

**資料 5.2 Technical Notes
(August 9, 2004)**

TECHNICAL NOTES
ON THE BASIC DESIGN STUDY
ON
THE PROJECT FOR IMPROVEMENT OF WATER SUPPLY SYSTEM
IN BELGRADE
IN THE REPUBLIC OF SERBIA AND MONTENEGRO

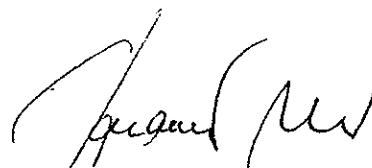
Based on the Minutes of Discussions (hereinafter referred to as "M/D") on the Basic Design Study on the Project for Improvement of Water Supply System in Belgrade (hereinafter referred to as "the Project") signed on 21st July 2004 between the Basic Design Study Team (hereinafter referred to as "the Team") of Japan International Cooperation Agency (hereinafter referred to as "JICA") and Belgrade Waterworks and Sewerage (hereinafter referred to as "BVK"), of the Government of the Republic of Serbia and Montenegro, the consultant members of the Team had a series of discussions and conducted field surveys from 16th July 2004 to 9th August 2004.

As a result of the discussions and the surveys, both sides confirmed the technical conditions described as per the attached.

Belgrade, 9th August 2004

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ATTACHMENT

Both parties agreed upon and confirmed the following items.

1. Equipment Requested

Both parties confirmed that the equipment listed in Table 1 was updated taking the present situation into consideration. The major points are as follows;

Following item shall delete.

- Transformer ----- from 14 to 0
- Flap valve for well equipment ----- from 100sets to 2sets
- Frequency inverter for distribution pump station -----from 53 panels to 28 panels
- Optical cable-----from 31.1km to 0km
- Control cubicle ----- from 44 panels to 28panels.

Following item is added.

- Auxiliary equipment for SCADA system required for system configuration. The details and specifications of the equipment are to be examined in the studies to be made in Japan.

2. Priority List

The Team agreed the priority list prepared by BVK and scope of supply is to be examined in the studies to be made in Japan as stipulated in M/D. Priority list is shown Table 2.

3. Scope of Work for Installation

Both parties confirmed that the scope of work for installation was discussed as follows:

- Installation works for the equipment to be supplied from Japan are done by BVK except for the equipment for SCADA system.
- Installation work for SCADA system including software is done by Japan side. However, telecommunication system for SCADA system is done by BVK.
- All hardware and software for SCADA system are required to be tested by Japan side.

Detailed work demarcation for installation between Japan side and BVK is shown in Table 3.

4. Implementation Work Schedule

Based on the scope of work, BVK prepared implementation schedule shown in Table 4 for their works. The schedule is to be examined in the studies as total implementation schedule of Japan Grand Aid system to be made in Japan.

5. Basic Design

5-1 SCADA System

Both parties agreed to the system configuration for SCADA system shown in Table 5.

5-2 Distribution and Well Pump

Both parties agreed to the basic design conditions for distribution pump and well pump shown in Table 6.

Table 1

BILL OF QUANTITY

Item No.	Equipment	Qty		Specification Sheet	Note
		Original	Proposal		
1. Well Equipment (97 wells)					
1-1	Aggregate (Pump & Motor)	49	49	SS-01	
1-2	Frequency Inverter	8	8	SS-02	
1-3	Measuring equipment	8	8	SS-03	
1-4	Valves	100	100	SS-04	
1-5	Flaps	100	7	SS-04	deleted by BVK
1-6	Control Cubicle	50	50	SS-05	
1-7	Terminal Equipment hw + sw	50	50	SS-06	
1-8	Telecommunication equipment (GPRS modem)	97	97	SS-07	
2. Pump Station Equipment (26 PS)					
2-1	Aggregate (Pump & Motor)	28	28	SS-01	
2-2	Frequency Inverter	53	53	SS-02	
2-3	Transformer	14	3	SS-08	out of Japan Grant Aid System
2-4	Control Cubicle	44	44	SS-05	
2-5	Flaps	65	65	SS-04	
2-6	Measuring equipment	75	75	SS-03	
2-7	Terminal Equipment hw + sw	23	23	SS-06	required to carry out data processing
2-8	Telecommunication equipment (GPRS modem)	24	23	SS-07	
2-9	Local SCADA (SCADA Server)	14	14	SS-10	
2-10	Monitor/SCADA HMI	0	14	SS-10	required to monitor operation data for water distribution at pump station
2-11	Printer	0	14	SS-10	same as 2-10
2-12	UPS	0	14	SS-10	same as 2-10
2-13	Touch panel	0	21	SS-10	same as 2-10
3. Measuring Point Equipment (28 points)					
3-1	Chlorine measurement	28	28	SS-11	
3-2	Cubicle	28	28	SS-05	
3-3	Terminal Equipment hw + sw	28	28	SS-06	
3-4	Telecommunication equipment (GPRS modem)	28	28	SS-07	
4. Reservoir Equipment					
4-1	Chlorine measurement	20	20	SS-11	
4-2	Terminal Equipment hw + sw	20	20	SS-06	
4-3	Telecommunication equipment (GPRS modem)	20	20	SS-07	
4-4	Cubicle	0	20	SS-11	required to provide as same as cubicles for measuring point equipment
5. Telecommunication Network					
5-1	IP Data network				
5-1-1	Optical cable link 31.1km	1	3	SS-08	Deleted by BVK
5-1-2	Active components				
5-1-2-1	SHDSL Layer 3 router	30	30	SS-08	
5-1-2-2	Layer 3 switch	4	4	SS-08	
5-1-2-3	Layer 2 switch	12	22	SS-08	revised based on basic design
5-1-2-4	Media converter	0	14	SS-08	revised based on basic design
5-2	Wireless data transmission network	8	3	SS-08	provided by BVK
6. Local Control Center - Bezanija					
6-1	Domain Controller server (sw + hw)	1	1	SS-10	
6-2	SQL Server (sw + hw)	1	1	SS-10	
6-3	GPRS server	0	1	SS-10	required to monitor operation data for water distribution at LCC
6-4	Monitor/SCADA HMI	0	1	SS-10	same as 6-3
6-5	Printer	0	1	SS-10	same as 6-3
6-6	UPS	0	1	SS-10	same as 6-3
7. Local Control Center - Banovo Brdo					
7-1	SQL Server (sw + hw)	1	1	SS-10	
7-2	Telecommunication Network Server (sw + hw)	1	1	SS-10	
7-3	Domain Controller server (sw + hw)	1	1	SS-10	
7-4	GPRS server	0	1	SS-10	same as 6-3
7-5	Monitor/SCADA HMI	0	1	SS-10	same as 6-3
7-6	Printer	0	1	SS-10	same as 6-3
7-7	UPS	0	1	SS-10	same as 6-3
7A. Local Control Center - Bela Bode					
7A-1	SCADA Server (sw + hw)	0	1	SS-10	same as 6-3
7A-2	Telecommunication equipment (GPRS modem)	0	1	SS-10	same as 6-3
7A-3	Monitor/HMI SCADA	0	1	SS-10	same as 6-3
7A-4	Printer	0	1	SS-10	same as 6-3
7A-5	UPS	0	1	SS-10	same as 6-3
7B. Local Control Center - Maks					
7B-1	SQL Server (sw + hw)	0	1	SS-10	same as 6-3
7B-2	GPRS server	0	1	SS-10	same as 6-3
7B-3	Monitor/SCADA HMI	0	1	SS-10	same as 6-3
7B-4	Printer	0	1	SS-10	same as 6-3
7B-5	UPS	0	1	SS-10	same as 6-3
8. Main Control Center - Deligradska Street					
8-1	Servers for real time BWS control				
8-1-1	SQL Server (sw + hw)	3	2	SS-08	deleted back-up server
8-1-2	Telecommunication Network Server (sw + hw)	1	0	SS-10	not required
8-1-3	Domain Controller server (sw + hw)	2	1	SS-10	deleted back-up server
8-1-4	Master SCADA server	1	1	SS-10	
8-1-5	Web server	0	1	SS-10	required to interface with other IP network
8-1-6	GPRS server	0	1	SS-10	required to connect with telecommunication system
8-2	Workstation for monitor				
8-2-1	Workstation (sw + hw) / SCADA HMI	3	2	SS-10	deleted one workstation and added a 50 inch display to facilitate monitoring work
8-2-2	50" Display	0	1	SS-10	same as 8-2-1
8-3	Voice over IP equipment				
8-3-1	VOIP gateway	1	3	SS-10	provided by BVK
8-3-2	VOIP softswitch	1	3	SS-10	provided by BVK
8-4	Printer	0	1	SS-10	required to print the daily report, operation data, etc.
8-5	UPS	0	1	SS-10	required to shutdown SCADA system safely under power failure
9. Laboratory measuring equipment and instrument					
9-1	Chemical laboratory				
9-1-1	Atomic Absorption Spectrometer(AAS)	1	1	SS-12	
9-1-2	Total Organic Carbon Analyzer(TOC)	1	1	SS-12	
9-1-3	UV-VIS Spectrometer	1	1	SS-12	
9-1-4	High Performance Liquid Chromatography(HPLC)	1	1	SS-12	
9-1-5	Ion Chromatography - IC	1	1	SS-12	
9-1-6	Analytical balance, 0.001g	1	1	SS-12	
9-1-7	Glassware Washer	1	1	SS-12	
9-2	Microbiological Laboratory				
9-2-1	Microscope	1	1	SS-12	
9-2-2	Autoclave	1	1	SS-12	
9-2-3	Glassware Washer with drying system	1	1	SS-12	
9-3	Chemical laboratory(waste water)				
9-3-1	Atomic Absorption Spectrometer(AAS)	1	1	SS-12	
9-3-2	Gas Chromatograph, PPC, FID and ECD	1	1	SS-12	
9-3-3	Total Organic Carbon Analyzer(TOC)	1	1	SS-12	
		Total			

SS-01 / SPECIFICATION OF Pumps & Motor

Item No.	Name of Station	Q'ty	Flow capacity (l/sec)	Head (m)	Motor Output (kW)	rpm	priority
<< Well Equipment >>							
1-1-01	RW-6m	1	100	75	132	1500	2
1-1-02	RW-2m	1	100	75	132	1500	2
1-1-03	RW-8m	1	70	75	90	1500	2
1-1-04	RW-1m	1	100	75	132	1500	2
1-1-05	RW-19/1	1	100	75	132	1500	2
1-1-06	RW-20/1	1	100	75	132	1500	2
1-1-07	RW-20	1	35	75	45	3000	2
1-1-08	RW-15/1	1	70	75	90	1500	2
1-1-09	RW-14/1	1	35	75	45	3000	2
1-1-10	RW-13/1	1	35	75	45	3000	2
1-1-11	RW-11/1	1	70	75	90	1500	2
1-1-12	RW-12/1	1	35	75	45	3000	2
1-1-13	RW12/2	1	70	75	90	1500	2
1-1-14	RW-3	1	35	75	45	3000	2
1-1-15	RW-9	1	35	75	45	3000	2
1-1-16	RW-7	1	35	75	45	3000	2
1-1-17	RW22/1	1	130	75	160	3000	2
1-1-18	RW-2	1	100	75	132	1500	2
1-1-19	RW-4/1	1	130	75	160	3000	2
1-1-20	RW-40	1	70	75	90	1500	2
1-1-21	RW-42	1	100	75	132	1500	2
1-1-22	RW-43	1	70	75	90	1500	2
1-1-23	RW-45	1	100	75	132	1500	2
1-1-24	RW-46	1	100	75	132	1500	2
1-1-25	RW-49	1	130	75	160	3000	2
1-1-26	RW-63	1	100	75	132	1500	2
1-1-27	RW-62	1	100	75	132	1500	2
1-1-28	RW-72	1	70	75	90	1500	2
1-1-29	RW-75	1	100	75	132	1500	2
1-1-30	RW-79	1	70	75	90	1500	2
1-1-31	RW-81	1	70	75	90	1500	2
1-1-32	RW-87	1	100	75	132	1500	2
1-1-33	RW-88	1	100	75	132	1500	2
1-1-34	RW-90	1	130	75	160	3000	2
1-1-35	RW-98	1	35	75	45	3000	2
1-1-36	RW-65	1	70	75	90	1500	2
1-1-37	RW-66	1	70	75	90	1500	2
1-1-38	RW-41	1	70	75	90	1500	2
1-1-39	RW-35	1	100	75	132	1500	2
1-1-40	RW-29	1	35	75	45	3000	2
1-1-41	RW-23/1	1	70	75	90	1500	2
1-1-42	RW-14	1	70	75	90	1500	2
1-1-43	RW-12/3	1	70	75	90	1500	2
1-1-44	RE-5m	1	35	75	45	3000	2
1-1-45	RW-8A	1	130	75	160	3000	2
1-1-46	RW-10	1	100	75	132	1500	2
1-1-47	RW-11	1	70	75	90	1500	2
1-1-48	RW-16/1	1	70	75	90	1500	2
1-1-49	RW-17	1	35	75	45	3000	2
<< Pump Station >>							
2-1-01	PS-1a Bele Vode	1	167	160	400	1500	1
2-1-02	PS-1a	1	167	160	400	1500	1
2-1-03	PS-1a	1	167	160	400	1500	1
2-1-04	PS-1b	1	400	90	550	1500	1
2-1-05	PS-1b	1	400	90	550	1500	1
2-1-06	PS-1b	1	400	90	550	1500	1
2-1-07	PS-1b	1	400	90	550	1500	1
2-1-08	PS-4 Crvrni Krst	1	300	70	400	1500	2
2-1-09	PS-18 Tasmajdan stari	1	400	65	400	1500	1

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SS-01 / SPECIFICATION OF Pumps & Motor

Item No.	Name of Station	Q'ty	Flow capacity (l/sec)	Head (m)	Motor Output (kW)	rpm	priority
2-1-10	PS-18	1	400	65	400	1500	1
2-1-11	PS-18	1	400	65	400	1500	1
2-1-12	PS-18	1	400	65	400	1500	1
2-1-13	PS-19 Bezanija	1	200	65	200	1500	1
2-1-14	PS-19	1	200	65	200	1500	1
2-1-15	PS-19	1	200	65	200	1500	1
2-1-16	PS-23 Studentski Grad	1	500	70	600	1500	1
2-1-17	PS-23	1	500	70	600	1500	1
2-1-18	PS-23	1	500	70	600	1500	1
2-1-19	PS-23	1	500	70	600	1500	1
2-1-20	PS-23	1	500	70	600	1500	1
2-1-21	PS-17 Zvezdara	1	120	80	160	1500	1
2-1-22	PS-17	1	120	80	160	1500	1
2-1-23	PS-17	1	120	80	160	1500	1
2-1-24	PS-21 Pionir	1	200	65	200	1500	2
2-1-25	PS-21	1	200	65	200	1500	2
2-1-26	PS-21	1	200	65	200	1500	2
2-1-27	PS-20 Zeleznik	1	240	150	600	1500	1
2-1-28	PS-20	1	240	150	600	1500	1

ss-02 / Specification of inverters and soft starters prioriteti

Item No.	Name of Station	Q'ty	Voltage(V)	Motor Output(kW)	priority
<< Well Equipment >>					
1-2-01	RW- 3	1	400	45	2
1-2-02	RW -9	1	400	45	2
1-2-03	RW-7	1	400	45	2
1-2-04	RW 46	1	400	132	2
1-2-05	RW-87	1	400	132	2
1-2-06	RW-88	1	400	132	2
1-2-07	RW-35	1	400	132	2
1-2-08	RW-49	1	400	160	2
<< Pump Station >>					
2-2-01	PS-1a Bele Vode	1	400	400	1
2-2-02	PS-1a	1	400	400	1
2-2-03	PS-1a	1	400	400	1
2-2-04	PS-1b	1	400	550	1
2-2-05	PS-1b	1	400	550	1
2-2-06	PS-1b	1	400	550	1
2-2-07	PS-1b	1	400	550	1
2-2-08	PS-4 Crvrni Krst	1	400	400	2
2-2-09	PS-18 Tasmajdan stari	1	400	400	1
2-2-10	PS-18	1	400	400	1
2-2-11	PS-18	1	400	400	1
2-2-12	PS-18	1	400	400	1
2-2-13	PS-19 Bezanija	1	400	200	1
2-2-14	PS-19	1	400	200	1
2-2-15	PS-19	1	400	200	1
2-2-16	PS-23 Studentski Grad	1	400	600	1
2-2-17	PS-23	1	400	600	1
2-2-18	PS-23	1	400	600	1
2-2-19	PS-23	1	400	600	1
2-2-20	PS-23	1	400	600	1
2-2-21	PS-17 Zvezdara	1	400	160	1
2-2-22	PS-17	1	400	160	1
2-2-23	PS-17	1	400	160	1
2-2-24	PS-21 Pionir	1	400	200	2
2-2-25	PS-21	1	400	200	2
2-2-26	PS-21	1	400	200	2
2-2-27	PS-20 Zeleznik	1	400	600	1
2-2-28	PS-20	1	400	600	1

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SS-03 SPECIFICATION OF MEASUREMENT EQUIPMENT (Pressure and Water Level)

Item No.	Name of Station	Q'ty	Type Pieso	Measuring Span	Depth of well (m)	priority
<< Well Equipment >>						
1-3-01	RW 3 Water Level	1	Pieso		0-40	2
1-3-02	RW 9	1	Pieso		0-40	2
1-3-03	RW 7	1	Pieso		0-40	2
1-3-04	RW 46	1	Pieso		0-40	2
1-3-05	RW 87	1	Pieso		0-40	2
1-3-06	RW 88	1	Pieso		0-40	2
1-3-07	RW 35	1	Pieso		0-40	2
1-3-08	RW 49	1	Pieso		0-40	2
<< Pump Station >>						
2-6-01	PS 1A Pressure	1	Pieso	0-16 bar		1
2-6-02	PS 1A	1	Pieso	0-16		1
2-6-03	PS 1A	1	Pieso	0-16		1
2-6-04	PS 1B	1	Pieso	0-16		1
2-6-05	PS 1B	1	Pieso	0-16		1
2-6-06	PS 1B	1	Pieso	0-16		1
2-6-07	PS 1B	1	Pieso	0-16		1
2-6-08	PS 4	1	Pieso	0-16		1
2-6-09	PS 4	1	Pieso	0-16		1
2-6-10	PS 4	1	Pieso	0-16		1
2-6-11	PS 15	1	Pieso	0-16		1
2-6-12	PS 15	1	Pieso	0-16		1
2-6-13	PS 15	1	Pieso	0-16		1
2-6-14	PS 15	1	Pieso	0-25		1
2-6-15	PS 15	1	Pieso	0-25		1
2-6-16	PS 15	1	Pieso	0-25		1
2-6-17	PS 15	1	Pieso	0-25		1
2-6-18	PS 16	1	Pieso	0-16		1
2-6-19	PS 16	1	Pieso	0-16		1
2-6-20	PS 16	1	Pieso	0-16		1
2-6-21	PS 16	1	Pieso	0-25		1
2-6-22	PS 16	1	Pieso	0-25		1
2-6-23	PS 16	1	Pieso	0-25		1
2-6-24	PS 16	1	Pieso	0-25		1
2-6-25	PS 18	1	Pieso	0-16		1
2-6-26	PS 18	1	Pieso	0-16		1
2-6-27	PS 18	1	Pieso	0-16		1
2-6-28	PS 18	1	Pieso	0-16		1
2-6-29	PS 18	1	Pieso	0-16		1
2-6-30	PS 19	1	Pieso	0-16		1
2-6-31	PS 19	1	Pieso	0-16		1
2-6-32	PS 23	1	Pieso	0-16		1
2-6-33	PS 23	1	Pieso	0-16		1
2-6-34	PS 23	1	Pieso	0-16		1
2-6-35	PS 23	1	Pieso	0-16		1
2-6-36	PS 23	1	Pieso	0-16		1
2-6-37	PS 25	1	Pieso	0-16		1
2-6-38	PS 25	1	Pieso	0-16		1
2-6-39	PS 25	1	Pieso	0-16		1
2-6-40	PS 25	1	Pieso	0-25		1
2-6-41	PS 25	1	Pieso	0-25		1
2-6-42	PS 25	1	Pieso	0-25		1
2-6-43	PS 28	1	Pieso	0-16		1
2-6-44	PS 28	1	Pieso	0-16		1
2-6-45	PS 28	1	Pieso	0-16		1
2-6-46	PS 28	1	Pieso	0-16		1
2-6-47	PS 28	1	Pieso	0-25		1
2-6-48	PS 28	1	Pieso	0-25		1
2-6-49	PS 5	1	Pieso	0-25		1
2-6-50	PS 5	1	Pieso	0-25		1
2-6-51	PS 17	1	Pieso	0-16		1

