

**Summary of the Cost Estimate  
(Price as of December 1993)**

Item No.	Component	Cost Estimate (Yen)
Item-1 :	Replacement of Intake Pumps	675,738,000-
Item-2 :	Remote Operation System for New 35 Intake Pumps	288,335,000-
Item-3 :	Replacement of Distribution Pumps	649,510,000-
Item-4 :	Procurement of Water Tank Lorries	127,644,000-
Item-5 :	Procurement of Materials for Wells	152,183,000-
Item-6 :	Remote Operation System for Existing 98 Intake Pumps	365,034,000-
Item-7 :	Water Meters at 40 Central Heating Centers (CTP)	21,817,000-
		Total = Yen 2,280,261,000- ( = US\$ 22,802,610- ) ( Rate: US\$ 1.00 = Yen 100.0 )

The breakdown of cost estimate is shown in "ANNEX", it is attached to the end of this APPENDIX.

#### 4. IMPLEMENTATION SCHEDULE

The Emergency Rehabilitation Program is proposed to be implemented in three (3) years, as mentioned below, considering the cost and time for the implementation.

Time	Item No. and Components	Investment Cost (Yen)
1st Year :	(Item-1) Replacement of Intake Pumps and (Item-4) Procurement of Water Tank Lorries.	803,382,000
2nd Year :	(Item-3) Replacement of Distribution Pumps and (Item-5) Procurement of Materials for Wells.	801,693,000
3rd Year :	(Item-2) Remote Operation System for New 35 Intake Pumps, (Item-6) Remote Operation System for Existing 98 Intake Pumps, and (Item-7) Water Meters at 44 Central Heating Centers (CTP).	675,186,000
	(Total)	2,280,261,000

More detailed investment cost is shown in "ANNEX", it is attached to the end of this APPENDIX.

#### 5. EVALUATION

- (1) As stated in Article 1 of this APPENDIX, the purpose of this emergency rehabilitation program is to maintain the present function of the existing facilities.
- (2) Almost all facilities for water supply system in Ulaanbaatar City, especially those nominated in the rehabilitation items, are superannuated and damaged or deteriorated due to the inability of replacement and the lack of spare parts, in spite of the efforts by USAG and officials concerned.

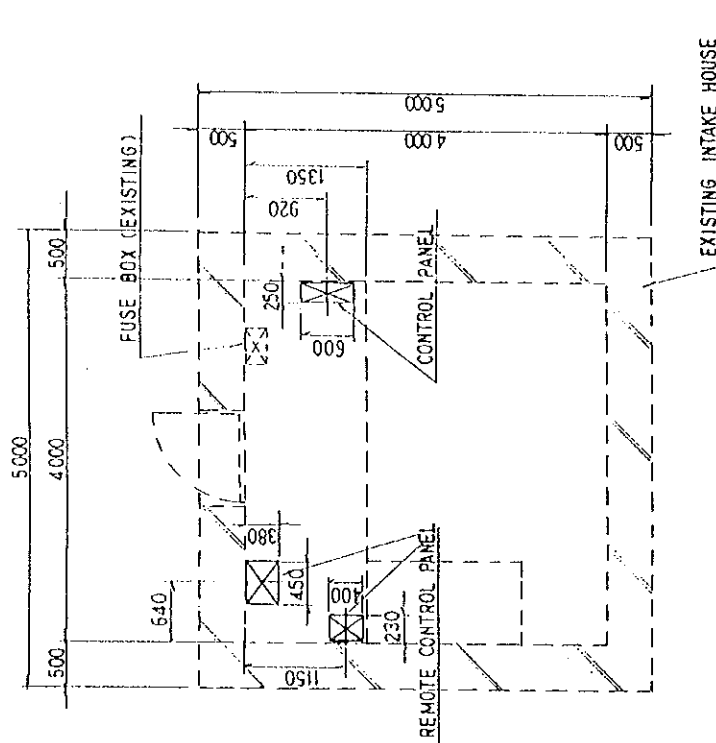
Without this rehabilitation program, the water supply system would not work properly and water for daily use and for industries would not be supplied within a short time, which would cause an uneasiness of the society.

(3) The effects of this rehabilitation program will be summarized below.

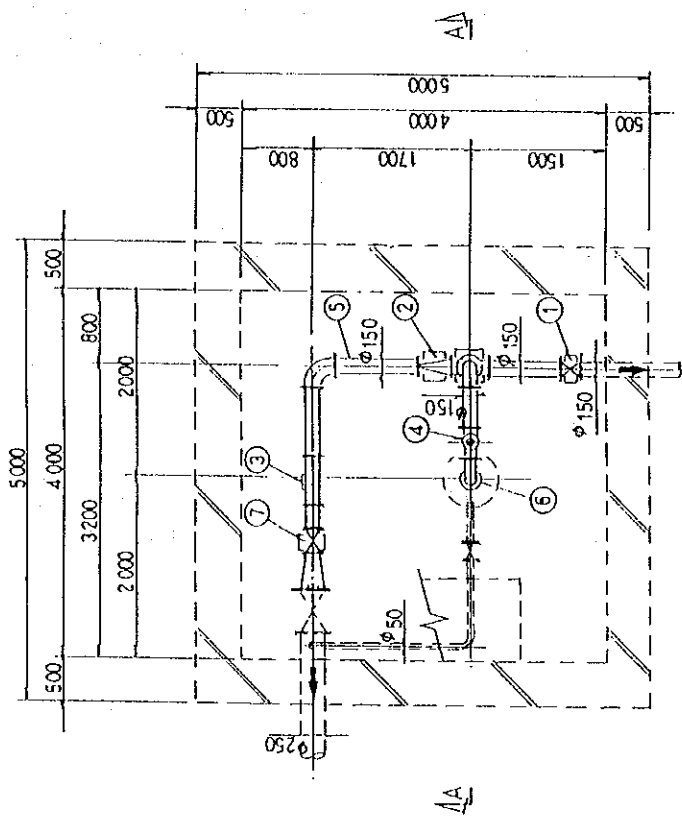
- 1) Water supply facilities will be able to maintain the function and the water for daily use will be secured.
- 2) Not only water by the centralized system, but water for the Ger Area will be supplied constantly by the supplement of Tank Lorries.
- 3) By the remote operation system for the replaced intake pumps, the operation of these pumps can be conducted easily and effectively and they will be well maintained.
- 4) Replacement of water meters at CTP will bring the tariff system based on the actual water usage, which will be the basis of future expansion of the water supply system in Ulaanbaatar City.

[Note]

The present water supply facilities will be showing a tendency of deterioration till an actual period of rehabilitation works, it was proposed in this report. Accordingly, item and contents of them should be reviewed when it will be enforced in accordance with an emergency rehabilitation program



GROUND FLOOR PLAN S=1/50



BASEMENT PLAN S=1/50

No	Name	Number/Place	Measurement	Materials
1	Drain Valve	1	150 A	FC/PC
2	Check Valve	1	150 A	FC/PC
3	Flow Meter	1	150 A	---
4	Air Vast Valve	1	10 A	---
5	Pipe	1 Set	150 A	Steel Pipe
6	Submersible Pump	1	125A, 203Y	---
7	Motor Valve	1	150 A	FC/PC

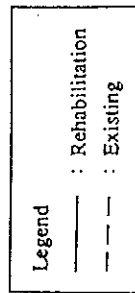
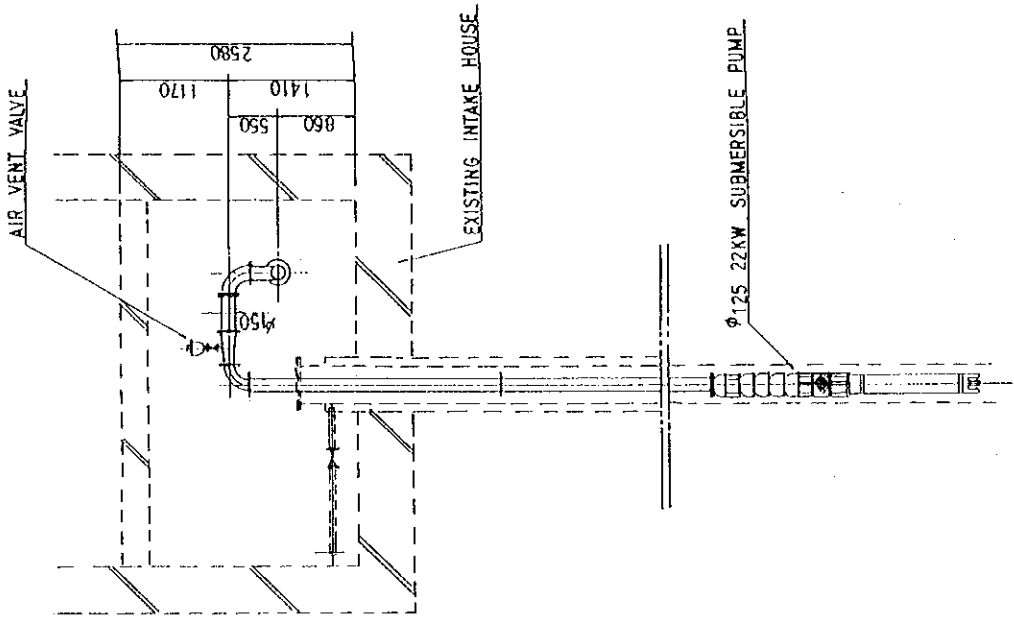


Fig. (1): Submersible Pump for Central Water Source (1)  
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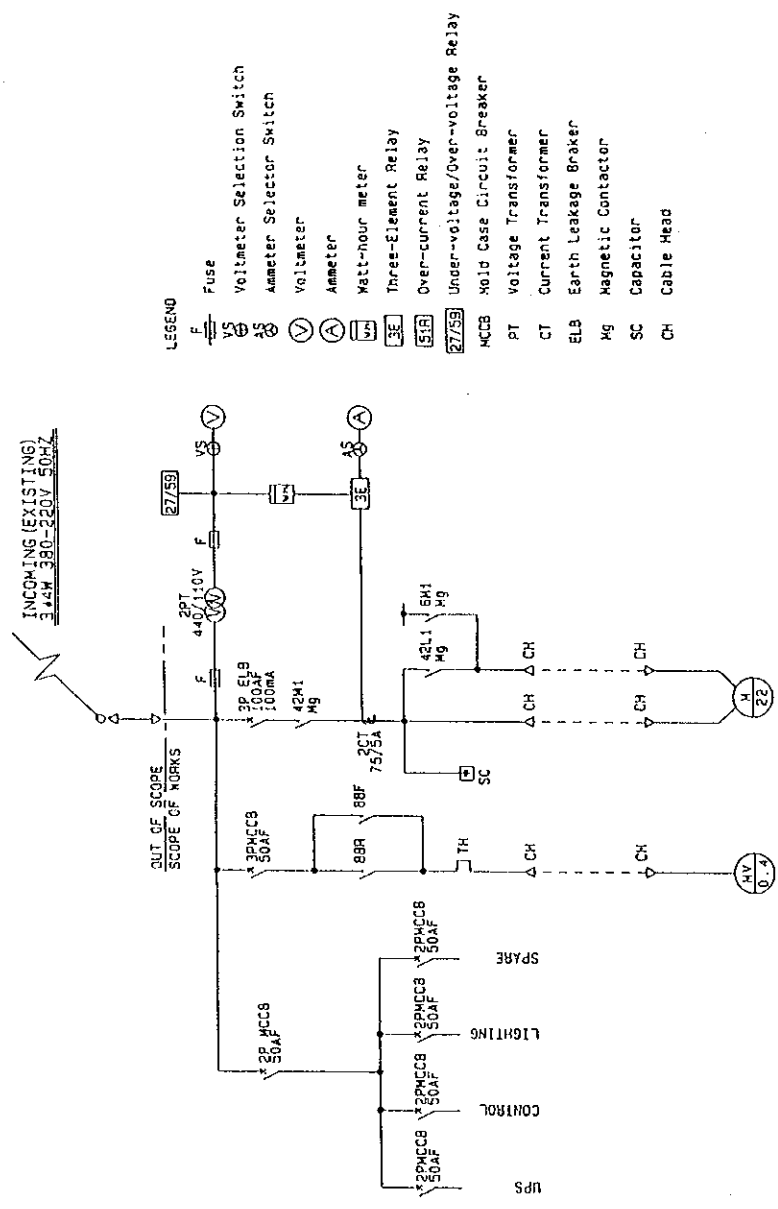


PUMP SPECIFICATION	
NO. OF REPLACED	23 SETS
NO. OF PROCUREMENT ONLY	7 SETS
TOTAL	30 SETS
DISCHARGE DIA.	125 mm
CAPACITY	63 m <sup>3</sup> /H
TOTAL HEAD	60 m
PUMP SPEED	2 900 rpm
MOTOR OUTPUT	22 KW

Legend  
 — : Rehabilitation  
 - - - : Existing

SECTION A - A S=1/50

Fig. (2): Submersible Pump for Central Water Source (?)  
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- LEGEND
- F Fuse
  - VS Voltmeter Selection Switch
  - AS Ammeter Selection Switch
  - V Voltmeter
  - A Ammeter
  - W Matt-hour meter
  - 3E Three-Element Relay
  - 5R Over-current Relay
  - 27/5B Under-voltage/Over-voltage Relay
  - MCCB Mold Case Circuit Breaker
  - PT Voltage Transformer
  - CT Current Transformer
  - ELB Earth Leakage Breaker
  - Mg Magnetic Contactor
  - SC Capacitor
  - CH Cable Head

