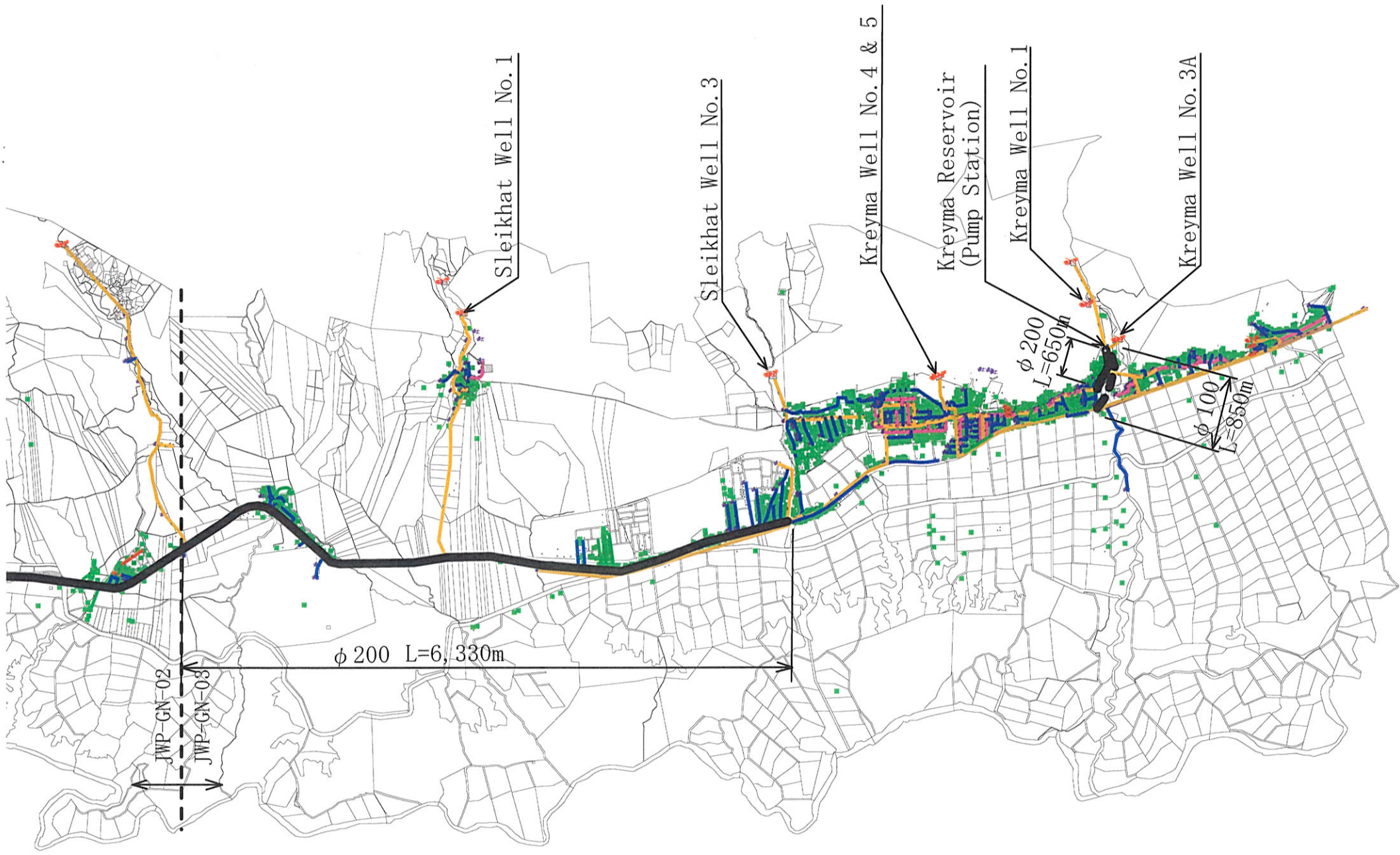


Key Plan



Legend

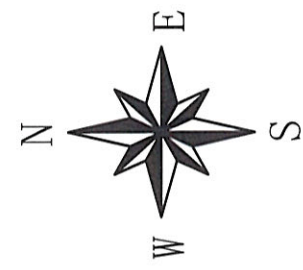
- Water Transmission Main
- Water Distribution Main