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SS-03 SPECIFICATION OF MEASUREMENT EQUIPMENT (Pressure and Water Level)

Item No.	Name of Station	Q'ty	Type Pieso	Measuring Span	Depth of well (m)	priority
2-6-52	PS 17	1	Pieso	0-16		1
2-6-53	PS 17	1	Pieso	0-16		1
2-6-54	PS 17	1	Pieso	0-16		1
2-6-55	PS 17	1	Pieso	0-16		1
2-6-56	PS 17	1	Pieso	0-16		1
2-6-57	PS 21	1	Pieso	0-16		1
2-6-58	PS 21	1	Pieso	0-16		1
2-6-59	PS 21	1	Pieso	0-16		1
2-6-60	PS 20	1	Pieso	0-25		1
2-6-61	PS 20	1	Pieso	0-25		1
2-6-62	PS 20	1	Pieso	0-25		1
2-6-63	PS 26	1	Pieso	0-25		1
2-6-64	PS 26	1	Pieso	0-25		1
2-6-65	PS 26	1	Pieso	0-25		1
2-6-66	PS 33	1	Pieso	0-40		1
2-6-67	PS 33	1	Pieso	0-40		1
2-6-68	PS 3	1	Pieso	0-16		1
2-6-69	PS 3	1	Pieso	0-16		1
2-6-70	PS 3	1	Pieso	0-16		1
2-6-71	PS 6	1	Pieso	0-16		1
2-6-72	PS 6	1	Pieso	0-16		1
2-6-73	PS Lesce	1	Pieso	0-16		1
2-6-74	PS Lesce	1	Pieso	0-16		1
2-6-75	PS Lesce	1	Pieso	0-16		1

SS-04 / SPECIFICATION OF Valves & Flaps

Item No.	Name of Station	Flaps			Item No.	Valves		
		Q'ty	Diameter (mm)	priority		Q'ty	Diameter	priority
<< Well Equipment >>				<< Well Equipment >>				
1-4-01	1				1-5-01	1	200	2
1-4-02	1m				1-5-02	1	200	2
1-4-03	2				1-5-03	1	200	2
1-4-04	2m				1-5-04	1	200	2
1-4-05	3				1-5-05	1	200	2
1-4-06	3m				1-5-06	1	200	2
1-4-07	3A				1-5-07	1	200	2
1-4-08	4/I				1-5-08	1	200	2
1-4-09	4/III				1-5-09	1	200	2
1-4-10	4m				1-5-10	1	200	2
1-4-11	5				1-5-11	1	200	2
1-4-12	5m				1-5-12	1	200	2
1-4-13	6				1-5-13	1	200	2
1-4-14	6A				1-5-14	1	200	2
1-4-15	6M				1-5-15	1	200	2
1-4-16	7				1-5-16	1	200	2
1-4-17	7M				1-5-17	1	200	2
1-4-18	8A				1-5-18	1	200	2
1-4-19	8M				1-5-19	1	200	2
1-4-20	9				1-5-20	1	200	2
1-4-21	10				1-5-21	1	200	2
1-4-22	10M				1-5-22	1	200	2
1-4-23	11				1-5-23	1	200	2
1-4-24	11/I				1-5-24	1	200	2
1-4-25	12				1-5-25	1	200	2
1-4-26	12/1				1-5-26	1	200	2
1-4-27	12/2				1-5-27	1	200	2
1-4-28	12/3				1-5-28	1	200	2
1-4-29	13/1				1-5-29	1	200	2
1-4-30	14				1-5-30	1	200	2
1-4-31	14/1				1-5-31	1	200	2
1-4-32	15				1-5-32	1	200	2
1-4-33	15/1				1-5-33	1	200	2
1-4-34	16				1-5-34	1	200	2
1-4-35	16/1				1-5-35	1	200	2
1-4-36	17				1-5-36	1	200	2
1-4-37	18				1-5-37	1	200	2
1-4-38	19				1-5-38	1	200	2
1-4-39	19/1				1-5-39	1	200	2
1-4-40	20				1-5-40	1	200	2
1-4-41	20/1				1-5-41	1	200	2
1-4-42	21				1-5-42	1	200	2
1-4-43	22/I				1-5-43	1	200	2
1-4-44	22/II				1-5-44	1	200	2
1-4-45	23/I				1-5-45	1	200	2
1-4-46	23/II				1-5-46	1	200	2
1-4-47	24				1-5-47	1	200	2
1-4-48	25				1-5-48	1	200	2
1-4-49	26				1-5-49	1	200	2
1-4-50	27				1-5-50	1	200	2
1-4-51	28				1-5-51	1	200	2
1-4-52	29				1-5-52	1	200	2
1-4-53	30				1-5-53	1	200	2
1-4-54	35				1-5-54	1	200	2
1-4-55	36				1-5-55	1	200	2
1-4-56	37				1-5-56	1	200	2
1-4-57	38				1-5-57	1	200	2
1-4-58	40				1-5-58	1	200	2
1-4-59	41				1-5-59	1	200	2
1-4-60	42				1-5-60	1	200	2
1-4-61	43				1-5-61	1	200	2
1-4-62	44				1-5-62	1	200	2
1-4-63	45				1-5-63	1	200	2

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SS-04 / SPECIFICATION OF Valves & Flaps

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Item No.	Name of Station	Flaps			Item No.	Valves		
		Q'ty	Diameter (mm)	priority		Q'ty	Diameter	priority
1-4-64	46				1-5-64	1	200	2
1-4-65	47				1-5-65	1	200	2
1-4-66	48				1-5-66	1	200	2
1-4-67	49				1-5-67	1	200	2
1-4-68	50				1-5-68	1	200	2
1-4-69	51				1-5-69	1	200	2
1-4-70	52				1-5-70	1	200	2
1-4-71	53				1-5-71	1	200	2
1-4-72	59				1-5-72	1	200	2
1-4-73	60				1-5-73	1	200	2
1-4-74	61				1-5-74	1	200	2
1-4-75	62				1-5-75	1	200	2
1-4-76	63				1-5-76	1	200	2
1-4-77	64				1-5-77	1	200	2
1-4-78	65				1-5-78	1	200	2
1-4-79	66				1-5-79	1	200	2
1-4-80	69				1-5-80	1	200	2
1-4-81	72				1-5-81	1	200	2
1-4-82	73				1-5-82	1	200	2
1-4-83	75				1-5-83	1	200	2
1-4-84	78				1-5-84	1	200	2
1-4-85	79				1-5-85	1	200	2
1-4-86	80				1-5-86	1	200	2
1-4-87	81				1-5-87	1	200	2
1-4-88	83				1-5-88	1	200	2
1-4-89	84				1-5-89	1	200	2
1-4-90	85				1-5-90	1	200	2
1-4-91	86				1-5-91	1	200	2
1-4-92	87				1-5-92	1	200	2
1-4-93	88				1-5-93	1	200	2
1-4-94	89				1-5-94	1	200	2
1-4-95	90				1-5-95	1	200	2
1-4-96	92				1-5-96	1	200	2
1-4-97	93				1-5-97	1	200	2
1-4-98	94				1-5-98	1	200	2
1-4-99	95				1-5-99	1	200	2
1-4-100	98				1-5-100	1	200	2
<< Pump Station >>								
2-5-01	PS 1A	1	250	1				
2-5-02	PS 1A	1	250	1				
2-5-03	PS 1A	1	250	1				
2-5-04	PS 1B	1	450	1				
2-5-05	PS 1B	1	250	1				
2-5-06	PS 1B	1	450	1				
2-5-07	PS 1B	1	250	1				
2-5-08	PS 4	1	250	2				
2-5-09	PS 4	1	200	2				
2-5-10	PS 4	1	250	2				
2-5-11	PS 15	1	200	3				
2-5-12	PS 15	1	200	3				
2-5-13	PS 15	1	200	3				
2-5-14	PS 16	1	200	3				
2-5-15	PS 16	1	200	3				
2-5-16	PS 16	1	250	3				
2-5-17	PS 18	1	400	1				
2-5-18	PS 18	1	400	1				
2-5-19	PS 18	1	350	1				
2-5-20	PS 18	1	400	1				
2-5-21	PS 19	1	300	1				
2-5-22	PS 19	1	300	1				
2-5-23	PS 19	1	300	1				
2-5-24	PS 25	1	250	2				
2-5-25	PS 25	1	250	2				
2-5-26	PS 25	1	250	2				

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SS-04 / SPECIFICATION OF Valves & Flaps

Item No.	Name of Station	Flaps			Item No.	Valves		
		Q'ty	Diameter (mm)	priority		Q'ty	Diameter	priority
2-5-27	PS 25A	1	200	2				
2-5-28	PS 25A	1	200	2				
2-5-29	PS 25A	1	200	2				
2-5-30	PS 28	1	500	2				
2-5-31	PS 28	1	500	2				
2-5-32	PS 28	1	500	2				
2-5-33	PS 28	1	400	2				
2-5-34	PS 28	1	400	2				
2-5-35	PS 28	1	400	2				
2-5-36	PS 17	1	200	1				
2-5-37	PS 17	1	250	1				
2-5-38	PS 17	1	250	1				
2-5-39	PS 17A	1	300	1				
2-5-40	PS 17A	1	300	1				
2-5-41	PS 17A	1	300	1				
2-5-42	PS 21	1	300	2				
2-5-43	PS 21	1	150	2				
2-5-44	PS 21	1	150	2				
2-5-45	PS 22	1	300	3				
2-5-46	PS 22	1	300	3				
2-5-47	PS 24	1	350	3				
2-5-48	PS 24	1	350	3				
2-5-49	PS 24	1	350	3				
2-5-50	PS 20	1	300	1				
2-5-51	PS 20	1	300	1				
2-5-52	PS 20	1	300	1				
2-5-53	PS 26	1	100	3				
2-5-54	PS 26	1	100	3				
2-5-55	PS 26	1	100	3				
2-5-56	PS 30	1	150	4				
2-5-57	PS 30	1	150	4				
2-5-58	PS 3	1	500	3				
2-5-59	PS 3	1	500	3				
2-5-60	PS 3	1	500	3				
2-5-61	PS 6	1	200	3				
2-5-62	PS 6	1	200	3				
2-5-63	PS Lesce	1	200	4				
2-5-64	PS Lesce	1	200	4				
2-5-65	PS Lesce	1	200	4				

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SS-05 / SPECIFICATION OF CONTROL CUBICLE

Item No.	Name of Station	Q'ty	Voltage(V)	Installation Indoor / outdoor	Contro Scheme	Major Component	Priority
<< Well Equipment >>							
1-6-01	RW-6m	1	400	indor			2
1-6-02	RW-2m	1	400	indor			2
1-6-03	RW-8m	1	400	indor			2
1-6-04	RW-1m	1	400	indor			2
1-6-05	RW-19/1	1	400	indor			2
1-6-06	RW-20/1	1	400	indor			2
1-6-07	RW-20	1	400	indor			2
1-6-08	RW-15/1	1	400	indor			2
1-6-09	RW-14/1	1	400	indor			2
1-6-10	RW-13/1	1	400	indor			2
1-6-11	RW-11/1	1	400	indor			2
1-6-12	RW-12/1	1	400	indor			2
1-6-13	RW12/2	1	400	indor			2
1-6-14	RW-3	1	400	indor			2
1-6-15	RW-9	1	400	indor			2
1-6-16	RW-7	1	400	indor			2
1-6-17	RW22/1	1	400	indor			2
1-6-18	RW-2	1	400	indor			2
1-6-19	RW-4/1	1	400	indor			2
1-6-20	RW-40	1	400	indor			2
1-6-21	RW-42	1	400	indor			2
1-6-22	RW-43	1	400	indor			2
1-6-23	RW-45	1	400	indor			2
1-6-24	RW-46	1	400	indor			2
1-6-25	RW-49	1	400	indor			2
1-6-26	RW-63	1	400	indor			2
1-6-27	RW-62	1	400	indor			2
1-6-28	RW-72	1	400	indor			2
1-6-29	RW-75	1	400	indor			2
1-6-30	RW-79	1	400	indor			2
1-6-31	RW-81	1	400	indor			2
1-6-32	RW-87	1	400	indor			2
1-6-33	RW-88	1	400	indor			2
1-6-34	RW-90	1	400	indor			2
1-6-35	RW-98	1	400	indor			2
1-6-36	RW-65	1	400	indor			2
1-6-37	RW-66	1	400	indor			2
1-6-38	RW-41	1	400	indor			2
1-6-39	RW-35	1	400	indor			2
1-6-40	RW-29	1	400	indor			2
1-6-41	RW-23/1	1	400	indor			2

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SS-05 / SPECIFICATION OF CONTROL CUBICLE

Item No.	Name of Station	Q'ty	Voltage(V)	Installation Indoor / Outdoor	Contro Scheme	Major Component	Priority
1-6-42	RW-14	1	400	indor			2
1-6-43	RW-12/3	1	400	indor			2
1-6-44	RE-5m	1	400	indor			2
1-6-45	RW-8A	1	400	indor			2
1-6-46	RW-10	1	400	indor			2
1-6-47	RW-11	1	400	indor			2
1-6-48	RW-16/1	1	400	indor			2
1-6-49	RW-17	1	400	indor			2
<< Pump Station >>							
2-4-01	PS-1a Bele Vode	1	400	indor			1
2-4-02	PS-1a	1	400	indor			1
2-4-03	PS-1a	1	400	indor			1
2-4-04	PS-1b	1	400	indor			1
2-4-05	PS-1b	1	400	indor			1
2-4-06	PS-1b	1	400	indor			1
2-4-07	PS-1b	1	400	indor			1
2-4-08	PS-4 Crvni Krst	1	400	indor			2
2-4-09	PS-18 Tasmajdan stari	1	400	indor			1
2-4-10	PS-18	1	400	indor			1
2-4-11	PS-18	1	400	indor			1
2-4-12	PS-18	1	400	indor			1
2-4-13	PS-19 Bezanija	1	400	indor			1
2-4-14	PS-19	1	400	indor			1
2-4-15	PS-19	1	400	indor			1
2-4-16	PS-23 Studentski Grad	1	400	indor			1
2-4-17	PS-23	1	400	indor			1
2-4-18	PS-23	1	400	indor			1
2-4-19	PS-23	1	400	indor			1
2-4-20	PS-23	1	400	indor			1
2-4-21	PS-17 Zvezdara	1	400	indor			1
2-4-22	PS-17	1	400	indor			1
2-4-23	PS-17	1	400	indor			1
2-4-24	PS-21 Pionir	1	400	indor			2
2-4-25	PS-21	1	400	indor			2
2-4-26	PS-21	1	400	indor			2
2-4-27	PS-20 Zeleznik	1	400	indor			1
2-4-28	PS-20	1	400	indor			1
<< Measuring Point >>							
3-2-01		1	400	outdor			2
3-2-02		1	400	outdor			2
3-2-03		1	400	outdor			2
3-2-04		1	400	outdor			2

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SS-05 / SPECIFICATION OF CONTROL CUBICLE

Item No.	Name of Station	Q'ty	Voltage (V)	Installation Indoor / Outdoor	Contro Scheme	Major Component	Priority
3-2-05		1	400	outdoor			2
3-2-06		1	400	outdoor			2
3-2-07		1	400	outdoor			2
3-2-08		1	400	outdoor			2
3-2-09		1	400	outdoor			2
3-2-10		1	400	outdoor			2
3-2-11		1	400	outdoor			2
3-2-12		1	400	outdoor			2
3-2-13		1	400	outdoor			2
3-2-14		1	400	outdoor			2
3-2-15		1	400	outdoor			2
3-2-16		1	400	outdoor			2
3-2-17		1	400	outdoor			2
3-2-18		1	400	outdoor			2
3-2-19		1	400	outdoor			2
3-2-20		1	400	outdoor			2
3-2-21		1	400	outdoor			2
3-2-22		1	400	outdoor			2
3-2-23		1	400	outdoor			2
3-2-24		1	400	outdoor			2
3-2-25		1	400	outdoor			2
3-2-26		1	400	outdoor			2
3-2-27		1	400	outdoor			2
3-2-28		1	400	outdoor			2

SS-06 / SPECIFICATION OF TERMINAL EQUIPMENT (hw + sw)

Item No.	Name of Station	Q'ty	Specification	Priority
<< Well Equipment >>				
1-7-01	98	1	PLC with accessories, programing	1
1-7-02	95	1	PLC with accessories, programing	1
1-7-03	94	1	PLC with accessories, programing	1
1-7-04	93	1	PLC with accessories, programing	1
1-7-05	92	1	PLC with accessories, programing	1
1-7-06	90	1	PLC with accessories, programing	1
1-7-07	89	1	PLC with accessories, programing	1
1-7-08	88	1	PLC with accessories, programing	1
1-7-09	87	1	PLC with accessories, programing	1
1-7-10	86	1	PLC with accessories, programing	1
1-7-11	85	1	PLC with accessories, programing	1
1-7-12	84	1	PLC with accessories, programing	1
1-7-13	83	1	PLC with accessories, programing	1
1-7-14	81	1	PLC with accessories, programing	1
1-7-15	80	1	PLC with accessories, programing	1
1-7-16	79	1	PLC with accessories, programing	1
1-7-17	78	1	PLC with accessories, programing	1
1-7-18	75	1	PLC with accessories, programing	1
1-7-19	73	1	PLC with accessories, programing	1
1-7-20	72	1	PLC with accessories, programing	1
1-7-21	69	1	PLC with accessories, programing	1
1-7-22	62	1	PLC with accessories, programing	1
1-7-23	61	1	PLC with accessories, programing	1
1-7-24	60	1	PLC with accessories, programing	1
1-7-25	59	1	PLC with accessories, programing	1
1-7-26	66	1	PLC with accessories, programing	1
1-7-27	65	1	PLC with accessories, programing	1
1-7-28	64	1	PLC with accessories, programing	1
1-7-29	63	1	PLC with accessories, programing	1
1-7-30	51	1	PLC with accessories, programing	1
1-7-31	50	1	PLC with accessories, programing	1
1-7-32	49	1	PLC with accessories, programing	1
1-7-33	48	1	PLC with accessories, programing	1
1-7-34	47	1	PLC with accessories, programing	1
1-7-35	46	1	PLC with accessories, programing	1
1-7-36	45	1	PLC with accessories, programing	1
1-7-37	44	1	PLC with accessories, programing	1
1-7-38	43	1	PLC with accessories, programing	1
1-7-39	42	1	PLC with accessories, programing	1
1-7-40	41	1	PLC with accessories, programing	1
1-7-41	40	1	PLC with accessories, programing	1
1-7-42	38	1	PLC with accessories, programing	1
1-7-43	37	1	PLC with accessories, programing	1
1-7-44	36	1	PLC with accessories, programing	1
1-7-45	35	1	PLC with accessories, programing	1
1-7-46	22/I	1	PLC with accessories, programing	1
1-7-47	22/II	1	PLC with accessories, programing	1
1-7-48	23/I	1	PLC with accessories, programing	1
1-7-49	23/II	1	PLC with accessories, programing	1

for
for

SS-06 / SPECIFICATION OF TERMINAL EQUIPMENT (hw + sw)