INTAKE PUMPING STATION

Fig. (3) Submersible Pump for Central Water Source (3)  
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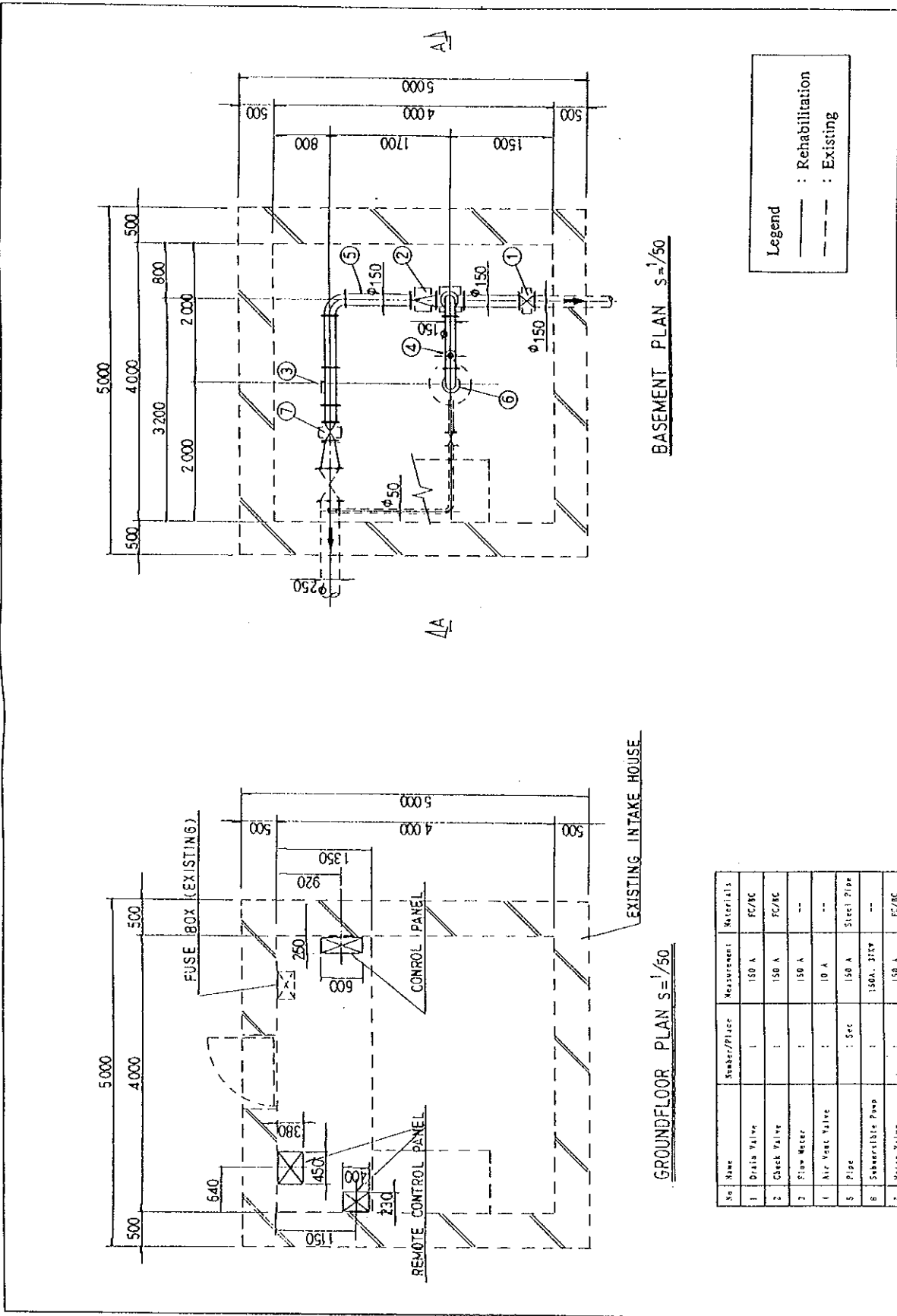
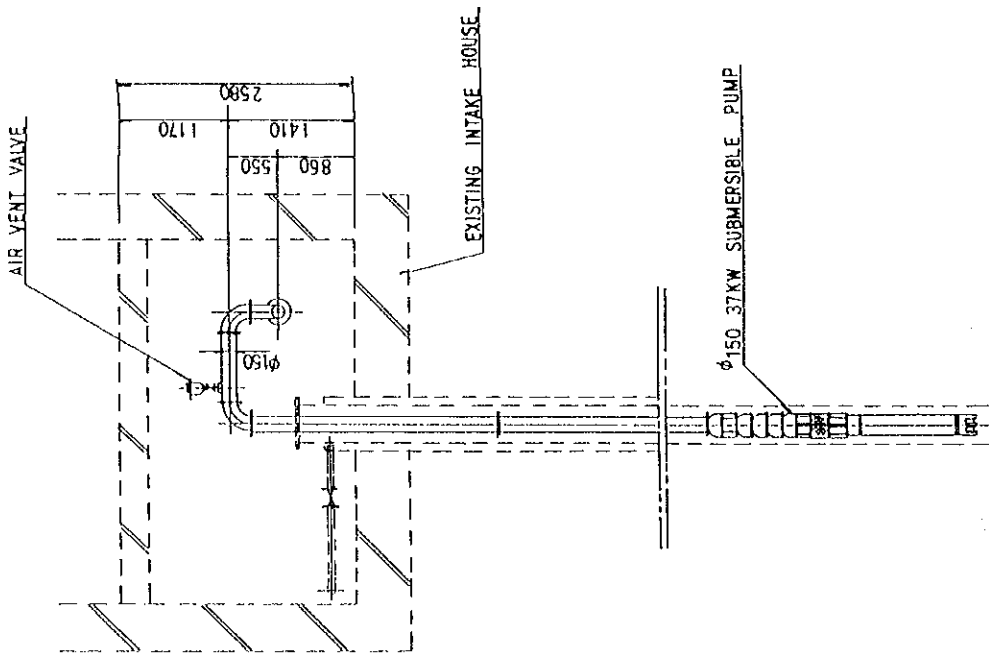


Fig. (4) Submersible Pump for Industrial Water Source and Meat Complex Water Source (1)

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No	Name	Number/Place	Measurement	Materials
1	Drain Valve	1	150 A	FC/NC
2	Check Valve	1	150 A	FC/NC
3	Flow Meter	1	150 A	---
4	Air Vent Valve	1	10 A	---
5	Pipe	1 Sec	150 A	Steel Pipe
6	Submersible Pump	1	150A, 311W	---
7	Motor Valve	1	150 A	FC/NC



SECTION A - A S = 1/50

PUMP SPECIFICATION	
NO. OF REPLACED FOR INDUSTRIAL	7 SETS
NO. OF PROCUREMENT ONLY FOR INDUSTRIAL	2 SETS
NO. OF REPLACED FOR MEAT COMPLEX	5 SETS
NO. OF PROCUREMENT ONLY FOR MEAT COMPLEX	2 SETS
TOTAL	16 SETS
DISCHARGE DIA.	150 mm
CAPACITY	120 m <sup>3</sup> /H
TOTAL HEAD	60 m
PUMP SPEED	2900 rpm
MOTOR OUTPUT	37 KW

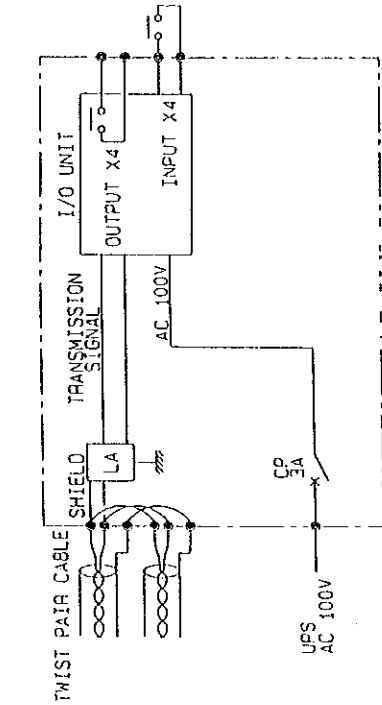
Legend  
 — : Rehabilitation  
 - - - : Existing

Fig. (5) Submersible Pump for Industrial Water Source and Meat Complex Water Source (2)  
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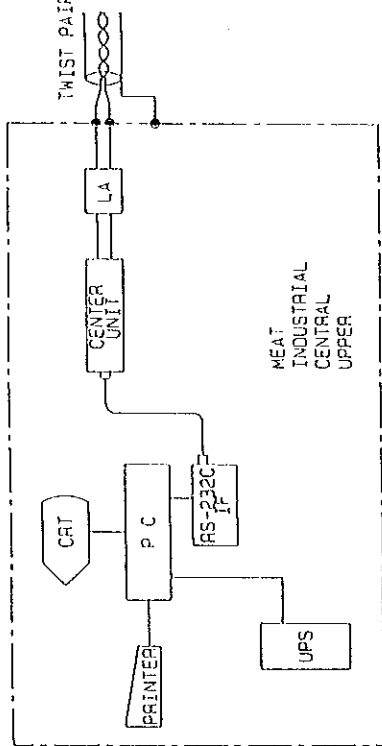




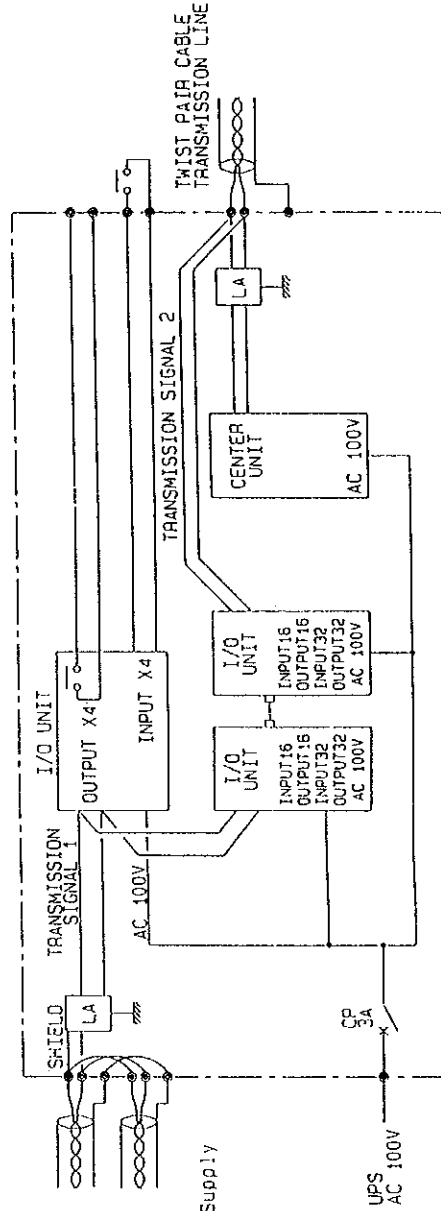
LOCAL STATION (A TYPE)



CENTER SYSTEM



LOCAL STATION (B TYPE) (WITH LONG DISTANCE TRANSMISSION BOOSTER)

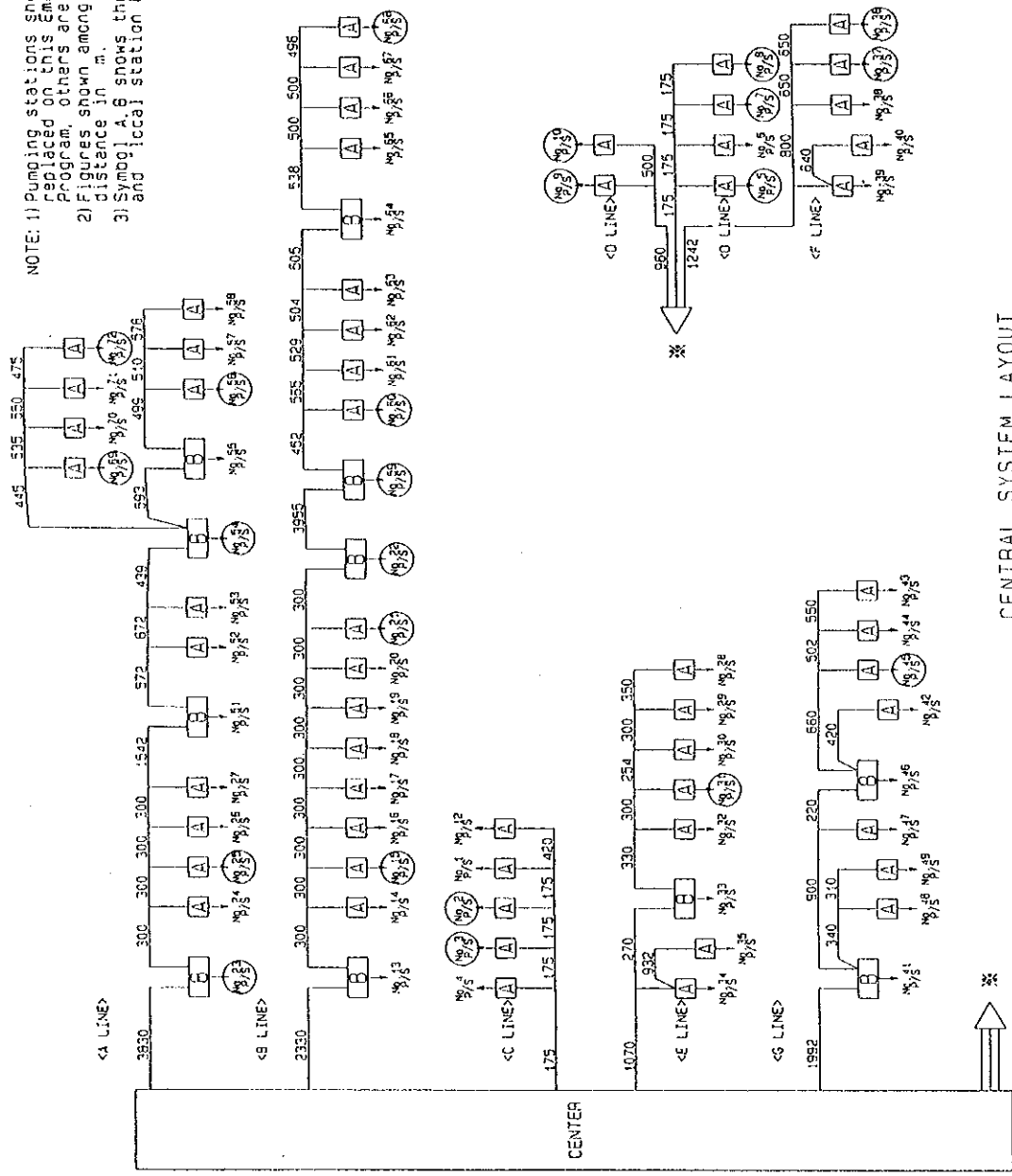


LEGEND

- PC Personal Computer
- CRT Cathoderay Tube
- UPS Un-interrupted Power Supply
- IF Inter Face
- LA Lightning Arrester
- CP Circuit Protector

