	
		Electric Power Facility	In use	-	Although the facility was destroyed by the ethnic tension, SIWA restored in December 2004 with newly procured equipment.	No	No	
	Water Conveyance	Water Conveyance Pipeline	Not in use	-	As the receiving tank is not used, the water conduction pipeline also is not used. Although there is no remarkable damage as long as viewed in the study, SIWA is not planning to utilize it in future	No	No	
	Water Receiving Tank	Water Receiving Tank	Not in use	Mischief	It was damaged by residents' mischief before the ethnic tension. As SIWA modified the water supply system, restoration is not urgent.	No	No	
	Water Transmission	Water Transmission Pipeline	Not in use	-	As the receiving tank is not used, the water transmission pipeline also is not used. Although there is no remarkable damage in visual inspection, SIWA is not planning to utilize it in future	No	No	
	Water Distribution	Panatina Tank	In use	-	There is no remarkable damage in visual inspection.	No	Yes	
		Water Distribution Pipeline	In use	-	There is no remarkable damage in visual inspection.	No	No	
	Disinfection	Chlorinating Facility	In use	-	As equipment were broken-down and corroded, the facility were repaired with substitutes, which are able to be purchased locally	No	No	
	Building	Transmission Pump Room and Chlorinating	In use	-	There is no remarkable damage in visual inspection.	No	No	

## **S-8-2 SIWA's Priority for the Follow-up Cooperation**

## SIWA's Priority for the Follow-up Cooperation

Location/ System	Facility	Requested Item	Q'ty	Undertaken by JICA (Priority)	Undertaken by SIWA
White River	Well	Submersible pump set	4 sets	○ (A)	
		Control equipment of submersible pump	4 sets	○ (A)	
		Electricity distribution equipment	1 lot	○ (A)	
		Spare parts for the above submersible pump	1 lot	○ (C)	
		Electric cable for the above submersible pump	1,500m	○ (A)	
		Riser pipe for the above submersible pump	70 pcs	○ (A)	
		Installation of the above equipment	1 lot		○
	Water transmission	Water transmission pump set	3sets	○ (A)	
		Control equipment of water transmission pump	1 set	○ (A)	
		Spare parts for the above transmission pump	1 lot	○ (C)	
		Installation of the above equipment	1 lot		○
	Disinfection	Dosing pump set	1 set	○ (A)	
		Mixing tank	1 set	○ (A)	
		Stirrer	1 set	○ (A)	
		Control equipment of the above equipment	1 set	○ (A)	
		Spare parts for the above equipment	1 lot	○ (C)	
Installation of the above equipment		1 lot		○	
Mataniko	Well	Spare parts for the 4 submersible pump	1 lot	○ (C)	
		Riser pipe for the above submersible pump	70 pcs	○ (B)	
Kombito	Well	Submersible pump set	2 sets		○
		Control equipment of submersible pump	2 sets		○
		Electricity distribution equipment	1 lot		○
		Spare parts for the above submersible pump	1 lot		○
		Electric cable for the above submersible pump	1,200m		○
		Riser pipe for the above submersible pump	50 pcs	○ (B)	
		Installation of the above equipment	1 lot		○
Above 3 sites	Water Distribution	Repair materials package for 3 water distribution reservoirs	1 lot		○
		Installation of the above equipment	1 lot		○

Remark: Priority A : High priority, Priority B : Less priority than A, Priority C : Low priority.  
High water level control equipment of the water distribution reservoir is included in "Control equipment of water transmission pump".

**S-8-3 Equipment Specifications for  
the Follow-up Cooperation  
(Draft Request for Quptation)**

# <JICA Letterhead >

## REQUEST FOR QUOTATION

No. \_\_\_\_\_ / \_\_\_\_\_  
(Date) \_\_\_\_\_

Mr./Ms. (Name of Contact Person)

(Name of Company) \_\_\_\_\_

### **RE: Supply of the Equipment for Solomon Islands Water Authority**

Dear Sir/Madam,

For the purpose of contributing to the execution of the Follow-up Cooperation Program by Japan International Cooperation Agency (JICA) in Solomon Islands, which is financed by the Government of Japan, JICA is planning to procure the Equipment for Solomon Islands Water Authority (SIWA).

JICA Solomon Islands Office (the "Buyer") wishes to receive a quotation for the supply of the goods, materials and equipment described in Attachment 3 (the "Equipment") in accordance with the conditions set forth below.

The firm (or company) whose Quotation is in compliance with the conditions and specifications stipulated in this Request for Quotation, who offers the lowest price which is equal to or lower than the predetermined price set by the Buyer (the "Predetermined Price"), will be designated as the prioritized negotiator for the supply of all or part of the Equipment.

### CONDITIONS OF QUOTATION

#### 1. Deadline and place for submission of quotation

The Quotation must be addressed to Japan International Cooperation Agency.

The Quotation must be received by the Buyer at the address specified in Clause 13 below no later than 17:00 on 1 st of November 2005 (見積依頼の1ヵ月後) . Quotations through telex, e-mail, telegraph or facsimile will not be accepted by the Buyer.

## 2. Documents Comprising the Quotation

The Quotation shall consist of the following documents:

(1) Quotation sheet(s): according to Attachment 1

(signed by a duly authorized representative of the firm or company)

The following data must be indicated in the Quotation sheet(s) for minimum requirements:

- 1) Total price of the Equipment (except Value Added Tax or Sales Tax)
- 2) Breakdown of price (per item)
- 3) Delivery period (after confirmation of order until Pre-Delivery Inspection (as defined in 9 below, the "Site"))
- 4) Period of validity of the Quotation  
(must be valid for the period specified in Clause 5 below)

(2) Product catalogue (per item)

(3) Documents evidencing the details of technical specifications of the Equipment and their country of origin (per item)

3. The entire documents for the Quotation and all accompanying documents shall be type-written in English.

4. The Quotation sheet(s) and accompanying documents, as specified in Clause 2 above, must be prepared and submitted in duplicate, clearly marked "**Original**", or "**Copy**" respectively. All required documents must be sealed in an envelope duly marked:

**Address to: JICA Solomon Islands Office**

**Title: Supply of the Equipment for Solomon Islands Water Authority**

**Submitted by: [Company Name]**

[Address]

## 5. Period of Validity of Quotation

The Quotation shall be irrevocable and remains valid for thirty (30) days or more after the deadline of Submission of the Quotation.

## 6. Prices of Quotation

Prices of the Quotation should be in US dollars (US\$) and shall include the price of inland transportation, insurance and other local costs incidental to delivery of the Equipment to their final

destination (the Site). The price shall also include technical guidance works and costs for necessary services.

If the Quotation is prepared in local currency (Solomon Islands Dollar and/or Australia Dollar), the rate of exchange used for currency conversion between the local currency and US dollars must be indicated in the Quotation sheet(s).

7. Alternative offers will not be allowed. If any, such offering quotation shall be rejected by the Buyer as non-responsive.

## 8. Terms of Payment

### 8-1 For the Equipment

The payment of one hundred (100%) of the Equipment Price will be made in US dollars denominated "check" or "wire transfer" within thirty (30) days after the Buyer has received from the Supplier the debit note issued by her/him after the issuance of the Certificate of Pre-Delivery Inspection issued by the End-User when all of the Equipment is ready in Honiara to be delivered to the site. The End-User is SIWA.

### 8-2 For Delivery and Technical Guidance Works

The payment of one hundred (100%) of the Delivery and Technical Guidance Price will be made in US dollars denominated "check" or "wire transfer" within thirty (30) days after the Buyer has received from the Supplier the debit note issued by her/him after the issuance of the Certificate of Completion issued by the End-User for over all contracted works including Delivery and Technical Guidance Works. The End-User is SIWA.

## 9. Place for Delivery (Site)

The final delivery sites are the existing well facilities of White River, Mataniko and Kombito in Honiara as shown in Attachment 4. The facilities are under responsibility of the following organization.

**Solomon Islands Water Authority (SIWA)**  
**Mendana Avenue, Honiara, P.O.BOX 1407**  
**Tel : 23985**  
**Fax: 20723**

SIWA is the official organization for water supply and sanitary drainage in Honiara. The Equipment will be utilized for repair of the existing well facilities of SIWA.

Before the final delivery, the Equipment shall be inspected by the End-User at Honiara



port and/or the Supplier's store in Honiara. This Inspection shall be called as "Pre-Delivery Inspection" in this Contract. Upon successful completion of the inspection and certified it by the End-User, the ownership of the Equipment shall be transferred to the End-User.

#### 10. Time of Delivery

**By 15 th day of February 2006 (11 月 15 日契約の場合で、契約の 3 ヶ月後が適当)**

For Honiara and ready to deliver to the final delivery sites and to be inspected as the Pre-Delivery Inspection.

**By 15 th day of May 2006 (契約の 6 ヶ月後)**

**However in accordance with the End-User's delivery order. Exact date shall be set, item by item, according to progress of the Equipment installation to be done by the End-User.**

For the final delivery and Technical Guidance

11. In the event that all Prices quoted by the firms (or companies), which are invited to submit competitive quotations for this Project, exceed the Predetermined Price set by the Buyer, the firm (company) submitting the lowest price will be asked to enter into price negotiation for price reduction.

12. Any condition or definition, other than the conditions or definitions stated in this Request for Quotation, is as specified in Attachment 2 FORM OF CONTRACT.

#### 13. Communications

Any firm (or company) may contact the following address for inquiries regarding this Request for Quotation and the submission of Quotation:

**Attention:** Ms. Yoko ASANO

**Address:** JICA Solomon Islands Office

1 st Floor, Solomons Mutual Center Building, Honiara

**TEL:** 24170, 24169

**FAX:** 24171

**E-mail:** jicasi@jica.go.jp

#### 14. Scope of Work

The services required shall include the procurement of the Equipment, transportation of the Equipment to the Site of the End-User. Provision of the services necessary for technical guidance for the Equipment (as defined in Attachment 3) at the Site shall also be required.

15. Name of the Equipment and Quantity

- (1) Details are shown in Attachment 3 SPECIFICATIONS.
- (2) The Equipment must be brand new, unused and genuine.
- (3) The final quantity of the Equipment will be determined pursuant to the result of evaluation of the Quotations.

Yours sincerely,

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Mr. Hiromi FUJITA  
Resident Representative  
Japan International Cooperation Agency  
Solomon Islands Office

Enclosure: Attachment 1 FORM OF QUOTATION  
Attachment 2 CONDITIONS OF CONTRACT (FORM OF CONTRACT)  
Attachment 3 SPECIFICATIONS  
Attachment 4 MAP OF THE SITE

## Attachment 1 FORM OF QUOTATION



## 2. PRICE SCHEDULES

Name of Bidder: \_\_\_\_\_

Item No	Description	Quantity (a)	Unit Price CIF Port of Entry (b)	Total Price CIF Port of Entry (c=a x b)	Price for delivery to final destination (d)	Total Price at final destination (e=c + d)
W	White River	---	---	---	---	---
W1	Submersible pumping system	---	---	---	---	---
W1-1	Submersible pump	4 units				
W1-2	Riser piping	4 sets				
W1-3	Non-return valve	4 sets				
W1-4	Gate valve	4 sets				
W1-5	Flow meter	4 sets				
W1-6	Air release valve	4 sets				
W1-7	Pressure gauge	4 sets				
W1-8	Level switch	4 pcs				
W1-9	Submersible pump local control panel	1 unit				
W2	Booster pump system	---	---	---	---	---
W2-1	Booster pump	3 units				
W2-2	Reducer for pump suction side	3 sets				
W2-3	Gate valve for pump suction side	3 sets				
W2-4	Expansion joint for pump suction side	3 sets				
W2-5	Reducer for pump discharge side	3 sets				
W2-6	Flexible joint for pump discharge side	3 sets				
W2-7	Non-return valve for pump discharge side	3 sets				

Item No	Description	Quantity (a)	Unit Price CIF Port of Entry (b)	Total Price CIF Port of Entry (c=a x b)	Price for delivery to final destination (d)	Total Price at final destination (e=c + d)
W2-8	Gate valve for pump discharge side	3 sets				
W2-9	Pressure gauge	3 sets				
W2-10	Level switch for receiving tank	1 set				
W2-11	Level switch for reservoir tank	1 set				
W2-12	Booster pump control panel	1 unit				
W3	Disinfection system	---	---	---	---	---
W3-1	Agitate tank	1 unit				
W3-2	Mixer	1 unit				
W3-3	Chlorine dosing pump	2 units				
W3-4-1	Piping for water supply (1" x 5.5m pipe)	1 pc				
W3-4-2	Piping for water supply (1/2" x 5.5m pipe)	1 pc				
W3-4-3	Piping for water supply (1" x 1/2" Reducer)	1 pc				
W3-4-4	Piping for water supply (1/2" Elbow)	3 pcs				
W3-5	Water hose for water supply	10 m				
W3-6	Stop valve for water supply	3 pcs				
W3-7	Disinfection pipe	20 m				
W3-8	Disinfection System Control panel	1 unit				
W4	Power distribution panel	1 unit				
W5	Cable and cable supports	---	---	---	---	---
W5-1	Power cable for submerge pump	---	---	---	---	---
W5-1-1	Type: ABC cable Aluminum conductor 70mm <sup>2</sup> x 3c + Messenger wire	950 m				

Item No	Description	Quantity (a)	Unit Price CIF Port of Entry (b)	Total Price CIF Port of Entry (c=a x b)	Price for delivery to final destination (d)	Total Price at final destination (e=c + d)
W5-1-2	Type: ABC cable Aluminum conductor 50mm <sup>2</sup> x 3c + Messenger wire	750 m				
W5-1-3	Type: ABC cable Aluminum conductor 25mm <sup>2</sup> x 3c + Messenger wire	450 m				
W5-1-4	Type: CV cable Copper conductor 50mm <sup>2</sup> x 3c + E	5 m				
W5-1-5	Type: CV cable Copper conductor 25mm <sup>2</sup> x 3c + E	20 m				
W5-1-6	Type: CV cable Copper conductor 6mm <sup>2</sup> x 3c + E	150 m				
W5-1-7	Straight joint for ABC Cable 70mm <sup>2</sup>	3 sets				
W5-1-8	Straight joint for ABC Cable 50mm <sup>2</sup>	2 sets				
W5-1-9	Straight joint for ABC Cable 25mm <sup>2</sup>	1 set				
W5-1-10	Straight joint for CV Cable 50mm <sup>2</sup>	1 set				
W5-1-11	Straight joint for CV Cable 25mm <sup>2</sup>	1 set				
W5-1-12	Straight joint for CV Cable 6mm <sup>2</sup>	4 sets				
W5-1-13	Termination kit for ABC Cable 70mm <sup>2</sup>	2 sets				
W5-1-14	Termination kit for ABC Cable 50mm <sup>2</sup>	2 sets				
W5-1-15	Termination kit for ABC Cable 25mm <sup>2</sup>	2 sets				
W5-1-16	Termination kit for CV Cable 50mm <sup>2</sup>	2 sets				