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Item No.	Name of Station	Q'ty	Specification	Priority
1-7-50	21	1	PLC with accessories, programing	1
<< Pump Station >>				
2-7-01	PS 1a Bele vode	2	PLC with accessories, programing	1
2-7-02	PS 1b Bele vode	2	PLC with accessories, programing	1
2-7-03	PS 4 Crveni krst	2	PLC with accessories, programing	1
2-7-04	PS 15 Topcider	2	PLC with accessories, programing	1
2-7-05	PS 15A Topcider	2	PLC with accessories, programing	1
2-7-06	PS 16 Vracar	2	PLC with accessories, programing	1
2-7-07	PS 16A Vracar	2	PLC with accessories, programing	1
2-7-08	PS 18 Tasmajdan	2	PLC with accessories, programing	1
2-7-09	PS 19 Bezanija	2	PLC with accessories, programing	1
2-7-10	PS 23 Stud. grad	2	PLC with accessories, programing	1
2-7-11	PS 25 Mokr.brdo	2	PLC with accessories, programing	1
2-7-12	PS 28 Zarkovo	2	PLC with accessories, programing	1
2-7-13	PS 5 T. Dražera	2	PLC with accessories, programing	1
2-7-14	PS 17 Zvezdara	2	PLC with accessories, programing	1
2-7-15	PS 21 Pionir	2	PLC with accessories, programing	1
2-7-16	PS 22 Torlak	2	PLC with accessories, programing	1
2-7-17	PS 24 Kosutnjak	2	PLC with accessories, programing	1
2-7-18	PS 20 Zeleznik	2	PLC with accessories, programing	1
2-7-19	PS 26 Ripanj	2	PLC with accessories, programing	1
2-7-20	PS 33 Avala	2	PLC with accessories, programing	1
2-7-21	PS 3 Surcin	2	PLC with accessories, programing	1
2-7-22	PS 6 Dunav	2	PLC with accessories, programing	1
2-7-23	PS Lesce	2	PLC with accessories, programing	1
2-7-24	PS 17A Zvezdara	2	PLC with accessories, programing	1
<< Measuring Point >>				
3-3-01	1	1	PLC with accessories, programing	2
3-3-02	2	1	PLC with accessories, programing	2
3-3-03	3	1	PLC with accessories, programing	2
3-3-04	4	1	PLC with accessories, programing	2
3-3-05	5	1	PLC with accessories, programing	2
3-3-06	6	1	PLC with accessories, programing	2
3-3-07	7	1	PLC with accessories, programing	2
3-3-08	8	1	PLC with accessories, programing	2
3-3-09	9	1	PLC with accessories, programing	2
3-3-10	10	1	PLC with accessories, programing	2
3-3-11	11	1	PLC with accessories, programing	2
3-3-12	12	1	PLC with accessories, programing	2
3-3-13	13	1	PLC with accessories, programing	2
3-3-14	14	1	PLC with accessories, programing	2
3-3-15	15	1	PLC with accessories, programing	2
3-3-16	16	1	PLC with accessories, programing	2
3-3-17	17	1	PLC with accessories, programing	2
3-3-18	18	1	PLC with accessories, programing	2
3-3-19	19	1	PLC with accessories, programing	2
3-3-20	20	1	PLC with accessories, programing	2
3-3-21	21	1	PLC with accessories, programing	2
3-3-22	22	1	PLC with accessories, programing	2
3-3-23	23	1	PLC with accessories, programing	2
3-3-24	24	1	PLC with accessories, programing	2
3-3-25	25	1	PLC with accessories, programing	2
3-3-26	26	1	PLC with accessories, programing	2
3-3-27	27	1	PLC with accessories, programing	2
3-3-28	28	1	PLC with accessories, programing	2
<< Reservoir Equipment >>				
4-2-01	Pionir	1	PLC with accessories, programing	1
4-2-02	Glavni	1	PLC with accessories, programing	1

Jan

SS-06 / SPECIFICATION OF TERMINAL EQUIPMENT (hw + sw)

Item No.	Name of Station	Q'ty	Specification	Priority
4-2-03	Krainski	1	PLC with accessories, programing	1
4-2-04	Zeleznik	1	PLC with accessories, programing	1
4-2-05	Zarkovo	1	PLC with accessories, programing	1
4-2-06	Umka	1	PLC with accessories, programing	1
4-2-07	Zvezdara	1	PLC with accessories, programing	1
4-2-08	Mokrolusko brdo	1	PLC with accessories, programing	1
4-2-09	Dedinje	1	PLC with accessories, programing	1
4-2-10	Barajevo	1	PLC with accessories, programing	1
4-2-11	Petlovo brdo	1	PLC with accessories, programing	1
4-2-12	Stojcino brdo	1	PLC with accessories, programing	1
4-2-13	Torlak	1	PLC with accessories, programing	1
4-2-14	Devojacki grob	1	PLC with accessories, programing	1
4-2-15	Lipovica	1	PLC with accessories, programing	1
4-2-16	Water tower Kosutnjak	1	PLC with accessories, programing	1
4-2-17	Suplja stena	1	PLC with accessories, programing	1
4-2-18	Kumodraz	1	PLC with accessories, programing	1
4-2-19	Water tower Lipovica	1	PLC with accessories, programing	1
4-2-20	Guncati	1	PLC with accessories, programing	1

Jan

SS-07 / SPECIFICATION OF TELECOMMUNICATION EQUIPMENT

Item No.	Name of Station	Q'ty	Specification	Priority
<< Well Equipment >>				
1-8-01	1	1	gprs modem, protocol converter	1
1-8-02	1m	1	gprs modem, protocol converter	1
1-8-03	2	1	gprs modem, protocol converter	1
1-8-04	2m	1	gprs modem, protocol converter	1
1-8-05	3	1	gprs modem, protocol converter	1
1-8-06	3m	1	gprs modem, protocol converter	1
1-8-07	3A	1	gprs modem, protocol converter	1
1-8-08	4/1	1	gprs modem, protocol converter	1
1-8-09	4m	1	gprs modem, protocol converter	1
1-8-10	5	1	gprs modem, protocol converter	1
1-8-11	5m	1	gprs modem, protocol converter	1
1-8-12	6	1	gprs modem, protocol converter	1
1-8-13	6A	1	gprs modem, protocol converter	1
1-8-14	6M	1	gprs modem, protocol converter	1
1-8-15	7	1	gprs modem, protocol converter	1
1-8-16	7M	1	gprs modem, protocol converter	1
1-8-17	8A	1	gprs modem, protocol converter	1
1-8-18	8M	1	gprs modem, protocol converter	1
1-8-19	9	1	gprs modem, protocol converter	1
1-8-20	10	1	gprs modem, protocol converter	1
1-8-21	10M	1	gprs modem, protocol converter	1
1-8-22	11	1	gprs modem, protocol converter	1
1-8-23	11/1	1	gprs modem, protocol converter	1
1-8-24	12	1	gprs modem, protocol converter	1
1-8-25	12/1	1	gprs modem, protocol converter	1
1-8-26	12/2	1	gprs modem, protocol converter	1
1-8-27	12/3	1	gprs modem, protocol converter	1
1-8-28	13/1	1	gprs modem, protocol converter	1
1-8-29	14	1	gprs modem, protocol converter	1
1-8-30	14/1	1	gprs modem, protocol converter	1
1-8-31	15	1	gprs modem, protocol converter	1
1-8-32	15/1	1	gprs modem, protocol converter	1
1-8-33	16	1	gprs modem, protocol converter	1
1-8-34	16/1	1	gprs modem, protocol converter	1
1-8-35	17	1	gprs modem, protocol converter	1
1-8-36	18	1	gprs modem, protocol converter	1
1-8-37	19	1	gprs modem, protocol converter	1
1-8-38	19/1	1	gprs modem, protocol converter	1
1-8-39	20	1	gprs modem, protocol converter	1
1-8-40	20/1	1	gprs modem, protocol converter	1
1-8-41	21	1	gprs modem, protocol converter	1
1-8-42	22/1	1	gprs modem, protocol converter	1
1-8-43	23/1	1	gprs modem, protocol converter	1
1-8-44	24	1	gprs modem, protocol converter	1
1-8-45	25	1	gprs modem, protocol converter	1
1-8-46	26	1	gprs modem, protocol converter	1
1-8-47	27	1	gprs modem, protocol converter	1
1-8-48	28	1	gprs modem, protocol converter	1
1-8-49	29	1	gprs modem, protocol converter	1
1-8-50	30	1	gprs modem, protocol converter	1
1-8-51	35	1	gprs modem, protocol converter	1
1-8-52	36	1	gprs modem, protocol converter	1
1-8-53	37	1	gprs modem, protocol converter	1
1-8-54	38	1	gprs modem, protocol converter	1
1-8-55	40	1	gprs modem, protocol converter	1
1-8-56	41	1	gprs modem, protocol converter	1
1-8-57	42	1	gprs modem, protocol converter	1
1-8-58	43	1	gprs modem, protocol converter	1
1-8-59	44	1	gprs modem, protocol converter	1
1-8-60	45	1	gprs modem, protocol converter	1

SS-07 / SPECIFICATION OF TELECOMMUNICATION EQUIPMENT

Item No.	Name of Station	Q'ty	Specification	Priority
1-8-61	46	1	gprs modem, protocol converter	1
1-8-62	47	1	gprs modem, protocol converter	1
1-8-63	48	1	gprs modem, protocol converter	1
1-8-64	49	1	gprs modem, protocol converter	1
1-8-65	50	1	gprs modem, protocol converter	1
1-8-66	51	1	gprs modem, protocol converter	1
1-8-67	52	1	gprs modem, protocol converter	1
1-8-68	53	1	gprs modem, protocol converter	1
1-8-69	59	1	gprs modem, protocol converter	1
1-8-70	60	1	gprs modem, protocol converter	1
1-8-71	61	1	gprs modem, protocol converter	1
1-8-72	62	1	gprs modem, protocol converter	1
1-8-73	63	1	gprs modem, protocol converter	1
1-8-74	64	1	gprs modem, protocol converter	1
1-8-75	65	1	gprs modem, protocol converter	1
1-8-76	66	1	gprs modem, protocol converter	1
1-8-77	69	1	gprs modem, protocol converter	1
1-8-78	72	1	gprs modem, protocol converter	1
1-8-79	73	1	gprs modem, protocol converter	1
1-8-80	75	1	gprs modem, protocol converter	1
1-8-81	78	1	gprs modem, protocol converter	1
1-8-82	79	1	gprs modem, protocol converter	1
1-8-83	80	1	gprs modem, protocol converter	1
1-8-84	81	1	gprs modem, protocol converter	1
1-8-85	83	1	gprs modem, protocol converter	1
1-8-86	84	1	gprs modem, protocol converter	1
1-8-87	85	1	gprs modem, protocol converter	1
1-8-88	86	1	gprs modem, protocol converter	1
1-8-89	87	1	gprs modem, protocol converter	1
1-8-90	88	1	gprs modem, protocol converter	1
1-8-91	89	1	gprs modem, protocol converter	1
1-8-92	90	1	gprs modem, protocol converter	1
1-8-93	92	1	gprs modem, protocol converter	1
1-8-94	93	1	gprs modem, protocol converter	1
1-8-95	94	1	gprs modem, protocol converter	1
1-8-96	95	1	gprs modem, protocol converter	1
1-8-97	98	1	gprs modem, protocol converter	1
<< Pump Station >>				
2-8-01	PS 1a Bele vode	1	gprs,prot.conv.,box, fiber, med.	1
2-8-02	PS 1b Bele vode	1	gprs,prot.conv., box	1
2-8-03	PS 4 Crveni krst	1	gprs,prot.conv., box	1
2-8-04	PS 15 Topcider	1	gprs,prot.conv., box	1
2-8-05	PS 15A Topcider	1	gprs,prot.conv., switch, box, fiber, med.	1
2-8-06	PS 16 Vracar	1	gprs,prot.conv., box	1
2-8-07	PS 16A Vracar	1	gprs,prot.conv., switch, box, fiber, med.	1
2-8-08	PS 18 Tasmajdan	1	gprs,prot.conv., box	1
2-8-09	PS 19 Bezanija	1	gprs,prot.conv., switch, box, fiber, med.	1
2-8-10	PS 23 Stud. grad	1	gprs,prot.conv., box	1
2-8-11	PS 25 Mokr.brdo	1	gprs,prot.conv., switch, box	1
2-8-12	PS 28 Zarkovo	1	gprs,prot.conv., switch, box	1
2-8-13	PS 5 T. Drajzera	1	gprs,prot.conv., switch, box	1
2-8-14	PS 17 Zvezdara	1	gprs,prot.conv., box	1
2-8-15	PS 21 Pionir	1	gprs,prot.conv., box	1
2-8-16	PS 22 Torlak	1	gprs,prot.conv., switch, box, wil subscr.	1
2-8-17	PS 24 Kosutnjak	1	gprs,prot.conv., switch, box	1
2-8-18	PS 20 Zeleznik	1	gprs,prot.conv., box	1
2-8-19	PS 30 Lipovica	1	gprs,prot.conv., box	1
2-8-20	PS 26 Ripanj	1	gprs,prot.conv., switch, box	1
2-8-21	PS 33 Avala	1	gprs,prot.conv., switch, box	1
2-8-22	PS 3 Surcin	1	gprs,prot.conv., switch, box	1
2-8-23	PS 6 Dunav	1	gprs,prot.conv., switch, box	1

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SS-07 / SPECIFICATION OF TELECOMMUNICATION EQUIPMENT

Item No.	Name of Station	Q'ty	Specification	Priority
2-8-24	PS Lesce	1	gprs,prot.conv., switch, box	1
2-8-25	PS 17A Zvezdara	1	gprs,prot.conv., box	1
2-8-26	PS 10 Dedinje	1	gprs,prot.conv., box	1
2-8-27	PS 27 Makis cista voda	1	gprs,prot.conv., box	1
<< Measuring Point >>				
3-4-01	1	1	gprs modem, protocol converter	2
3-4-02	2	1	gprs modem, protocol converter	2
3-4-03	3	1	gprs modem, protocol converter	2
3-4-04	4	1	gprs modem, protocol converter	2
3-4-05	5	1	gprs modem, protocol converter	2
3-4-06	6	1	gprs modem, protocol converter	2
3-4-07	7	1	gprs modem, protocol converter	2
3-4-08	8	1	gprs modem, protocol converter	2
3-4-09	9	1	gprs modem, protocol converter	2
3-4-10	10	1	gprs modem, protocol converter	2
3-4-11	11	1	gprs modem, protocol converter	2
3-4-12	12	1	gprs modem, protocol converter	2
3-4-13	13	1	gprs modem, protocol converter	2
3-4-14	14	1	gprs modem, protocol converter	2
3-4-15	15	1	gprs modem, protocol converter	2
3-4-16	16	1	gprs modem, protocol converter	2
3-4-17	17	1	gprs modem, protocol converter	2
3-4-18	18	1	gprs modem, protocol converter	2
3-4-19	19	1	gprs modem, protocol converter	2
3-4-20	20	1	gprs modem, protocol converter	2
3-4-21	21	1	gprs modem, protocol converter	2
3-4-22	22	1	gprs modem, protocol converter	2
3-4-23	23	1	gprs modem, protocol converter	2
3-4-24	24	1	gprs modem, protocol converter	2
3-4-25	25	1	gprs modem, protocol converter	2
3-4-26	26	1	gprs modem, protocol converter	2
3-4-27	27	1	gprs modem, protocol converter	2
3-4-28	28	1	gprs modem, protocol converter	2
<< Reservoir >>				
4-3-01	Pionir	1	gprs modem, protocol converter	1
4-3-02	Glavni	1	gprs modem, protocol converter	1
4-3-03	Krainski	1	gprs modem, protocol converter	1
4-3-04	Zelesnik	1	gprs modem, protocol converter	1
4-3-05	Zarkovo	1	gprs modem, protocol converter	1
4-3-06	Umka	1	gprs modem, protocol converter	1
4-3-07	Zvezdara	1	gprs modem, protocol converter	1
4-3-08	Mokrolusko brdo	1	gprs modem, protocol converter	1
4-3-09	Dedinje	1	gprs modem, protocol converter	1
4-3-10	Barajevo	1	gprs modem, protocol converter	1
4-3-11	Petlovo brdo	1	gprs modem, protocol converter	1
4-3-12	Stojcino brdo	1	gprs modem, protocol converter	1
4-3-13	Torlak	1	gprs modem, protocol converter	1
4-3-14	Devojacki grob	1	gprs modem, protocol converter	1
4-3-15	Lipovica	1	gprs modem, protocol converter	1
4-3-16	Water tower Kosutnjak	1	gprs modem, protocol converter	1
4-3-17	Suplja stena	1	gprs modem, protocol converter	1
4-3-18	Kumodraz	1	gprs modem, protocol converter	1
4-3-19	Water tower Lipovica	1	gprs modem, protocol converter	1
4-3-20	Guncati	1	gprs modem, protocol converter	1