Existing Pipe(Size)

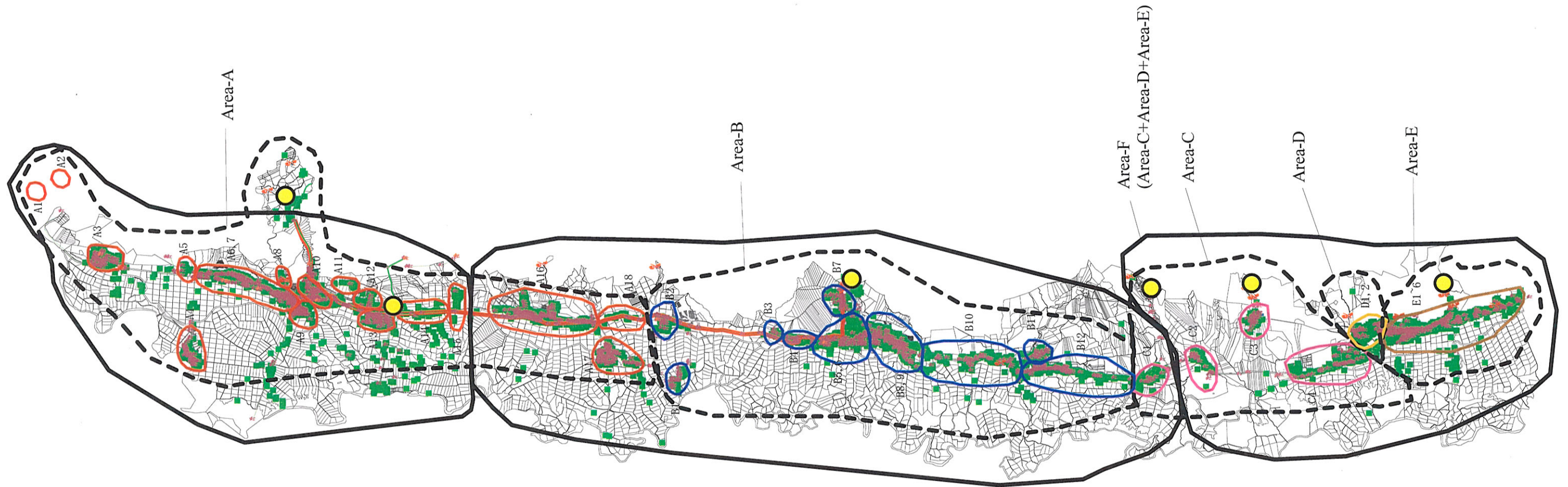
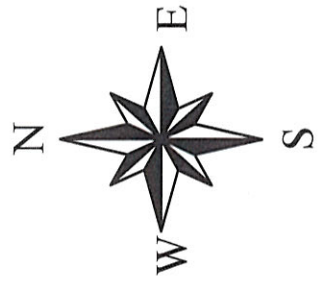
- 20mm
- 25mm
- 50mm
- 75mm
- 100mm
- 150mm
- 200mm
- 250mm
- 300mm
- 600mm