Item No	Description	Quantity (a)	Unit Price CIF Port of Entry (b)	Total Price CIF Port of Entry (c=a x b)	Price for delivery to final destination (d)	Total Price at final destination (e=c + d)
W5-1-17	Termination kit for CV Cable 25mm <sup>2</sup>	2 sets				
W5-1-18	Termination kit for CV Cable 6mm <sup>2</sup>	8 sets				
W5-2	Control and instrument cables	---	---	---	---	---
W5-2-1	Type: CVV Cable 2.5mm <sup>2</sup> x 6c	2,155m				
W5-2-2	Termination kit for CVV Cable 2.5mm <sup>2</sup> x 6c	82 pcs				
W5-2-3	Type: CVV Cable 2.5mm <sup>2</sup> x 4c	690m				
W5-2-4	Termination kit for CVV Cable 2.5mm <sup>2</sup> x 4c	12 pcs				
W5-3	Conduit pipe	---	---	---	---	---
W5-3-1	Type: Steel conduit pipe 32mm diameter with straight joint and normal bend	3 sets				
W5-3-2	Type: Steel conduit pipe 40mm diameter with straight joint and normal bend	3 sets				
W5-3-3	Type: Steel conduit pipe 50mm diameter with straight joint and normal bend	3 sets				
W5-3-4	Accessories: Pipe support band for 32mm diameter with fixing bolts	10 sets				
W5-3-5	Accessories: Pipe support band for 40mm diameter with fixing bolts	10 sets				



Item No	Description	Quantity (a)	Unit Price CIF Port of Entry (b)	Total Price CIF Port of Entry (c=a x b)	Price for delivery to final destination (d)	Total Price at final destination (e=c + d)
W5-3-6	Accessories: Pipe support band for 50mm diameter with fixing bolts	10 sets				
W6	Electric pole facilities	---	---	---	---	---
W6-1	Electric pole	---	---	---	---	---
W6-1-1	Dead end pole	2 pcs				
W6-1-2	Double anchor on stopping pole	8 pcs				
W6-1-3	Suspension pole	20 pcs				
K	Kombito	---	---	---	---	---
K-1	Riser piping	2 sets				
M	Mataniko	---	---	---	---	---
M-1	Riser piping	4 sets				
Sub-Total for the Equipment			---	(A)	(B)	(C)
T	Technical Guidance	1 lot	---	---	---	(D)
TOTAL				(A)	(B)	(C+D)

Note A: Equipment Price  
B: Delivery Price  
D: Technical Guidance Price  
B+D: Delivery and Technical Guidance Price  
C+D: Contract Amount

The Equipment Price: US Dollar \_\_\_\_\_.

The Delivery and Technical Guidance Price: US Dollar \_\_\_\_\_.

Total : US Dollar \_\_\_\_\_.

Signature of Bidder \_\_\_\_\_

### 3. DELIVERY SCHEDULE

TO: Mr. Hiromi FUJITA  
Resident Representative  
JICA Solomon Islands Office

**Title: Quotation for Supply of the Equipment for Solomon Islands Water Authority**

We hereby guarantee that the Equipment is ready for Pre-Delivery Inspection in Honiara within the period specified below:

1	Number of Items	All items
2	Delivery Schedule (Time of Arrival at the place for Pre-Delivery Inspection)	Within _____ days after the date of the Contract
3	Transportation Route and Method	

(Date) \_\_\_\_\_

(Signature) \_\_\_\_\_

(Name of Signer (print)) \_\_\_\_\_

(Title of Signer) \_\_\_\_\_

(Company Name) \_\_\_\_\_

## 4. OFFERING EQUIPMENT

Name of Bidder: \_\_\_\_\_

Item No	Description	Country of Origin	Manufacture	Model No.	Compliance With Specification Yes or No
W	White River	---	---	---	---
W1	Submersible pumping system	---	---	---	---
W1-1	Submersible pump				
W1-2	Riser piping				
W1-3	Non-return valve				
W1-4	Gate valve				
W1-5	Flow meter				
W1-6	Air release valve				
W1-7	Pressure gauge				
W1-8	Level switch for wells				
W1-9	Submersible pump local control panel				
W2	Booster pump system	---	---	---	---
W2-1	Booster pump				
W2-2	Reducer for pump suction				
W2-3	Gate valve for pump suction				
W2-4	Expansion joint for pump suction				
W2-5	Reducer for pump discharge				
W2-6	Flexible joint for pump discharge				
W2-7	Non-return valve for pump discharge				
W2-8	Gate valve for pump discharge				
W2-9	Pressure gauge for pump discharge				
W2-10	Level switch for receiving tank				
W2-11	Level switch for reservoir tank				
W2-12	Booster pump control panel				
W3	Disinfection system	---	---	---	---
W3-1	Agitate tank				
W3-2	Mixer				
W3-3	Chlorine dosing pump				

Item No	Description	Country of Origin	Manufacture	Model No.	Compliance With Specification Yes or No
W3-4-1	Piping for water supply (1" x 5.5m pipe)				
W3-4-2	Piping for water supply (1/2" x 5.5m pipe)				
W3-4-3	Piping for water supply (1" x 1/2" Reducer)				
W3-4-4	Piping for water supply (1/2" Elbow)				
W3-5	Water hose for water supply				
W3-6	Stop valve for water supply				
W3-7	Disinfection pipe				
W3-8	Disinfection system control panel				
W4	Power distribution panel				
W5	Cable and cable supports	---	---	---	---
W5-1	Power cable for submerge pump	---	---	---	---
W5-1-1	Type: ABC cable Aluminum conductor 70mm <sup>2</sup> x 3c + Messenger wire				
W5-1-2	Type: ABC cable Aluminum conductor 50mm <sup>2</sup> x 3c + Messenger wire				
W5-1-3	Type: ABC cable Aluminum conductor 25mm <sup>2</sup> x 3c + Messenger wire				
W5-1-4	Type: CV cable Copper conductor 50mm <sup>2</sup> x 3c + E				
W5-1-5	Type: CV cable Copper conductor 25mm <sup>2</sup> x 3c + E				
W5-1-6	Type: CV cable Copper conductor 6mm <sup>2</sup> x 3c + E				
W5-1-7	Straight joint for ABC Cable 70mm <sup>2</sup>				
W5-1-8	Straight joint for ABC Cable 50mm <sup>2</sup>				
W5-1-9	Straight joint for ABC Cable 25mm <sup>2</sup>				
W5-1-10	Straight joint for CV Cable 50mm <sup>2</sup>				
W5-1-11	Straight joint for CV Cable 25mm <sup>2</sup>				
W5-1-12	Straight joint for CV Cable 6mm <sup>2</sup>				
W5-1-13	Termination kit for ABC Cable 70mm <sup>2</sup>				

Item No	Description	Country of Origin	Manufacture	Model No.	Compliance With Specification Yes or No
W5-1-14	Termination kit for ABC Cable 50mm2				
W5-1-15	Termination kit for ABC Cable 25mm2				
W5-1-16	Termination kit for CV Cable 50mm2				
W5-1-17	Termination kit for CV Cable 25mm2				
W5-1-18	Termination kit for CV Cable 6mm2				
W5-2	Control and instrument cables	---	---	---	---
W5-2-1	Type: CVV Cable 2.5mm2 x 6c				
W5-2-2	Termination kit for CVV Cable 2.5mm2 x 6c				
W5-2-3	Type: CVV Cable 2.5mm2 x 4c				
W5-2-4	Termination kit for CVV Cable 2.5mm2 x 4c				
W5-3	Conduit pipe	---	---	---	---
W5-3-1	Type: Steel conduit pipe 32mm diameter with straight joint and normal bend				
W5-3-2	Type: Steel conduit pipe 40mm diameter with straight joint and normal bend				
W5-3-3	Type: Steel conduit pipe 50mm diameter with straight joint and normal bend				
W5-3-4	Accessories: Pipe support band for 32mm diameter with fixing bolts				
W5-3-5	Accessories: Pipe support band for 40mm diameter with fixing bolts				
W5-3-6	Accessories: Pipe support band for 50mm diameter with fixing bolts				
W6	Electric pole facilities	---	---	---	---
W6-1	Electric pole	---	---	---	---
W6-1-1	Dead end pole				
W6-1-2	Double anchor on stopping pole				
W6-1-3	Suspension pole				

Item No	Description	Country of Origin	Manufacture	Model No.	Compliance With Specification Yes or No
K	Kombito	---	---	---	---
K-1	Riser piping				
M	Mataniko	---	---	---	---
M-1	Riser piping				
T	Technical Guidance	---	---	---	

Signature of Bidder \_\_\_\_\_

Note: Please attach Catalogues and/or Drawings.

### 5. COMPARISON TABLE OF SPECIFICATIONS

Name of Bidder: \_\_\_\_\_

Page: \_\_\_ of \_\_\_

*Note: If the Bidder offers a product that is different from the Specifications set out by the Buyer, the Bidder will be required both to describe the detailed specifications of the product in accordance with this sheet and to submit the product catalogue showing technical specifications of the said products.*

Item No.	Originally Required Specifications	Statement of Bidder's Specifications
	<u>Details of Originally Required Technical Specifications</u>	Details of Technical Specifications
	<u>Details of Originally Required Technical Specifications</u>	Details of Technical Specifications

Signature of Bidder \_\_\_\_\_

**Attachment 2 CONDITIONS OF CONTRACT  
(FORM OF CONTRACT)**



**PROCUREMENT CONTRACT**

**BETWEEN**

**JAPAN INTERNATIONAL COOPERATION AGENCY**

**SOLOMON ISLANDS OFFICE**

**AND**

***[NAME OF THE SUPPLIER]***

**ON**

**SUPPLY OF THE EQUIPMENT**

**FOR**

**SOLOMON ISLANDS WATER AUTHORITY**

***[DAY / MONTH 2005]***

**CONTRACT**

1.	Contract Number	No. _____
2.	Equipment and Specifications	See Appendix A
3.	Presentation of Documents	See Appendix B
4.	Contract Amount	US dollars _____  Breakdown Equipment Price: US dollars _____ Delivery and Technical Guidance Price: US dollars _____
5.	Time of Delivery	1) By 15 th of February 2006 for Pre-Delivery Inspection 2) By 15 th of May 2006 for final delivery and technical guidance
6.	Place for Delivery (Site)	Well facilities at White River, Mataniko and Kombito in Honiara as described in Appendix C, which are under responsibility of Solomon Islands Water Authority Address : Mendana Avenue, Honiara, P.O.BOX 1407 Tel : 23985 Fax: 20723

This Contract is made and entered into on [Day, Month, Year] by and between Mr. Hiromi FUJITA, the Resident Representative of Japan International Cooperation Agency (JICA) Solomon Islands Office having its registered office at 1 st Floor, Solomons Mutual Center Building, Honiara (hereinafter referred as "Buyer") and [Name of the Supplier] with its principal place of business at \_\_\_\_\_ [Address of the supplier] (hereinafter referred as "Supplier").

The Buyer:

The Supplier:

By: \_\_\_\_\_

Mr. Hiromi FUJITA  
Resident Representative  
JICA Solomon Islands Office

By: \_\_\_\_\_

(Name)  
(Title)  
(Company Name)

## 1. DEFINITIONS

In this Contract, the following terms shall be interpreted as indicated:

**“Buyer”** means the Japan International Cooperation Agency Solomon Islands Office, as named in the Contract, and includes any person, personnel and organization authorized by the Buyer.

**“End-User”** means Solomon Islands Water Authority.

**“Certificate of Pre-Delivery Inspection”** means the document, duly signed by the inspector appointed by the End-User, after the Pre-Delivery Inspection executed by the inspector to confirm and certify that the ownership of Equipment has been surely transferred to her/him in good quality and correct quantity.

**“Certificate of Completion”** means the document, duly signed by the inspector appointed by the End-User, after the final inspection executed by the inspector to confirm and certify that (i) the Equipment has been delivered at the final deliver sites in good quality and correct quantity, (ii) the technical guidance (as defined in 5. below) has been duly carried out by the Supplier.

**“Conditions”** means the standard terms and conditions set out in the Contract, and includes terms and conditions agreed in writing from time to time between the Buyer and the Supplier.

**“Contract”** means this Procurement Contract and all appendixes which shall be an integral part of this Contract.

**“Contract Amount”** means the aggregate amount of the price of the Equipment and the charge for the Services payable to the Supplier for the full and proper performance of his duties under the Contract.

**“Day”** means calendar day.

**“Equipment”** means all the equipment, machinery, product, and/or other materials, that the Supplier is required to supply to the Buyer under the Contract.

**“Procurement Contract”** means the procurement contract executed by and between the Buyer and the Supplier within fourteen (14) days after the Supplier receives from the Buyer a notification of Award of Contract.

**“Project”** means the Project for Supply of the Equipment for Solomon Islands Water Authority

“**Services**” means those services incidental to the supply of the Equipment, such as transportation, presentation of documents, technical guidance, and any other related services that are designated as obligations of the Supplier covered under the Contract.

“**Site(s)**” means the destination of the Equipment designated in the Contract.

“**Supplier**” means the company supplying the Equipment and Services in accordance with the Contract, as named in the said Contract.

“**Writing**” includes a reference to any communications effected by telex, facsimile transmission, or similar means.

Words importing singular only also include plural and vice versa. Words indicating one gender includes all genders.

## 2. TRADE TERMS

Trade Terms used in the Contract shall be interpreted in accordance with INCOTERMS 2000. In case that any provision of the Contract is inconsistent with interpretation of the trade terms of INCOTERMS 2000, such provision of the Contract shall prevail.

## 3. SCOPE OF WORK

The full and proper performance to be rendered by the Supplier under the Contract is to procure, ship and deliver the Equipment to the Site, and to carry out technical guidance for the Equipment. This Contract is part of the implementation of international cooperation programs under the Agreement on Technical Co-operation between the government of Japan and the government of Solomon Islands signed on [Day, Month, Year] at [Place]. The Supplier shall acknowledge that her/his work designated in the Contract contributes to the Official Development Assistance (ODA) by the Japanese Government for Solomon Islands.