Fig. (7) Remote Operation System for Submersible Pump (1)  
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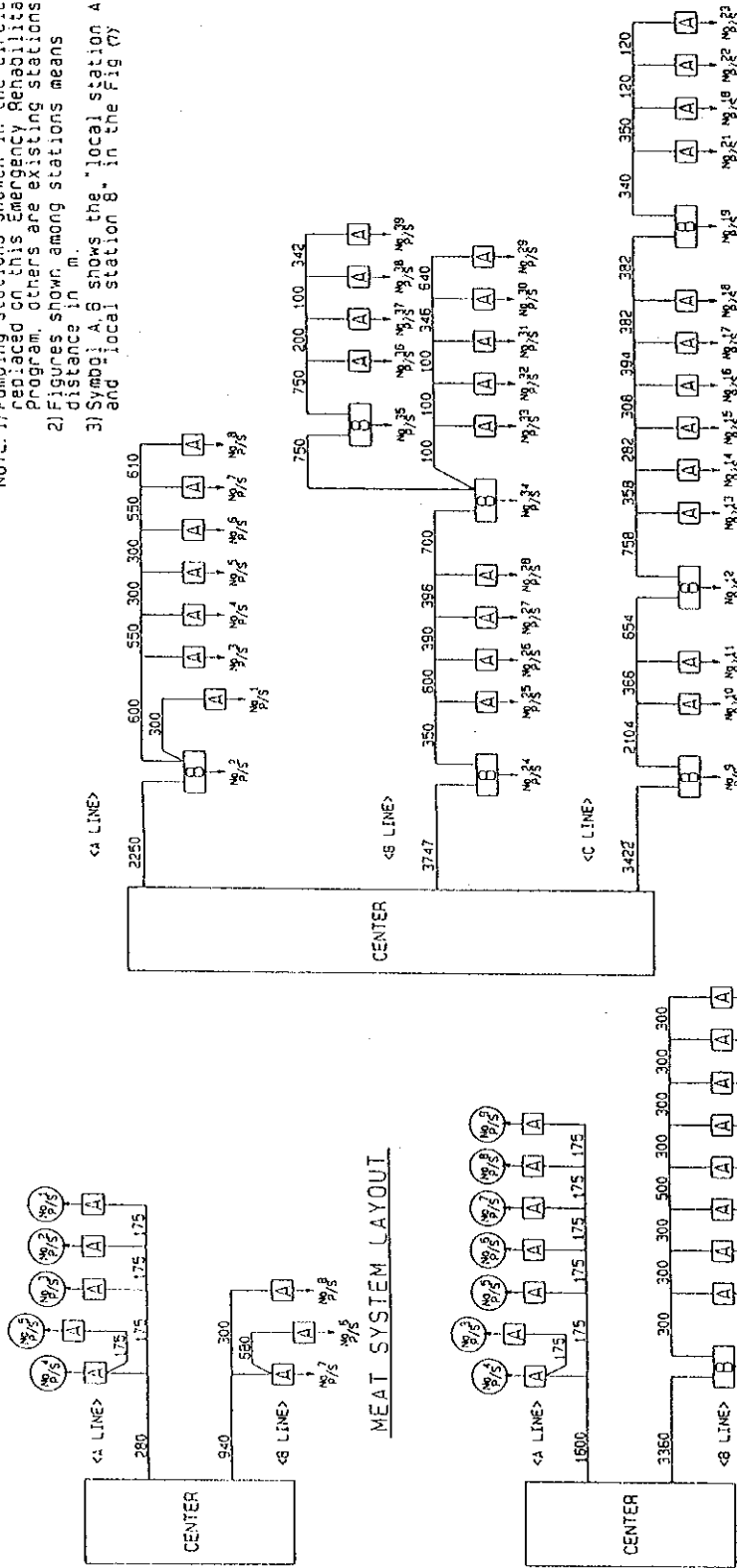
NOTE: 1) Pumping stations shown in the circle are replaced on this Emergency Rehabilitation Program, others are existing stations.  
 2) Figures shown among stations means distance in m.  
 3) Symbol "A, B" shows the "local station A" and "local station B" in the Fig (7).



CENTRAL SYSTEM LAYOUT

Fig. (8) Remote Operation System for Submersible Pump (2)  
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NOTE: 1) Pumping stations shown in the circle are provided on this Emergency Rehabilitation Program. Others are existing stations.  
 2) Figures show existing stations distance in m.  
 3) Symbol A, B shows the "local station A" and "local station B" in the Fig (7)

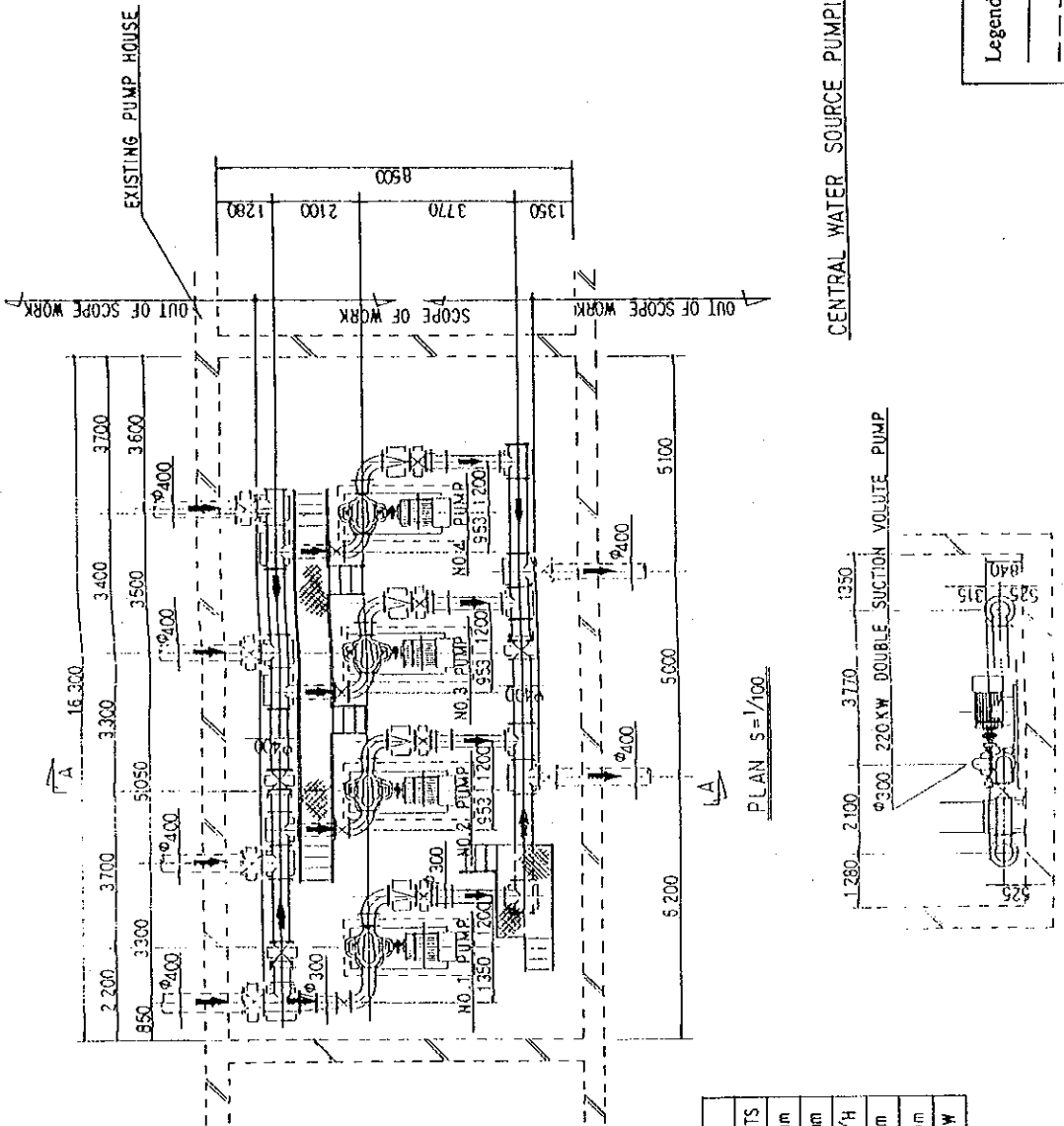


UPPER SYSTEM LAYOUT

INDUSTRIAL SYSTEM LAYOUT

MEAT SYSTEM LAYOUT

Fig. (9) Remote Operation System For Submersible Pump (3)  
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Legend  
 : Rehabilitation  
 : Existing

PUMP SPECIFICATION	
NO. OF REPLACED	4 SETS
SUCTION DIA.	300 mm
DISCHARGE DIA.	250 mm
CAPACITY	630 m <sup>3</sup> /H
TOTAL HEAD	90 m
PUMP SPEED	1470 rpm
MOTOR OUTPUT	220 KW

Fig. (10) Distribution Pump (Old Station) for Central Water Source (1)  
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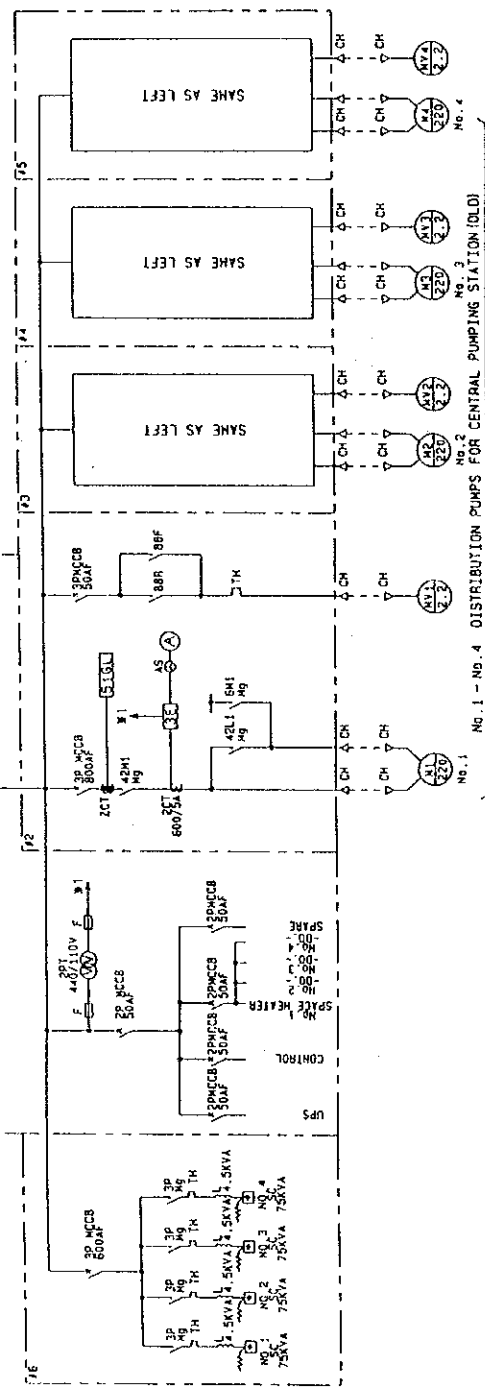
LEGEND

- F Fuse
- V Selection Switch
- AS Ammeter Selector Switch
- V Voltmeter
- W Watt-hour meter
- REG Automatic Power-factor Regulator
- Watt-meter
- Over-current Relay
- Ground Fault Current Relay
- Under-voltage/Over-voltage Relay
- Thermal Relay
- MCCB Mold Case Circuit Breaker
- PT Voltage Transformer
- CT Current Transformer
- ZCT Zero-phase Current Transformer
- Mg Magnetic Contactor
- SC Capacitor
- CH Cable Head