Customers

-



1:50,000








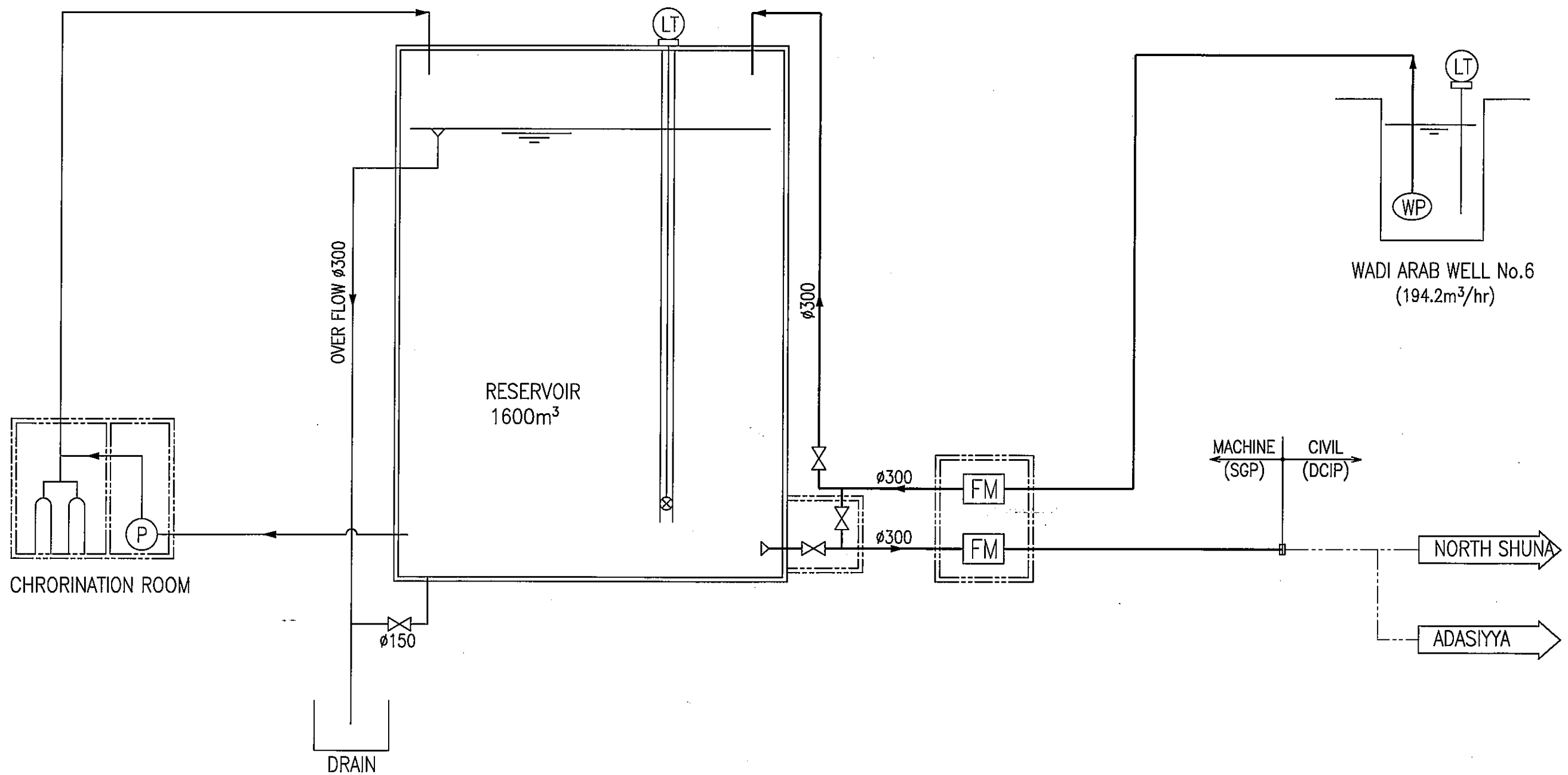
Water Distribution Zoning in Base Year 2003