## 4. DELIVERY

4.1 The Supplier shall punctually deliver the Equipment free and clear of any liens, claims, charges, or any other encumbrances of any nature whatsoever to the Site specified in the Contract.

4.2 The Supplier shall pay all costs relating to the delivery of the Equipment to the Site, except all taxes, duties and other such levies designated in Clause 13. The Supplier shall also pay all duties, taxes or other official charges as well as the cost of customs formalities necessary at the shipping port(s)/place(s).

4.3 The Equipment shall be inspected at Honiara port and/or the Supplier's store before final delivery for quantity, quality and condition to be handed over, as the Pre-Delivery Inspection. The Supplier shall store temporarily the Equipment in his/her store until issuance of final delivery order by the End-User.

4.4 Time of the Pre-Delivery Inspection is of the essence of the Contract.

- 4.5 Certificate of Pre-Delivery Inspection issued by the End-User is a proof of the date of completion of the Equipment import and ownership transfer of the Equipment.
- 4.6 Although the ownership of the Equipment is transferred upon the successful completion of Pre-Delivery Inspection, the Supplier shall keep/store the Equipment under his/her responsibility until final delivery order.
- 4.7 The Equipment shall be delivered to the final delivery sites in accordance with final delivery orders issued by the End-User. The final delivery order will be issued within 3 months after the date of Certificate of Pre-Delivery Inspection. If 3 months exceeded, the Supplier is allowed to deliver the Equipment to the store of the End-User in Honiara.

**5. TECHNICAL GUIDANCE**

The Supplier shall conduct technical guidance for the Equipment. The cost for technical guidance is included in the Contract. The End-User shall conduct the installation works of the Equipment. The Supplier should make technical services such as advising on the installation, attending the installation work and confirming appropriate installation, attending performance/quality test and verifying quality, providing basic operation/maintenance training pertaining to the Equipment as described in Appendix A.

**6. PACKING AND MARKING**

- 6.1 The Supplier shall pack the Equipment as is required to prevent any damage or deterioration to the Equipment during transit to the Delivery Site, as indicated in the Contract. The packing shall be sufficient to withstand, without limitation, rough handling during transit and exposure to extreme temperatures, salt and precipitation during transit, and open storage. The remoteness of the Equipment's final destination and the absence of heavy handling facilities at any points in transit shall be taken into consideration when the Supplier decides the material, size, weights and other factors in choosing packing means.
- 6.2 The Supplier shall prepare shipping marks and any other instructions, and attach the same onto every unit / package in accordance with the Buyer's instructions.

**7. SPECIFICATIONS**

- 7.1 The Equipment must meet the specifications as described in Appendix A.
- 7.2 The Specifications and their related conditions in respect of the Equipment may not be altered unless a prior written consent by the Buyer is given to the Supplier.
- 7.3 The quantity and quality of the Equipment to be delivered to the Site shall be as described in the Contract.

**8. INSPECTION**

- 8.1 The Supplier is required to carry out all possible and necessary inspections and tests of the Equipment prior to Pre-Delivery Inspection

described in clause 8.2, in order to ensure that the Equipment is in accordance with the Contract and the Specifications at the Supplier's expense.

- 8.2 Upon completion of preparation to hand the Equipment over, the End-User will conduct a Pre-Delivery Inspection of the Equipment. When all the Equipment under the Contract are found to be in compliance with the Specifications and Conditions, the Certificate of Pre-Delivery Inspection will be issued by the End-User. Upon the issue of the Certificate of Pre-Delivery, ownership of the Equipment shall be transferred to the End-User.
- 8.3 Upon completion of final delivery and technical guidance, the End-User will conduct a Final Inspection to confirm that (i) the Equipment has been delivered at the final deliver sites in good quality and correct quantity, (ii) the technical guidance has been duly carried out by the Supplier. When all the Supplier's works are found to be in compliance with the Specifications and Conditions, the works shall be deemed to be completed and the Certificate of Completion will be issued by the End-User.
- 8.4 Should any inspected Equipment fail to conform to the Specifications and Conditions, the Buyer may reject the Equipment, and the Supplier shall either replace the rejected Equipment or make alterations necessary to meet specification requirements, free of cost, expense or change to the Buyer.

## **9. AFTER-SALES SERVICE**

The Supplier shall be required to provide supply of spare parts and repairs for the End-User in Solomon Islands if requested by the End-User. The Supplier must ensure its capability to supply spare parts for at least five (5) years from the issuance date of the Certificate of Completion.

## **10. WARRANTY**

- 10.1 The Supplier shall guarantee the Buyer that the Equipment supplied under the Contract will strictly comply with the Contract, will be standard terms and condition in every particular case and free from defects. The Supplier further guarantees the Buyer that all materials, equipment and supplies furnished by the Supplier for the purpose of the Equipment will be new, merchantable, and fit for their intended purpose.
- 10.2 The Warranty shall remain valid for a period of one (1) year from the issuance date of the Certificate of Completion.
- 10.3 The Buyer shall promptly notify the Supplier in writing of any claims arising under this Warranty and be entitled to require the Supplier to remedy all defects and/or to supply replacement of the Equipment and/or Services in accordance with the Contract within a reasonable time, at the Supplier's own expense. The repaired or replaced Equipment shall be guaranteed for an additional one (1) year period after repair or

replacement, as the case may be.

**11. PERFORMANCE  
BOND**

- 11.1 The Supplier shall furnish a performance bond to the Buyer in the amount prescribed in Sub-Clause 11.2 below ("Performance Bond"). Such Performance Bond shall be provided in the form of a Bond or Guarantee issued by a bank or insurance company acceptable to the Buyer, within fourteen (14) days after the Supplier's receipt of the contract award notification.
- 11.2 The amount of the Performance Bond, as a percentage of the Contract Amount, shall be ten percent (10%).
- 11.3 The proceeds of the Performance Bond shall be payable to the Buyer upon failure of the Supplier to complete its obligations under the Contract.
- 11.4 The Performance Bond will be released immediately after the issue of the Certificate of Completion by the End-User.

**12. TERMS OF  
PAYMENT**

- 12.1 The payment of one hundred (100%) of the Equipment Price will be made in US dollars denominated "check" or "wire transfer" within thirty (30) days after the Buyer has received from the Supplier the debit note issued by her/him after the issuance of the Certificate of Pre-Delivery Inspection issued by the End-User when all of the Equipment is ready in Honiara to be delivered to the site.
- 12.2 The payment of one hundred (100%) of the Delivery and Technical Guidance Price will be made in US dollars denominated "check" or "wire transfer" within thirty (30) days after the Buyer has received from the Supplier the debit note issued by her/him after the issuance of the Certificate of Completion issued by the End-User for over all contracted works including Delivery and Technical Guidance Works.

**13. TAXES AND DUTIES**

- 13.1 The Supplier shall take necessary measures to exempt the Equipment from Value Added Tax (VAT) and/or sales taxes that may be imposed by the Government of Solomon Islands with respect to the purchase of the Equipment. The Buyer shall provide official documents and/or related documents necessary for exemption to the Supplier, if such documents are required.
- 13.2 In the event that the Supplier purchases the Equipment from outside the Buyer's country, the Supplier shall take necessary measures to absolve the Buyer from custom duties and other such levies imposed on the Equipment.

**14. RIGHTS OF ASSIGNMENT**

Supplier hereto shall not assign, transfer, or otherwise dispose of the Contract in whole or in part to any third party without a prior written consent of the other party.

**15. EVENTS OF DEFAULT**

15.1 If the Supplier fails or refuses for any reason to perform any provision of the Contract, or to fulfill any of its obligations under the Contract, and if such failure or refusal is not cured within fourteen (14) days after the date of notice thereof being dispatched by the Buyer to the Supplier requiring the Supplier to remedy such a failure or refusal, the Buyer may, without prejudice to the other rights and remedies which it may have,

- (1) forthwith terminate this Contract in whole or in part by giving written notice to the Supplier; and/or
- (2) recover from the Supplier any and all damages and losses, direct or indirect, caused by such failure or refusal; and/or,
- (3) refuse to take delivery of the Equipment, return the Equipment to the Supplier, dispose of the Equipment for the account of the Supplier at the time and price which the Buyer, in its sole discretion, deems reasonable, and/or may hold the proceeds thereof for the settlement of any losses and damages to be recovered from the Supplier.

15.2 If the Supplier fails to ship or deliver any or all of the Equipment by the time specified in the Contract, the Buyer shall, without prejudice to its other remedies under the Contract, deduct from the Contract Amount, as liquidated damages, following:

- (1) The amount to be deducted shall be calculated at the rate of zero point one percent (0.1%) of the total contract amount, for the first seven (7) days' delay and the same rate for each additional seven (7) days' period during which the shipment or delivery of such portion of the Equipment remains delayed.
- (2) The delayed term shall be determined in accordance with the date stated in the Certificate of Pre-Delivery Inspection of the Equipment and/or the Certificate of Completion issued by the End-User.
- (3) If the delayed term exceeds thirty five (35) days without justifiable reasons, the Buyer has the right to terminate the Contract without the Supplier's consent. In such a case, the Buyer may charge a liquidated damage up to ten percent (10%) of the Contract Amount on the Supplier.

15.3 If any of the following events occur, the Buyer may, without prejudice to any other rights or remedies the Buyer may have, terminate the Contract



by giving written notice to the Supplier with an immediate effect, and charge a liquidated penalty up to ten percent (10%) of the Contract Amount on the Supplier.

- (1) the insolvency, bankruptcy, liquidation or dissolution of the Supplier ;
- (2) the institution of any proceeding against the Supplier under the provisions of any insolvency or bankruptcy law or any law for the relief of debtors;
- (3) the appointment of a trustee, receiver, administrator, assignee or liquidator over any of the Supplier's assets or property;
- (4) the issuance of an order for the attachment of all or a part of the assets or property of the Supplier which is material in its effect upon the operation of the Supplier; and
- (5) the general assignment by the Supplier for the benefit of its creditors.

15.4 In the event of the failure of the Buyer to make payment within the time stated in Clause 12 due to the reason caused by the Buyer, the Supplier may impose the liquidated damage at the rate of zero point one percent (0.1%) of the Contract Amount for the first seven (7) day's delay and the same rate for each seven (7) day period during which the payment of the Contract Amount delayed.

**16. NON-WAIVER**

16.1 No provision of the Contract shall be deemed to be waived by the Buyer unless the Buyer gives such notice of waiver in writing to the Supplier.

16.2 Even if such notice has been given, such waiver shall not be construed as being a waiver of any other past or future right of the Buyer under the provisions of the Contract, unless otherwise expressly stipulated in such notice of waiver.

**17. FORCE MAJEURE**

17.1 Neither party shall be liable to the other for the delay or failure in the performance of its obligations under the Contract, if and to the extent such delay or failure in performance arises from any cause(s) beyond the reasonable control of the party affected (hereinafter referred to as "Force Majeure"), including, but not limited to, acts of God; acts of government or government authorities; compliance with laws, regulations or orders; storm, flood or earthquake; war (declared or not), rebellion, revolution or riots; strike or lockouts.

17.2 In the event of Force Majeure, the party so affected shall immediately provide written notice to the other party of such date and the nature of such Force Majeure, and the anticipated period of time during which the Force Majeure conditions are expected to persist.

17.3 The parties hereto shall consult and agree upon appropriate measures to be taken in order to eliminate, mitigate or minimize the unfavorable consequences of such Force Majeure.

- 18. INDEMNIFICATION**
- 18.1 The Supplier shall indemnify and hold the Buyer, JICA, and the End-User harmless from any liability, claim, loss, cause of action, suit or judgment for property damage, bodily injury and death caused by the fault or negligence of the Supplier or caused by any defect in the Equipment.
- 18.2 The Supplier shall indemnify and hold the Buyer, JICA, and the End-User harmless from any claim or dispute which may arise from patents infringement, trademarks, utility models, designs, copyrights, trade secrets or any other intellectual property right in connection with the Equipment.
- 19. GOVERNING LAW**
- This Contract shall be governed by and construed in accordance with the laws of Solomon Islands.
- 20. CLAIMS AND ARBITRATION**
- 20.1 If any claim arises out of this Contract, both parties shall use their best efforts to settle such claim amicably. If a mutually agreed settlement cannot be reached, such claim shall be settled by arbitration in accordance with the United Nations Commission on International Trade Law (UNCITRAL) Arbitration Rules. Any such arbitration shall be administered by the permanent arbitration institution in Honiara.
- 20.2 Any arbitration award thereof shall be final and binding upon the parties hereto, and the parties shall comply in good faith with the decision. Judgment upon such award of the arbitrators may be enforced in any court having jurisdiction thereof.
- 20.3 The fees of all proceedings of arbitration, the cost of arbitrators and other associated costs and expenses shall be paid by the party who shall be adjudged liable.
- 21. LANGUAGE AND MEASUREMENT SYSTEM**
- 21.1 Unless otherwise agreed or provided herein, all correspondences between the parties hereto, including notices, requests, consents, offers or demands shall be made in English. All specifications, reports and other documents shall also be presented in English.
- 21.2 All documents made under the Contract shall employ the metric system, and days specified in such documents shall refer to the Gregorian calendar days.
- 22. NOTICE**
- 22.1 Any notice required or permitted to be given under the Contract shall be given in writing and shall be sent to the addresses shown below. Unless otherwise set forth herein, such notice may be given either by personal delivery, by registered mail/nationally recognized overnight courier service/airmail, or by facsimile.

To the Buyer:

Japan International Cooperation Agency (JICA) Solomon Islands Office

Attention: Ms. Yoko ASANO

Address : 1 st Floor, Solomons Mutual Center Building, Honiara

Phone : 24170, 24169

Facsimile : 24171

To the Supplier:

*[Name of Supplier]*

Address : (Address)

Phone : (Telephone)

Facsimile : (Facsimile)

22.2 Either the Buyer or the Supplier may, at any time and from time to time, change its address and facsimile number for the purpose of this Article, by giving notice to the other in accordance with Article 22.1.

**23. CONTRACT AMENDMENTS**

Any amendments or modifications of the conditions and terms of the Contract, if necessary, may be negotiated between the parties hereto. This agreement shall be evidenced by a written document signed by both parties.