INCOMING (EXISTING)  
3.3KV 50HZ 3W-3PH

OUT OF SCOPE  
SCOPE OF WORK

NO.	N A M E	REMARK
11	INCOMING PANEL	NEW
12	NO. 1 MOTOR STARTER PANEL	NEW
13	NO. 2 -DITTO-	NEW
14	NO. 3 -DITTO-	NEW
15	NO. 4 -DITTO-	NEW
16	AUTOMATIC POWER FACTOR CONTROL PANEL	NEW



CENTRAL PUMPING STATION (OLD)

Fig. (11) Distribution Pump (Old station) for Central Water Source (2)  
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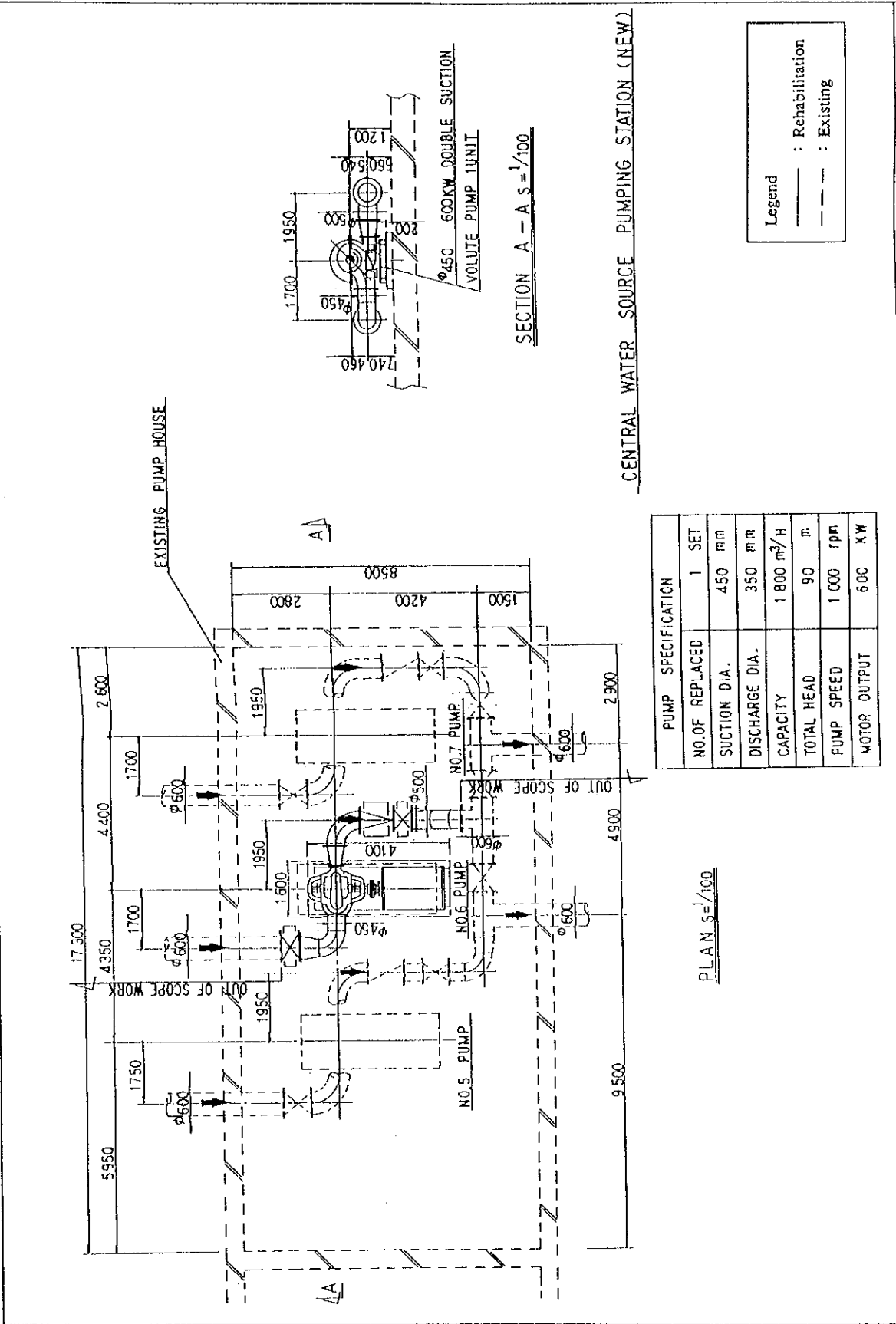
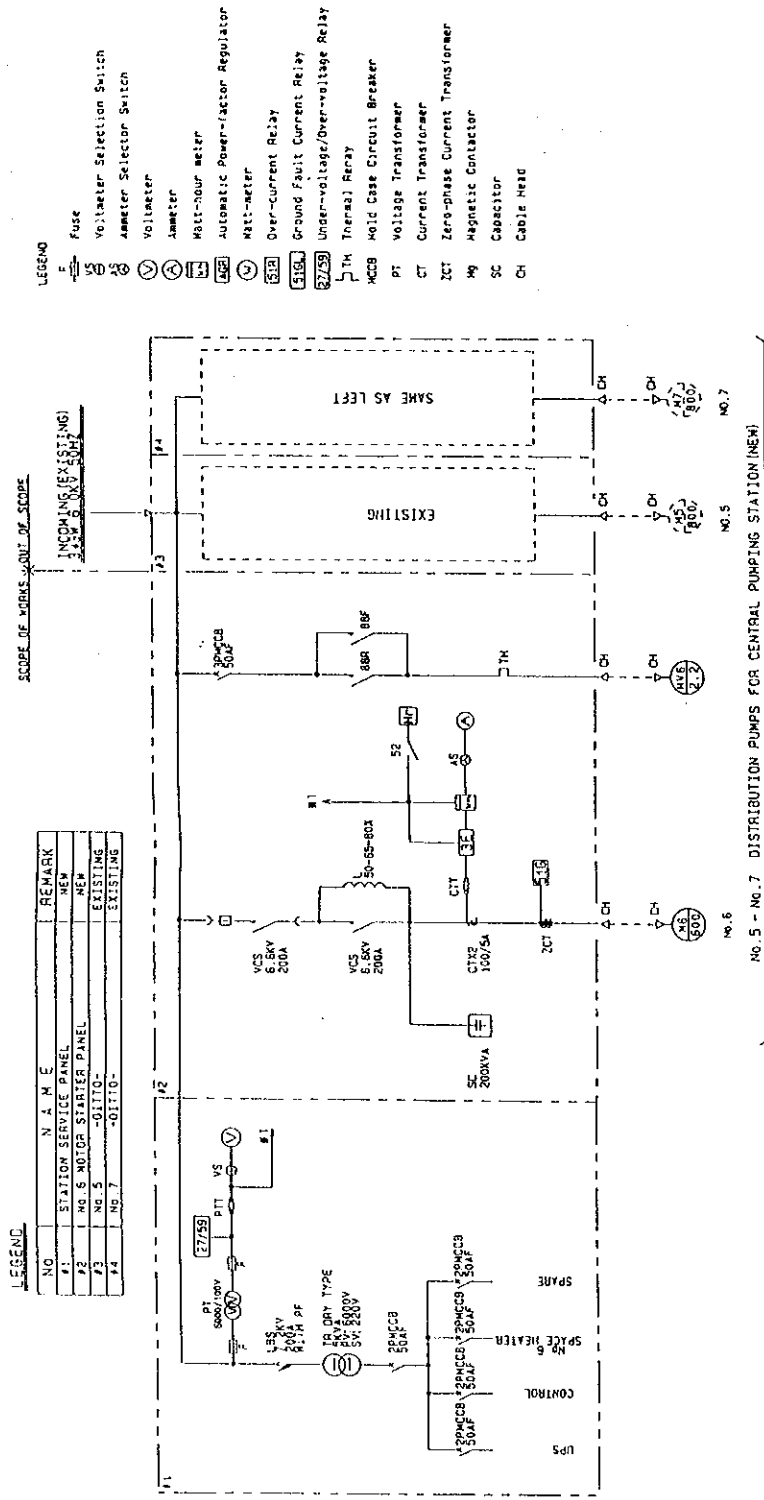


Fig. (12) Distribution Pump (New Station) for Central Water Source (1)  
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CENTRAL PUMPING STATION (NEW)

Fig. (13) Distribution Pump (New Station) for Central Water Source (2)  
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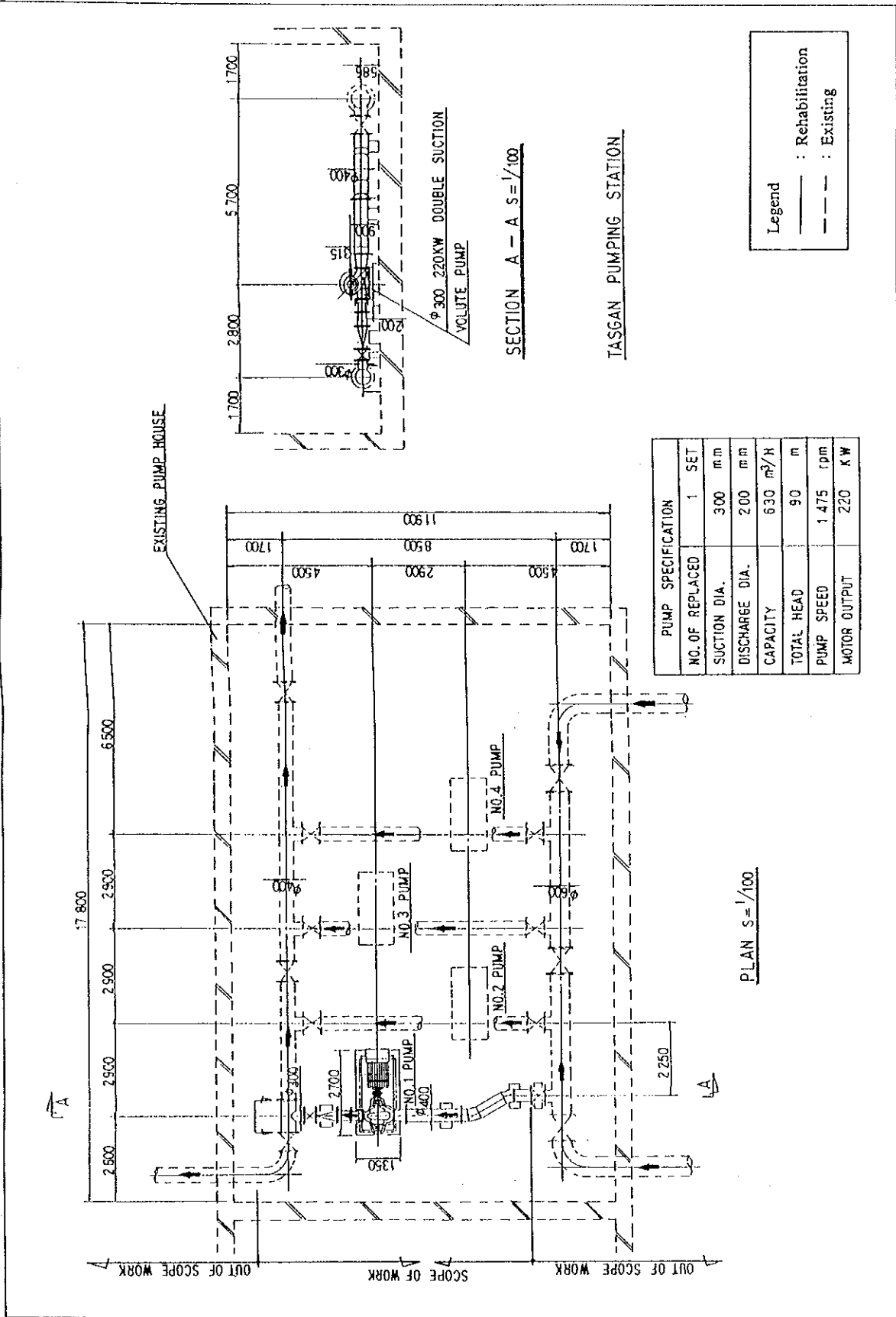


Fig. (14) Distribution Pump for Tasgan Pumping Station (I)