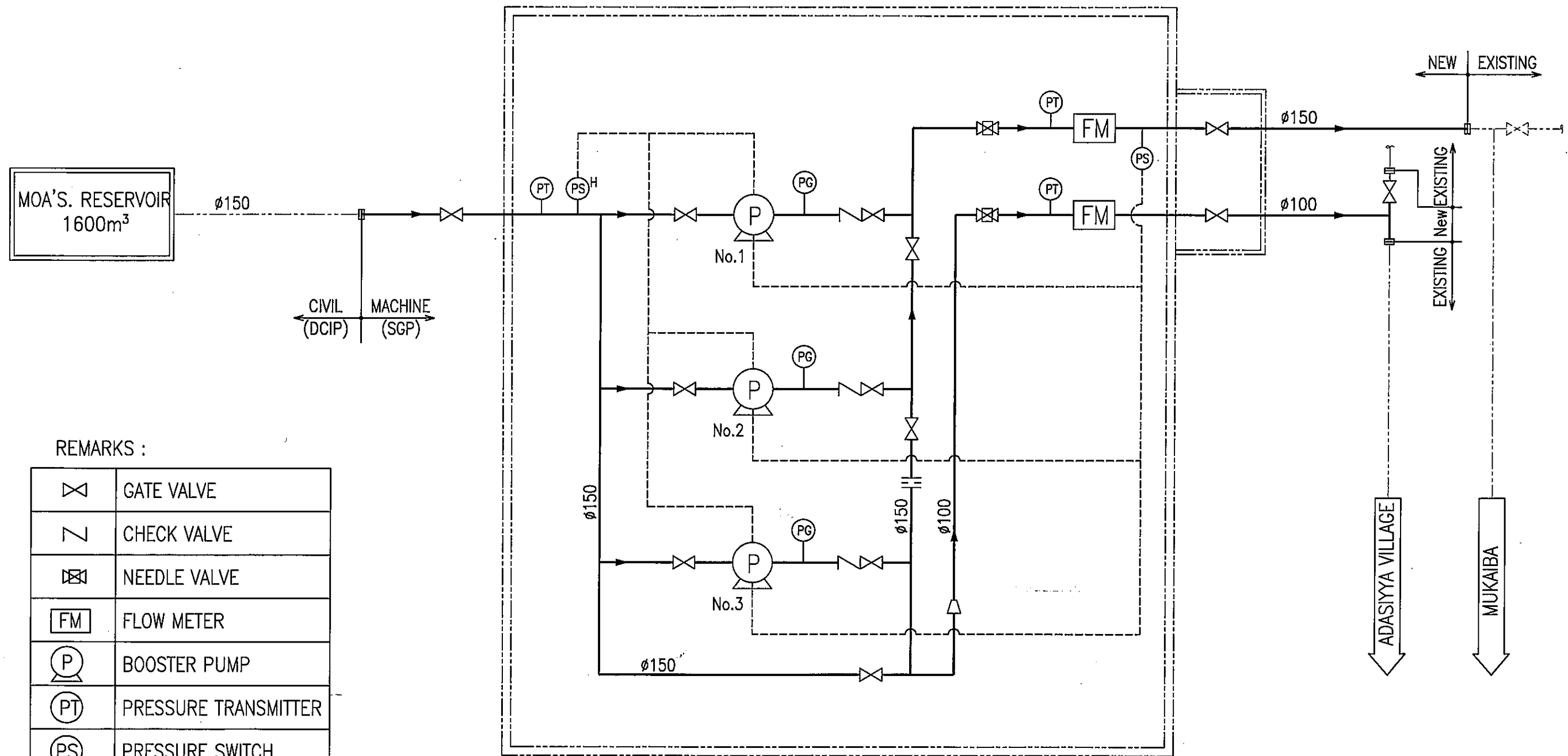
Water Distribution Zoning in Target Year 2010

REMARKS :