**24. SEVERABILITY**

If any provision of the Contract shall be held to be illegal, void, invalid or unenforceable under the laws of any jurisdiction, the legality, validity and enforceability of the remainder of the Contract in that jurisdiction shall not be affected, and the legality, validity and enforceability of the whole of the Contract shall not be affected in any other jurisdiction.

**25. ENTIRE CONTRACT**

25.1 The Contract (including the Appendixes) sets forth the entire agreement and understanding between the parties as to the subject matter of the Contract and the related request documents for quotation, and merges and supersedes all prior discussions, agreements and understandings of any and every nature between them, and neither party shall be bound by any condition, definition, warranty or representation other than as expressly provided for in the Contract and the related request documents for quotation, or as may be on a subsequent date duly set forth in writing and signed by a duly authorized officer of the party to be bound.

25.2 In the case of a contradiction between the contents of the Contract and the related request documents for quotation, the contents of the Contract alone shall govern.

IN WITNESS WHEREOF, the parties hereto have executed the Contract in duplicate by their duly authorized representatives, each party retaining one (1) copy thereof, as of the date first above written.

## **Equipment and Specifications**

(Price Schedules and Specifications submitted by the Supplier will be attached here.)

(Appendix B)

## Presentation of Documents

The Supplier shall provide the following documents to the End-User at the time of delivery of the Equipment designated in the Procurement Contract. All the documents shall be written in English.

Documents to be presented		To End-User	
		Original	Copy
1	Catalogue (per item)	1	2
2	Operation manual (per item)	1	2
3	Manufacturer's Test Report (per item) *if available	1	2
4	Service Manual (per item) *if available	1	2
5	Parts List (per item) *if available	1	2

**(Appendix C)**

## **Map of the Site**

(Map of the Site will be attached here.)

## Attachment 3 SPECIFICATIONS

**PART 1**  
**TECHNICAL SPECIFICATIONS**



## TECHNICAL SPECIFICATIONS

### Chapter 1. White River Site

#### 1.1 General

##### (1) General

The Supplier shall provide all equipment and materials in this specification and attached specification list.

The installation work of equipment and materials are scope of the End-User. However the Supplier shall dispatch supervisor for supervise of installation work by the End-User.

##### (2) Specification of existing well

Nominal drilling size	: 12"
Well depth	: 80m
Nominal casing size	: 8"
Installed numbers	: 4 nos

The submersible pump shall be installed in existing wells.

These existing wells are numbered as W-1, W-2, W-3 and W-4 respectively from the upstream-side of White River.

#### 1.2 Requirement of Submersible Pump System

##### W1-1: Submersible Pump

Required specification is as follows:

Type of pump	: Vertical multi stage centrifugal or turbine (submersible pump)
Pump capacity	: 600 liters/min./unit
Total head of pump	: 80m/unit
Material of casing	: Stainless steel or bronze
Material of shaft	: Stainless steel or bronze
Material of impeller	: Stainless steel or bronze
Power source of motor	: 415V, 3-phase, 4-wire, 50Hz

Type of motor	: for submersible motor
Motor output	: 13kW
Starting method of pump motor	: Soft starter or star delta
Required numbers	: 4 units (for well No. W-1 to W-4)
Installation level of pump	: GL-52m

Accessories:

- Each one(1) set of cable connection box shall be provided for connection of power, control and earth cables with 1-breaker (power) and 2- terminals (control and earthing).
- Each one(1) set of setting base plate and bolts for pump on the foundation
- Each one(1) set of power cable 100m for motor of submersible pump

\* Notes

1. Power cable of submersible motor pump shall be assembled at factory.
2. The material of terminal box: steel plate with painting.

W1-2: Riser piping

The Supplier shall provide the following riser pipes and accessories for existing submersible pumps.

1) riser pipe

Pipe size	: 3"
Material	: Stainless steel, schedule 10, screw end (both side)
Length of pipe	: Total 55m (5.5m x 10pcs)/ well
Required numbers	: 4 sets

2) Accessories for each well

Joint	: Ten(10) 3" stainless steel pipe joints and one(1) submersible pump connector with sealing tapes
Elbow	: One(1) 3" stainless steel welding type elbow
Flange	: One(1) set of 3" flange and one(1) set of 4" flange (stainless steel) with electrical insulation flange type (one(1) set means including gasket, bolts and nuts)
Reducer	: One(1) set of 3" x 4" stainless steel reducer with electrical insulation flange both end of reducer (one(1) set means including gasket, bolts and nuts)
Plate	: One(1) set of setting plate on the existing foundation

## W1-3: Non-return valve

Type	: 4" swing type (flange type)
Materials	: Carbon steel
Required numbers	: 4 sets
Accessories	: Carbon steel plate type companion flange, bolt, nut and gasket

## W1-4 Gate valve

Type	: 4" gate valve (Inside screw, flange type)
Materials	: Carbon steel
Required numbers	: 4 sets
Accessories	: Carbon steel plate type companion flange, bolt, nut and gasket

## W1-5: Flow meter

Type	: 4" Counter type flow meter (flange type), 7digits
Flow rate	: 0 - 800liters/min.
Indicate unit	: liters
Required numbers	: 4 sets
Installation	: Outdoor
Accessories	: Carbon steel plate type companion flange, bolt, nut and gasket

## W1-6: Air release valve

Type	: Automatic type 1" screw connection
Materials	: Carbon steel
Required numbers	: 4 sets
Installation	: Outdoor
Accessories	: 1" carbon steel piping and 1" screw connection boss

## W1-7: Pressure gauge

Type	: 1/2" screw connection type, 4" diameter
Range	: 0 - 10kg/cm <sup>2</sup>
Required numbers	: 4 sets
Installation	: Outdoor
Accessories	: 1/2" carbon steel piping, 1 set of 1/2" stop valve and 1 set of 1/2" screw connection boss

## W1-8: Level switch

The level switch of electrode band type shall be supplied with of three(3) contacts (contact type B) as follows;

Location	Q'ty	Type	Number of contact	Type of contact
Well (W-1 to W-4)	4	Electrode band	3 (H, L, LL)	B

The setting level of switch refers to drawing M-1: Flow sheet of water supply system.

Accessories: Cable 2.5mm<sup>2</sup> x 4c CVV x 10m

#### W1-9: Submersible pump local control panel

Required specification is as follows:

- Type of panel : Self-standing indoor type
- Power source : 415 V, 3 phase, 4-wire, 50 Hz
- Sealing class : More than IP55
- Switches and controllers : Main circuit breaker (MCCB) with rated rupturing capacity for the operation of pump
  - : Soft starter unit or magnetic contactor for star-delta starting circuit
  - : Current transformer (100/5A, 15VA)
  - : Potential transformer (415/110V, 100VA)
  - : Auxiliary transformer (415/110V, 1kVA)
  - : Low water level cut-off relay for well
  - : High water level cut-off relay for receiving tank
  - : Change over switch for Auto/Manual
  - : Manual ON/OFF selector switch
  - : Trouble reset button
  - : 3 element relay/OCG relay for motor protection
- Indicators : Ammeter and Voltmeter
  - : Main power lamp and trouble lamp
  - : Indicating lamps for pump run and stop
  - : Indicating lamp for low water level of well(with alarm)
  - : Indicating lamp for high water level of receiving tank (with alarm)
- Required numbers : 1 unit (for four(4) pumps)
- Coating :Manufacturer's standard finish coating in

accordance with the requirement of AS standard.

Accessories:

- One(1) set of anchor bolts and nuts
- One(1) set of sealing material for cable entrance (cable gland for power and control cables) and cable size refer to clause 1.5.
- Fluorescence and receptacle shall be mounted in the panel for operation and maintenance.

Control:

- Four(4) submersible pumps start by signal of water level low by receiving tank and no signal of water level low of well.
- Four(4) submersible pumps stop by signal of water level high by receiving tank.
- Four(4) submersible pumps shall be started serially(not start at same time).
- The MCCB will trip by signal of 3 element and OCG relay.

### 1.3 Requirement of Booster Pump System

#### W2-1: Booster Pump

Required specification is as follows:

Type of pump	: Horizontal centrifugal
Pump capacity	: 1,220 liters/min./unit
Total head of pump	: 60m/unit
Material of casing	: Cast iron
Material of shaft	: Stainless steel or bronze
Material of impeller	: Stainless steel or bronze
Power source of motor	: 415V, 3-phase, 4-wire, 50Hz
Type of motor	: TEFC motor
Motor output	: 18.5kW
Motor protection class	: IP55
Starting method of pump motor	: Soft starter or star delta
Terminal box	: Right side (view at motor end)
Required numbers	: 3 units (including 1 for standby)
Installation of pump	: In pump house

Accessories:

- Each one(1) set of anchor bolts and nuts

W2-2: Reducer for pump suction side

- Type : 4" x 3" reducer (flange shall be installed at both end)  
Size of pump suction side (3") shall be confirmed with pump suction size
- Materials : Carbon steel
- Required numbers : 3 sets
- Accessories : Carbon steel plate type companion flanges (4" and 3"), bolt, nut and gaskets

W2-3: Gate valve for pump suction side

- Type : 4" gate valve (Inside screw, flange type)
- Materials : Carbon steel
- Required numbers : 3 sets
- Accessories : Carbon steel plate type companion flange, bolt, nut and gasket

W2-4: Expansion joint for pump suction side

- Type : 4" Rubber type (flange type)
- Length : Reference dimension 225mm
- Required numbers : 3 sets
- Installation : Indoor
- Accessories : Carbon steel plate type companion flange, bolt, nut and gasket

W2-5: Reducer for pump discharge side

- Type : 4" x 2" reducer (flange shall be installed at both end)  
Size of pump suction side (2") shall be confirmed with pump discharge size
- Materials : Carbon steel
- Required numbers : 3 sets
- Accessories : Carbon steel plate type companion flanges (4" and 2"), bolt, nut and gaskets

W2-6: Flexible joint for pump discharge side

- Type : 4" stainless steel type (flange type)
- Length : Reference dimension 292mm
- Required numbers : 3 sets
- Installation : Indoor

Accessories : Carbon steel plate type companion flange, bolt, nut and gasket

W2-7: Non-return valve for pump discharge side

Type : 4" swing type (flange type)  
 Materials : Carbon steel  
 Required numbers : 3 sets  
 Accessories : Carbon steel plate type companion flange, bolt, nut and gasket

W2-8: Gate valve for pump discharge side

Type : 4" gate valve (Inside screw, flange type)  
 Materials : Carbon steel  
 Required numbers : 3 sets  
 Accessories : Carbon steel plate type companion flange, bolt, nut and gasket

W2-9: Pressure gauge

Type : 1/2" screw connection type, 4" diameter  
 Range : 0 - 10kg/cm<sup>2</sup>  
 Required numbers : 3 sets  
 Installation : Outdoor  
 Accessories : 1/2" carbon steel piping, 1 set of 1/2" stop valve and 1 set of 1/2" screw connection boss

W2-10/11: Level switch

The electrode level switch of stainless steel shall be supplied with of three(3) and four(4) contacts (contact type B) as follows;

	Location	Q'ty	Type	Number of contact	Type of contact
W2-10	Receiving tank	1	Electrode	4 (HH, H, L, LL)	B
W2-11	Reservoir tank	1	Electrode	3 (HH, H, L)	B

The setting level of switch refers to drawing M-1: Flow sheet of water supply system.

Accessories : Each one(1) set of setting plate and fixing bolts

W2-12: Booster pump control panel

Required specification is as follows:

Type of panel	: Self-standing indoor type
Power source	: 415 V, 3 phase, 3-wire, 50 Hz
Sealing class	: More than IP55
Switches and controllers	: Main circuit breaker (MCCB) with rated rupturing capacity for the operation of pump : MCCB for each feeder : Soft starter unit or magnetic Supplier for star-delta starting circuit : Current transformer (100/5A, 15VA) : Potential transformer (415/110V, 100VA) : Auxiliary transformer (415/110V, 1kVA) : Low water level cut-off relay for receiving tank : High water level cut-off relay for reservoir tank : Change over switch for Auto/Manual : Manual ON/OFF selector switch : Trouble reset button : 3 element relay/OCG relay for motor protection
Indicators	: Ammeter and Voltmeter : Main power lamp and trouble lamp : Indicating lamps for each pump run and stop : Indicating lamp for low water level of receiving tank : Indicating lamp for high water level of reservoir tank
Required number	: 1 unit
Coating	: Manufacturer's standard finish coating in accordance with the requirement of AS standard.

Accessories:

- One(1) set of anchor bolts and nuts
- One(1) set of sealing material for cable entrance (cable gland for power and control cables) and cable size refer to clause 1.5.
- Fluorescence and receptacle shall be mounted in the panel for operation and maintenance.

Control:

- Two(2) booster pumps start by signal of water level low by reservoir tank and no signal of water level low of receiving tank.
- Two(2) booster pumps stop by signal of water level high by reservoir tank or water level low of receiving tank.



- Two(2) booster pumps shall be started serially (not start at same time).
- One(1) pump is standby purpose.
- The MCCB will trip by signal of 3 element and OCG relay.