SS-09 / SPECIFICATION OF TELECOMMUNICATION NETWORK

Item No.	Name of Station	Q'ty	Specification	priority
5-1 IP data network for tehncial system data transmission				
5-1-2 Active components				
<< SHDSL Layer 3 router >>				
5-1-2-1-01	PS 30 Lipovica - PS 20	1	SHDSL Router Layer 3	1
5-1-2-1-02	PS 20 Zeleznik - PS 30	1	SHDSL Router Layer 3	1
5-1-2-1-03	PS 20 Zeleznik - PS 1B	1	SHDSL Router Layer 3	1
5-1-2-1-04	PS 1B Bele vode- PS 20	1	SHDSL Router Layer 3	1
5-1-2-1-05	PS 1B Bele vode-B.Brdo	1	SHDSL Router Layer 3	1
5-1-2-1-06	B.Brdo-PS 1B Bele vode	1	SHDSL Router Layer 3	1
5-1-2-1-07	B.Brdo-K.Milosa	1	SHDSL Router Layer 3	1
5-1-2-1-08	K.Milosa - B.Brdo	1	SHDSL Router Layer 3	1
5-1-2-1-09	K.Milosa - PS 15 Topcider	1	SHDSL Router Layer 3	1
5-1-2-1-10	PS 15- K.Milosa	1	SHDSL Router Layer 3	1
5-1-2-1-11	K.Milosa - PS 16 Vracar	1	SHDSL Router Layer 3	1
5-1-2-1-12	PS 16- K.Milosa	1	SHDSL Router Layer 3	1
5-1-2-1-13	K.Milosa - PS 4 C Krst	1	SHDSL Router Layer 3	1
5-1-2-1-14	PS 4- K.Milosa	1	SHDSL Router Layer 3	1
5-1-2-1-15	K.Milosa - PS 17 Zvezdara	1	SHDSL Router Layer 3	1
5-1-2-1-16	PS 17- K.Milosa	1	SHDSL Router Layer 3	1
5-1-2-1-17	K.Milosa - PS 18 Tasmajdan	1	SHDSL Router Layer 3	1
5-1-2-1-18	PS 18- K.Milosa	1	SHDSL Router Layer 3	1
5-1-2-1-19	K.Milosa - PS 21 Pionir	1	SHDSL Router Layer 3	1
5-1-2-1-20	PS 21- K.Milosa	1	SHDSL Router Layer 3	1
5-1-2-1-21	K.Milosa - PS 23 S.Grad	1	SHDSL Router Layer 3	1
5-1-2-1-22	PS 23- K.Milosa	1	SHDSL Router Layer 3	1
5-1-2-1-23	Bezanija- PS 23	1	SHDSL Router Layer 3	1
5-1-2-1-24	PS 23- Bezanija	1	SHDSL Router Layer 3	1
5-1-2-1-25	K.Milosa - Deligradska	1	SHDSL Router Layer 3	1
5-1-2-1-26	Deligradska - K.Milosa	1	SHDSL Router Layer 3	1
5-1-2-1-27	K.Milosa - PS 10 Dedinje	1	SHDSL Router Layer 3	1
5-1-2-1-28	PS 10- K.Milosa	1	SHDSL Router Layer 3	1
5-1-2-1-29	B.Brdo-Makis	1	SHDSL Router Layer 3	1
5-1-2-1-30	Makis - B.Brdo	1	SHDSL Router Layer 3	1
5-1-2-1-31	PS 5 T. draizera-Kneza Milosa	1	SHDSL Router Layer 3	1
5-1-2-1-32	Kneza Milosa - PS 5 T.drazer	1	SHDSL Router Layer 3	1
<< Layer 3 switch >>				
5-1-2-2-01	PS 1B Bele vode	1	Layer 3 + acc	1
5-1-2-2-02	Banovo Brdo	1	Layer 3 + acc	1
5-1-2-2-03	Bezanija	1	Layer 3 + acc	1
5-1-2-2-04	K.Milosa	0	Layer 3 + acc	1
5-1-2-2-05	Makis	1	Layer 3 + acc	1
<< Layer 2 switch >>				
5-1-2-3-01	PS 30 Lipovica	1	Layer 2	1
5-1-2-3-02	PS 20 Zeleznik	1	Layer 2	1
5-1-2-3-03	PS 1A Bele vode	1	Layer 2	1
5-1-2-3-04	PS 4 Crveni krst	1	Layer 2	1
5-1-2-3-05	PS 15 Topcider	1	Layer 2	1
5-1-2-3-06	PS 15 A Topcider	1	Layer 2	1
5-1-2-3-07	PS 16 Vracar	1	Layer 2	1
5-1-2-3-08	PS 16 A Vracar	1	Layer 2	1
5-1-2-3-09	PS 17 Zvezdara	1	Layer 2	1
5-1-2-3-10	PS 18 Tasmajdan	1	Layer 2	1
5-1-2-3-11	PS 23 Studentski grad	1	Layer 2	1
5-1-2-3-12	PS 21 Pionir	1	Layer 2	1
5-1-2-3-13	PS Teodora draizera	1	Layer 2	1
5-1-2-3-14	PS 10 Dedinje	1	Layer 2	1

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SS-09 / SPECIFICATION OF TELECOMMUNICATION NETWORK

Item No.	Name of Station	Q'ty	Specification	priority
5-1-2-3-15	PS 22 Torlak	1	Layer 2	1
5-1-2-3-16	PS 24 Kosutnjak	1	Layer 2	1
5-1-2-3-17	PS 1A Bele Vode	1	Layer 2	1
5-1-2-3-18	Deligradska	1	Layer 2	1
5-1-2-3-19	PS 27 Cista voda	1	Layer 2	1
5-1-2-3-20	PS 19 Bezanija	1	Layer 2	1
5-1-2-3-21	PS 6 Dunav	1	Layer 2	1
5-1-2-3-22	PS 25 Mokrolusko brdo	1	Layer 2	1
5-1-2-3-23	PS 28 Zarkovo	1	Layer 2	1
<< Media converter >>				
5-1-2-4-01	Bezanija - PS 19 Bezanija	1	Media converter SM/FE 100Mbps	1
5-1-2-4-02	PS 19 Bezanija - Bezanija	1	Media converter SM/FE 100Mbps	1
5-1-2-4-03	PS15 Topcider - PS15A Topcider	1	Media converter SM/FE 100Mbps	1
5-1-2-4-04	PS15A Topcider - PS15 Topcider	1	Media converter SM/FE 100Mbps	1
5-1-2-4-05	PS16 Vracar - PS16A Vracar	1	Media converter SM/FE 100Mbps	1
5-1-2-4-06	PS16A Vracar - PS16 Vracar	1	Media converter SM/FE 100Mbps	1
5-1-2-4-07	Makis - PS 27 Cista voda	1	Media converter SM/FE 100Mbps	1
5-1-2-4-08	PS 27 Cista voda - Makis	1	Media converter SM/FE 100Mbps	1
5-1-2-4-09	PS1A B. vode - PS1B B. vode	1	Media converter SM/FE 100Mbps	1
5-1-2-4-10	PS1B B. vode - PS1A B. vode	1	Media converter SM/FE 100Mbps	1
5-1-2-4-11	Kosutnjak - PS 24 Kosutnjak	1	Media converter SM/FE 100Mbps	1
5-1-2-4-12	PS 24 Kosutnjak - Kosutnjak	1	Media converter SM/FE 100Mbps	1
5-1-2-4-13	PS 17 Zvezdara - Kosutnjak	1	Media converter SM/FE 100Mbps	1
5-1-2-4-14	Kosutnjak - PS 24 Kosutnjak	1	Media converter SM/FE 100Mbps	1

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SS-10 / SPECIFICATION OF SERVER

Item No.	Name of Server	Q'ty	Specification	priority
<< Pump Station / Local SCADA >>				
2-9-01	PS 4 Orveni krst	1		1
2-9-02	PS 15 Topcider	1		1
2-9-03	PS 16 Vracar	1		1
2-9-04	PS 18 Tasmajdan	1		1
2-9-05	PS 23 Stud. grad	1		1
2-9-06	PS 25 Mokrbdo	1		1
2-9-07	PS 28 Zarkovo	1		1
2-9-08	PS 27 Makis	1		1
2-9-09	PS 10 Dedinje	1		1
2-9-10	PS 17 Zvezdara	1		1
2-9-11	PS 21 Pionir	1		1
2-9-12	PS 20 Zeleznik	1		1
2-9-13	PS 30 Lipovica	1		1
2-9-14	PS 6 Dunav	1		1
<< Pump Station / Monitor HMI Scada >>				
2-12-01	PS 4 Orveni krst	1		1
2-12-02	PS 15 Topcider	1		1
2-12-03	PS 16 Vracar	1		1
2-12-04	PS 18 Tasmajdan	1		1
2-12-05	PS 23 Stud. grad	1		1
2-12-06	PS 25 Mokrbdo	1		1
2-12-07	PS 28 Zarkovo	1		1
2-12-08	PS 27 Makis	1		1
2-12-09	PS 10 Dedinje	1		1
2-12-10	PS 17 Zvezdara	1		1

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SS-10 / SPECIFICATION OF SERVER

Item No.	Name of Server	Q'ty	Specification	priority
2-12-11	PS 21 Pionir	1		1
2-12-12	PS 20 Zeleznik	1		1
2-12-13	PS 30 Lipovica	1		1
2-12-14	PS 6 Dunav	1		1
<< Pump Station / printer >>				
2-13-01	PS 4 Crveni krst	1		1
2-13-02	PS 15 Topcider	1		1
2-13-03	PS 16 Vracar	1		1
2-13-04	PS 18 Tasmajdan	1		1
2-13-05	PS 23 Stud. grad	1		1
2-13-06	PS 25 Mokri.brdo	1		1
2-13-07	PS 28 Zarkovo	1		1
2-13-08	PS 27 Makis	1		1
2-13-09	PS 10 Dedinje	1		1
2-13-10	PS 17 Zvezdara	1		1
2-13-11	PS 21 Pionir	1		1
2-13-12	PS 20 Zeleznik	1		1
2-13-13	PS 30 Lipovica	1		1
2-13-14	PS 6 Dunav	1		1
<< Pump Station / UPS >>				
2-14-01	PS 4 Crveni krst	1		1
2-14-02	PS 15 Topcider	1		1
2-14-03	PS 16 Vracar	1		1
2-14-04	PS 18 Tasmajdan	1		1
2-14-05	PS 23 Stud. grad	1		1
2-14-06	PS 25 Mokri.brdo	1		1

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SS-10 / SPECIFICATION OF SERVER

Item No.	Name of Server	Q'ty	Specification	priority
2-14-07	PS 28 Zarkovo	1		1
2-14-08	PS 27 Makis	1		1
2-14-09	PS 10 Dedinje	1		1
2-14-10	PS 17 Zvezdara	1		1
2-14-11	PS 21 Pionir	1		1
2-14-12	PS 20 Zeleznik	1		1
2-14-13	PS 30 Lipovica	1		1
2-14-14	PS 6 Dunav	1		1
<< Pump Station / Touch panel >>				
2-15-01	PS 1a Bele vode	1		1
2-15-02	PS 1b Bele vode	1		1
2-15-03	PS 4 Crveni krst	1		1
2-15-04	PS 15 Topcider	1		1
2-15-05	PS 15 Topcider	1		1
2-15-06	PS 16 Vracaar	1		1
2-15-07	PS 16 Vracaar	1		1
2-15-08	PS 18 Tasmajdan	1		1
2-15-09	PS 19 Bezanija	1		1
2-15-10	PS 23 Stud. grad	1		1
2-15-11	PS 25 Mokr.brdo	1		1
2-15-12	PS 28 Zarkovo	1		1
2-15-13	PS 5 T. Drajzera	1		1
2-15-14	PS 17 Zvezdara	1		1
2-15-15	PS 17 a Zvezdara	1		1
2-15-16	PS 21 Pionir	1		1
2-15-17	PS 22 Torlak	1		1

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SS-10 / SPECIFICATION OF SERVER

Item No.	Name of Server	Q'ty	Specification	priority
2-15-18	PS 24 Kosutnjak	1		1
2-15-19	PS 20 Zeleznik	1		1
2-15-20	PS 26 Ripanj	1		1
2-15-21	PS 33 Avala	1		1
2-15-22	PS 3 Surcin	1		1
2-15-23	PS 6 Dunav	1		1
2-15-24	PS Lesce	1		1
<< Local Control Center Bezanija >>				
6-1	Domain Controller Server	1		1
6-2	SQL Server (sw + hw)	1		1
6-3	GPRS server	1		1
6-4	Monitor/HMI Scada	1		1
6-5	Printer	1		1
6-6	UPS	1		1
<< Local Control Center Banovo Brdo >>				
7-1	SQL Server (sw + hw)	1		1
7-2	Telecommunication Network Server (sw+hw)	1		1
7-3	Domain Controller Server	1		1
7-4	GPRS server	1		1
7-5	Monitor/HMI Scada	1		1
7-6	Printer	1		1
7-7	UPS	1		1

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SS-10 / SPECIFICATION OF SERVER

Item No.	Name of Server	Q'ty	Specification	priority
<< Local Control Center Bele vode >>				
7A-1	Scada server (SW+HW)	1		1
7A-2	GPRS modem	1		1
7A-3	Monitor/HMI Scada	1		1
7A-4	Printer	1		1
7A-5	UPS	1		1
<< Local Control Center Makis >>				
7B-1	SQL Server (sw + hw)	1		1
7B-2	GPRS server	1		1
7B-3	Monitor/HMI Scada	1		1
7B-4	Printer	1		1
7B-5	UPS	1		1
<< Main Control Center Deligradska Street >>				
8-1	Server for real time BWS control			1
8-1-1	SQL Server (sw + hw)	2		1
8-1-2	GPRS server	1		1
8-1-3	Domain Controller Server	1		1
8-1-4	Master SCADA server (hw)	1		1
8-1-5	WEB server	1		1
8-2	Workstation			1
8-2-1	Workstation HMI SCADA	2		1
8-2-2	50 " display	1		1
8-2	Printer	1		1
8-3	UPS	1		1

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SS-11 / SPECIFICATION OF Chlorine Measurement

Item No.	Name of Station (check point)	Q'ty	Specification			priority
			chlorine	residual	cubicle	
<< Measuring Point Equipment >>						
3-1-01		1	1			2
3-1-02		2	1			2
3-1-03		3	1			2
3-1-04		4	1			2
3-1-05		5	1			2
3-1-06		6	1			2
3-1-07		7	1			2
3-1-08		8	1			2
3-1-09		9	1			2
3-1-10		10	1			2
3-1-11		11	1			2
3-1-12		12	1			2
3-1-13		13	1			2
3-1-14		14	1			2
3-1-15		15	1			2
3-1-16		16	1			2
3-1-17		17	1			2
3-1-18		18	1			2
3-1-19		19	1			2
3-1-20		20	1			2
3-1-21		21	1			2
3-1-22		22	1			2
3-1-23		23	1			2
3-1-24		24	1			2
3-1-25		25	1			2
3-1-26		26	1			2
3-1-27		27	1			2
3-1-28		28	1			2
<< Reservoir Equipment >>						
4-1-01	Pionir		1		1	1
4-1-02	Glavni		1		1	1
4-1-03	Krainski		1		1	1
4-1-04	Zelesnik		1		1	1
4-1-05	Zarkovo		1		1	1
4-1-06	Umka		1		1	1
4-1-07	Zvezdara		1		1	1
4-1-08	Mokrolusko brdo		1		1	1
4-1-09	Dedinje		1		1	1
4-1-10	Barajevo		1		1	1
4-1-11	Petlovo brdo		1		1	1
4-1-12	Stojcino brdo		1		1	1
4-1-13	Torlak		1		1	1
4-1-14	Devojacki grob		1		1	1
4-1-15	Lipovica		1		1	1
4-1-16	Water tower Kosutnjak		1		1	1
4-1-17	Suplja stena		1		1	1
4-1-18	Kumodraz		1		1	1
4-1-19	Water tower Lipovica		1		1	1
4-1-20	Guncati		1		1	1

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SS-12 / SPECIFICATION OF Laboratory Measuring Equipment

Item No.	Name of Station (check point)	Q'ty	Specification			Remarks
<< Chemical Laboratory Equipment >>						
9-1-01	Atomic Absorption Spectrometer(AAS)					1
9-1-02	Total Organic Carbon Analyzer(TOC)					1
9-1-03	UV-VIS Spectrometer					1
9-1-04	High Performance Liquid Chromatography(HPLC)					3
9-1-05	Ion Chromatography - IC					2
9-1-06	Analytical balance, 0.001g					3
9-1-07	Glassware Washer					2
<< Microbiological Laboratory Equipment >>						
9-2-01	Microscope					2
9-2-02	Autoclave					1
9-2-03	Glassware Washer with drying system					1
<< Chemical Laboratory Equipment (waste water) >>						
9-3-01	Atomic Absorption Spectrometer(AAS)					1
9-3-02	Gas chromatograph, PPC, FID and ECD					2
9-3-03	Total Organic Carbon Analyzer(TOC)					3

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Work Demarcation for Installation between Japan Side and BVK

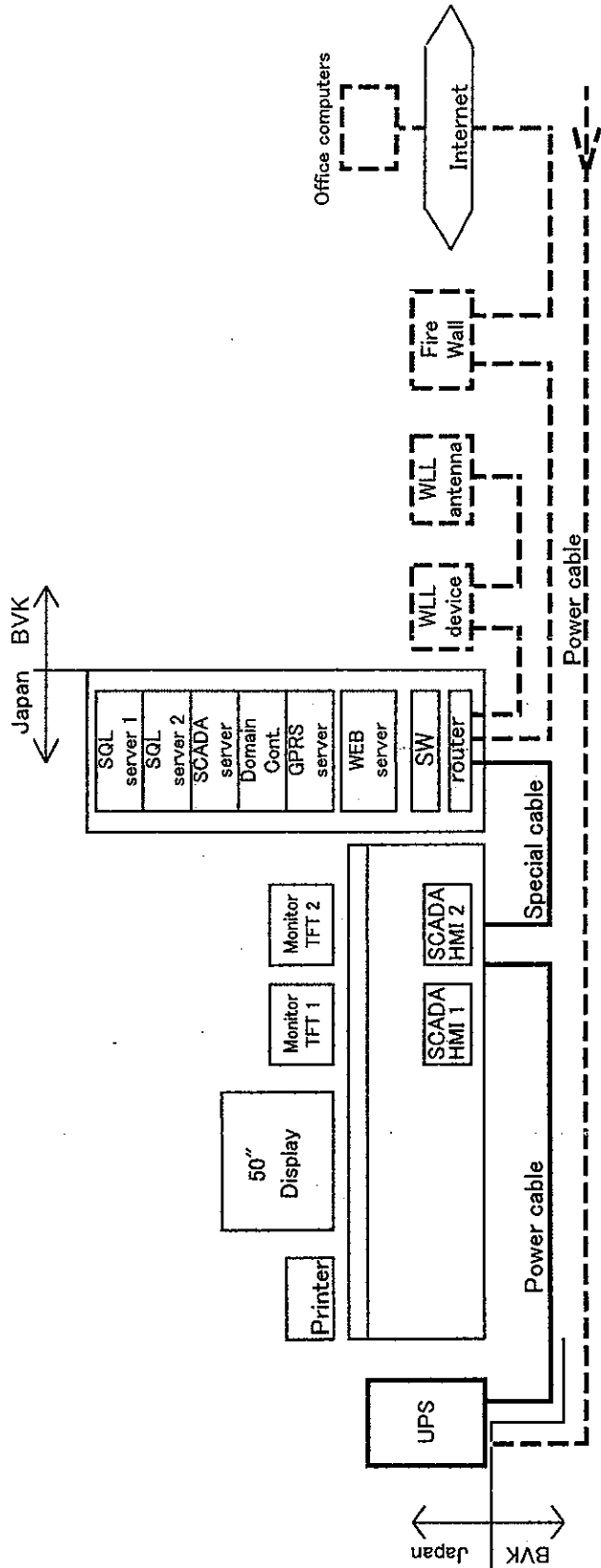
1. The well equipment to be provided by Japan side shall be installed by BVK.
2. The mechanical and electrical equipment for the pump stations such as pumps/motors, frequency converters, control cubicles and flaps to be provided by Japan side shall be installed by BVK. Meanwhile, the terminal equipment, telecommunication equipment and SCADA servers related to SCADA system to be provided by Japan side shall be installed by Japan side.
3. The measuring point equipment and reservoir equipment to be provided by Japan side shall be installed by Japan side.
4. The equipment for SCADA system located in the central control station and the local control stations to be provided by Japan side shall be installed by Japan side.
5. The laboratory measuring equipment and instrument to be provided by Japan side shall be installed by BVK.
6. For detail work demarcation between Japan side and BVK for SCADA system, please refer to Appendix 1 to 8.