	GATE VALVE
	FLOW METER
	BOOSTER PUMP
	WELL PUMP
	LEVEL TRANSMITTER



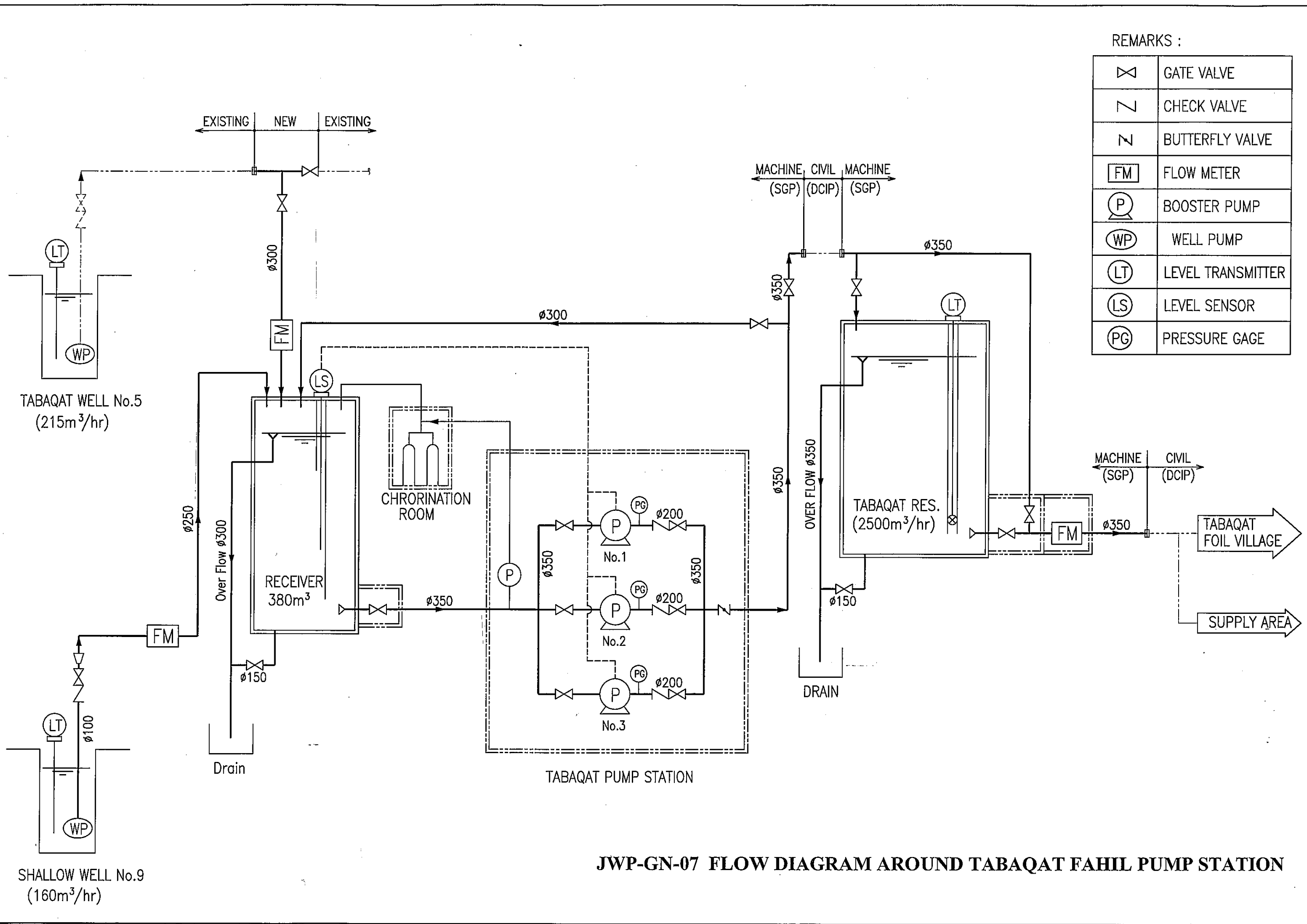
JWP-GN-05 FLOW DIAGRAM AROUND MOA'S RESERVOIR



REMARKS :

	GATE VALVE
	CHECK VALVE
	NEEDLE VALVE
	FLOW METER
	BOOSTER PUMP
	PRESSURE TRANSMITTER
	PRESSURE SWITCH
	PRESSURE GAGE
	ORIFICE PLATE