#### 1.4 Disinfection System

Disinfection equipment is for use at chlorine dosing for sterilization of treated water and shall consist of the following main kits:

##### W3-1: Agitate tank

- Capacity : Approx. 1,200 liters  
(Approx. dimensions:  $\phi$  1,200mm x H1,260mm)
- Material : Glass fiber or PVC, more than 3mm thickness
- Required numbers : 1 unit
- Installation : Indoor installation
- Accessories
  - One(1) 1/2" Water inlet nozzle with valve
  - One(1) 1/2" Chlorine outlet nozzle with valve
  - One(1) Chlorine powder inlet hatch (400 square mm)
  - One(1) opening of mixer (300 square mm)
  - One(1) set of anchor bolts and nuts

##### W3-2: Mixer

- Type : Portable type
- Operation : Motor operate
- Impeller : Dual impeller type
- Motor : 240V, 1 phase, 50 Hz
- Motor protection class : IP44
- Material (Shaft/Impeller) : Stainless steel covered by polyethylene
- Required numbers : 1 unit
- Installation : Indoor installation
- Accessories
  - One(1) support stand (on the floor) with anchor bolt and nut

##### W3-3: Chlorine dosing pump

- Capacity : 9.54 liter/min (Tolerance plus 20%)
- Delivery pressure : 10kg/ cm<sup>2</sup> (Tolerance plus 20%)
- Motor : 240V, 1 phase, 50 Hz

- Motor protection class : IP55
- Required numbers : 2 units (one set stand-by)
- Installation : Indoor installation
- Diameter of pipe : 3/4"
- Material : diaphragm; Teflon  
wetter part; PVC (polyvinyl chloride)
- Accessories  
Two(2) sets of anchor bolts and nuts for fixing of pump

W3-4: Piping

- Materials : 1" galvanized steel pipe: 1 piece (5.5m)  
: 1/2" galvanized steel pipe: 1 piece (5.5m)
- Fittings : 1" x 1/2" galvanized reducer : 1 piece  
: 1/2" galvanized elbow: 3 pieces

W3-5: Water hose for water supply

- Materials : 1/2" Polypropylene tube
- Length : 10m
- Accessories : Connection material between steel pipe and polypropylene tube

W3-6: Stop valve for water supply

- Type : 1/2" gate valve or globe type, screw connection
- Materials : Bronze
- Required numbers : 3 sets

W3-7: Disinfection pipe

- Materials : 1/2" Vinyl tube
- Length : 20m
- Accessories : Connection material between steel pipe and vinyl tube

W3-8: Disinfection system control panel

Required specification is as follows:

- Type of panel : Wall mounted or self-standing indoor type

Power source	: 240V, 1 phase, 50Hz
Sealing class	: More than IP55
Switches and controllers	: Main circuit breaker (MCCB) with rated rupturing capacity for the operation of pump : MCCB for each feeder : Magnetic contactor : Low water level cut-off relay : Manual ON/OFF selector switch - 2 switches for chlorine dosing pump - 1-switch for mixer
Indicators	: Voltmeter and Ammeter : Main power lamp : Indicating lamps for mixer and each pump-run
Required numbers	: 1 unit
Coating	: Manufacturer's standard finish coating in accordance with the requirement of AS standard.

Accessories:

- One(1) set of anchors bolt and nuts
- One(1) set of sealing material for cable entrance (cable gland for power and control cables) and cable size refer to clause 1.5..
- Fluorescence and receptacle shall be mounted in the panel for operation and maintenance.

Control:

- Manual operation.

1.5 Electrical facilities

W4: Power distribution panel

Required specification is as follows:

Type of panel	: Self-standing indoor type
Power source	: 415 V, 3 phase, 3-wire, 50 Hz
Sealing class	: More than IP55
Switches and controllers	: Main circuit breaker (MCCB) with rated rupturing capacity for the operation of pump : MCCB for each feeder : Current transformer (100/5A, 15VA) : Potential transformer (415/110V, 100VA) : Auxiliary transformer (415/240-120V, 10kVA)
Indicators	: Ammeter and Voltmeter : Main power and trouble lamps
Required numbers	: 1 unit
Coating	: Manufacturer's standard finish coating in accordance with the requirement of AS standard.

Accessories:

- One(1) set of anchor bolts and nuts
- One(1) set of sealing material for cable entrance (cable grand for power and control cables) and cable size refer to clause 1.5.
- Fluorescence and receptacle shall be mounted in the panel for operation maintenance.

W5-1: Power cables

Standard cable drum	: Cable drum shall be 300m.
Method of cable installation	: 415V ABC cables shall be installed on the electrical pole at interval of less than 40m.

Accessories for 415V Cables;

- The straight joint materials, indoor type termination kit with insulation cover, terminal lugs, etc. shall be supplied.
- The straight joint and insulation cover of termination kit shall be of heat shrinkable materials.

Specification of each power cable is as follows;

From	To	Cable type	Cable size (mm <sup>2</sup> )	No. of Core	Length (m)	Straight joint	Terminal
CP L3	Terminal box of W-1	AL ABC	70	3	950	3	2
CP L3	Terminal box of W-2	AL ABC	50	3	750	2	2
CP L3	Terminal box of W-4	AL ABC	25	3	450	1	2
PD L1	CP L3 (Internal)	CV (Cu)	50	3	5	1	2
PD L1	CP L2 (Internal)	CV (Cu)	25	3	20	1	2
CP L2	Each booster pump	CV (Cu)	6	3	80	1	2
PD L1	CP C1	CV (Cu)	6	3	30	1	2
CP C1	Mixer	CV (Cu)	6	3	20	1	2
CP C1	Each dosing pump	CV (Cu)	6	3	20	1	2

Note: 1) Abbreviation of panel number is refer to drawing No. E-2  
2) Power cable for W-3 shall be used existing power cable.

#### W5-2: Control cables

Control cables shall have a copper conductor with PVC insulation, PVC overall sheath, and jacket type unless specified otherwise. All the cables shall be of oil resistant, heat-resistant and flame-retardant type, if necessary, and shall be stranded copper conductors, with the insulation color-coded or numbering, where applicable.

All cables used for control circuits shall be polyvinyl chloride insulated and sheathed control cable type CVV.

The required quantity of control cable with accessories is as follows:

- 2.5 mm<sup>2</sup> x 6c CVV : 2,155m
- 2.5 mm<sup>2</sup> x 6c CVV terminal : 82 pieces
- 2.5 mm<sup>2</sup> x 4c CVV : 690m
- 2.5 mm<sup>2</sup> x 4c CVV terminal : 12 pieces

The minimum size of the control cables (inside of panel) shall be as follows:

- For CT circuit : 2.5 mm<sup>2</sup>
- For VT circuit : 2.5 mm<sup>2</sup>
- Other circuit : 1.25 mm<sup>2</sup>

#### W5-3: Conduit pipe

The following steel conduit pipe with accessories shall be provided.

- 32mm diameter conduit pipe with 1-bend and 1-straight joint : 3 sets
- 40mm diameter conduit pipe with 1-bend and 1-straight joint : 3 sets
- 50mm diameter conduit pipe with 1-bend and 1-straight joint : 3 sets
- Support band with bolt and nut for 32mm diameter conduit pipe : 10 sets
- Support band with bolt and nut for 40mm diameter conduit pipe : 10 sets
- Support band with bolt and nut for 50mm diameter conduit pipe : 10 sets

Note: Length of steel conduit pipe is 4m/piece

W6: Electric pole with accessories

The following electric pole for support of overhead cable with cable hanging accessories shall be provided.

Electric pole install between W-1 and W-4 well.

The interval of electric pole is approximate 40m.

Type	Q'ty	Material	Length
Dead end pole (W-1 and W-4)	2	3" galvanized steel pipe	10m
Double anchor on stopping pole	8	3" galvanized steel pipe	10m
Suspension pole	20	3" galvanized steel pipe	10m

## Chapter 2. Kombito Site

### 1.1 General

#### (1) Specification of existing well

Nominal drilling size	: 12"
Well depth	: 80m
Nominal casing size	: 8"
Installed numbers	: 2

### 1.2 Requirement of K1: Riser piping

#### (1) Riser piping

The Supplier shall provide the following riser pipes for existing submersible pumps.

Pipe size	: 3"
Material	: Stainless steel, schedule 10, screw end (both side)
Length of pipe	: Total 55m (5.5m x 10pcs)/ well
Required numbers	: 2 sets

#### (2) Accessories for each well

Joint	: Ten(10) 3" stainless steel pipe joints and one(1) submersible pump connector with sealing tapes
Elbow	: One(1) 3" stainless steel welding type elbow
Flange	: One(1) set of 3" stainless steel flange and one(1) set of 4" carbon steel flange (4" carbon steel flange shall be provided electrical insulation flange type) (one(1) set means including gasket, bolts and nuts)
Reducer	: One(1) set of 3" x 4" stainless steel reducer with both end stainless steel flange (4" side flange shall be provided electrical insulation type) (one(1) set means including gasket, bolts and nuts)
Plate	: One(1) set of setting plate on the existing foundation

### Chapter 3. Mataniko Site

#### 1.1 General

##### (1) Specification of existing well

Nominal drilling size	: 12"
Well depth	: 100m
Nominal casing size	: 8"
Installed numbers	: 4 nos

#### 1.2 Requirement of M1: Riser piping

##### (1) Riser piping

The Supplier shall provide following riser pipe for existing submersible pump.

Pipe size	: 3"
Material	: Stainless steel, schedule 10, screw end (both side)
Length of pipe	: Total 55m (5.5m x 10pcs)/ well
Required numbers	: 4 sets

##### (2) Accessories for each well

Joint	: Ten(10) 3" stainless steel pipe joints and one(1) submersible pump connector with sealing tapes
Elbow	: One(1) 3" stainless steel welding type elbow
Flange	: One(1) set of 3" stainless steel flange and one(1) set of 4" carbon steel flange (4" carbon steel flange shall be provided electrical insulation flange type) (one(1) set means including gasket, bolts and nuts)
Reducer	: One(1) set of 3" x 4" stainless steel reducer with both end stainless steel flange (4" side flange shall be provided electrical insulation type) (one(1) set means including gasket, bolts and nuts)
Plate	: One(1) set of setting plate on the existing foundation



**PART 2**  
**DELIVERY REQUIREMENTS**

## 2. Delivery Requirements

### 2.1 Documents for Presentation

The Supplier shall submit the following documents for all Equipment to the End-User at the time of delivery; all the documents shall be written in **English**.

Product catalog	( 3 ) copy(ies) (including original)
Operation manual	( 3 ) copy(ies) (including original)
Service manual (if available)	( 3 ) copy(ies) (including original)
Parts list (if available)	( 3 ) copy(ies) (including original)
Manufacturer's test report (if available)	( 3 ) copy(ies) (including original)

### 2.2 Inspection of the Equipment

- (1) The Supplier shall carry out all possible and necessary inspections and tests of the Equipment prior to the delivery.
- (2) The End-User will conduct inspections of the Equipment upon completion of delivery preparation in Honiara for contracted items, quantity and quality, as Pre-Delivery Inspection. When all the Equipment has passed the inspection, the End-User will issue the Certificate of Pre-Delivery Inspection and the ownership shall be transferred to the End-User.
- (3) The End-User will conduct inspections of the Equipment upon completion of delivery to the final delivery sites for quality and quantity, as Final Inspection. When all the Equipment has passed the inspections, the End-User will issue the Certificate of Completion. The Technical Guidance shall be a subject of this Final Inspection.

### 2.3 Temporary Storage and Delivery to the Site

- (1) The Supplier shall deliver the Equipment, item by item, in accordance with final delivery order issued by the End-User after the Pre-Delivery Inspection. The final delivery order will be issued according to progress of installation of the Equipment, to be done by the End-User.
- (2) The Supplier shall keep the Equipment in his/her store and under his/her responsibility until issue of the final delivery order. The period of this temporary storage will be less than 3 months from the date of issue of Certificate of Pre-Delivery Inspection. After the said 3 months pass, the Supplier is allowed to

deliver the Equipment to the store of the End-User.

- (3) All necessary cost for transportation, loading and unloading, storage until issue of final delivery order, etc. shall be borne by the Supplier.

#### 2.4 After-Sales Service

The Supplier shall be required to provide spare parts and repairs for the End-User in Solomon Islands. The Supplier must ensure the supply of spare parts for at least five (5) years from the issuance date of the Certificate of Completion.

#### 2.5 Warranty

The Supplier shall guarantee the Buyer that the Equipment supplied under the Contract will strictly comply with the Contract, will be first class in every particular case and free from defects. This Warranty shall remain valid for one (1) year following the issuance of the Certificate of Completion.

#### 2.6 Packing and Marking

##### (1) Packing

The Equipment to be delivered must be packed in a manner in compliance with the manufacturer's export standard packing, in order to prevent any damage and deterioration of the Equipment from heat, humidity or adverse conditions.

##### (2) Marking

The marking shall be sealed or printed onto a main body and/or every outer package/carton in indelible black ink as follows:

##### (1)Case Mark

Solomon Islands Water Authority



Honiara  
C/NO.

##### (2)Side Mark

**TECHNICAL COOPERATION BY  
THE GOVERNMENT OF JAPAN**

#### 2.7 Consignee

- (1) Consignee

Solomon Islands Water Authority  
Attention: Mr. John WAKI  
Address: Mendana Avenue, Honiara, P.O.BOX 1407  
Tel: 23985  
Fax: 20723

(2) Notify Party

1) Same as the Consignee

2) JICA Solomon Islands Office

Attention: Ms. Yoko ASANO

Address: 1 st Floor, Solomons Mutual Center Building, Honiara

Tel: 24170, 24169

Fax: 24171

E-mail: [jicasi@jica.go.jp](mailto:jicasi@jica.go.jp)

**PART 3**  
**TECHNICAL GUIDANCE**

### **3. Technical Guidance**

#### **3.1 Duty**

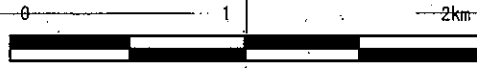
The Supplier shall provide necessary fulltime engineers for the following works at his/her own cost, during the period of installation to be done by the End-User for the Equipment.

- To advise the End-User on the installation of the Equipment.
- To attend the installation works to be done by the End-User and to confirm the appropriate installation as a witness.
- To attend performance and/or quality tests of facilities to be completed with the supplied Equipment.
- To make a basic training of the staff of the End-User for the proper operation and maintenance of the Equipment.
- To control the final delivery of the Equipment in accordance with final delivery order and progress of the installation works.