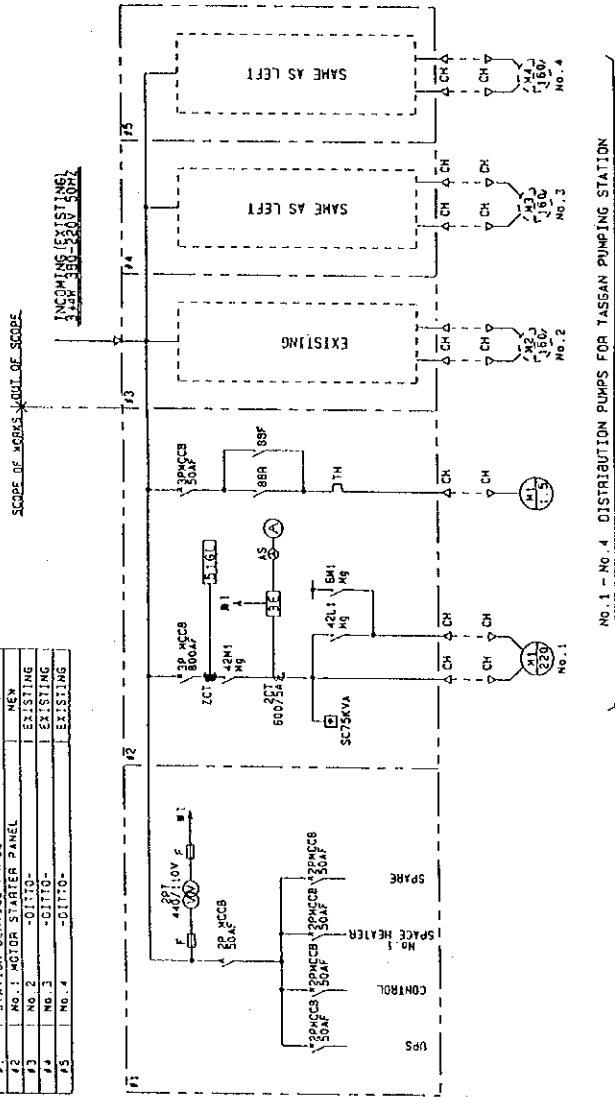
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- LEGEND
- F Fuse
  - VS Voltmeter Selection Switch
  - AS Ammeter Selection Switch
  - V Voltmeter
  - A Ammeter
  - WH Watt-hour meter
  - WR Automatic Power-factor Regulator
  - W Watt-meter
  - OR Over-current Relay
  - GR Ground Fault Current Relay
  - UV Under-voltage/Over-voltage Relay
  - TR Thermal Relay
  - MCS Mold Case Circuit Breaker
  - PT Voltage Transformer
  - CT Current Transformer
  - ZCT Zero-phase Current Transformer
  - Mg Magnetic Contactor
  - SC Capacitor
  - CH Cable Head

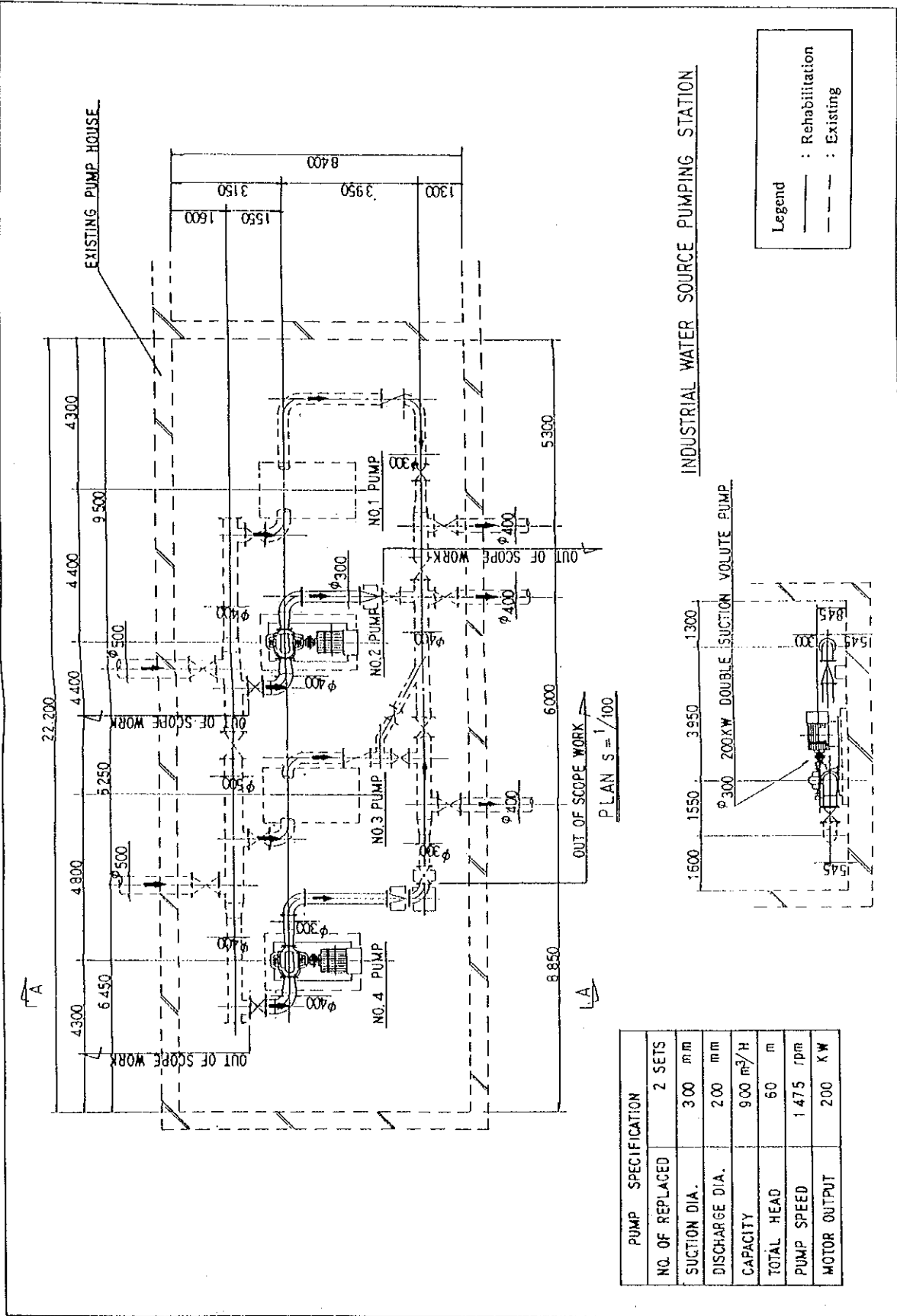
LEGEND

NO.	N.A.M.E	REMARK
21	STATION SERVICE PANEL	NEW
22	NO. 1 MOTOR STARTER PANEL	NEW
23	NO. 2 -DITTO-	EXISTING
24	NO. 3 -DITTO-	EXISTING
25	NO. 4	EXISTING



NO. 1 - NO. 4 DISTRIBUTION PUMPS FOR TASSAN PUMPING STATION

Fig. (15) Distribution Pump for Tassan Pumping Station (2)



PUMP SPECIFICATION	
NO. OF REPLACED	2 SETS
SUCTION DIA.	300 mm
DISCHARGE DIA.	200 mm
CAPACITY	900 m <sup>3</sup> /H
TOTAL HEAD	60 m
PUMP SPEED	1 475 rpm
MOTOR OUTPUT	200 KW

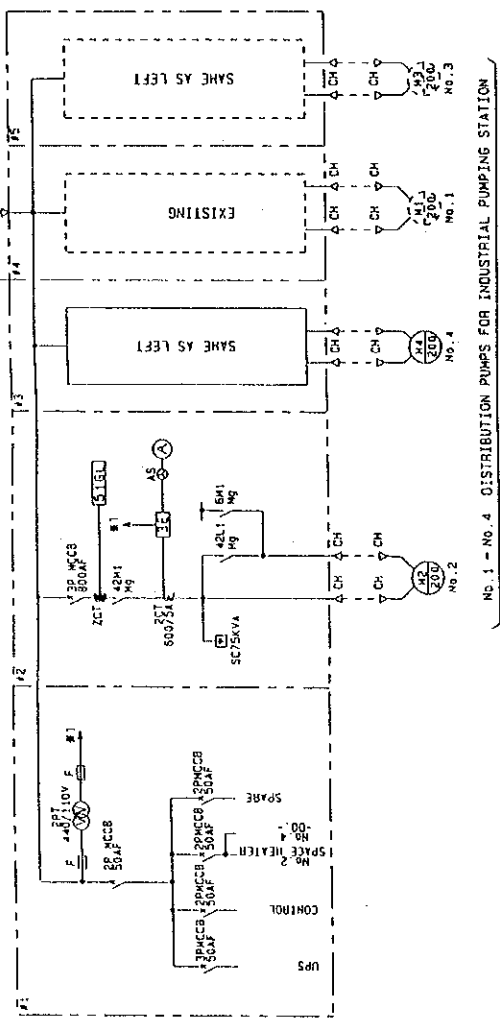
Fig. (16) Distribution Pump for Industrial Water Source (1)

SECTION A - A S = 1/100

- LEGEND**
- F Fuse
  - VS Voltmeter Selection Switch
  - AS Ammeter Selection Switch
  - V Voltmeter
  - A Ammeter
  - MHT-Hour meter
  - APR Automatic Power-factor Regulator
  - MHT-meter
  - OR Over-current Relay
  - SIB Ground Fault Current Relay
  - UVR Under-voltage/Over-voltage Relay
  - TR Thermal Relay
  - MCCB Mold Case Circuit Breaker
  - PT Voltage Transformer
  - CT Current Transformer
  - ZCT Zero-phase Current Transformer
  - Mg Magnetic Contactor
  - SC Capacitor
  - CH Cable Head

**LEGEND**

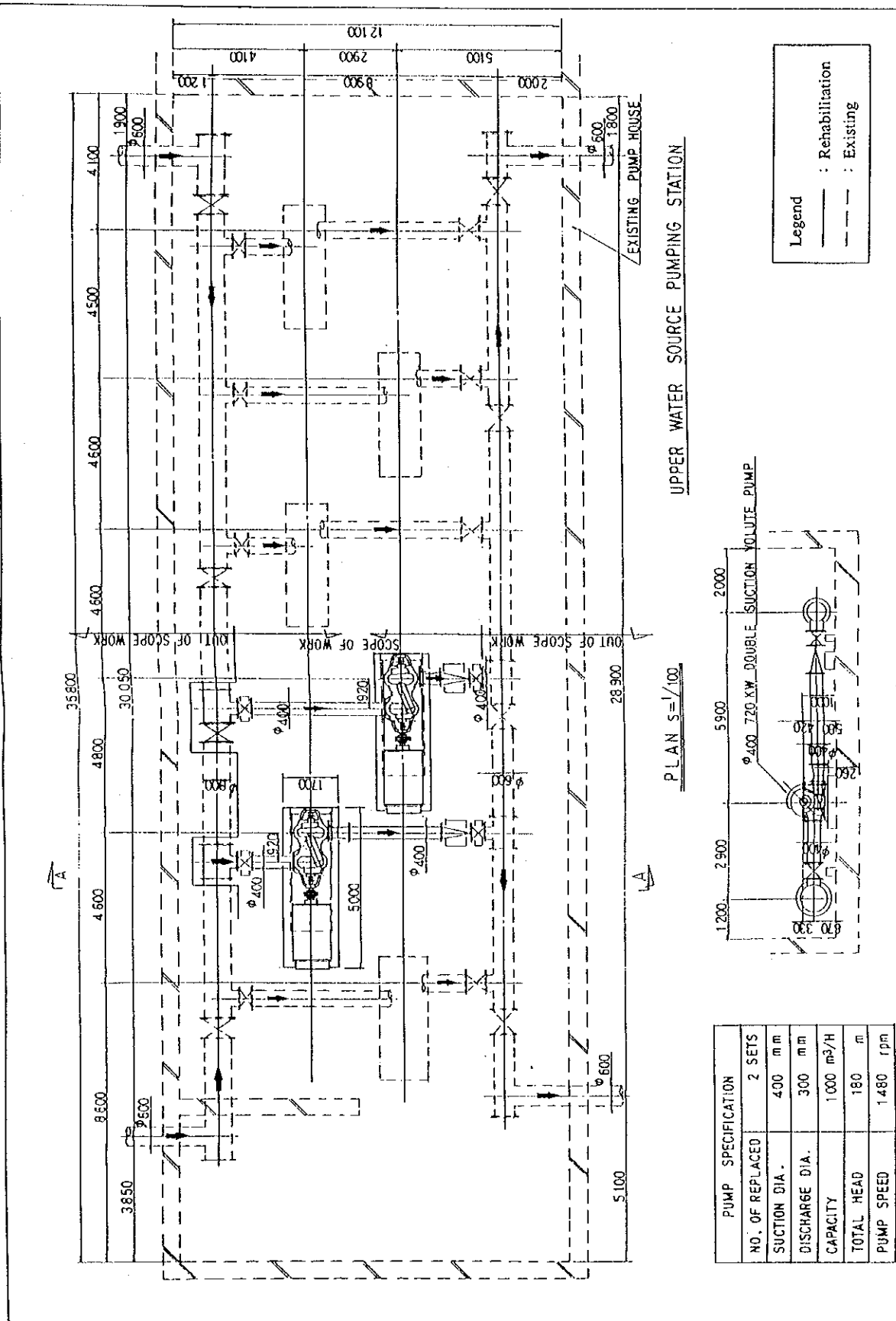
NO.	N.A.M.E.	REMARK
#1	STATION SERVICE PANEL	NEW
#2	NO. 2 MOTOR STARTER PANEL	NEW
#3	NO. 4	-DITTO-
#4	NO. 1	EXISTING
#5	NO. 3	EXISTING