Work demarcation of Main Control Center

Japan side: Supply, installation, connection and site test of the following equipment indicated by solid line below.

- GPRS modem
- SQL Server
- GPRS server
- Domain Controller server
- SCADA server
- WEB server
- Layer 2 switch
- SHDSL Layer 3 router
- Monitor/SCADA HMI
- 50" Display
- Printer
- UPS

BVK side: 1. Procurement, installation and connection of materials indicated by dotted line below.



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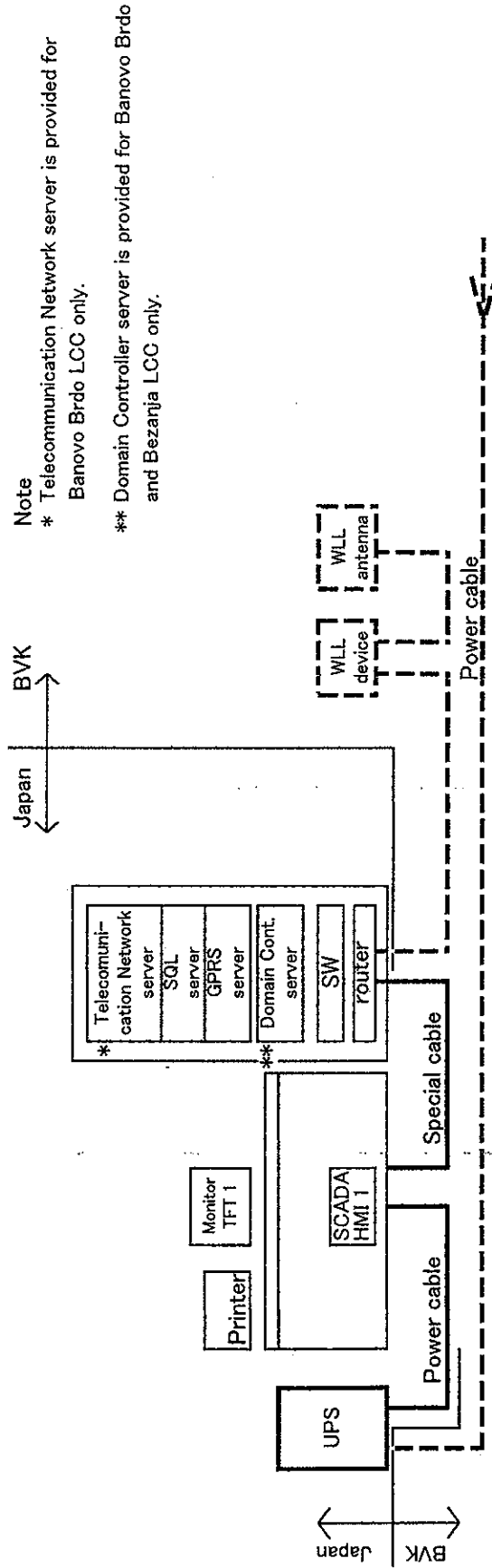
Work demarcation of Local Control Center (Type A)

Japan side: Supply, installation, connection and site test of the following equipment indicated by solid line below.

- Telecommunication Network Server *
- SQL Server
- GPRS server
- Domain Controller server

- Layer 3 switch
- SHDSL Layer 3 router
- Monitor/SCADA HMI
- Printer
- UPS

BVK side: 1. Procurement, installation and connection of materials indicated by dotted line below



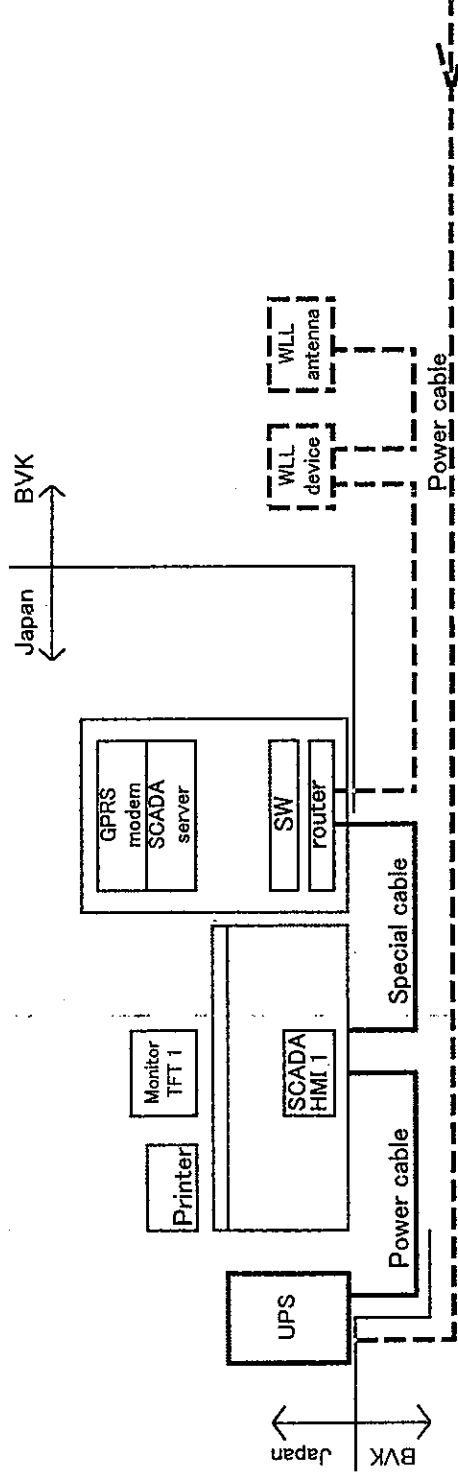
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Work demarcation of Local Control Center (Type B)

Japan side: Supply, installation, connection and site test of the following equipment indicated by solid line below;

- GPRS modem
- SCADA server
- Layer 3 switch
- SHDSL Layer 3 router
- Monitor/ SCADA HMI
- Printer
- UPS

BVK side: 1. Procurement, installation and connection of materials indicated by dotted line below



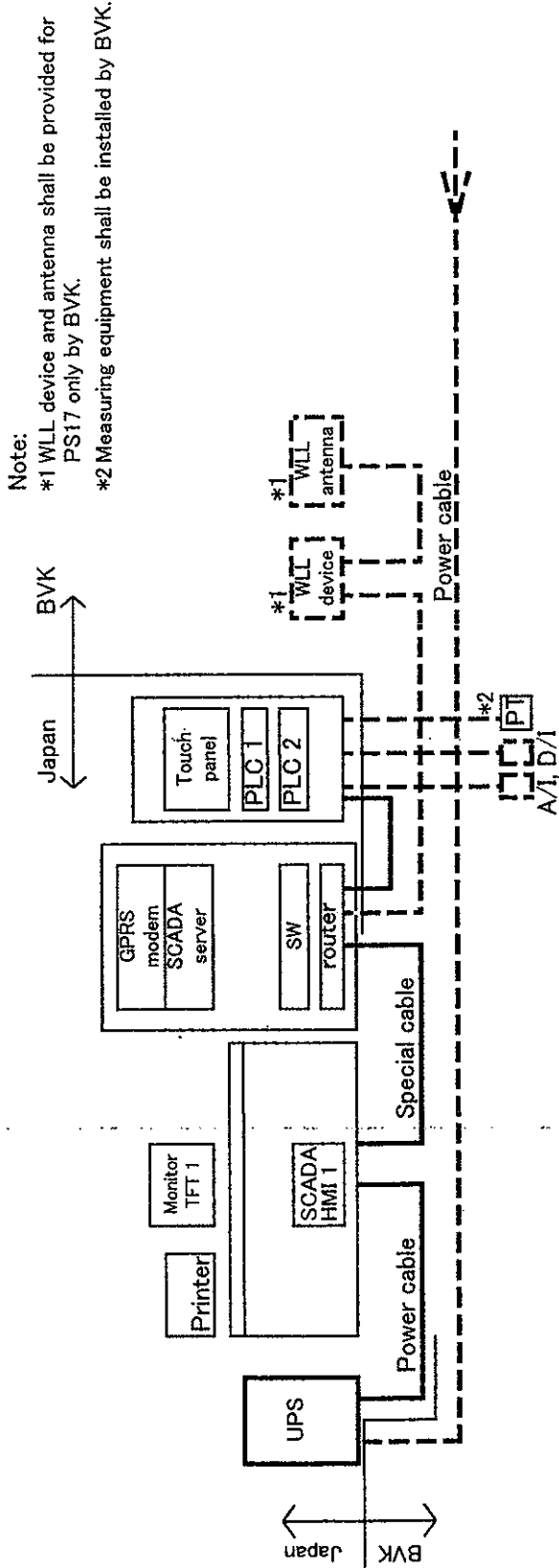
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Work demarcation of Pumping station (Type A)

Japan side: Supply, installation, connection and site test of the following equipment indicated by solid line below;

- GPRS modem
- SCADA server
- Layer 2 switch
- SHDSL Layer 3 router
- Monitor/SCADA HMI
- Printer
- UPS
- Measuring equipment #2
- PLC
- Touch panel

BVK side: 1. Procurement, installation and connection of materials indicated by dotted line, below



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Work demarcation of Pumping station (Type B)

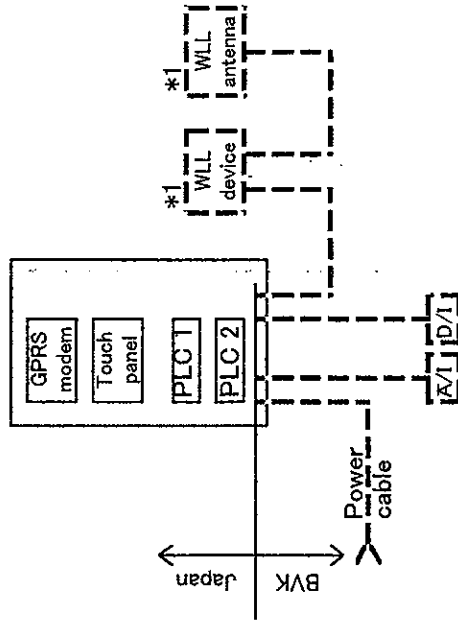
Japan side: Supply, installation, connection and site test of the following equipment indicated by solid line below.

- GPRS modem
- PLC
- Touch panel
- Layer 2 switch *2
- SHDSL Layer 3 router *2

BVK side: 1. Procurement, installation and connection of materials indicated by dotted line below

Note:

- *1 WLL device and antenna shall be provided for PS22 only by BVK.
- *2 Layer 2 switch and SHDSL Layer3 router shall be provided for PS1A, PS1B, PS19, PS5, PS22, and PS24



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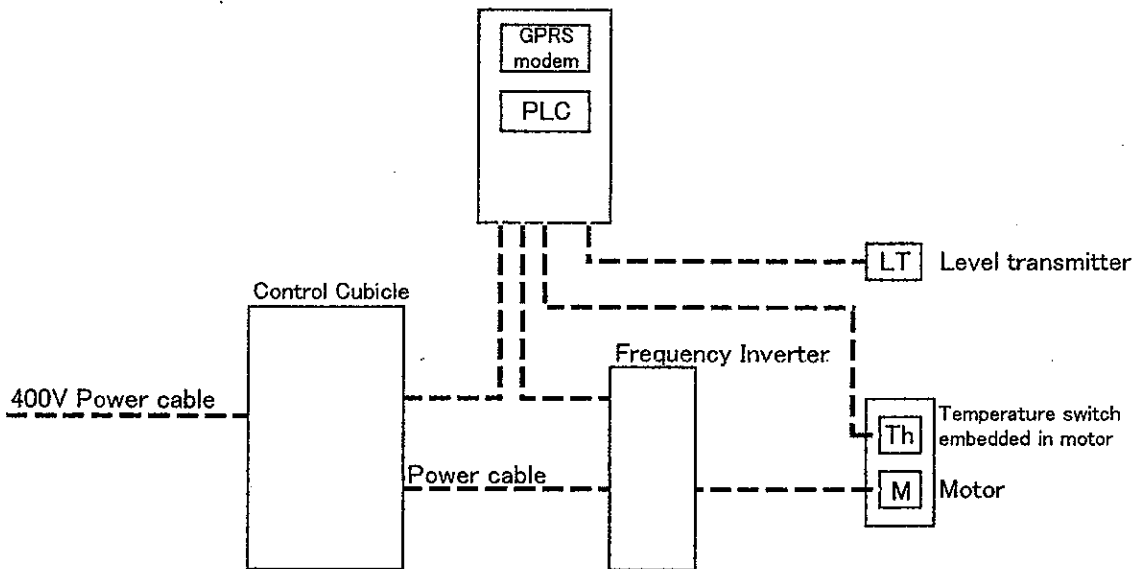
Work demarcation of Well equipment (99 wells)

Japan side: Supply of the following equipment;

- Frequency Inverter
- Level transmitter
- Control Cubicle
- PLC
- GPRS modem

BVK side: 1. Installation of equipment to be provided by Japan side.

2. Procurement, installation and connection of materials indicated by dotted line below..



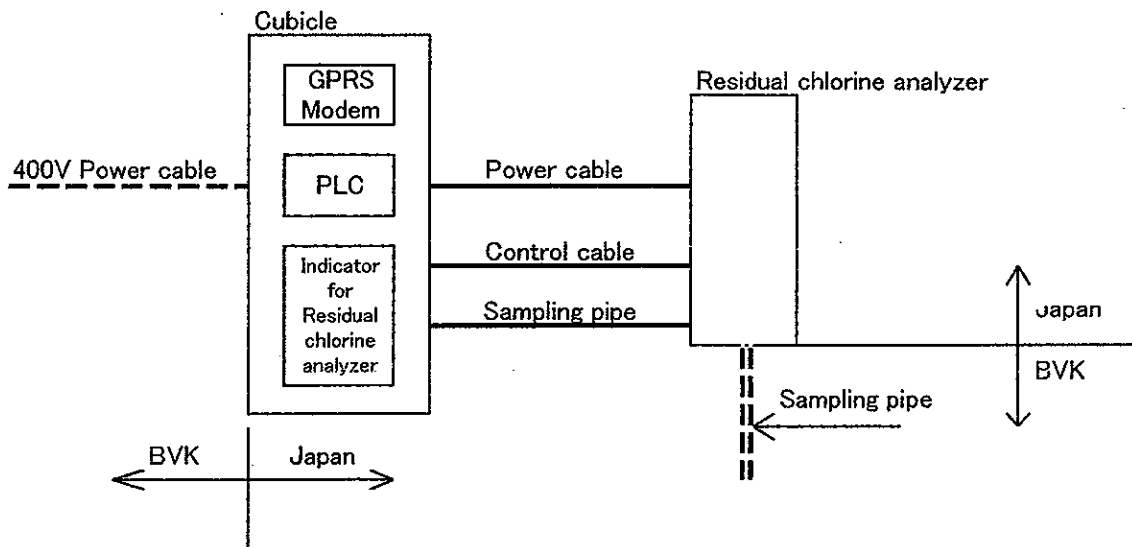
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Work demarcation of measuring point(Residual chlorine) (28 points)

Japan side: Supply, installation and site test of the following equipment;

- Cubicle
- GPRS modem
- PLC
- Residual chlorine analyzer

BVK side: 1. Procurement, installation and connection of materials indicated by dotted line below



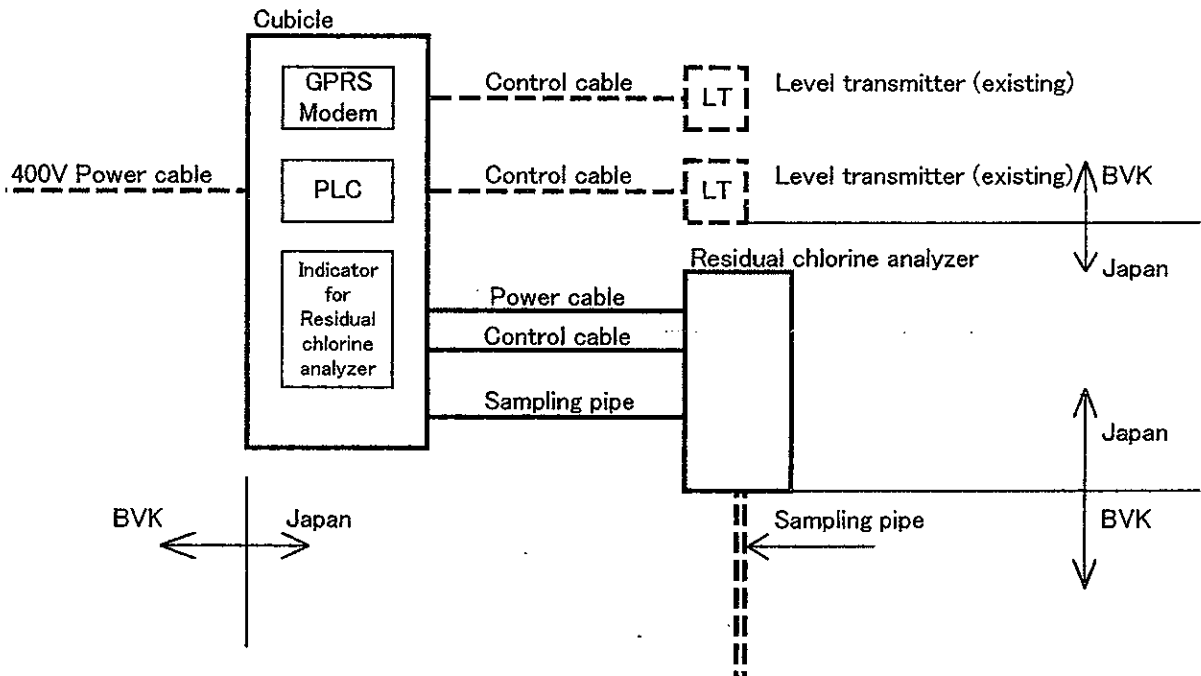
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Work demarcation of reservoir equipment (20 points)

Japan side: Supply, installation and site test of the following equipment;

- Cubicle
- GPRS modem
- PLC
- Residual chlorine analyzer

BVK side: 1. Procurement and installation of materials indicated by dot line below.
 2. Connection of cables and sampling pipe.