#### **3.2 Period**

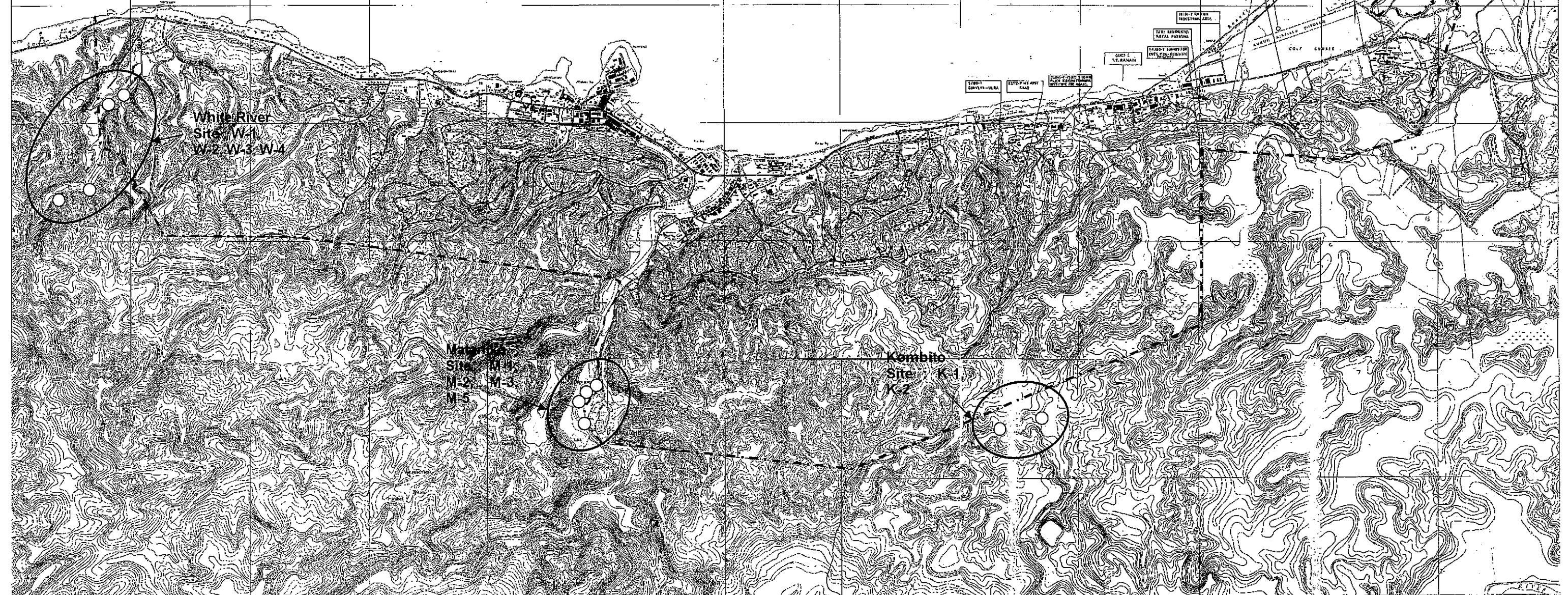
The period of this technical guidance shall be for no less than 1 month. The starting date of the technical guidance shall be set at the time of Pre-Delivery Inspection. However the technical guidance shall be started within 3 months after the date of issue of the Certificate of Pre-Delivery Inspection. If it can not be started within said 3 months due to unexpected reasons, the Supplier shall make off-site training for the End-User through preparing necessary documents and lecture instead of the specified in clause 3.1.

## Attachment 4 MAP OF THE SITE



DEFINITION FOR NON COASTAL SURVEY TRIMBLE MARK LETTERS:  
C - CONTROL FOR SURVEY POINTS BY STAMPEL TRANSFER  
L - LANTERNES, COMETS, FOR BURN, LANTERNES, ETC., ETC.  
L - LANTERNES  
F - FORTS - CONTROL  
Y - TRANSFERRED METAL, CONTROLS ETC.  
L - 20' OF BARRIERS

IRON BOTTOM SOUND



White River Site W-1, W-2, W-3, W-4

Mat... Site M-1, M-2, M-3, M-5

Kombito Site K-1, K-2

Legend  
○ Existing Bores

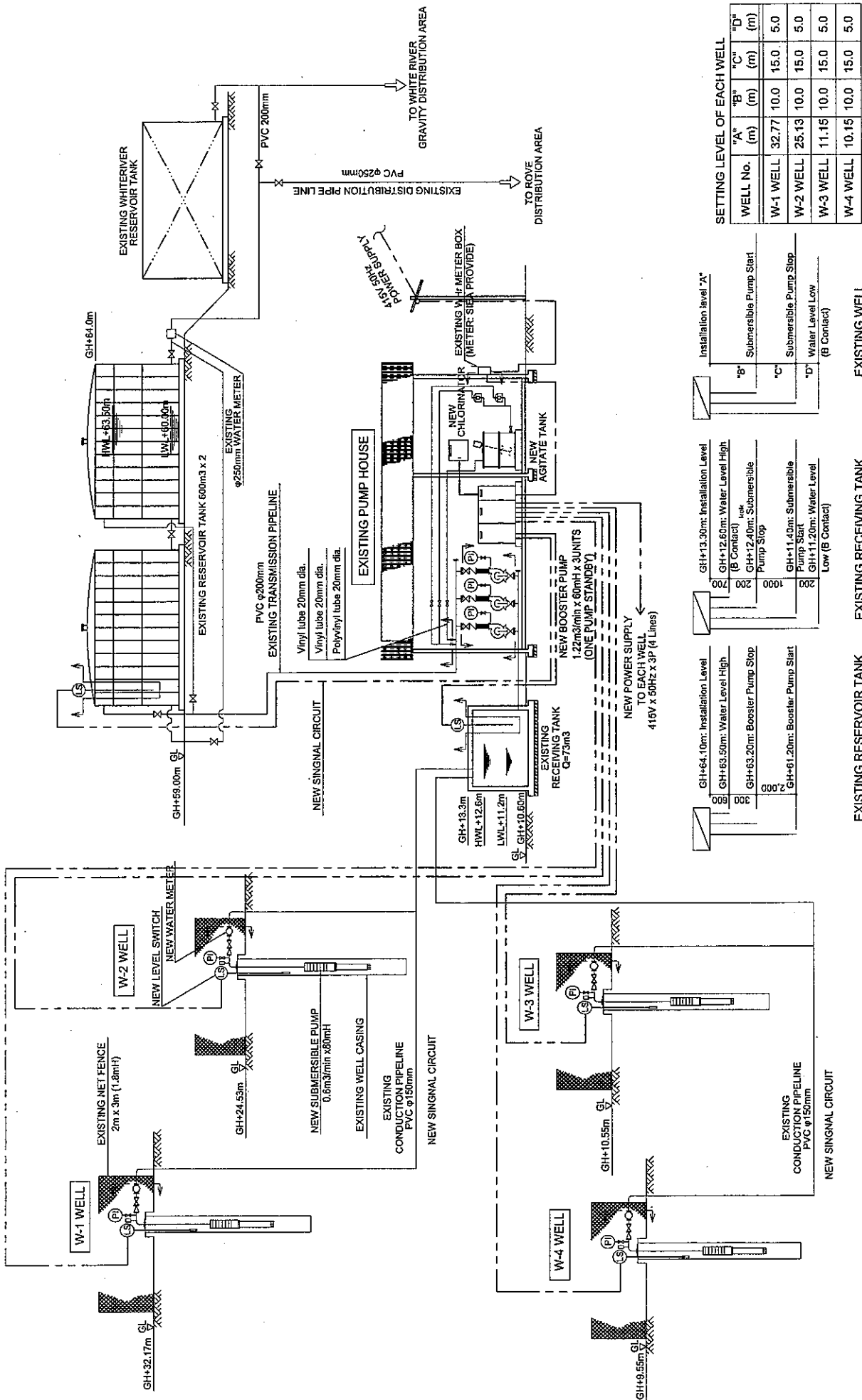


**Supply of the Equipment for  
Solomon Islands Water Authority**

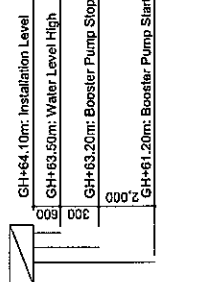
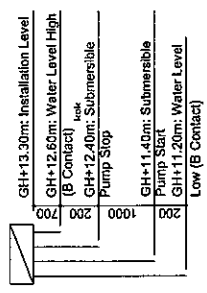
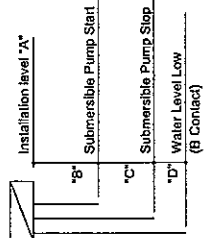
**Reference Drawings for  
Request for Quotation**

**Japan International Cooperation Agency**

# No. M-1: FLOW SHEET OF WATER SUPPLY SYSTEM (WHITE RIVER)



WELL No.	"A" (m)	"B" (m)	"C" (m)	"D" (m)
W-1 WELL	32.77	10.0	15.0	5.0
W-2 WELL	25.13	10.0	15.0	5.0
W-3 WELL	11.15	10.0	15.0	5.0
W-4 WELL	10.15	10.0	15.0	5.0



EXISTING WELL  
 EXISTING RECEIVING TANK  
 EXISTING RESERVOIR TANK

Dimension: shows the millimeter (mm)

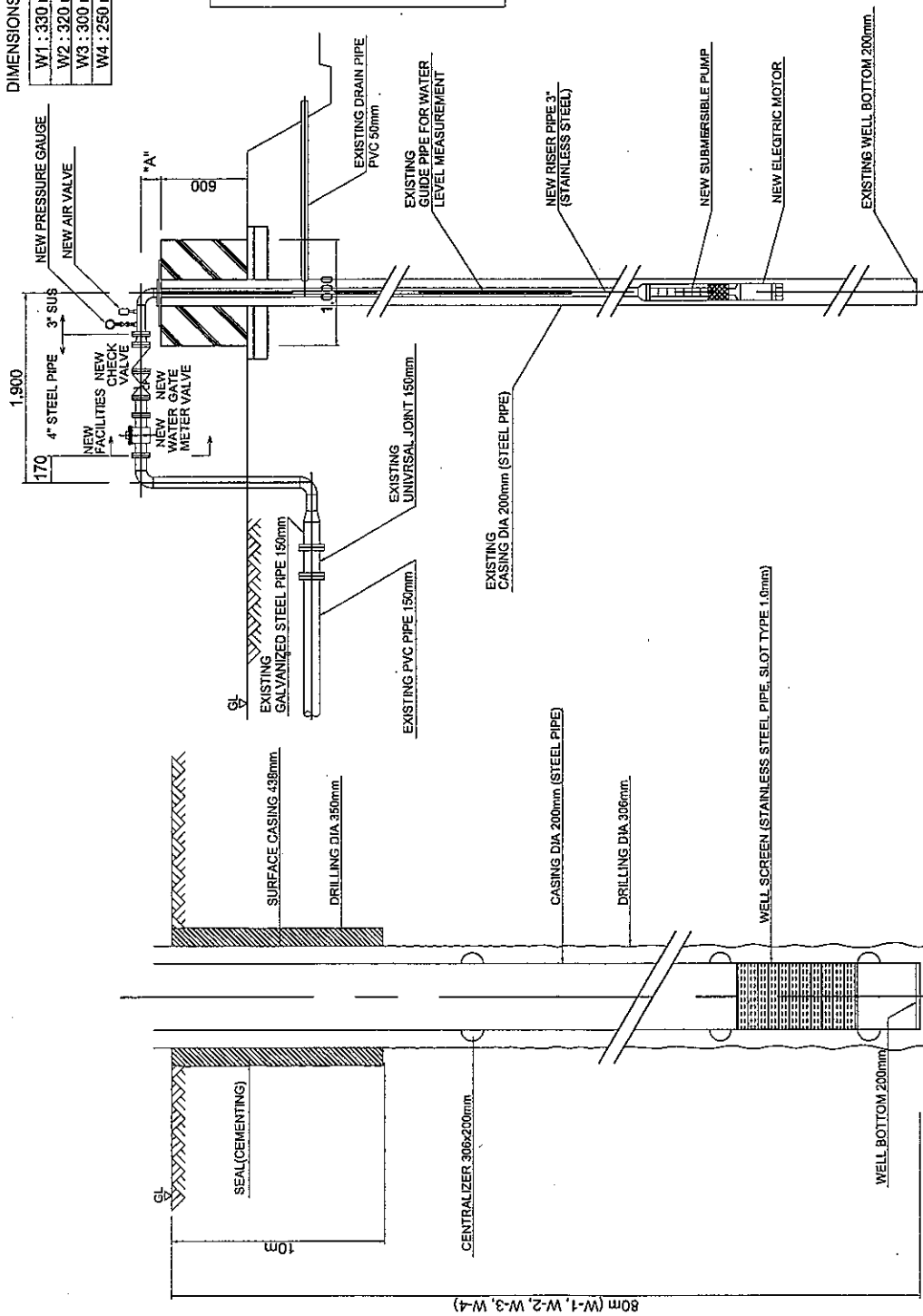
SETTING LEVEL FOR LEVEL SWITCH

LEGEND

- SCOPE OF SUPPLY
- NEW PIPELINE
- NEW POWER AND SIGNAL CABLE
- EXISTING PIPELINE
- EXISTING POWER AND SIGNAL CABLE

DIMENSIONS OF "A"

W1	: 330 mm
W2	: 320 mm
W3	: 300 mm
W4	: 250 mm



SPECIFICATION OF MELL AND PUMP

WELL DEPTH	LENGTH OF SCREEN	SUBMERSIBLE PUMP INSTALLATION LEVEL	SUBMERSIBLE PUMP	UNITS
80m	24m	52m	0.6m <sup>3</sup> /min x 80m	4