INDUSTRIAL PUMPING STATION

No. 1 - No. 4 DISTRIBUTION PUMPS FOR INDUSTRIAL PUMPING STATION

Fig. (17) Distribution Pump for Industrial Water Source (2)  
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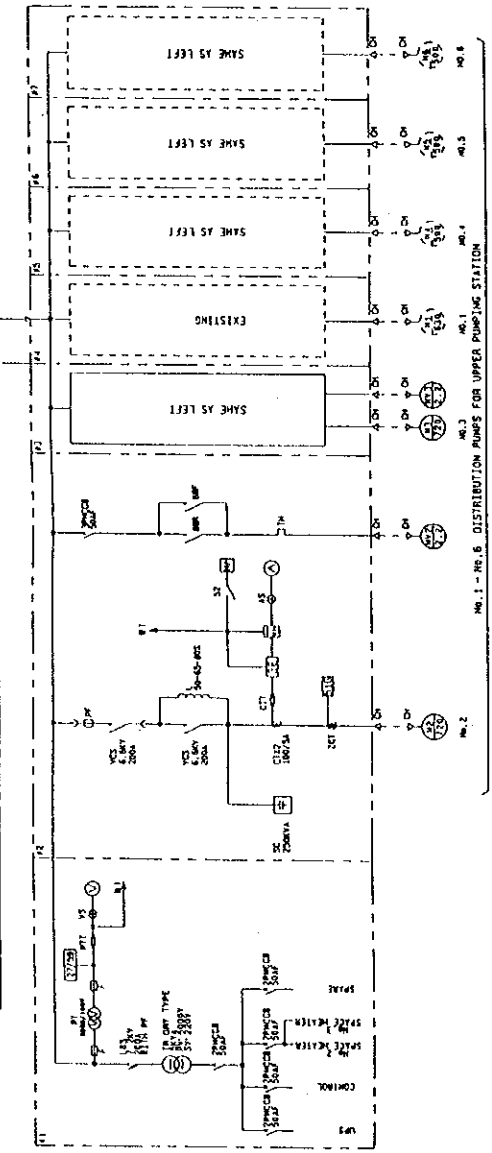


PUMP SPECIFICATION	
NO. OF REPLACED	2 SETS
SUCTION DIA.	400 mm
DISCHARGE DIA.	300 mm
CAPACITY	1000 m <sup>3</sup> /H
TOTAL HEAD	180 m
PUMP SPEED	1480 rpm
MOTOR OUTPUT	720 KW

Fig. (18) Distribution Pump for Upper Water Source (1)  
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- LEGEND
- F Fuse
  - VS Voltmeter Selection Switch
  - AS Ammeter Selection Switch
  - VS Voltmeter
  - AS Ammeter
  - MH Meter-hour meter
  - APR Automatic Power-factor Regulator
  - MH Meter
  - OR Over-current Relay
  - GR Ground Fault Current Relay
  - UV Under-voltage/Over-voltage Relay
  - TR Thermal Relay
  - MCB Mold Case Circuit Breaker
  - PT Voltage Transformer
  - CT Current Transformer
  - ICT Zero-phase Current Transformer
  - Mg Magnetic Contactor
  - SC Capacitor
  - CH Cable Head

NO.	N.A.M.E.	REMARK
41	25.11.1967	REVISION
42	25.11.1967	REVISION
43	25.11.1967	REVISION
44	25.11.1967	REVISION
45	25.11.1967	REVISION
46	25.11.1967	REVISION
47	25.11.1967	REVISION



UPPER PUMPING STATION

Fig. (19) Distribution Pump for Upper Water Source (2)  
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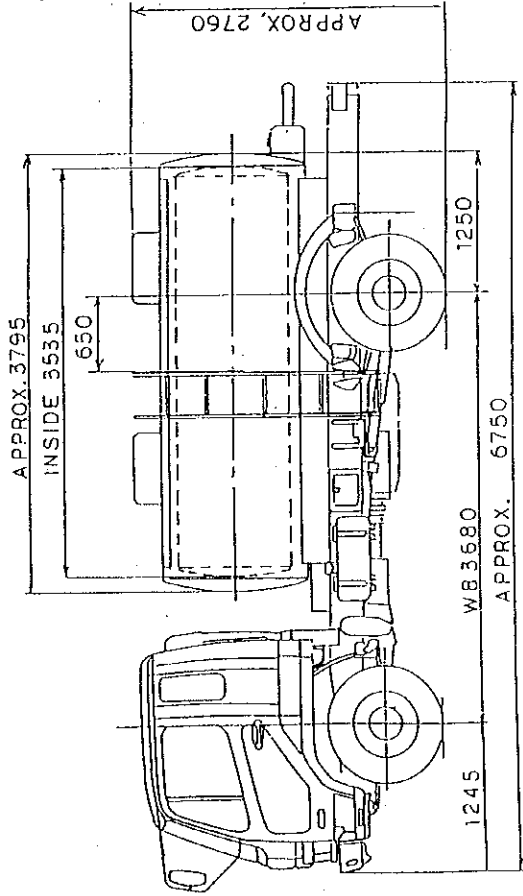
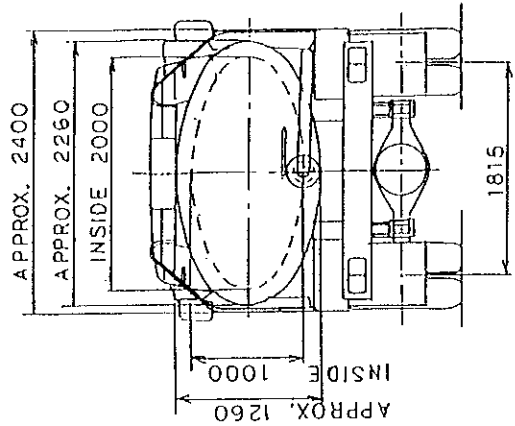
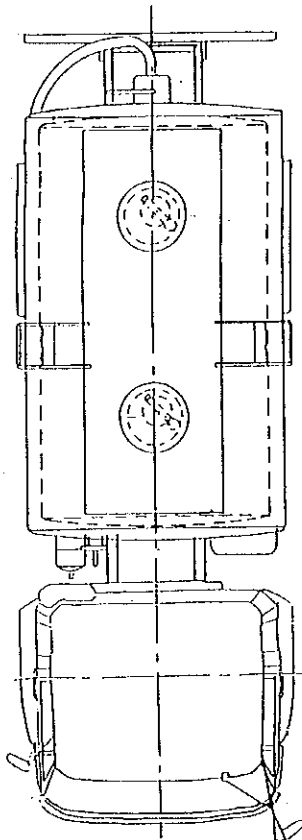


Fig. (20) Water Tank Lorry  
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**ANNEX**  
**Cost Estimate Breakdown**

Cost Estimate Breakdown

	Item-No	Construction			Consultants Fee	Total (x.10 <sup>3</sup> Yen)	Contingency (10%)	Grand Total (x.10 <sup>3</sup> Yen)
		Equipment	Transportation and Insurance	Sub-Total(CIF) (x.10 <sup>3</sup> Yen)				
1st Year	(Item-1) Replacement of Intake Pumps	547,313	25,346	572,659	45,813	618,472	57,266	675,738
	(Item-4) Procurement of Water Tank Lorries	104,951	8,008	112,959	3,389	116,348	11,296	127,644
	<b>Sub-Total</b>	<b>652,264</b>	<b>33,354</b>	<b>685,618</b>	<b>49,202</b>	<b>734,820</b>	<b>68,562</b>	<b>803,382</b>
2nd Year	(Item-3) Replacement of Distribution Pumps	533,317	17,115	550,432	44,035	594,467	55,043	649,510
	(Item-5) Procurement of Materials for Wells	113,908	20,767	134,675	4,040	138,715	13,468	152,183
	Well Materials	14,908	2,767	17,675	530	18,205	1,768	19,973
	Drilling Machine	99,000	18,000	117,000	3,510	120,510	11,700	132,210
	<b>Sub-Total</b>	<b>647,225</b>	<b>37,882</b>	<b>685,107</b>	<b>48,075</b>	<b>733,182</b>	<b>68,511</b>	<b>801,693</b>
3rd Year	(Item-2) Remote Operation System for New 35 Intake Pumps	237,246	7,106	244,352	19,548	263,900	24,435	288,335
	(Item-6) Remote Operation System for Existing 98 Intake Pumps	297,229	12,122	309,351	24,748	334,099	30,935	365,034
	(Item-7) Water Meters at 44 central Heating Centers (CTP)	17,906	583	18,489	1,479	19,968	1,849	21,817
	<b>Sub-Total</b>	<b>552,381</b>	<b>19,811</b>	<b>572,192</b>	<b>45,775</b>	<b>617,967</b>	<b>57,219</b>	<b>675,186</b>
	<b>Total</b>	<b>1,851,870</b>	<b>91,047</b>	<b>1,942,917</b>	<b>143,052</b>	<b>2,085,969</b>	<b>194,292</b>	<b>2,280,261</b>

(Note)

\*1. Consultants fee : The percentage of Item-4 and Item-5 is 3% of amount for equipment and installation cost, and other Item is 8%

\*2. Contingency : 10% of Construction cost



(Item-1)

Item No.	Q'ty	Unit Cost (Yen)	Amount (Yen)	
<b>Item-1 : Replacement of Intake Pumps</b>				
1.1 Submersible deep well pump for intake (23 pumps) of Central Water Source, including accessories and installation works				
(1)	Submersible motor pump, with motor and cable, 63m <sup>3</sup> /hour x 60m	23 nos.	3,449,000	79,327,000
(2)	Rising pipe, with bolts/nuts, packing and cable, 125mm dia., 2,750mm length	23 sets	721,000	16,583,000
(3)	Pump control panel (Wall mounted type)	23 nos.	1,724,000	39,652,000
(4)	Motor-driven delivery gate valve, 150mm dia. (10kgf/cm <sup>2</sup> )	23 nos.	828,000	19,044,000
(5)	Pump discharge non-return valve, 150mm dia. (10kgf/cm <sup>2</sup> )	23 nos.	156,000	3,588,000
(6)	Flowmeasurement device, orifice type	23 nos.	310,000	7,130,000
(7)	Steel pipes in the pump house, including bolts/nuts and packing	23 sets	1,261,000	29,003,000
(8)	Hand-operated gate valve for well drain use, 150mm dia.	23 nos.	156,000	3,588,000
(9)	Accessories for submersible pump, including low water level detector, auto air valve and compound gauge	23 sets	297,000	6,831,000
(10)	Equipment for pump station, including room heater, room lights, manual hoist and wiring	23 sets	826,000	18,998,000

- Continued to -

(Item-1)

Item No.	Q'ty	Unit Cost (Yen)	Amount (Yen)
(11) Spare parts for the above submersible pump, including the following:	1 lot		31,963,000
5 nos. - complete motors			
23 sets - liner rings			
23 sets - bushings			
5 sets - strainer			
5 sets - shaft coupling			
1 lot - recommended spares			
5 sets - complete set of contactors			
5 sets - push buttons and selector switches			
5 sets - volt-meters, ammeters and KWH meters			
5 sets - potential transformers and current transformer			
2 sets - lighting arrestors			
23 sets - fluorescent lamps			
23 sets - lamp bulb and fuse			
Sub Total (FOB of 1.1)			255,707,000
1.2			
Submersible deep well pump for extra use (7 pumps) in future in Central Water Source, including accessories			
(1) Submersible motor pump, with motor and cable, 63m <sup>3</sup> /hour x 60m	7 nos.	3,449,000	24,143,000
(2) Rising pipe, with bolts/nuts, packing and cable, 125mm dia., 2,750mm length	7 sets	721,000	5,047,000
(3) Pump control panel (Wall mounted type)	7 nos.	1,724,000	12,068,000
(4) Motor-driven delivery gate valve, 150mm dia. (10kgf/cm <sup>2</sup> )	7 nos.	828,000	5,796,000
(5) Pump discharge non-return valve, 150mm dia. (10kgf/cm <sup>2</sup> )	7 nos.	156,000	1,092,000
(6) Flow measurement device, orifice type	7 nos.	319,000	2,233,000
(7) Steel pipes in the pump house, including bolts/nuts and packing	7 sets	1,261,000	8,827,000
(8) Hand-operated gate valve for well drain use, 150mm dia.	7 nos.	156,000	1,092,000

- Continued to -

(Item-1)				
Item No.	Q'ty	Unit Cost (Yen)	Amount (Yen)	
(9)	Accessories for submersible pump, including low water level detector, auto air valve and compound gauge	7 sets	297,000	2,079,000
(10)	Equipment for pump station, including room heater, room lights, manual hoist and wiring	7 sets	826,000	5,782,000
(11)	Spare parts for the above submersible pump, including the following: 2 nos. - complete motors 7 sets - liner rings 7 sets - bushings 2 sets - strainer 2 sets - shaft coupling 1 lot - recommended spares 1 sets - complete set of contactor 1 sets - push button and selector switch 1 sets - volt-meter, ammeter and KWH meter 1 sets - potential transformer and current transformer 1 sets - lighting arrestor 2 sets - fluorescent lamps 2 sets - lamp bulb and fuse	1 lot		10,640,000
Sub Total (FOB of 1.2)				78,799,000

### 1.3

Submersible deep well pump for intake  
(7 pumps) of Industrial Water Source,  
including accessories  
and installation works

(1)	Submersible motor pump, with motor and cable, 120m <sup>3</sup> /hour x 60m	7 nos.	4,344,000	30,408,000
(2)	Rising pipe, with bolts/nuts, packing and cable, 150mm dia., 2,750mm length	7 sets	762,000	5,334,000
(3)	Pump control panel (Wall mounted type)	7 nos.	2,038,000	14,266,000
(4)	Motor-driven delivery gate valve, 150mm dia. (10kgf/cm <sup>2</sup> )	7 nos.	828,000	5,796,000
(5)	Pump discharge non-return valve, 150mm dia. (10kgf/cm <sup>2</sup> )	7 nos.	156,000	1,092,000