JWP-GN-06 FLOW DIAGRAM AROUND ADASIYYA PUMP STATION










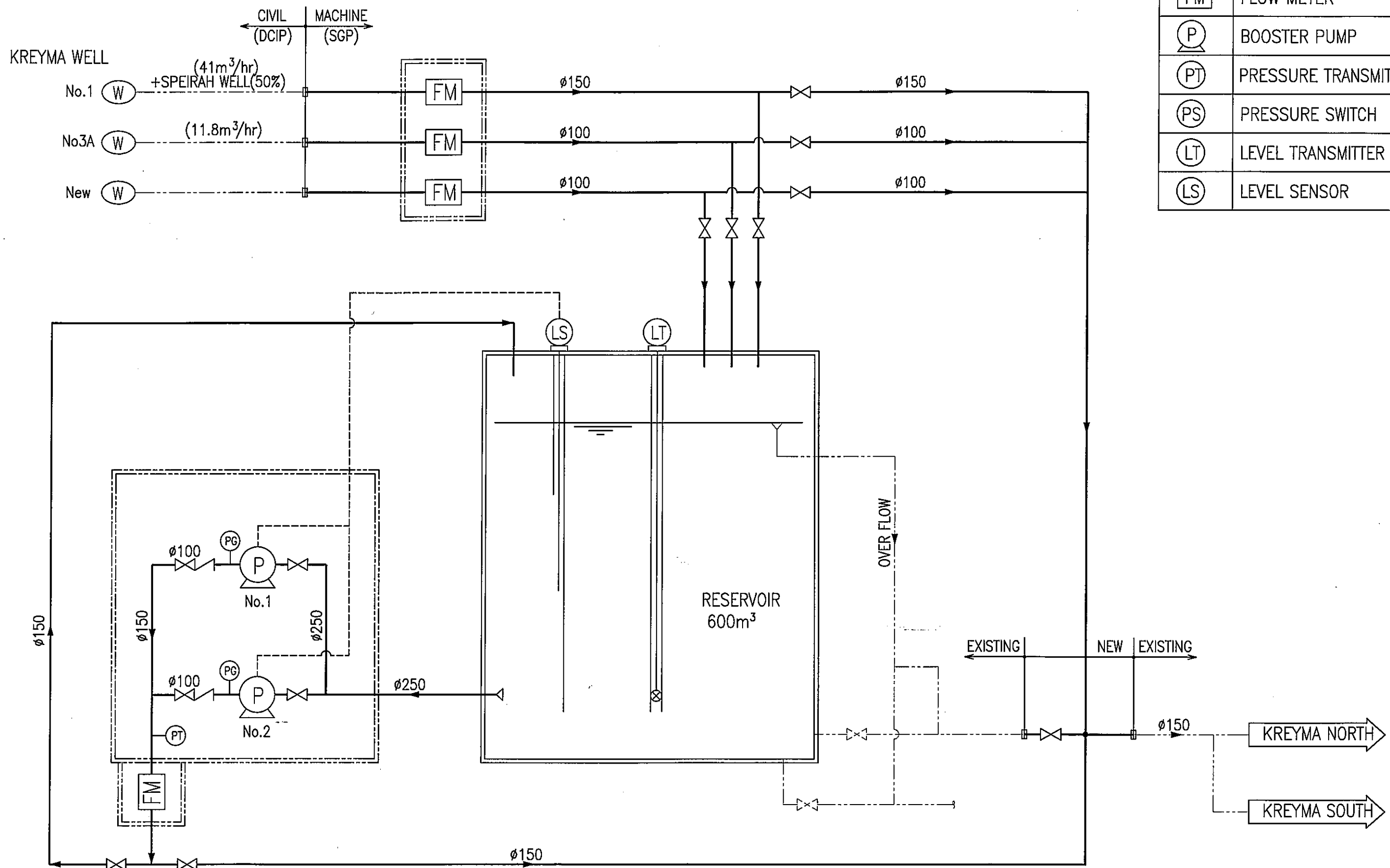
REMARKS :

	GATE VALVE
	CHECK VALVE
	BUTTERFLY VALVE
	FLOW METER
	BOOSTER PUMP
	WELL PUMP
	LEVEL TRANSMITTER
	LEVEL SENSOR
	PRESSURE GAGE

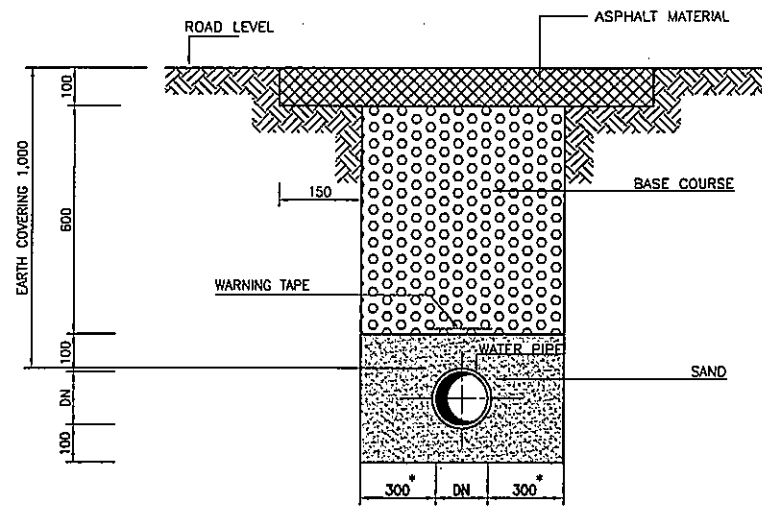
JWP-GN-07 FLOW DIAGRAM AROUND TABAQAT FAHIL PUMP STATION

REMARKS :