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Table 4

Proposed Schedule works and procurement by BVK

Year	2004												2005												2006												2007		
	Fiscal Year												Fiscal Year												Fiscal Year												Fiscal Year		
No	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3								
1.	Projecting phase																																						
1.1	PS																																						
1.2	Well																																						
1.3	Measure. Point																																						
1.4	Reservoir																																						
1.5	Telecom. Network																																						
1.5.1	IP Cable network																																						
1.5.2	IP WLL network																																						
1.6	LCC, MCC infrastructure																																						
2.	Contracting GSM/GPRS service																																						
3.	Procurement by BVK																																						
3.1	Transformers																																						
3.2	WLL network components																																						
3.3	Installation material																																						
4.	Preparation of objects																																						
4.1	Review and discuss on design material																																						
4.2	Creating instruction for disassembling of old equipment																																						
4.3	Creating instruction for installation of new equipment																																						
5.	Installation works by BVK (aggregate, freq, regulator, control cubicle, flaps, valves, transformers)																																						
5.1	Wells																																						
5.2	PS																																						
5.2.1	PS-18 Tasmaidan																																						
5.2.2	PS-17 Zvezdara																																						
5.2.3	PS-20 Zeleznik																																						
5.2.4	PS-21 Pionir																																						

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Proposed Schedule works and procurement by BVK

Year	2004												2005												2006												2007		
	Fiscal Year			Fiscal Year			Fiscal Year			Fiscal Year			Fiscal Year			Fiscal Year			Fiscal Year			Fiscal Year			Fiscal Year														
No	Work item	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3							
5.25	PS-19 Bezanija																																						
5.26	PS-4 Crveni krst																																						
5.27	PS-1A Bele Vode																																						
5.28	PS-23 Student.grad																																						
5.29	PS-1B Bele vode																																						
6.	Installation works by BVK (measuring equipment, terminal equipment, telecom. Equipment)																																						
6.1	Wells																																						
6.2	PS																																						
6.2.1	PS-18 Tasmajdan																																						
6.2.2	PS-17 Zvezdara																																						
6.2.3	PS-20 Zveznik																																						
6.2.4	PS-21 Pionir																																						
6.2.5	PS-19 Bezanija																																						
6.2.6	PS-4 Crveni krst																																						
6.2.7	PS-1A Bele Vode																																						
6.2.8	PS-23 Student.grad																																						
6.2.9	PS-1B Bele vode																																						
6.3	Reservoirs																																						
6.4	Measure. Points																																						
6.5	Telecommunication Network																																						
6.6	LCC, MCC																																						
6.7	System integration																																						
6.8	System function testing																																						

Basic Plan on SCADA System for BVK Water Supply

1. General

This basic plan shall apply to the SCADA system for BVK water supply to monitor the ninety-nine Reny well pumps, the twenty-six water distribution pump stations, the twenty reservoirs and the twenty-eight measuring points, and to operate remotely the ninety-nine Reny well pumps at the local control centers in Bezanija and in Banovo Brdo.

2. Scope of Work

The procurement and installation works for SCADA system including software shall be done by Japan side. However, the telecommunication system for SCADA system shall be made by BVK. The equipment for SCADA system to be provided by Japan side is shown in Table-1.

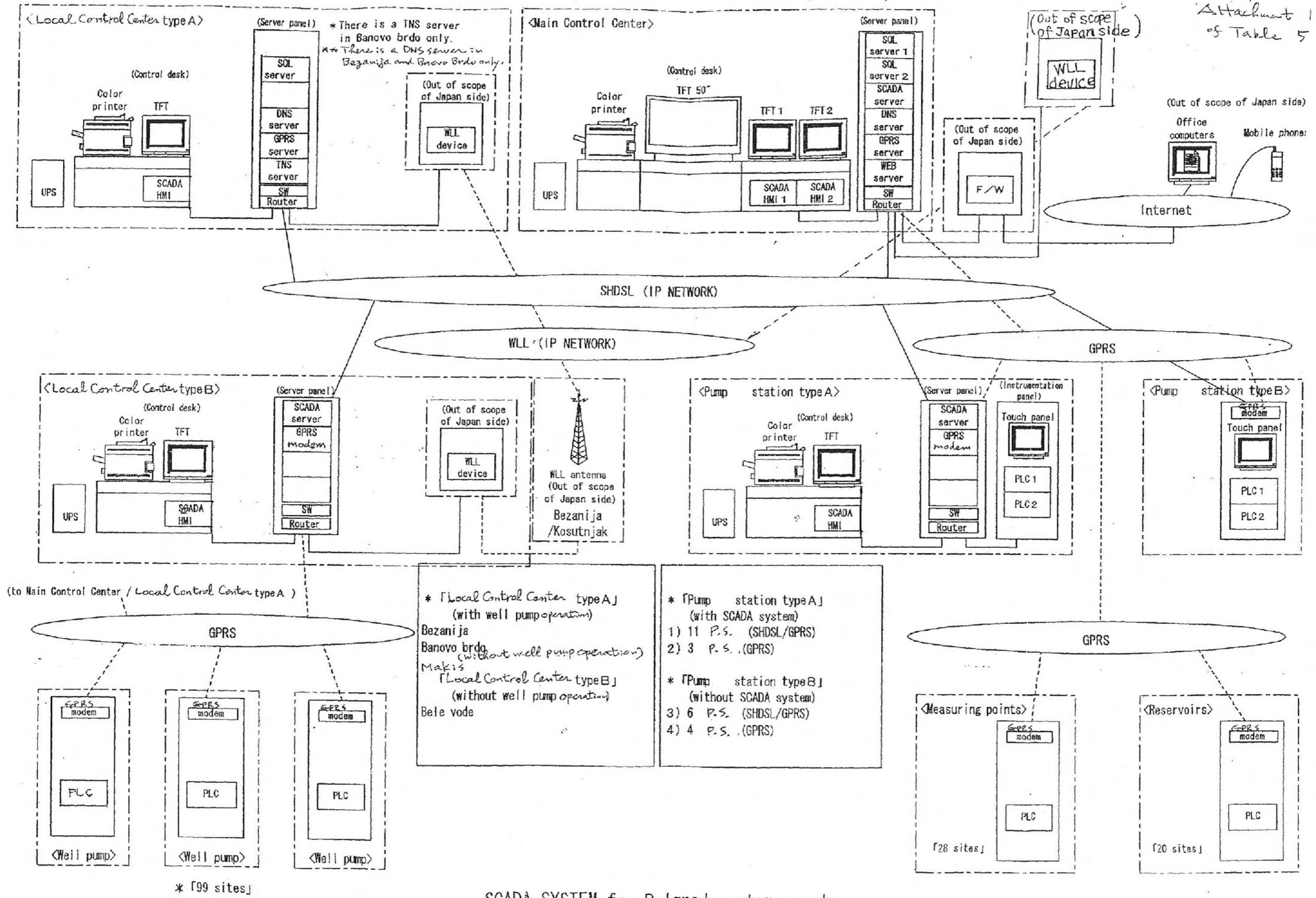
For detail of work demarcation between Japan side and BVK, please refer to table 3.

3. System Configuration

Overall SCADA system configuration is shown in Attachment 1.

4. Test

All hardware and software for SCADA system shall be tested at the factory before delivery to BVK.



SCADA SYSTEM for Belgrade water supply

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Sektor Održavanja - Služba tehničke pomoći

Int.broj _____

Datum 04.08.2004.

Beograd

THE LEFT BANK OF RIVER SAVA RANNEY WELLS EQUIPMENT - PUMPS AND MOTORS

It.No	RW	EXISTING				REPLACEMENT				Remark
		Q (l/s)	H (m)	Motor output (kW)	rpm	Q (l/s)	H (m)	Motor output (kW)	rpm	
1.	98	30	75	30	3000	35	75	45	3000	
2.	95	70	75	90	3000	70	75	90	1500	
3.	94	70	75	90	3000	110	75	132	1500	*
4.	93	100	75	132	3000	70	75	132	1500	
5.	92	70	75	75	3000	70	75	90	1500	
6.	90	100	75	132	3000	110	75	132	1500	
7.	89	100	75	132	3000	70	75	90	1500	
8.	88	100	75	110	3000	70	75	90	1500	
9.	87	70	75	110	3000	70	75	90	1500	
10	86	70	75	90	3000	70	75	90	1500	
11	85	100	75	132	3000	110	75	132	1500	
12	84	130	75	160	3000	130	75	160	3000	
13	83	70	75	90	3000	70	75	90	1500	
14	81	35	75	45	3000	70	75	90	1500	*
15	80	100	75	132	3000	110	75	132	1500	
16	79	70	75	85	3000	70	75	90	1500	
17	78	70	75	90	3000	70	75	90	1500	
18	75	35	75	45	3000	35	75	45	3000	
19	73	30	75	48	3000	35	75	45	3000	
20	72	35	75	45	3000	35	75	45	3000	
21	69	30	75	48	3000	35	75	45	3000	
22	62	100	75	110	3000	110	75	132	1500	
23	61	70	75	90	3000	70	75	90	1500	
24	60	100	75	135	3000	110	75	132	1500	
25	59	70	75	80	3000	70	75	90	1500	
26	66	70	75	80	3000	70	75	90	1500	
27	65	70	75	90	3000	35	75	45	3000	**
28	64	30	75	40	3000	35	75	45	3000	
29	63	70	75	75	3000	35	75	45	3000	**
30	51	100	75	130	3000	110	75	132	1500	
31	50	100	75	132	3000	110	75	132	1500	
32	49	70	75	90	3000	130	75	160	3000	*
33	48	30	75	48	3000	30	75	45	3000	
34	47	100	75	110	3000	110	75	132	1500	
35	46	70	75	80	3000	110	75	132	1500	*
36	45	100	75	110	3000	110	75	132	1500	
37	44	70	75	85	3000	110	75	132	1500	*
38	43	70	75	85	3000	70	75	90	1500	
39	42	100	75	110	3000	110	75	132	1500	
40	41	70	75	90	3000	110	75	132	1500	*
41	40	70	75	85	3000	70	75	90	1500	
42	38	100	75	110	3000	110	75	132	1500	
43	37	100	75	132	3000	110	75	132	1500	
44	36	70	75	75	3000	70	75	90	1500	
45	35	100	75	132	3000	110	75	132	1500	
46	22/I	100	75	130	3000	130	75	160	3000	*
47	22/II	-	-	-	-	110	75	132	1500	
48	23/I	70	75	90	3000	70	75	90	1500	
49	21	130	75	158	3000	130	75	160	3000	

*- For wells we are requesting stronger aggregates then installed. Existing aggregates are working on 50Hz with high water level in well.

** - For wells we are requesting smaller aggregates then installed. Existing aggregates are working on frequencies close to minimal values recommended by manufacturer.

- Pump power is adopted according to frequency converter characteristic.

- Submersible pump and motor manufacturers are recommending that the submersible motor power is min.10% higher then pump power. 1500 rpm submersible motor life time is 2.5 times longer then existing 3000 rpm motors and pumps are more reliable and persistent.

5-2 Confirmation of the pump specification for Distribution pump

(1) Pump head and delivery capacity

The specifications of the requested new pumps to be installed are designed on the bases of future demand (in year 2007).

Hydraulic calculation was based on the Colbruk White formula and calculated by computer with Info Works software. BVK has carried out hydraulic calculation by computer since 1981.

Estimate of motor output was confirmed by the formula. $A(kW)=0.163 \times (Q \text{ m}^3/\text{hr} \times H \text{ m}) / \eta$. Here, η of pump efficiency is to be 70 to 80%.

Existing pump is sagging efficiency because of aging. These pumps run on 28 to 68 years. Discharge capacity and head are not enough to supply distribution water.

The specification of the requested pumps are accepted by the consultant team and basic design conditions are shown as follows,

Specification of the distribution pump with motor

Location	Pump No.	Existing pump specifications			Requested pump specifications			Remarks
		Capacity (L/s)	Head (m)	Output (kW)	Capacity (L/s)	Head (m)	Output (kW)	
PS-1a Bele Vode	1	150	142	315	167	160	400	Capacity: Increase population served 340L/s x 2 pumps and 1 stand by Head: based on hydraulic calculation
	2	150	142	315	167	160	400	
	3	150	142	315	167	160	400	
PS-1b Bele Vode	1	400	98	575	400	90	550	Capacity: Increased population served 800L/s 2 pumps and 2 stand by Head: based on hydraulic calculation
	2	150	97	210	400	90	550	
	3	400	98	575	400	90	550	
	4	150	97	210	400	90	550	
PS-4 Crveni Krst	1	300	70	300	300	70	400	• Replacement
PS-18	1	400	60	400	400	65	400	• Capacity: Increase population served (1,400L/s to

Table 6

Trasmajdan	2	400	60	400	60	400	400	65	1,600L/s)	
									400	400
Trasmajdan	3	240	60	250	400	400	65	400	• Head: Due to hydraulic calculations	
	4	400	60	400	400	400	65	400		
	1	200-250	88-65	210	200	200	65	200	• Capacity: : As same as existing conditions	
PS-19 Bezanija	2	180	88	210	200	200	65	200	• Head: Due to hydraulic calculations	
	3	200-250	88-65	210	200	200	65	200		
	1	261	70	211	500	500	70	400		
PS-23 Stu.Grad	2	261	70	211	500	500	70	400	• Capacity: Expansion of distribution network (New industrial area) with 1,700L/s.	
	3	380	70	304	500	500	70	400		
	4	380	70	304	500	500	70	400	• Head: Based on the additional pipeline in future	
	5	380	70	304	500	500	70	400		
	1	200	82	188	120	120	80	160	• Capacity: Reducing capacity due to construct new pump station (PS-17a)	
PS-17 Zvezdara	2	200	82	188	120	120	80	160		
	3	200	82	188	120	120	80	160	• Head: Due to hydraulic calculations	
	1	50	65	75	200	200	65	200	• Capacity: Expansion to new water supply area such as Karaburma and Mirijevo	
PS-21 Pionir	2	50	65	75	200	200	65	200		
	3	100	65	110	200	200	65	200	• Head: Based on the additional pipeline.	
	1	80-140	166-130	320	240	240	150	600	• Capacity: Expansion to South part of BG.	
PS-20 Zeleznik	2	80-140	166-130	320	240	240	150	600	• Head: Based on the new distribution network.	

(2) Pump type

All pumps except PS-18, Trasmajdan are design horizontal shaft type and pumps of PS-18 are vertical shaft type.

**資料 5.3 Minutes of Discussions
(December 16, 2004)**

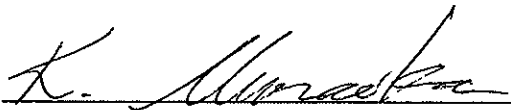
**MINUTES OF DISCUSSIONS
ON THE BASIC DESIGN STUDY ON THE PROJECT
FOR IMPROVEMENT OF WATER SUPPLY SYSTEM
IN BELGRADE
IN SERBIA AND MONTENEGRO
(EXPLANATION ON DRAFT REPORT)**

In July 2004, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched a Basic Design Study Team on THE PROJECT FOR IMPROVEMENT OF WATER SUPPLY SYSTEM IN BELGRADE (hereinafter referred to as "the Project") to Serbia and Montenegro, and through discussion, field survey, and technical examination of the results in Japan, JICA prepared a draft report of the study.

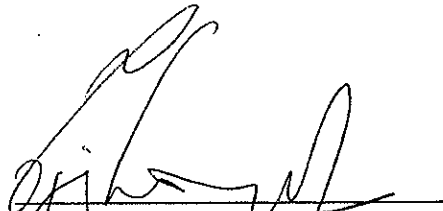
In order to explain and to consult the Serbia and Montenegro on the components of the draft report, JICA sent to Serbia and Montenegro the Draft Report Explanation Team (hereinafter referred to as "the Team"), which is headed by Mr. Keiichi Muraoka, Resident Representative, JICA Austria Office, from 13th December to 21st December.

As a result of discussions, both parties confirmed the main items described on the attached sheets.

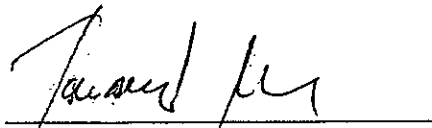
Belgrade, Serbia and Montenegro, 16th December 2004



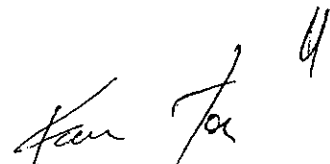
Keiichi Muraoka
Leader
Draft Report Explanation Team
Japan International Cooperation Agency
Japan



Bojan Stanojevic
City Manager
City Assembly of Belgrade
Serbia and Montenegro



Vladimir Tausanovic
Managing Director
Belgrade Waterworks and Sewerage
Serbia and Montenegro



ATTACHMENT

1. Components of the Draft Report

The Government of Serbia and Montenegro agreed and accepted in principle the components of the draft report explained by the Team.

2. Japan's Grant Aid scheme

The Serbia and Montenegro side understands the Japan's Grant Aid Scheme and the necessary measures to be taken by the Government of Serbia and Montenegro as explained by the Team and described in **Annex-3** and **Annex-4** of the Minutes of Discussions signed by both parties on 21st July 2004.

3. Schedule of the Study

JICA will complete the final report in accordance with the confirmed item and send it to the Government of Serbia and Montenegro by February 2005.

4. Other Relevant Issues

The following issues were discussed and confirmed by both sides.

4-1 Scope of Work

The both sides agreed each undertaking of procurement and installation between the Serbia and Montenegro side, and the Japanese side for the Project as shown in **Annex-1**.

4-2 The maintenance of SCADA system

The Serbia and Montenegro side agreed that BVK will guarantee the proper operation and maintenance using SCADA system, and continuous practical use. The chart for operation and maintenance organization is shown in **Annex-2**.

4-3 Suitable application of SCADA system

The Japanese side and the Serbia and Montenegro side agreed that BVK will draw up a more efficient and suitable operation plan based on the data acquired by SCADA system, which would be introduced in the Project.

4-4 Implementation schedule

The Serbia and Montenegro side agreed to complete its scope without any delay based on the installation schedule which the Japanese side presented.

Scope of Work

Items	Procurement	Installation
1. Water Distribution Pump Station		
(1) Pump/Motor	Japan	Serbia
(2) Control Cubicles	Japan	Serbia
(3) Frequency Inverter/Soft Starter	Japan	Serbia
(4) Flap (Check Valve)	Japan	Serbia
(5) Pressure Transmitter	Japan	Serbia
(6) Electrical and Instrument Wiring	Serbia	Serbia
(4) Piping for Pump	Serbia	Serbia
2. SCADA System		
(1) SCADA System	Japan/Serbia ^{*1}	Japan/Serbia ^{*3}
(2) PLC/Radio Modem (except for well pumps)	Japan/Serbia ^{*2}	Japan/Serbia ^{*4}
(3) PLC/Radio Modem (for well pumps)	Japan/Serbia ^{*2}	Serbia
(4) Residual Chlorine Analyzer	Japan/Serbia ^{*5}	Japan/Serbia ^{*6}
(5) Telecommunication System	Serbia	Serbia
3. Laboratory Equipment	Japan	Serbia

Note: *1 Serbia and Montenegro side shall carry out procurement for power cable.

*2 Serbia and Montenegro side shall carry out procurement for power cable and signal cable.

*3 Serbia and Montenegro side shall carry out installation for power cable.