- Continued to -

			(Item-1)	
Item No.	Q'ty	Unit Cost ( Yen )	Amount ( Yen )	
(6)	Flow measurement device, orifice type	7 nos.	342,000	2,394,000
(7)	Steel pipes in the pump house, including bolts/nuts and packing	7 sets	1,261,000	8,827,000
(8)	Hand-operated gate valve for well drain use, 150mm dia.	7 nos.	156,000	1,092,000
(9)	Accessories for submersible pump, including low water level detector, auto air valve and compound gauge	7 sets	286,000	2,002,000
(10)	Equipment for pump station, including room heater, room lights, manual hoist and wiring	7 sets	859,000	6,013,000
(11)	Spare parts for the above submersible pump, including the following: 2 nos. - complete motors 7 sets - liner rings 7 sets - bushings 2 sets - strainer 2 sets - shaft coupling 1 lot - recommended spares 2 sets - complete set of contactors 2 sets - push buttons and selector switches 2 sets - volt-meters, ammeters and KWH meters 2 sets - potential transformers and current transformer 1 set - lighting arrestor 7 sets - fluorescent lamps 7 sets - lamp bulb and fuse	1 lot		13,648,000
Sub Total (FOB of 1.3)				90,872,000
1.4 Submersible deep well pump for extra use (2 pumps) in future in Industrial Water Source, including accessories				
(1)	Submersible motor pump, with motor and cable, 120m <sup>3</sup> /hour x 60m	2 nos.	4,344,000	8,688,000
(2)	Rising pipe, with bolts/nuts, packing and cable, 150mm dia., 2,750mm length	2 sets	762,000	1,524,000

- Continued to -

(Item-1)			
Item No.	Q'ty	Unit Cost ( Yen )	Amount ( Yen )
(3) Pump control panel (Wall mounted type)	2 nos.	2,038,000	4,076,000
(4) Motor-driven delivery gate valve, 150mm dia. (10kgf/cm <sup>2</sup> )	2 nos.	828,000	1,656,000
(5) Pump discharge non-return valve, 150mm dia. (10kgf/cm <sup>2</sup> )	2 nos.	156,000	312,000
(6) Flow measurement device, orifice type	2 nos.	376,000	752,000
(7) Steel pipes in the pump house, including bolts/nuts and packing	2 sets	1,261,000	2,522,000
(8) Hand-operated gate valve for well drain use, 150mm dia.	2 nos.	156,000	312,000
(9) Accessories for submersible pump, including low water level detector, auto air valve and compound gauge	2 sets	286,000	572,000
(10) Equipment for pump station, including room heater, room lights, manual hoist and wiring	2 sets	859,000	1,718,000
(11) Spare parts for the above submersible pump, including the following:	1 lot		6,245,000
1 no - complete motor			
2 sets - liner rings			
2 sets - bushings			
1 set - strainer			
1 set - shaft coupling			
1 lot - recommended spares			
1 set - complete set of contactor			
1 set - push button and selector switch			
1 set - volt-meter, ammeter and KWH meter			
1 set - potential transformer and current transformer			
1 set - lighting arrestor			
2 sets - fluorescent lamps			
2 sets - lamp bulb and fuse			
Sub Total (FOB of 1.4)			28,377,000

- Continued to -

(Item-1)

Item No.	Q'ty	Unit Cost (Yen)	Amount (Yen)
1.5 Submersible deep well pump for intake (5 pumps) of Meat Complex Water Source, including accessories and installation works			
(1) Submersible motor pump, with motor and cable, 120m <sup>3</sup> /hour x 60m	5 nos.	4,344,000	21,720,000
(2) Rising pipe, with bolts/nuts, packing and cable, 150mm dia., 2,750mm length	5 sets	791,000	3,955,000
(3) Pump control panel (Wall mounted type)	5 nos.	2,038,000	10,190,000
(4) Motor-driven delivery gate valve, 150mm dia. (10kgf/cm <sup>2</sup> )	5 nos.	828,000	4,140,000
(5) Pump discharge non-return valve, 150 mm dia. (10kgf/cm <sup>2</sup> )	5 nos.	156,000	780,000
(6) Flow measurement device, orifice type	5 nos.	360,000	1,800,000
(7) Steel pipes in the pump house, including bolts/nuts and packing	5 sets	1,261,000	6,305,000
(8) Hand-operated gate valve for well drain use, 150mm dia.	5 nos.	156,000	780,000
(9) Accessories for submersible pump, including low water level detector, auto air valve and compound gauge	5 sets	286,000	1,430,000
(10) Equipment for pump station, including room heater, room lights, manual hoist and wiring	5 sets	859,000	4,295,000
(11) Spare parts for the above submersible pump, including the following: 1 no. - complete motor 5 sets - liner rings 5 sets - bushings 1 set - strainer 1 set - shaft coupling 1 lot - recommended spares	1 lot		9,106,000

- Continued to -

			(Item-1)
Item No.	Q'ty	Unit Cost ( Yen )	Amount ( Yen )
2 sets			
2 sets			
2 sets			
2 sets			
1 set			
5 sets			
5 sets			
Sub Total (FOB of 1.5)			64,501,000
1.6			
Submersible deep well pump for extra use (2 pumps) in future in Meat Complex Water Source, including accessories			
(1)	Submersible motor pump, with motor and cable, 120m <sup>3</sup> /hour x 60m	2 nos.	4,344,000      8,688,000
(2)	Rising pipe, with bolts/nuts, packing and cable, 150mm dia., 2,750mm length	2 sets	791,000      1,582,000
(3)	Pump control panel (Wall mounted type)	2 nos.	2,038,000      4,076,000
(4)	Motor-driven delivery gate valve, 150mm dia. (10kgf/cm <sup>2</sup> )	2 nos.	828,000      1,656,000
(5)	Pump discharge non-return valve, 150mm dia. (10kgf/cm <sup>2</sup> )	2 nos.	156,000      312,000
(6)	Flow measurement device, orifice type	2 nos.	376,000      752,000
(7)	Steel pipes in the pump house, including bolts/nuts and packing	2 sets	1,261,000      2,522,000
(8)	Hand-operated gate valve for well drain use, 150mm dia.	2 nos.	156,000      312,000
(9)	Accessories for submersible pump, including low water level detector, auto air valve and compound gauge	2 sets	286,000      572,000
(10)	Equipment for pump station, including room heater, room lights, manual hoist and wiring	2 sets	859,000      1,718,000

- Continued to -

(Item-1)			
Item No.	Q'ty	Unit Cost ( Yen )	Amount ( Yen )
(11) Spare parts for the above submersible pump, including the following:	1 lot		6,057,000
1 no. - complete motor			
2 sets - liner rings			
2 sets - bushings			
1 set - strainer			
1 set - shaft coupling			
1 lot - recommended spares			
1 set - complete set of contactor			
1 set - push button and selector switch			
1 set - volt-meter, ammeter and KWH meter			
1 set - potential transformer and current transformer			
1 set - lighting arrestor			
2 sets - fluorescent lamps			
2 sets - lamp bulb and fuse			
Sub Total (FOB of 1.6)			28,247,000
Total (FOB of Item-1: 1.1 + 1.2 + 1.3 + 1.4 + 1.5 + 1.6)			546,503,000
Installation cost	1 lot		810,000
Total (Equipment)			547,313,000
Transportation and Insurance	1 lot		25,346,000
Total (Construction cost)			572,659,000
Consultants Fee (8% of Construction cost)	1 lot		45,813,000
Total			618,472,000
Contingency (10% of Construction cost)	1 lot		57,266,000
Grand Total (Item-1)			Yen 675,738,000

(End of Item-1)



(Item-2)

Item No.	Q'ty	Unit Cost (Yen)	Amount (Yen)	
<b>Item-2 : Remote Operation System for New 35 Intake Pumps</b>				
2.1				
Remote operation system for new 23 intake pumps in the Central Water Source, including operation/indication at the control center				
(1)	Telemeter transfer panel at intake pump house for new 23 sites, wall-mounted type	23 nos.	1,254,000	28,842,000
(2)	Un-interrupted power supply (UPS) in intake pump house	23 nos.	941,000	21,643,000
(3)	Telemeter receiving panel for 70 intake pumps, 23 new pumps and 47 existing pumps	1 lot		15,326,000
(4)	Control cable between 70 intake pump house and the control center, including connection box	1 lot		46,981,000
(5)	Attachment on the wooden pole for transmission line	1 lot		7,004,000
(6)	Spare parts of the above remote operation system, including the following: 2 sets - complete set of local units 5 sets - lighting arrestors 2 sets - un-interrupted power supply 250m - communication cable 1 lot - maintenance parts for transmission line 1 set - processors, remote I/O, recording paper, etc.	1 lot		15,509,000
Sub Total (FOB of 2.1)				135,305,000

- Continued to -

(Item-2)

Item No.	Q'ty	Unit Cost ( Yen )	Amount ( Yen )
2.2			
Remote operation system for new 7 intake pumps in the Industrial Water Source, including operation/indication at the control center			
(1) Telemeter transfer panel at intake pump house for new 7 sites, wall-mounted type	7 nos.	1,254,000	8,778,000
(2) Un-interrupted power supply (UPS) in intake pump house	7 nos.	941,000	6,587,000
(3) Telemeter receiving panel for 16 intake pumps, 7 new pumps and 9 existing pumps	1 lot		14,072,000
(4) Control cable between 16 intake pump houses and the control center, including connection box	1 lot		14,180,000
(5) Attachment on the wooden pole for transmission line	1 lot		2,335,000
(6) Spare parts of the above remote operation system, including the following: 1 set - complete set of local unit 2 sets - lighting arrestors 1 set - un-interrupted power supply 50m - communication cable 1 lot - maintenance parts for transmission line 1 set - processors, remote I/O, recording paper, etc.	1 lot		12,352,000
Sub Total (FOB of 2.2)			58,304,000

- Continued to -

(Item-2)

Item No.	Q'ty	Unit Cost (Yen)	Amount (Yen)
2.3 Remote operation system for new 5 intake pumps in the Meat Complex Water Source, including operation/indication at the control center			
(1) Telemeter transfer panel at intake pump house for new 5 sites, wall-mounted type	5 nos.	1,254,000	6,270,000
(2) Un-interrupted power supply (UPS) in intake pump house	5 nos.	941,000	4,705,000
(3) Telemeter receiving panel for 70 intake pumps, 5 new pumps and 3 existing pumps	1 lot		13,758,000
(4) Control cable between 8 intake pump houses and the control center, including connection box	1 lot		3,969,000
(5) Attachment on the wooden pole for transmission line	1 lot		468,000
(6) Spare parts of the above remote operation system, including the following: 1 set - complete set of local unit 2 sets - lightning arrestors 1 set - un-interrupted power supply 50m - communication cable 1 lot - maintenance parts for transmission line 1 set - processor, remote I/O, recording paper, etc.	1 lot		12,352,000
Sub Total (FOB of 2.3)			41,522,000

- Continued to -

(Item-2)			
Item No.	Q'ty	Unit Cost ( Yen )	Amount ( Yen )
Total (FOB of Item-2: 2.1 + 2.2 + 2.3)			235,131,000
Installation cost	1 lot		2,115,000
Total (Equipment)			237,246,000
Transportation and Insurance	1 lot		7,106,000
Total (Construction cost)			244,352,000
Consultants Fee (8% of Construction cost)	1 lot		19,548,000
Total			263,900,000
Contingency (10% of Construction cost)	1 lot		24,435,000
Grand Total (Item-2)			Yen 288,335,000

(End of Item-2)

(Item-3)

Item No.	Q'ty	Unit Cost (Yen)	Amount (Yen)
<b>Item-3 : Replacement of Distribution Pumps</b>			
3.1	Horizontal double-suction volute pump (4 sets) for distribution in the Central Pumping Station (Old), including accessories and installation work		
(1)	4 sets	13,400,000	53,600,000
(2)	4 nos.	427,000	1,708,000
(3)	4 nos.	1,761,000	7,044,000
(4)	4 nos.	417,000	1,668,000
(5)	2 nos.	877,000	1,754,000
(6)	2 nos.	877,000	1,754,000
(7)	1 lot		18,065,000
(8)	1 lot		39,570,000
(9)	1 lot		254,000
(10)	1 lot		945,000
(11)			15,400,000
	Spare parts for the above distribution pump, including the following:		
	4 sets - liner rings		
	4 sets - pump bearings		

- Continued to -

(Item-3)

Item No.	Q'ty	Unit Cost (Yen)	Amount (Yen)
16 sets - gland packings			
16 sets - O-ring, gaskets			
1 set - coupling parts			
1 lot - recommended spares			
1 set - motor bearings			
4 sets - complete set of contactors			
1 set - push button and selector switch			
1 set - auxiliary relay and timer			
1 set - volt meter and KWH meter			
1 set - potential transformer and current transformer			
1 set - lamp bulb, control fuse			
1 set - measuring equipment for maintenance			
1 set - maintenance tools			
Sub Total (FOB of 3.1)			141,762,000
3.2 Horizontal double-suction volute pump (1 set) for distribution in the Central Pumping Station (New), including accessories and installation work			
(1) Horizontal double-suction pump, including motor, common base and coupling, 1,800m <sup>3</sup> /hour capacity and 90m head	1 set	45,800,000	45,800,000
(2) Hand-operated pump suction gate valve, 600mm dia. (10kgf/cm <sup>2</sup> )	1 no.	2,154,000	2,154,000
(3) Motor-driven pump discharge gate valve, 250mm dia. (10kgf/cm <sup>2</sup> )	1 no.	3,368,000	3,368,000
(4) Non-return valve, 500mm dia. (10kgf/cm <sup>2</sup> )	1 no.	1,831,000	1,831,000
(5) Steel pipes around the pump replaced, including bolts/nuts and packing	1 lot		3,318,000
(6) Motor control panel, self-standing indoor use	1 lot		12,100,000
(7) Instrumentation, including switch for suction and pressure gauges	1 lot		64,000
(8) Drain pump for pumping station with delivery pipes, valves and control; panel	1 lot		945,000