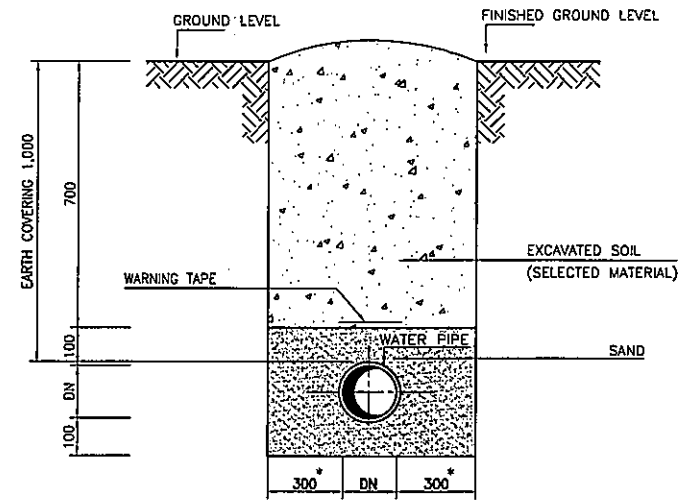
	GATE VALVE
	FLOW METER
	BOOSTER PUMP
	PRESSURE TRANSMITTER
	PRESSURE SWITCH
	LEVEL TRANSMITTER
	LEVEL SENSOR