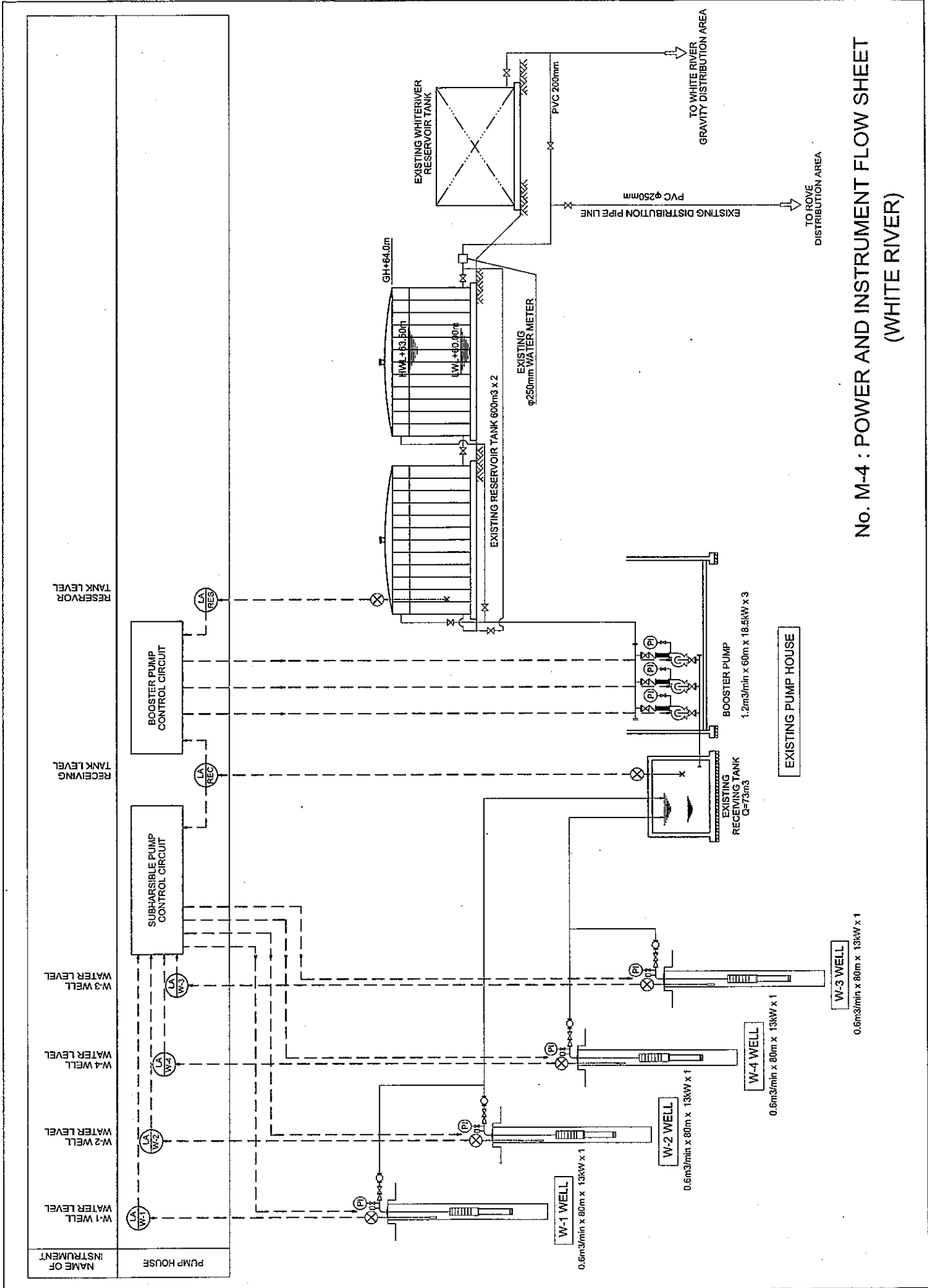
TYPICAL INSTALLATION OF SUBMERSIBLE PUMP

EXISTING BOREHOLE STRUCTURE

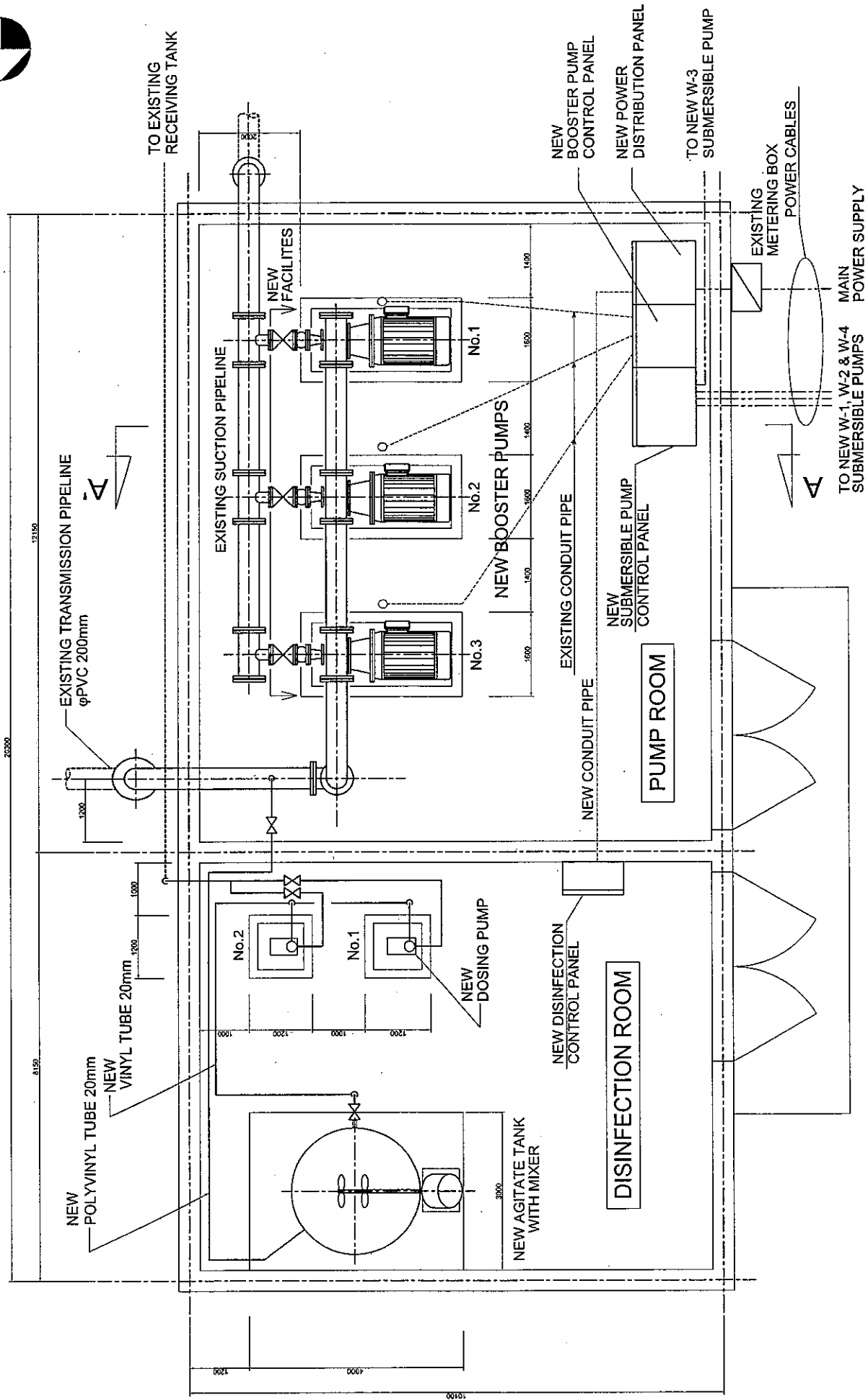
TYPICAL PLAN OF SUBMERSIBLE PUMP FACILITIES

No. M-2: DETAIL OF WELL FACILITIES  
(WHITE RIVER)

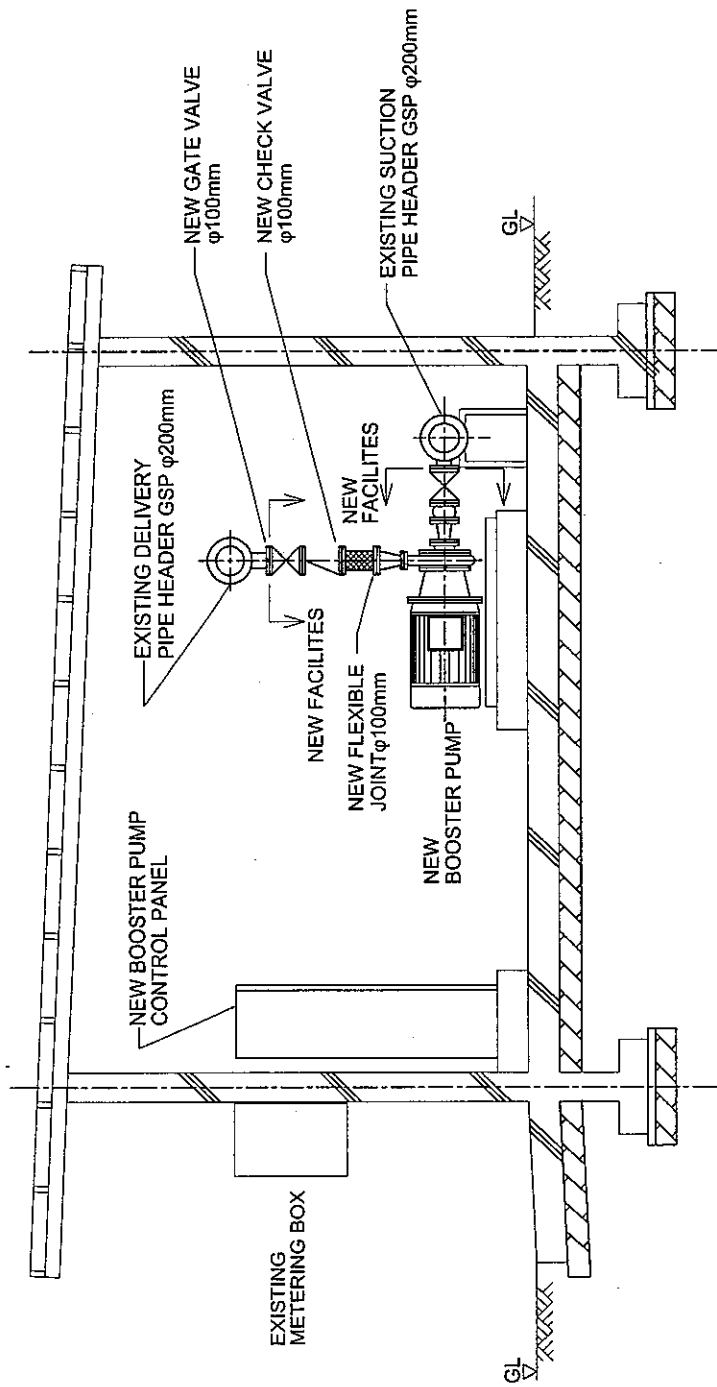




No. M-4 : POWER AND INSTRUMENT FLOW SHEET  
(WHITE RIVER)



No. M-5: PUMP HOUSE LAYOUT (PLAN)  
(WHITE RIVER)

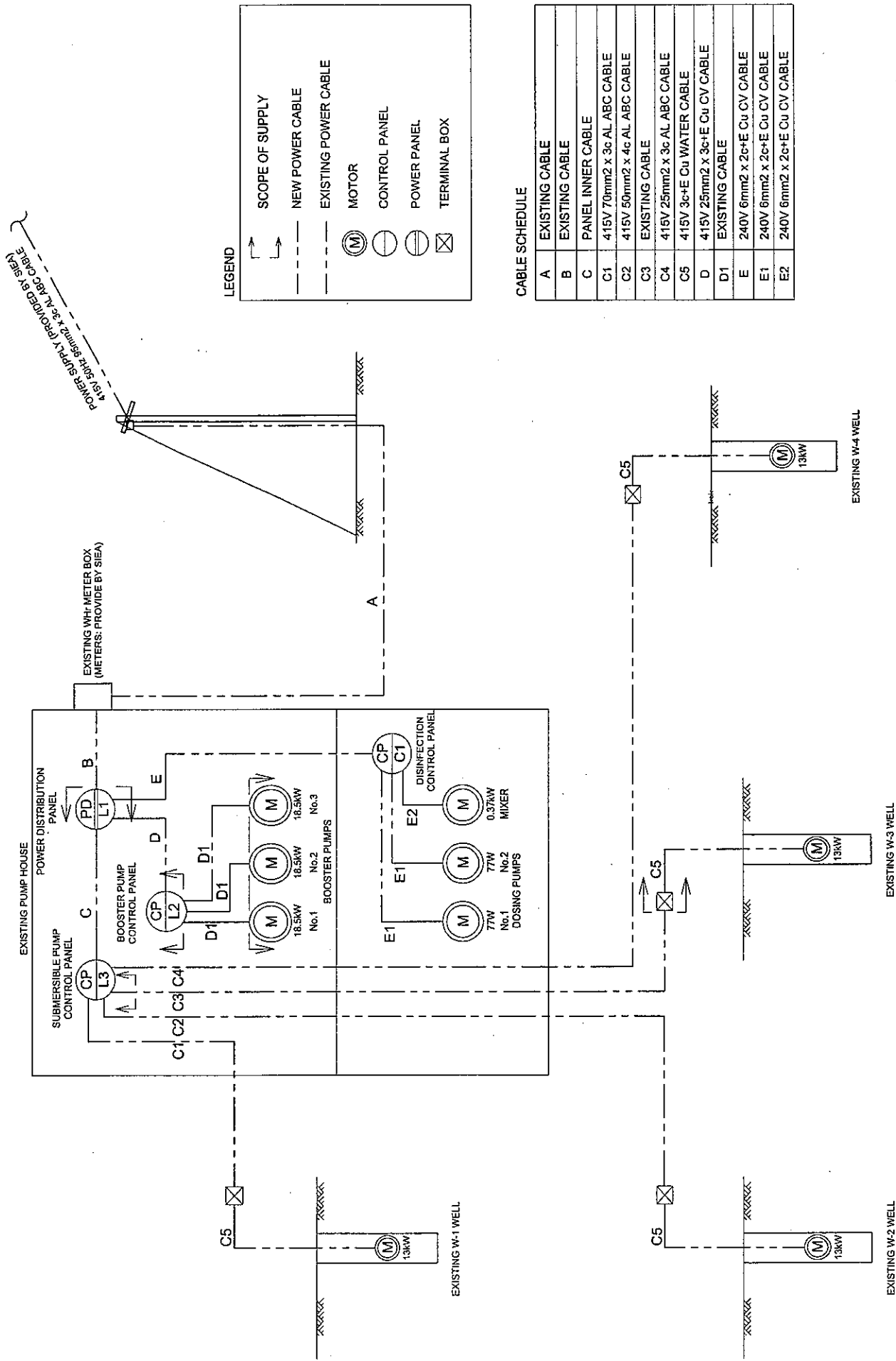


A-A' SECTION

No. M-6: PUMP HOUSE LAYOUT (SECTION)  
(WHITE RIVER)







POWER SUPPLY PROVIDED BY SIEMENS  
415V 50Hz 3Phase 3c AL ABC CABLE

EXISTING W-4 METER BOX  
(METERS PROVIDED BY SIEMENS)