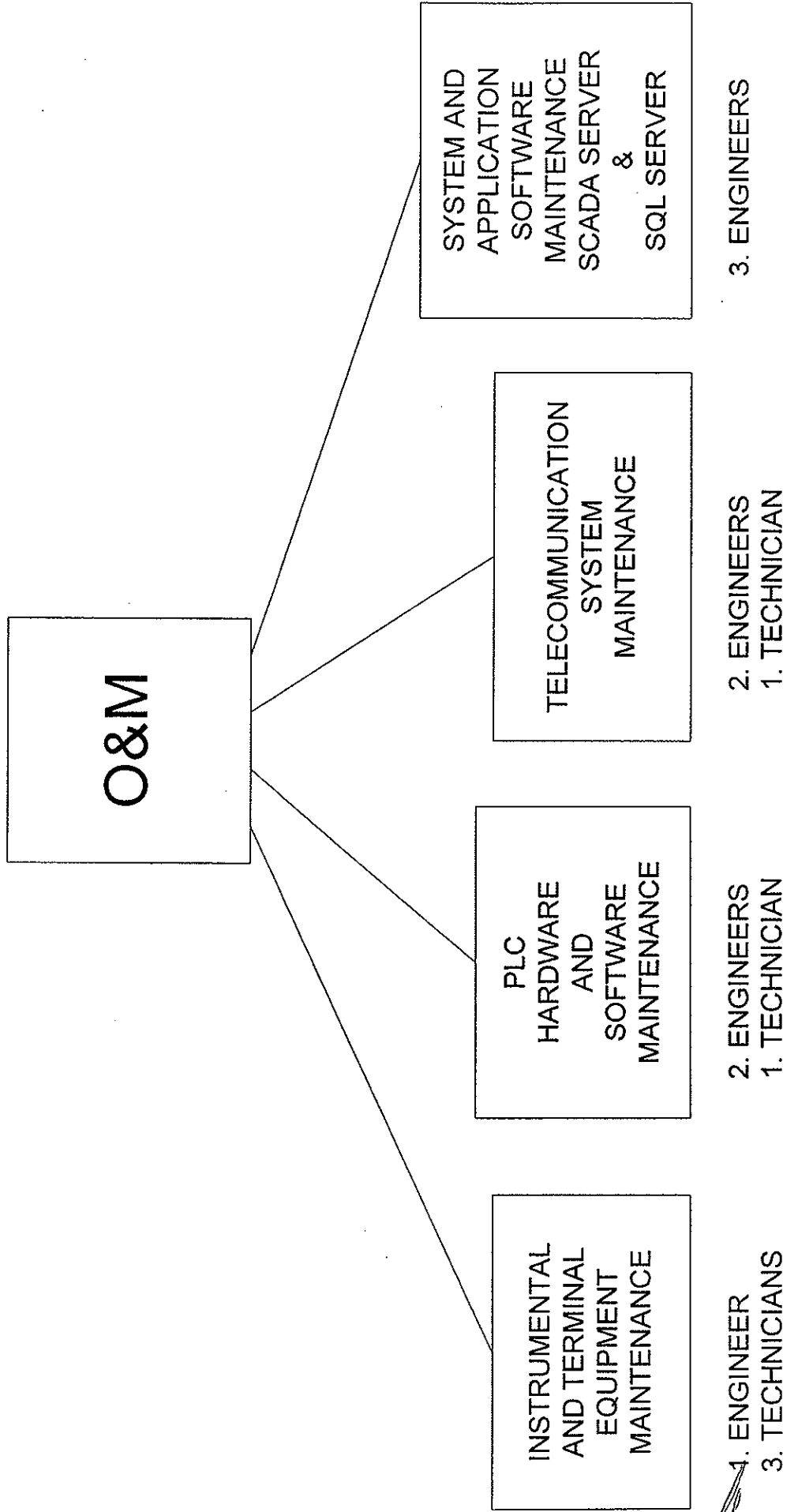
*4 Serbia and Montenegro side shall carry out installation for power cable and signal cable.

*5 Serbia and Montenegro side shall carry out procurement for sampling pipe.

*6 Serbia and Montenegro side shall carry out installation for sampling pipe.

ORGANISATION CHART FOR O&M

ANNEX-2



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JAPAN'S GRANT AID

1. Japan's Grant Aid System

(1) Grant Aid Procedures

- 1) Japan's Grant Aid Program is executed through the following procedures.
 - Application (Request made by a recipient country)
 - Study (Basic Design Study conducted by JICA)
 - Appraisal & Approval (Appraisal by the Government of Japan and Approval by the Cabinet)
 - Determination of the implementation (The Notes exchanged between the Governments of Japan and the recipient country)
 - Implementation (Implementation of the Project)
- 2) Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA to conduct a study on the request.

Secondly, JICA conducts the study (Basic Design Study), using Japanese consulting firms.

Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Aid Programme, based on the Basic Design Study report prepared by JICA, and the results are then submitted to the Cabinet for approval.

Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes signed by the Governments of Japan and the recipient country.

Finally, for the implementation of the project, JICA assists the recipient country in such matters as preparing tenders, contracts and so on.

(2) Basic Design Study

1) Contents of the Study

The aim of the Basic Design Study (hereinafter referred to as "the Study"), conducted by JICA on a requested project (hereinafter referred to as "the Project"), is to provide a basic document necessary for the appraisal of the Project by the Government of Japan. The contents of the Study are as follows:

- i) Confirmation of the background, objectives and benefits of the Project and also institutional capacity of agencies concerned of the recipient country necessary for the Project's implementation;
- ii) Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, social and economic points of view;
- iii) Confirmation of items agreed on by both parties concerning the basic concept of the Project;
- iv) Preparation of a basic design of the Project; and
- v) Estimation of costs of the Project.

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the Project is confirmed considering the guidelines of Japan's Grant Aid Scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

2) Selection of Consultants

For the smooth implementation of the Study, JICA uses a registered consulting firm. JICA selects a firm based on proposals submitted by interested firms. The firm selected carries out a Basic Design Study and writes a report, based upon terms of reference set by JICA.

The consultant firm used for the Study is recommended by JICA to the recipient country to also work in the Project's implementation after the Exchange of Notes, in order to maintain technical consistency and also to avoid any undue delay in implementation should the selection process be prepared.

(3) Japan's Grant Aid Scheme

1) What is Grant Aid?

The Grant Aid Program provides a recipient country with non-reimbursable funds to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. Grant Aid is not supplied through the donation of materials as such.

2) Exchange of Notes (E/N)

Japan's Grant Aid is extended in accordance with the Notes exchanged by the two Governments concerned, in which the objectives of the project, period of execution, conditions and amount of the Grant Aid, etc., are confirmed.

3) "The period of the Grant" means the one fiscal year which the Cabinet approves the project for. Within the fiscal year, all procedure such as exchanging of the Notes, concluding contracts with consulting firms and contractors and final payment to them must be completed.

However, in case of delays in delivery, installation or construction due to unforeseen factors such as weather, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement between the two Governments.

4) Under the Grant, in principle, Japanese products and services including transport or those of the recipient country are to be purchased.

When the two Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country.

However, the prime contractors, namely consulting, contracting and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

5) Necessity of "Verification"

The Government of the recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by

the Government of Japan. This "Verification" is deemed necessary to secure accountability of Japanese taxpayers.

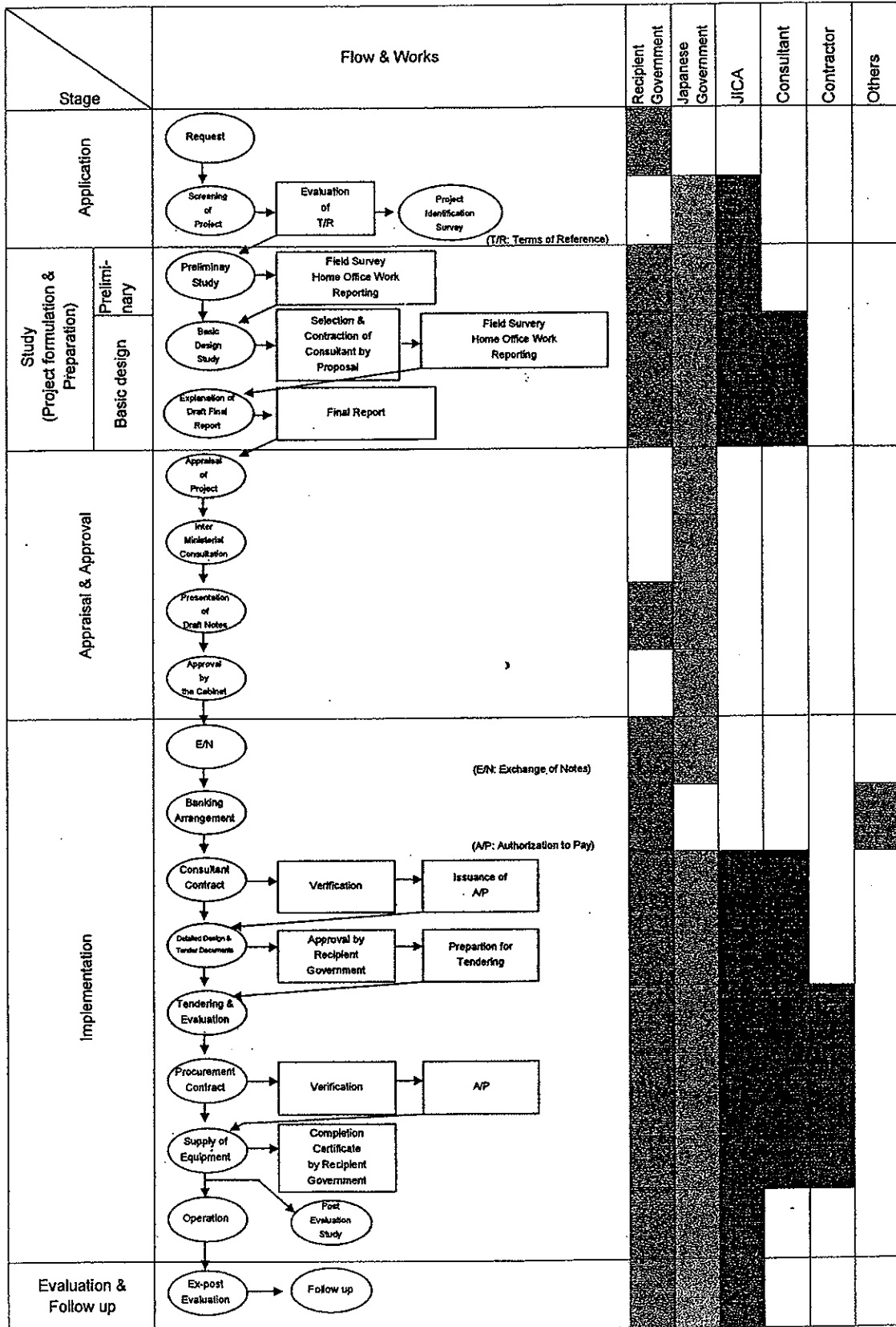
- 6) Undertakings required to the Government of the recipient country
In the implementation of the Grant Aid project, the recipient country is required to undertake such necessary measures as the followings:
- i) To secure land necessary for the sites of the Project and to clear, level and reclaim the land prior to commencement of the construction;
 - ii) To provide facilities for the distribution of electricity, water supply and drainage and other incidental facilities in and around the site;
 - iii) To secure buildings prior to the procurement in case the installation of the equipment;
 - iv) To ensure all the expenses and prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid;
 - v) To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contracts;
 - vi) To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the verified contracts such as facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work;
 - vii) "Proper Use"
The recipient country is required to maintain and use the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign the necessary staff for this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.
 - viii) "Re-export"
The products purchased under the Grant Aid shall not be re-exported from the recipient country.
 - ix) Banking Arrangement (B/A)
 - a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in an authorized foreign exchange bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the verified contracts.
 - b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an Authorization to Pay (A/P) issued by the Government of recipient country or its designated authority.
 - x) Authorization to Pay
The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commission to the Bank.

**Major Undertakings to be taken by Each Government
For the Procurement**

NO.	Items	To be covered by Grant Aid	To be covered by Recipient Side
1	To bear the following commissions to the Japanese bank for banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●
2	To ensure unloading and customs clearance at port of disembarkation in recipient country		
	1) Marine (Air) transportation of the products from Japan to the recipient country	●	
	2) Tax exemption and custom clearance of the products at the port of disembarkation		●
	3) Internal transportation from the port of disembarkation to the project site	(●)	(●)
3	To accord Japanese nationals, whose services may be required in connection with the supply of the products and the services under the verified contract, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		●
4	To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contracts.		●
5	To maintain and use properly and effectively the facilities constructed and/or equipment provided under the Grant Aid		●
6	To bear all the expenses, other than those to be borne by the Grant Aid, necessary for the transportation and installation of the equipment		●

(B/A: Banking Arrangement, A/P: Authorization to Pay)

FLOW CHART OF JAPAN'S GRANT AID PROCEDURES



Kan

Jca

資料 6 事業事前計画表（基本設計時）

事業事前計画表（基本設計時）

1. 案件名
セルビア・モンテネグロ国 ベオグラード上水道整備計画
2. 要請の背景（協力の必要性・位置付け）
<p>ベオグラード市の水道システムは1892年に建設され、市街地の拡大に伴い拡張を繰り返されてきた。現在、既存の水道施設は老朽化による能力の低下や施設の設計容量を超えた給水地域の拡大により市内の需要に対応することが難しくなっている。また、長い歴史と共に拡張されたシステムは非常に複雑なうえに市内に散在する施設の稼動状況を一元的に監視・制御する手段がなく、需要に応じた適切な施設の運転・維持管理が困難な状況にある。このため夏季の水不足を始め市内の給水に大きな問題が引き起こされている。</p> <p>ベオグラード市上下水道公社（Beogradski Vodovod i Kanalizacija: 以下、BVK）は2001年6月29日の対ユーゴスラヴィア支援国会合に際して、市内の給水事情を改善すべく、上水道整備計画として21事業を立案し支援要請リストを作成した。リストに載せられた事業の主な目的は、①生産能力の増強、②取水の安定化、③配水能力の改善、④施設の監視制御の近代化などである。</p> <p>BVKの開発計画である「Prospective Development Program for the Water Supply System for Belgrade」の目標として「市内の需要を満たす衛生的に安全な水の供給」が謳われている。計画の中では、現在ベオグラード市が抱える重要な課題として①主要施設の生産能力および配水能力の増強、②無収水の削減、③施設管理能力の強化を挙げている。</p> <p>BVKは上記の支援要請リストおよび開発計画に沿い、自己資金の他にEBRD、KfW、USAIDなどの援助機関の協力を得ながら事業を実施している。本無償資金協力案件はこのうち施設管理能力の強化および配水能力の改善に係わる事業である。</p>
3. プロジェクト全体計画概要
<p>(1) プロジェクト全体計画の目標（裨益対象の範囲及び規模）</p> <p>BVKの開発計画の目標は「ベオグラード市内の需要を満たす衛生的に安全な水を供給する」である。本計画による裨益人口は、ベオグラード市の給水人口約132万人（2003年）である。</p> <p>(2) プロジェクト全体計画の成果</p> <ol style="list-style-type: none"> ① 生産能力および配水能力が増強される。 ② 無収水が改善される。 ③ システムが更新される。 <p>(3) プロジェクト全体計画の主要活動</p> <ol style="list-style-type: none"> ① 生産能力および配水能力の増強 <ul style="list-style-type: none"> ・ マキシム浄水場を拡張する。（浄水能力の増強） ・ 取水用の水中ポンプを更新する。（取水能力の増強） ・ <u>配水ポンプを更新する。（配水能力の増強）</u> ② 無収水の改善 <ul style="list-style-type: none"> ・ 市内の老朽配水管を更新する。（漏水の低減） ・ 水道メータを更新する。（財政基盤の強化） ③ 施設管理能力の強化 <ul style="list-style-type: none"> ・ <u>水道施設の監視制御システム（SCADAシステム）を導入する。（施設管理能力の強化）</u> ・ <u>水質分析機器を更新する。（水質管理能力の強化）</u>

<p>(4) 投入（インプット）</p> <p><u>日本側：無償資金協力 11.8 億円</u></p> <p>相手国側</p> <p>① 必要な人員</p> <p>② 建設資機材</p> <p>③ 施設・機材の運営・維持管理に係る経費</p> <p>(5) 実施体制</p> <p>実施機関：ベオグラード市上下水道公社（Beogradski Vodovod i Kanalizacija）</p>
<p>4. 無償資金協力案件の内容</p> <p>(1) サイト</p> <p>セルビア・モンテネグロ国ベオグラード市</p> <p>(2) 概要</p> <p>① 配水ポンプの調達および据付</p> <p>② SCADA システム機材の調達およびシステム構築</p> <p>③ 水質分析機器の調達</p> <p>(3) 相手国側負担事項</p> <p>① 配水ポンプの据付</p> <p>② SCADA システム機材の一部据付（通信設備部分）</p> <p>(4) 概算事業費</p> <p>概算事業費 12.43 億円（無償資金協力 11.77 億円、セルビア・モンテネグロ国負担 0.66 億円）</p> <p>(5) 工期</p> <p>第 1 期：入札期間を含め約 20.0 ヶ月（予定）</p> <p>第 2 期：入札期間を含め約 17.5 ヶ月（予定）</p>
<p>5. 外部要因リスク（プロジェクト全体計画の目標達成に関するもの）</p> <p>① EBRD によるマキシユ浄水場の拡張計画が予定通り完工する。（2007 年完工予定）</p> <p>② KfW による漏水改善事業が予定通り完了し、BVK が漏水対策を継続的に実施する。</p>
<p>6. 過去の類似案件からの教訓活用</p> <p>特に無し。</p>
<p>7. プロジェクト全体計画の事後評価に係る提案</p> <p>(1) プロジェクト全体計画の目標達成を示す成果指標</p> <p>24 時間給水を受けられる人口 約 132 万人</p> <p>(2) 評価のタイミング</p> <p>2009 年以降（SCADA システム運用開始後 1 年経過以降）</p>

資料 7 取水量について

取水量について

1. 井戸と取水量

浄水場	井戸位置と本数			井戸計 (本)	取水量 (m ³ /s)	取水量 (m ³ /d)	1井当り取水量 (m ³ /s)
	左岸	右岸	中州				
Bele Bode	0	5	0	5	0.4	34,560	0.08
Banovo Brdo	8	14	20	42	2.7	233,280	0.06
Bezanija	52	0	0	52	1.9	164,160	0.04
計	60	19	20	99	5	432,000	0.05

資料：BVK、2004年

2. 取水量の推移

	1960	1965	1970	1975	1980	1985	1990	1995	2000	2003
本数	6	14	26	38	55	83	93	96	97	99
平均用水量 (L/s/1本)	182	158	115	115	92	69	54	52	56	51
全体水量 (m ³ /d)	94,349	191,117	258,336	377,568	437,184	494,813	433,901	431,309	469,325	436,234

資料：BVK、2003

3. 取水ポンプの故障 (1)

年度	故障件数		
	ポンプ	モーター	合計
2001	18	29	47
2002	13	26	39
2003	9	17	26
2004	2*	5*	7*

資料：BVKメンテナンス工場、2004年

注) *は6ヶ月分

4. 取水ポンプの故障 (2) (in interval 1.04.04. - 28.05.04 (2 months))

WELL No.	FAILURE STANDS			Note
	Start	End	duration (Day)	
RB-23	27.02.04.	28.05.04.	91	motor failure
CB-59	1.04.04.	28.05.04.	57	pump failure
RB-30	11.04.04.	28.05.04.	47	motor failure
RB-6a	7.04.04.	8.04.04.	1	pump failure
RB-35	7.04.04.	8.04.04.	1	pump failure
RB-18	13.04.04.	14.04.04.	1	pump overheating
RB-92	16.04.04.	21.05.04.	35	motor failure
RB-41	26.04.04.	14.05.04.	18	burned pump
RB-75	29.04.04.	14.05.04.	15	pump overheating
RB-63	21.05.04.	28.05.04.	7	pump failure
RB-10	25.05.04.	26.05.04.	1	pump overheating
Total		11 sets	274 days	