- Continued to -

(Item-3)

Item No.	Q'ty	Unit Cost ( Yen )	Amount ( Yen )
(9) Spare parts for the above distribution pump, including the following:	1 lot		15,400,000
1 set - liner ring			
1 sets - pump bearings			
4 sets - gland packings			
4 sets - O-ring, gaskets			
1 set - coupling parts			
1 lot - recommended spares			
1 set - motor bearings			
1 set - vacuum contactor switch with power fuse			
1 set - push button and selector switch			
1 set - auxiliary relay and timer			
1 set - volt meter and KWH meter			
1 set - potential transformer and current transformer			
1 set - lamp bulb, control fuse			
1 set - measuring equipment for maintenance			
1 set - maintenance tools			
Sub Total (FOB of 3.2)			84,980,000
3.3 Horizontal double-suction volute pump (1 set) for distribution in the Tasgan Pumping Station, including accessories and installation work			
(1) Horizontal double-suction pump, including motor, common base and coupling, 630m <sup>3</sup> /hour capacity and 90m head	1 set	13,400,000	13,400,000
(2) Motor-driven pump discharge gate valve, 300mm dia.	1 no.	1,911,000	1,911,000
(3) Non-return valve, 300mm dia. (10kg/cm <sup>2</sup> )	1 no.	618,000	618,000
(4) Steel pipes around the pump replaced, including bolts/nuts and packing	1 lot		2,444,000
(5) Motor control panel, self-standing indoor use	1 no.		6,897,000
(6) Instrumentation, including switch for suction and pressure gauges	1 lot		64,000

- Continued to -

(Item-3)

Item No.	Q'ty	Unit Cost (Yen)	Amount (Yen)
(7) Drain pump for pumping station with delivery pipes, valves and control; panel	1 lot		945,000
(8) Spare parts for the above distribution pump, including the following: 1 set - liner ring 1 set - pump bearings 4 sets - gland packings 4 sets - O-ring, gaskets 1 set - coupling parts 1 lot - recommended spares 1 set - motor bearings 1 set - complete set of contactor 1 set - push button and selector switch 1 set - auxiliary relay and timer 1 set - volt meter and KWH meter 1 set - potential transformer and current transformer 1 set - lamp bulb, control fuse 1 set - measuring equipment for maintenance 1 set - maintenance tools	1 lot		9,093,000
Sub Total (FOB of 3.3)			35,372,000
3.4 Horizontal double-suction volute pump (2 sets) for distribution in the Industrial Water Source Pumping Station, including accessories and installation work			
(1) Horizontal double-suction pump, including motor, common base and coupling, 900m <sup>3</sup> /hour capacity and 60m head	2 sets	11,520,000	23,040,000
(2) Hand-operated pump suction gate valve, 400mm dia. (10kg/cm <sup>2</sup> )	2 nos.	877,000	1,754,000
(3) Non-return valve, 300mm dia. (10kg/cm <sup>2</sup> )	2 nos.	618,000	1,236,000
(4) Steel pipes around the pump replaced, including bolts/nuts and packing	1 lot		3,113,000
(5) Motor control panel, self-standing indoor use	1 no.		16,010,000

- Continued to -



				(Item-3)
Item No.		Q'ty	Unit Cost ( Yen )	Amount ( Yen )
(6)	Instrumentation, including switch for suction and pressure gauges	1 lot		127,000
(7)	Drain pump for pumping station with delivery pipes, valves and control; panel	1 lot		945,000
(8)	Spare parts for the above distribution pump, including the following: 2 sets - liner rings 2 sets - pump bearings 8 sets - gland packings 8 sets - O-ring, gaskets 1 set - coupling parts 1 lot - recommended spares 1 set - motor bearings 1 set - complete set of contactor 1 set - push button and selector switch 1 set - auxiliary relay and timer 1 set - volt meter and KWH meter 1 set - potential transformer and current transformer 1 set - lamp bulb, control fuse 1 set - measuring equipment for maintenance 1 set - maintenance tools	1 lot		11,785,000
Sub Total (FOB of 3.4)				58,010,000
3.5 Horizontal double-suction volute pump (2 sets) for distribution in the Upper Water Source Pumping Station, including accessories and installation work				
(1)	Horizontal double-suction pump, including motor, common base and coupling, 1,000m <sup>3</sup> /hour capacity and 180m head	2 sets	62,300,000	124,600,000
(2)	Hand-operated pump suction gate valve, 400mm dia. (10kgf/cm <sup>2</sup> )	2 nos.	877,000	1,754,000
(3)	Motor-driven pump discharge gate valve, 400mm dia. (20kg/cm <sup>2</sup> )	2 nos.	5,261,000	10,522,000
(4)	Non-return valve, 350mm dia. (20kg/cm <sup>2</sup> )	2 nos.	2,366,000	4,732,000

- Continued to -

(Item-3)

Item No.	Q'ty	Unit Cost ( Yen )	Amount ( Yen )
(5) Hand-operated suction header valve, 800mm dia. (10kgf/cm <sup>2</sup> )	1 no.	4,829,000	4,829,000
(6) Steel pipes in the pumping station, including bolts/nuts and packing	1 lot		10,270,000
(7) Motor control panel, self-standing indoor use	1 lot		28,850,000
(8) Instrumentation, including switch for suction and pressure gauges	1 lot		127,000
(9) Drain pump for pumping station with delivery pipes, valves and control; panel	1 lot		945,000
(10) Spare parts for the above distribution pump, including the following: 2 sets - liner rings 2 sets - pump bearings 8 sets - gland packings 8 sets - O-ring, gaskets 1 set - coupling parts 1 lot - recommended spares 1 set - motor bearings 2 sets - vacuum contactor switch with power fuse 1 set - push button and selector switch 1 set - auxiliary relay and timer 1 set - volt meter and KWH meter 1 set - potential transformer and current transformer 1 set - lamp bulb, control fuse 1 set - measuring equipment for maintenance 1 set - maintenance tools			25,304,000
Sub Total (FOB of 3.5)			211,933,000

- Continued to -

(Item-3)			
Item No.	Q'ty	Unit Cost (Yen)	Amount (Yen)
Total (FOB of Item-3: 3.1 + 3.2 + 3.3 + 3.4 + 3.5)			532,057,000
Installation cost	1 lot		1,260,000
Total (Equipment)			533,317,000
Transportation and Insurance	1 lot		17,115,000
Total (Construction Cost)			550,432,000
Consultants Fee (8% of Construction cost)	1 lot		44,035,000
Total			594,467,000
Contingency (10% of Construction cost)	1 lot		55,043,000
Grand Total (Item-3)			Yen 649,510,000

(End of Item-3)

				(Item-4)
Item No.	Q'ty	Unit Cost ( Yen )	Amount ( Yen )	
<b>Item-4 : Procurement of Tank Lorries</b>				
(1)	Procurement of tank lorries (Capacity: 5m3)	7 units	13,630,000	95,410,000
(2)	Spare parts for the above (10%)	7 sets	1,363,000	9,541,000
Sub Total (FOB of Item-4)				104,951,000
(3)	Transportaion and Insurance	1 lot		8,008,000
Total (CIF of Item-4)				Yen 112,959,000
Consultant Fee (3% of CIF-Total)		1 lot		3,389,000
Total				116,348,000
Contingency (10% of CIF-Total)		1 lot		11,296,000
Grand Total (Item-4)				Yen 127,644,000
				(End of Item-4)

(Item-5)

Item No.	Q'ty	Unit Cost ( Yen )	Amount ( Yen )
<b>Item-5 : Procurement of Materials for Deep Wells</b> (33m depth x 20 wells)			
5.1 Well Materials			
(1) Casing pipe (plain end) Diameter : 300mm Unit length : 5.5m	88 pieces	48,200	4,242,000
(2) Screen pipe round-wire type, plain end, pipe base galvanized) Diameter : 300mm Unit length : 5.5m Slit size : 1.0mm	44 pieces	211,000	9,284,000
(3) Centralizer (hinge type for 300mm x 450mm)	88 pieces	15,700	1,382,000
Sub Total (FOB of Item-5.1)			14,908,000
(4) Transportation and Insurance	1 lot		2,767,000
Total (CIF of Item-5.1)			17,675,000
Consultants fee (3% of CIF-Total)	1 lot		530,000
Total			18,205,000
Contingency (10% of CIF-Total)	1 lot		1,768,000
Grand Total (Item-5.1)			Yen 19,973,000

- Continued to -

			(Item-5)
Item No.	Q'ty	Unit Cost (Yen)	Amount (Yen)
5.2 Drilling Machine			
(1) Well Drilling Rig Type : Cable Percussion Drilling Capacity : more than 100mH Drilling Diameter : 500mm	1 unit		48,000,000
(2) Transportation Truck GVW : 24,000kg Engine : 4-cycle, water cooled diesel engine Lifting capacity : 2500kg or more	1 truck		11,500,000
(3) Standard Operation Accessories and Tools	1 lot		36,000,000
(4) Spare Parts	1 lot		3,500,000
Sub Total (FOB of Item-5.2)			99,000,000
(5) Transportation and Insurance	1 lot		18,000,000
Total (CIF of Item-5.2)			117,000,000
Consultants Fee (3% of CIF-Total)	1 lot		3,510,000
Total			120,510,000
Contingency (10% of CIF-Total)	1 lot		11,700,000
Grand Total (Item-5.2)			Yen 132,210,000
Grand Total (Item-5)			Yen 152,183,000

(End of Item-5)

(Item-6)

Item No.	Q'ty	Unit Cost ( Yen )	Amount ( Yen )	
<b>Item-6 : Remote Operation System for Existing 98 Intake Pumps</b>				
<b>6.1</b>				
Remote operation system for existing 59 intake pumps in the Central Water Source, Industrial Water Source, Meat Complex Water Source, including transfer panel and UPS				
(1)	Telemeter transfer panel at intake pump house for existing 59 sites, wall-mounted type	59 nos.	1,254,000	73,986,000
(2)	Un-interrupted power supply (UPS) in intake pump house	59 nos.	941,000	55,519,000
(3)	Spare parts of the above remote operation system, including the following: 4 sets - complete set of local units 10 sets - lighting arrestors 2 sets - un-interrupted power supply 500m - communication cable 1 lot - maintenance parts for transmission line	1 lot		12,443,000
Sub Total (FOB of 6.1)				141,948,000
<b>6.2</b>				
Remote operation system for existing 39 intake pumps in the Upper Water Source, including operation and indication at control center				
(1)	Telemeter transfer panel at intake pump house for existing 39 sites, wall-mounted type	39 nos.	1,254,000	48,906,000
(2)	Un-interrupted power supply (UPS) in intake pump house	39 nos.	941,000	36,699,000
(3)	Telemeter receiving panel for 39 intake pumps	1 lot		14,700,000

- Continued to -

(Item-6)

Item No.	Q'ty	Unit Cost ( Yen )	Amount ( Yen )
(4) Control cable between 39 intake pump house and control center including connection box	1 lot		31,767,000
(5) Attachment on the wooden pole for transmission line	1 lot		5,914,000
(6) Spare parts of the above remote operation system, including the following: 2 sets - complete set of local units 5 sets - lighting arrestors 2 sets - un-interrupted power supply 250m - communication cable 1 lot - maintenance parts for transmission line 1 lot - processors, remote I/O interface, UPS, recording papers, etc.	1 lot		15,510,000
Sub Total (FOB of 6.2)			153,496,000
Total (FOB of Item-6: 6.1 + 6.2)			295,444,000
Installation cost	1 lot		1,785,000
Total (Equipment)			297,229,000
Transportation and Insurance	1 lot		12,122,000
Total (Construction Cost)			309,351,000
Consultants Fee (8% of Construction cost)	1 lot		24,748,000
Total			334,099,000
Contingency (10% of Construction cost)	1 lot		30,935,000
Grand Total (Item-6)			Yen 365,034,000

(End of Item-6)



				(Item-7)
Item No.	Q'ty	Unit Cost ( Yen )	Amount ( Yen )	
<b>Item-7 : Water Meters at 44 Central Heating Centers (CTP)</b>				
(1)	Procurement of water meter, 150mm	44 pieces	361,900	15,924,000
(2)	Pipe fittings for the above 150mm steel pipe	44 sets	36,200	1,593,000
Sub Total (FOB of Item-7)				17,517,000
Installation cost		1 lot		389,000
Total (Equipment)				17,906,000
Transportation and Insurance		1 lot		583,000
Total (Construction Cost)				18,489,000
Consultants Fee (8% of Construction cost)		1 lot		1,479,000
Total				19,968,000
Contingency (10% of Construction cost)		1 lot		1,849,000
Grand Total (Item-7)				Yen 21,817,000
				(End of Item-7)