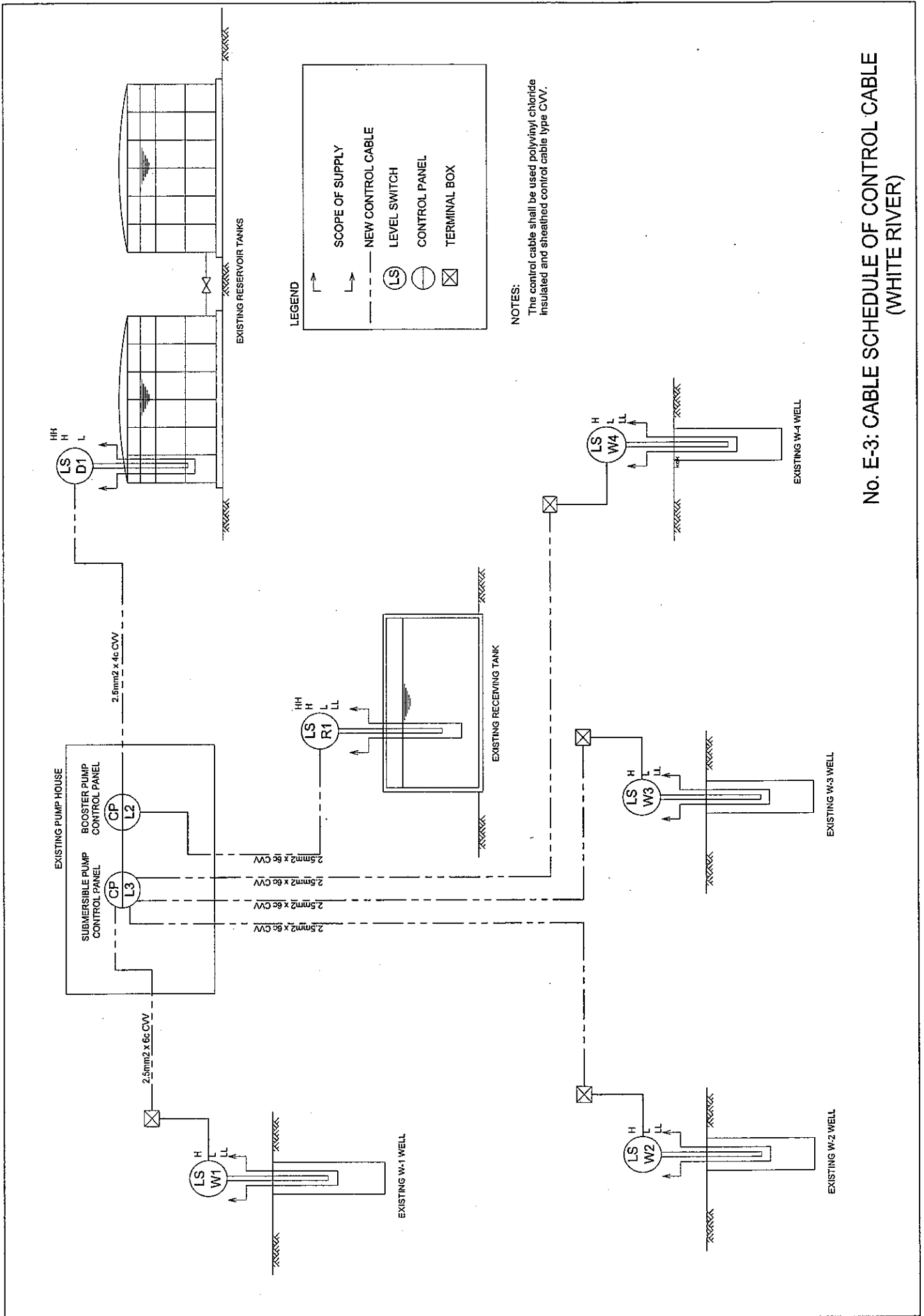
**LEGEND**

↑	SCOPE OF SUPPLY
---	NEW POWER CABLE
- - -	EXISTING POWER CABLE
(M)	MOTOR
(C)	CONTROL PANEL
(E)	POWER PANEL
(X)	TERMINAL BOX

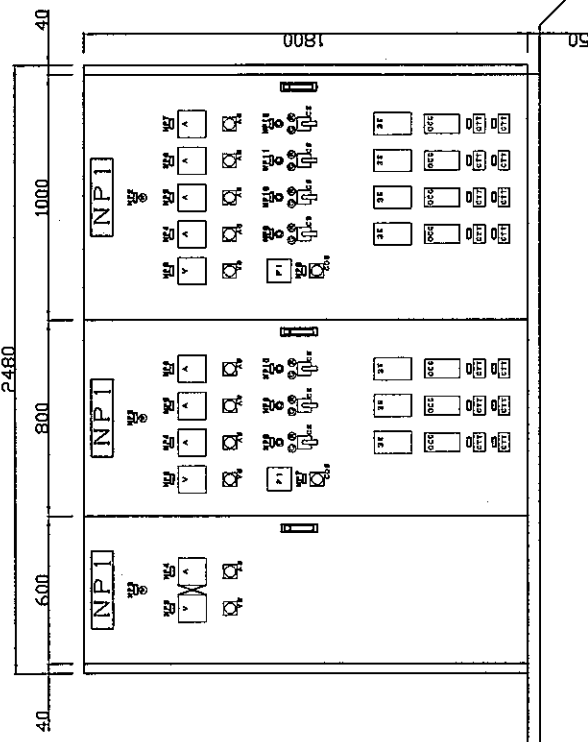
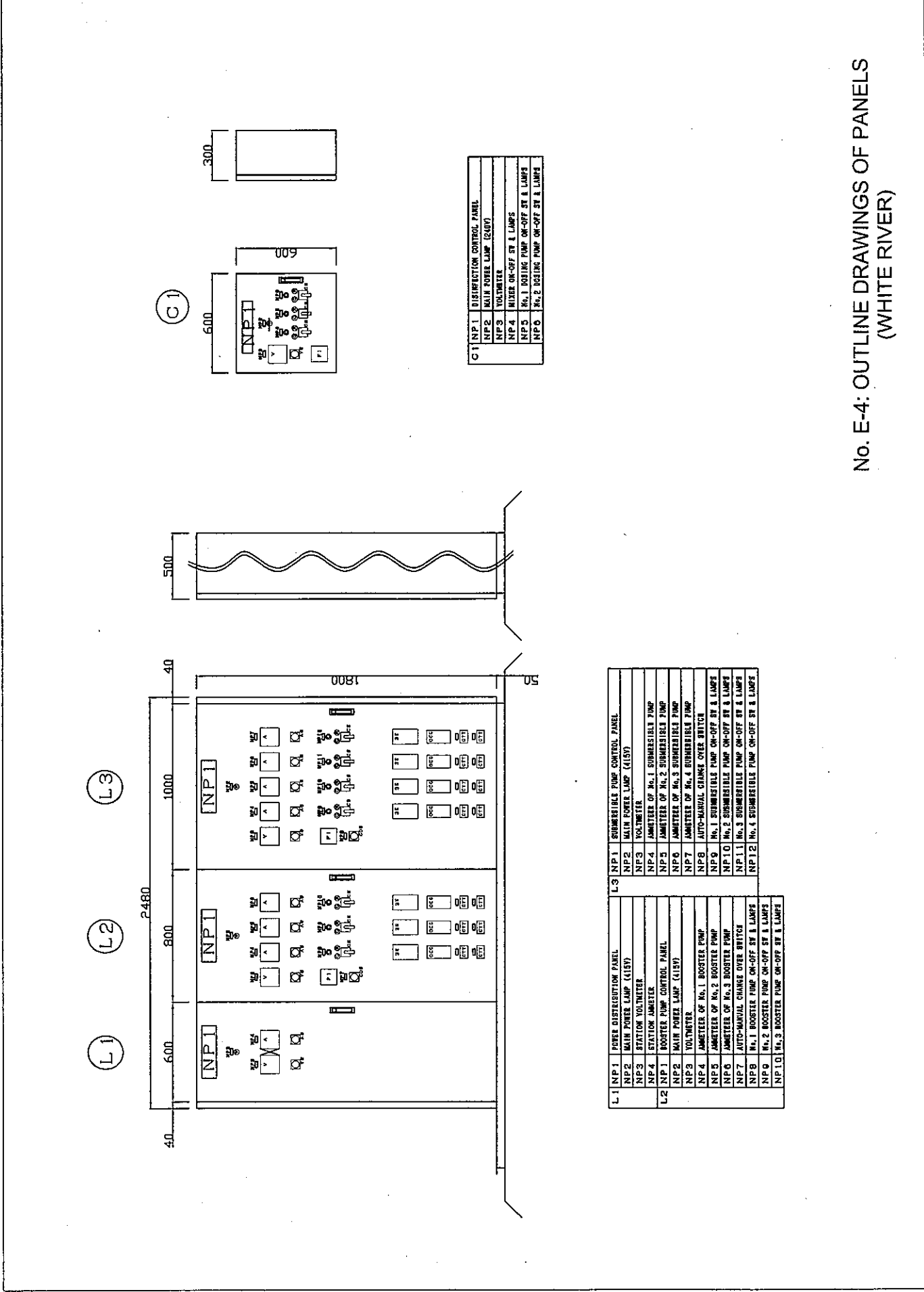
**CABLE SCHEDULE**

A	EXISTING CABLE
B	EXISTING CABLE
C	PANEL INNER CABLE
C1	415V 70mm <sup>2</sup> x 3c AL ABC CABLE
C2	415V 50mm <sup>2</sup> x 4c AL ABC CABLE
C3	EXISTING CABLE
C4	415V 25mm <sup>2</sup> x 3c AL ABC CABLE
C5	415V 3c+E Cu WATER CABLE
D	415V 25mm <sup>2</sup> x 3c+E Cu CV CABLE
D1	EXISTING CABLE
E	240V 6mm <sup>2</sup> x 2c+E Cu CV CABLE
E1	240V 6mm <sup>2</sup> x 2c+E Cu CV CABLE
E2	240V 6mm <sup>2</sup> x 2c+E Cu CV CABLE

No. E-2: CABLE SCHEDULE OF POWER CABLE  
(WHITE RIVER)



No. E-3: CABLE SCHEDULE OF CONTROL CABLE  
(WHITE RIVER)



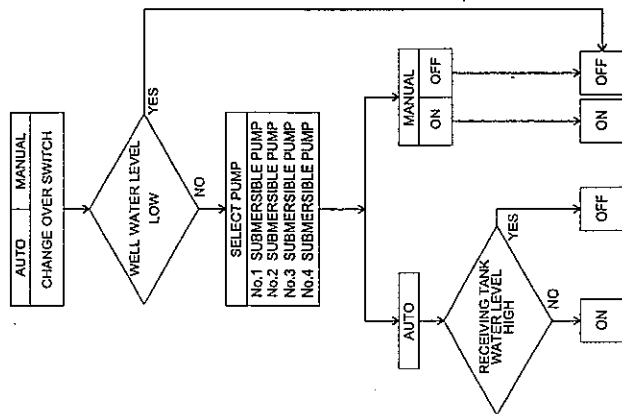
**C1**

N.P.1	DISTRIBUTION CONTROL PANEL
N.P.2	MAIN POWER LAMP (240V)
N.P.3	VOLTMETER
N.P.4	WATER ON-OFF SWITCH & LAMPS
N.P.5	No. 1 BOOSTING PUMP ON-OFF SWITCH & LAMPS
N.P.6	No. 2 BOOSTING PUMP ON-OFF SWITCH & LAMPS

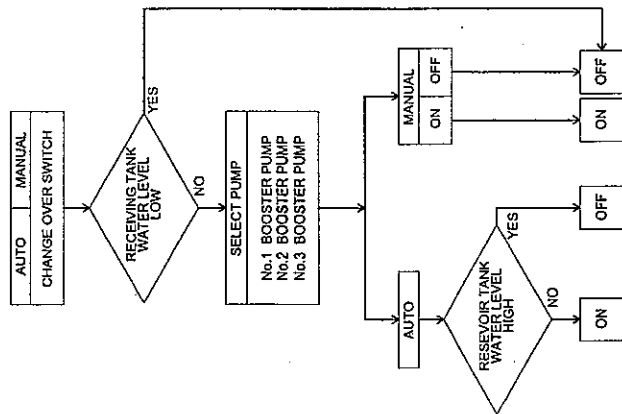
<b>L.1</b>	N.P.1	POWER DISTRIBUTION PANEL
	N.P.2	MAIN POWER LAMP (115V)
	N.P.3	STATION VOLTMETER
	N.P.4	STATION AMMETER
<b>L.2</b>	N.P.1	BOOSTER PUMP CONTROL PANEL
	N.P.2	MAIN POWER LAMP (115V)
	N.P.3	VOLTMETER
	N.P.4	AMMETER OF No. 1 BOOSTER PUMP
	N.P.5	AMMETER OF No. 2 BOOSTER PUMP
	N.P.6	AMMETER OF No. 3 BOOSTER PUMP
	N.P.7	AUTO-MANUAL CHANGE OVER SWITCH
	N.P.8	No. 1 BOOSTER PUMP ON-OFF SWITCH & LAMPS
	N.P.9	No. 2 BOOSTER PUMP ON-OFF SWITCH & LAMPS
	N.P.10	No. 3 BOOSTER PUMP ON-OFF SWITCH & LAMPS
<b>L.3</b>	N.P.1	SUBMERGIBLE PUMP CONTROL PANEL
	N.P.2	MAIN POWER LAMP (115V)
	N.P.3	VOLTMETER
	N.P.4	AMMETER OF No. 1 SUBMERGIBLE PUMP
	N.P.5	AMMETER OF No. 2 SUBMERGIBLE PUMP
	N.P.6	AMMETER OF No. 3 SUBMERGIBLE PUMP
	N.P.7	AMMETER OF No. 4 SUBMERGIBLE PUMP
	N.P.8	AUTO-MANUAL CHANGE OVER SWITCH
	N.P.9	No. 1 SUBMERGIBLE PUMP ON-OFF SWITCH & LAMPS
	N.P.10	No. 2 SUBMERGIBLE PUMP ON-OFF SWITCH & LAMPS
	N.P.11	No. 3 SUBMERGIBLE PUMP ON-OFF SWITCH & LAMPS
	N.P.12	No. 4 SUBMERGIBLE PUMP ON-OFF SWITCH & LAMPS

No. E-4: OUTLINE DRAWINGS OF PANELS  
(WHITE RIVER)

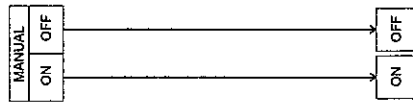
SUBMERSIBLE PUMP SYSTEM FLOW



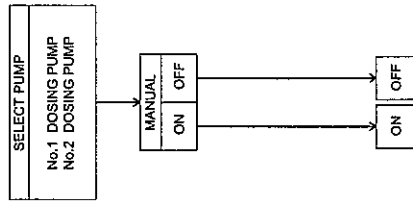
BOOSTER PUMP SYSTEM FLOW



DISINFECTION MIXER SYSTEM FLOW



DOSING PUMP SYSTEM FLOW



No. E-5: OPERATION FLOW DIAGRAM  
(WHITE RIVER)