資料：BVK本部取水担当部門

274dayx0.05m³/secx3600X24=1,183,680 m³/60days

25,920,000 2ヶ月間の取水ロス率 5%

5. 停電によるポンプロス (July)

WELL ID	POWER STOPS DATE	Time and interval		Loss (m3)
7 tube wells	18.07.04.	3 times	5 minutes	27,468
5 wells	20.07.04.	3 times	5 minutes	19,620
4 wells	23.07.04.	3 times	5 minutes	15,696
5 wells	25.07.04.	3 times	5 minutes	19,620
Total				82,404

0.636% ロス

6. 取水量

単位:m3/d

	施設容量	ロス	実稼動
地下水	432,000	24,000	408,000
表流水	340,000	0	340,000
合計	772,000	24,000	748,000

ロスは既存施設容量に対し5.6%とする

7. ポンプの更新

	台数	変更理由
ポンプ容量を増加	25	・通常周波数 (50Hz) で運転しても井戸の水位が高い為
ポンプ容量を変更しない	19	・井戸の水位が低く、運転可能最低周波
ポンプ容量を減少	5	数 (35Hz) で運転している為
合計	49	

資料: BVK要請書、2004年

要請ポンプ49台の総容量 (4070 l/s) は既設ポンプ総容量に比べて385 l/sの増加となる。

351648 49台
 33,264 増加水量
 取水量の増加率 8%

資料 8 配水量・給水量について

配水量・給水量について

1. 給水人口と給水量 (水需要量)

	Municipality	人口(人)	給水人口 (人)	普及率 (%)	給水量 (m3/d)			合計
					家庭用	工業用	漏水 (33%)	
1	Novibeograd	217,180	217,180	100%	52,682	18,603	35,067	106,352
2	Zemnu	191,938	181,624	95%	44,057	15,558	29,326	88,940
3	Cukarica	168,356	168,356	100%	40,839	14,421	27,183	82,443
4	Vozdovac	151,746	151,755	100%	36,812	12,999	24,503	74,314
5	Palilula	155,575	144,445	93%	35,039	12,373	23,323	70,734
6	Zvezdara	132,352	132,352	100%	32,105	11,337	21,370	64,812
7	Rakovica	98,935	98,935	100%	23,999	8,475	15,974	48,448
8	Vracar	57,934	57,934	100%	14,053	4,963	9,354	28,370
9	Stari Grad	55,541	55,541	100%	13,473	4,758	8,968	27,198
10	Savski Venac	42,483	42,483	100%	10,305	3,639	6,859	20,804
11	Grocka	75,376	52,006	69%	12,615	4,455	8,397	25,467
12	Barajevo	24,436	16,577	68%	4,021	1,420	2,677	8,118
13	Obrenovac	70,974	0	0%	0	0	0	0
14	Lazarevac	58,474	0	0%	0	0	0	0
15	Mladenovac	52,394	0	0%	0	0	0	0
16	Sopot	20,356	0	0%	0	0	0	0
	合計	1,574,050	1,319,188	84%	320,000	113,000	213,000	646,000
	給水用途別割合				50%	17%	33%	100%

資料: 2003年BVK

2. 配水区域とゾーン

	Municipality	給水人口 (人)	ゾーン別
1	Novibeograd	217,180	I
2	Zemnu	181,624	I
3	Cukarica	168,356	I
4	Vozdovac	151,755	II,IV
5	Palilula	144,445	I, II
6	Zvezdara	132,352	II, III
7	Rakovica	98,935	II
8	Vracar	57,934	I, II
9	Stari Grad	55,541	I,II
10	Savski Venac	42,483	I, II
11	Grocka	52,006	II
12	Barajevo	16,577	III,IV
13	Obrenovac	0	
14	Lazarevac	0	
15	Mladenovac	0	
16	Sopot	0	
	合計	1,319,188	

出典: BVK、2004年

3. ゾーン別給水量 (需要量)

Unit in m3/m

Zone	I	II	III	IV	TOTAL
January	10,740,982.00	5,377,351.00	3,785,016.00	504,517.00	20,407,866.00
February	9,658,355.00	4,819,326.00	3,392,081.00	449,452.00	18,319,214.00
March	10,137,872.00	5,641,288.00	3,844,739.00	438,144.00	20,062,043.00
April	9,169,393.00	5,945,004.00	3,686,350.00	558,320.00	19,359,067.00
May	9,957,675.00	6,429,063.00	3,857,108.00	576,723.00	20,820,569.00
June	9,683,062.00	6,719,913.00	3,677,164.00	506,503.00	20,586,642.00
July	10,056,655.00	6,392,163.00	3,679,182.00	548,987.00	20,676,987.00
August	9,835,947.00	6,572,508.00	3,812,615.00	493,935.00	20,715,005.00
September	9,607,672.00	6,360,897.00	3,634,131.00	491,201.00	20,093,901.00
October	8,873,460.00	6,134,948.00	3,278,074.00	475,447.00	18,761,929.00
November	8,077,101.00	6,007,845.00	3,156,563.00	522,645.00	17,764,154.00
December	8,551,363.00	5,699,364.00	3,306,170.00	583,764.00	18,140,661.00
Avarage/mor	9,529,128.08	6,008,305.83	3,592,432.75	512,469.83	19,642,336.50
Avarage/day	317,638	200,277	119,748	17,082	654,745
給水人口	639,980	403,520	241,269	34,418	1,319,188

資料: BVK本社、2004年

4. ゾーン別配水量

Zone	I	II	III	IV	TOTAL
January	10,740,982.00	5,377,351.00	3,785,016.00	504,517.00	20,407,866.00
February	9,658,355.00	4,819,326.00	3,392,081.00	449,452.00	18,319,214.00
March	10,137,872.00	5,641,288.00	3,844,739.00	438,144.00	20,062,043.00
April	9,169,393.00	5,945,004.00	3,686,350.00	558,320.00	19,359,067.00
May	9,957,675.00	6,429,063.00	3,857,108.00	576,723.00	20,820,569.00
June	9,683,062.00	6,719,913.00	3,677,164.00	506,503.00	20,586,642.00
July	10,056,655.00	6,392,163.00	3,679,182.00	548,987.00	20,676,987.00
August	9,835,947.00	6,572,508.00	3,812,615.00	493,935.00	20,715,005.00
September	9,607,672.00	6,360,897.00	3,634,131.00	491,201.00	20,093,901.00
October	8,873,460.00	6,134,948.00	3,278,074.00	475,447.00	18,761,929.00
November	8,077,101.00	6,007,845.00	3,156,563.00	522,645.00	17,764,154.00
December	8,551,363.00	5,699,364.00	3,306,170.00	583,764.00	18,140,661.00
Avarage/mor	9,529,128.08	6,008,305.83	3,592,432.75	512,469.83	19,642,336.50
Avarage/day	317,638	200,277	119,748	17,082	654,745
日最大量	381,165	240,332	143,697	20,499	785,693
給水人口	639,980	403,520	241,269	34,418	1,319,188

par capita demand 0.496 平均
(m3/c/d) 0.595 最大

5. 既存配水ポンプ

ポンプ場	ポンプNo.	既設ポンプ仕様					新設ポンプ仕様		
		容量 (L/s)	揚程 (m)	定格kW	建設年	更新 kW	容量 (L/s)	揚程	定格 kW
PS-1a Bele Vode	1	150	142	315	1940	315	167	160	386
	2	150	142	315	1940	315	167	160	386
	3	150	142	315	1940	315	167	160	386
PS-1b Bele Vode	1	400	98	575	1932	575	400	90	488
	2	150	97	210	1932	210	400	90	488
	3	400	98	575	1932	575	400	90	488
	4	150	97	210	1932	210	400	90	488
PS-4 Krst	1	300	70	300	1962				
PS-18 Trasmajdan	1	400	60	400	1964	400	400	65	366
	2	400	60	400	1964	400	400	65	366
	3	240	60	250	1964	250	400	65	366
	4	400	60	400	1964	400	400	65	366
PS-19 Bezanija	1	200	88-65	210	1964	210	200	65	179
	2	180	88	210	1964	210	200	65	179
	3	200	88-65	210	1964	210	200	65	179
PS-23 Stu.Grad	1	261	70	211	1976	211	500	70	481
	2	261	70	211	1976	211	500	70	481
	3	380	70	304	1976	304	500	70	481
	4	380	70	304	1976	304	500	70	481
	5	380	70	304	1976	304	500	70	481
PS-17a Zvezdara	1	200	82	188	1982				
	2	200	82	188					
	3	200	82	188					
PS-21 Pionir	1	50	65	75	1967				
	2	50	65	75	1967				
	3	100	65	110	1967				
PS-20 Zeleznik	1	80	166-130	320	1980	320	240	150	526
	2	80	166-130	320	1980	320	240	150	526
PS-2 Sava	1	520	18	110	1985				
	2	1000	18	250	1985				
	3	1000	18	250	1985				
	4	1000	18	250	1985				
	5	1000	18	250	1985				
PS-15 Topcider	1	100	70-60	316	1961				
	2	135	70-65	316	1961				
	3	135	70-65	316	1961				
PS-15a Topcider	1	400	125	608	1967				
	2	400	125	608	1967				
	3	400	125	608	1967				
	4	250	125	404	1967				
PS-18a Tasmajdan	1	611	70	500	1997				
	2	611	70	500	1997				
	3	611	70	500	1997				
	4	611	70	500	1997				
PS-25a M.brdo	1	200	82	188	1981				
	2	200	82	188	1981				
	3	200	82	188	1981				

ポンプ場	ポンプNo.	既設ポンプ仕様					新設ポンプ仕様		
		容量 (L/s)	揚程 (m)	定格kW	建設年	更新 kW	容量 (L/s)	揚程	定格 kW
PS-25 M.brdo	1	80	145	237	1981				
	2	80	145	237	1981				
	3	80	145	237	1981				
PS-10 Dedinje	1	180	50-55	160	1978				
	2	180	50-55	160	1978				
	3	180	50-55	160	1978				
	4	375	50-55	160	1978				
PS-16a Vracar	1	450	132-120	629	1976				
	2	450	132-120	629	1976				
	3	450	132-120	629	1976				
	4	450	132-120	629	1976				
PS-27 Makis C.V	1	800	50	700	1986				
	2	800	50	700	1986				
	3	1000	100	1400	1986				
	4	1000	100	1400	1986				
	5(diesel)	500	96	700	1986				
	6	1600	95	900	1986				
PS-3a Surcin	1	450	36-25	250	1987				
	2	450	36-25	250	1987				
	3	450	36-25	250	1987				
	4	450	36-25	250	1987				
PS-28 Zarkovo	1	120	144-108	400	1990				
	2	120	144-108	400	1990				
PS-28a Zarkovo	1	210	64-52	250	1991				
	2	375	64-52	400	1991				
	3	375	64-52	400	1991				
	4	37	64-52	400	1991				
PS-1 Sabačka	1	320	144-108	74	1940				
	2	230	22	59	1935				
	3	200	15	50	1935				
	4	350	20	110	1969				
PS-22 Torlak	1	60	90	76	1970				
	2	60	90	76	1970				
PS-5	1	50	60	100	1928				
	2	50	60	100	1928				
P.P. Vinca	1	20	300	110	1974				
	2	21	250	110	1994				
PS-6 Dunav	1	25	40	75	1989				
	2	20		45	1989				
	3	25	40	75	1989				
PS-16 Vracar	1	150	65	126	1961				
	2	150	65	126	1961				
	3	200	60	162	1961				
PS-17 Zvezdara	1	60	50	50	1964	50	120	80	139
	2	75	90-80	118	1964	118	120	80	139
	3	75	90-80	118	1964	118	120	80	139
PS-24 Kosutnjak	1	125	60	85.5	1979				
	2	125	60	85.5	1979				
	3	125	60	85.5	1979				
PS-3 Surcin	1	195	45-34	160	1987				
	2	195	45-34	160	1987				
Total kW				29,797		6,855			8,448

ポンプ全体容量	30,474	並列運転による損失(25%)	809,557
①m3/d	2,296,521	故障による損失(14%)	113,338
②予備機なしの場合	1,630,530	(故障水量/全体水量)	14%
3台-1台、4台-1台平均29%の予備率		現状配水量(m3/d)	696,219
並列運転による損失(25%)		1970年以前のポンプ(L/s)	6,760
現状配水量(m3/d)	1,222,897	m3/d	584,064
Zone 1用配水ポンプ(L/s)	17,596		
m3/d	1,520,294		
予備ポンプ除く水量	1,079,409		

6. 配水ポンプの故障データ

losses caused by pump breaks	
	(m3)
MAY	7,513,258
JUN	7,835,184
JULY	4,486,061
total for 3 months	19,834,503

By BVK

3ヶ月81回の故障回による損出水量は19,834,503m³

7. 配水ポンプの老朽化による損失

損失理由 ①インペラの磨耗(水との摩擦、エアの混入)

②絶縁の不良

③異常振動(ベアリングの磨耗)

1980年以前のポンプ台数は74台中38台、38台のポンプ稼働率(設計値に対し)は最大80%

8. 配水ポンプ場の停電(2004年7月)

pump station	date	power stop duration		location	Pump Capacity	Loss
		Hour	Minut		L/sec	m3
CS-30	03.jul	1	45	suburban	Under rehabilitation	
CS-22	03.jul		30	suburban	60	108
CS-23	06.jul		15	central	1,021	919
CS-19	06.jul		45	central	400	1080
CS-18	06.jul		45	central	1,040	2808
CS-19	06.jul		35	central	400	840
CS-23	06.jul		35	central	1,021	2,144
CS-4	06.jul		45	central	630	1701
CS-21	07.jul		25	central	200	300
CS-17	07.jul	1	0	central	305	1098
CS-20	07.jul		30	suburban	280	504
CS1A	08.jul		25	central	450	675
CS1B	08.jul		25	central	1,100	1650
CS-19	09.jul		5	central	400	120
CS-23	09.jul		5	central	1,021	306
CS-16	20.jul		15	central	500	450
CS-16a	20.jul		15	central	1,350	1215
CS-30	21.jul		10	suburban	Under rehabilitation	
CS-31	27.jul	1	15	suburban	60	270
CS-31	29.jul		30	suburban	60	108
CS-26	30.jul	1	20	suburban	60	288
CS-33	30.jul	1	20	suburban	23	110
CS-18	31.jul		9	central	1,040	562
		14	4			17,256

(停電ロス水量/全ポンプ運転水量)
17256/(1222897*30)

0.0470% 停電によるロス

資料: BVK、2004

停電状況

central	
Hour	Minut
1	344
6	44
suburban	
4	200
7	20

9. 現状の給水量

Zone	I	II	III	IV	TOTAL
日平均	317,638	200,277	119,748	17,082	654,745
現状	238,228	150,208	89,811	12,812	491,058
差	-79,409	-50,069	-29,937	-4,271	-163,686
日最大量	381,165	240,332	143,697	20,499	785,693

10. 配水ポンプの更新

	台数
ポンプ容量の増加	17
ポンプの更新	8
ポンプ容量の減少	3
計	28

浄水場から配水する量の増加 : 749L/sec (64,714m³/d)
 ゾーン2又は3, 4からの増量 : 480L/sec (41,472m³/d)

資料 : BVK要請書、2004年

11. 配水ポンプ設計水量(浄水場から揚水されるポンプのみ)

ポンプ場	容量 (L/Sec)	浄水場	容量 (L/sec)
CS19	700	Bezanija	2,000
CS23	1,300	Bezanija	
CS18	1,440	Banobo Brdo	5,590
CS16	500	Banobo Brdo	
CS16a	1,800	Banobo Brdo	
CS15	400	Banobo Brdo	
CS15a	1,450	Banobo Brdo	
CS5	100	Vinca	100
CS1a	450	Bele Bode	1,550
CS1b	1,100	Bele Bode	
CS27	3,600	Makis & Jezero	3,600
Total (L/s)	12,840		12,840
Total (M ³ /d)	1,109,376		1,109,376

12. 浄水場の生産水量

浄水場	①設計容量		②実績容量		稼働率 %	差①-② m ³ /d	水源
	(l/s)	m ³ /d	(l/s)	m ³ /d			
バレ・ボデ	600	51,840	450	38,880	75%	12,960	地下水
	500	43,200	500	43,200	100%	0	表流水
バノボ・ブルド 1, 2, 3	4,200	362,880	2,450	211,680	58%	151,200	地下水
ベザニア 1, 2, 3	3,200	276,480	1,850	159,840	58%	116,640	地下水
マキッシュ 1	2,000	172,800	1,900	164,160	95%	8,640	表流水
イエゼロ	1,000	86,400	900	77,760	90%	8,640	表流水
ビンチャ	80	6,912	60	5,184	75%	1,728	表流水
合計	11,580	1,000,512	7,760	670,464	67%	330,048	

資料 : 2004年BVK

資料 9 資料リスト

資料リスト (□収集資料/○専門家作成資料)

平成16年8月19日作成

主管部長	文書管理課長	主管課長	情報管理課長	技術情報課長	図書館受入日

地域	プロジェクトID	調査団名又は専門家氏名	プロジェクト名	ベオグラード下水道整備計画	ベオグラード市上下水道公社 (BVK)	収集資料	形態(図書・ビデオ・地図・写真等)	専門家作成資料	JICA作成資料	テキスト	発行機関	担当者氏名	担当部課	無償資金協力部業務第一グループ
欧州														
セルビア・モンテネグロ共和国														
番号	資料の名称													
1	Master Water Plan for the Republic of Serbia					○	コピー (抜粋)						JR・CR () ・SC	
2	List of Legal Regulation related to Water Works					○	コピー (抜粋)						JR・CR () ・SC	
3	General Plan of Belgrade 2021					○	コピー (抜粋)						JR・CR () ・SC	
4	Prospective Development Program for The Water Supply System for Belgrade (Draft)					○	図書						JR・CR () ・SC	
5	Investment Plan of Belgrade Waterworks					○	コピー (抜粋)						JR・CR () ・SC	

資料リスト (□収集資料/□専門家作成資料)

平成16年8月19日作成

主管部長	文書管理課長	主管課長	情報管理課長	技術情報課長	図書館受入日

地域	プロジェクトID	調査団名又は 専門家氏名	プロジェクトID	ベオグラード下水道整備計画	調査の種類又は指導科目	調査団番号		発行機関	取扱区分	図書館記入欄
						調査の種類又は指導科目	調査の種類又は指導科目			
国名	セルビア・モンテネグロ共和国	配属機関名	ベオグラード市上下水道公社 (BVK)	ベオグラード市上下水道公社 (BVK)	現地調査期間又は派遣期間	JICA作成資料	専門家作成資料	ベオグラード市水道公社 (BVK)	吉田 早苗	
番号	資料の名称	形態(図書・ビデオ・地図・写真等)	収集資料	資料	テキスト	発行機関	取扱区分	図書館記入欄		
6	Water Law (Draft May 2004)	コピー (抜粋)	○				JR・CR () ・SC			
7	Raw Water System – Water Balance Overview	コピー	○			ベオグラード市水道公社 (BVK)	JR・CR () ・SC			
8	配水ポンプ故障回数	データ	○			ベオグラード市水道公社 (BVK)	JR・CR () ・SC			
9	他ドナーの案件リスト	コピー	○			対外経済関係省	JR・CR () ・SC			
10	Special Agreement (KfW 案件契約書 公式英訳)	コピー	○			ベオグラード市水道公社 (BVK)	JR・CR () ・SC			