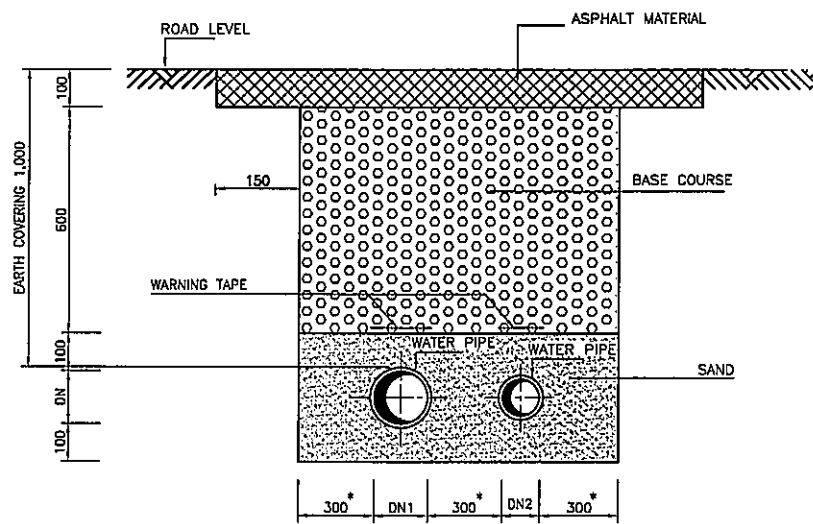
JWP-GN-08 FLOW DIAGRAM AROUND KREYMA PUMP STATION



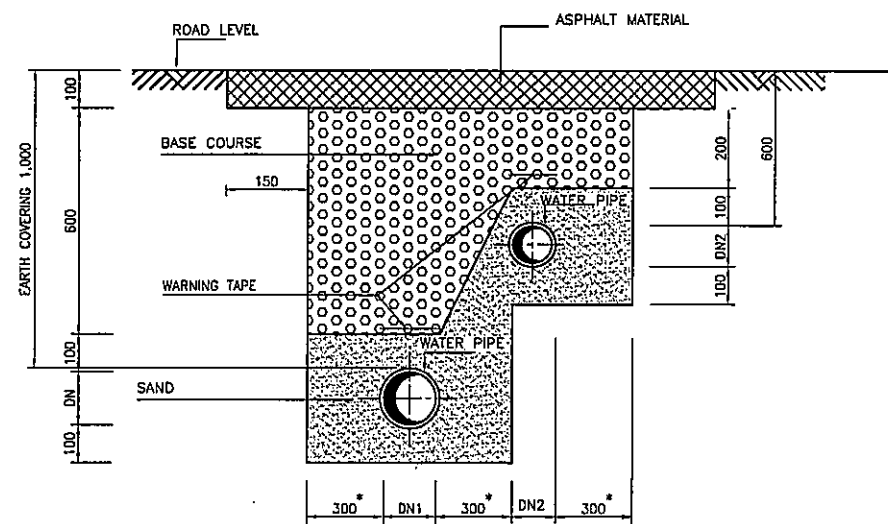
Main Pipe (Asphalt)



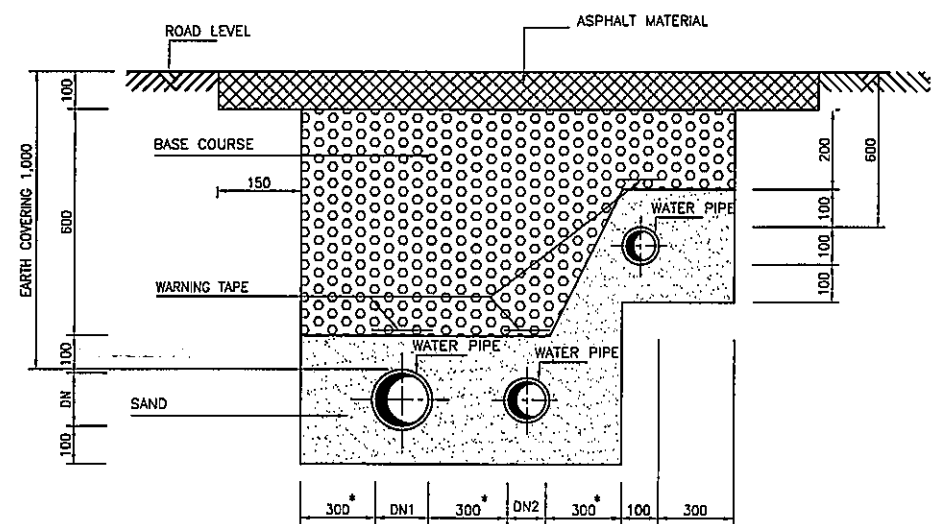
Main Pipe (No Asphalt Road)



Dual Main Pipes (Asphalt Road)



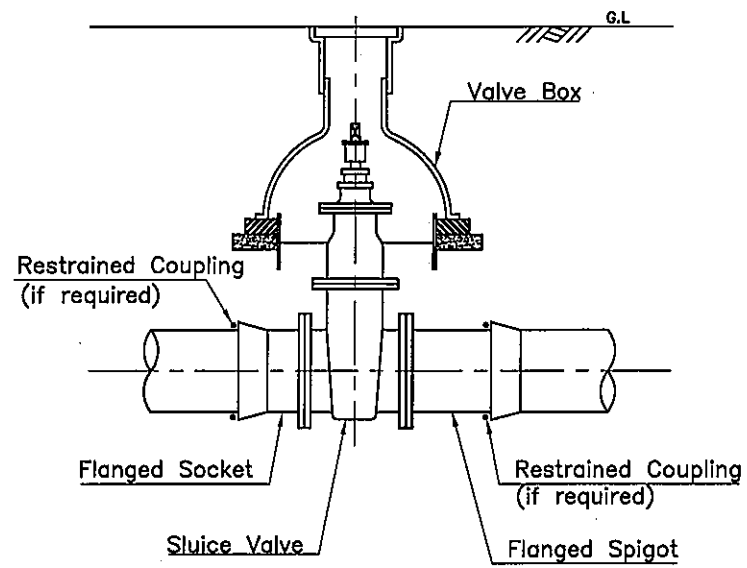
Main Pipe + Header Pipe (Asphalt Road)



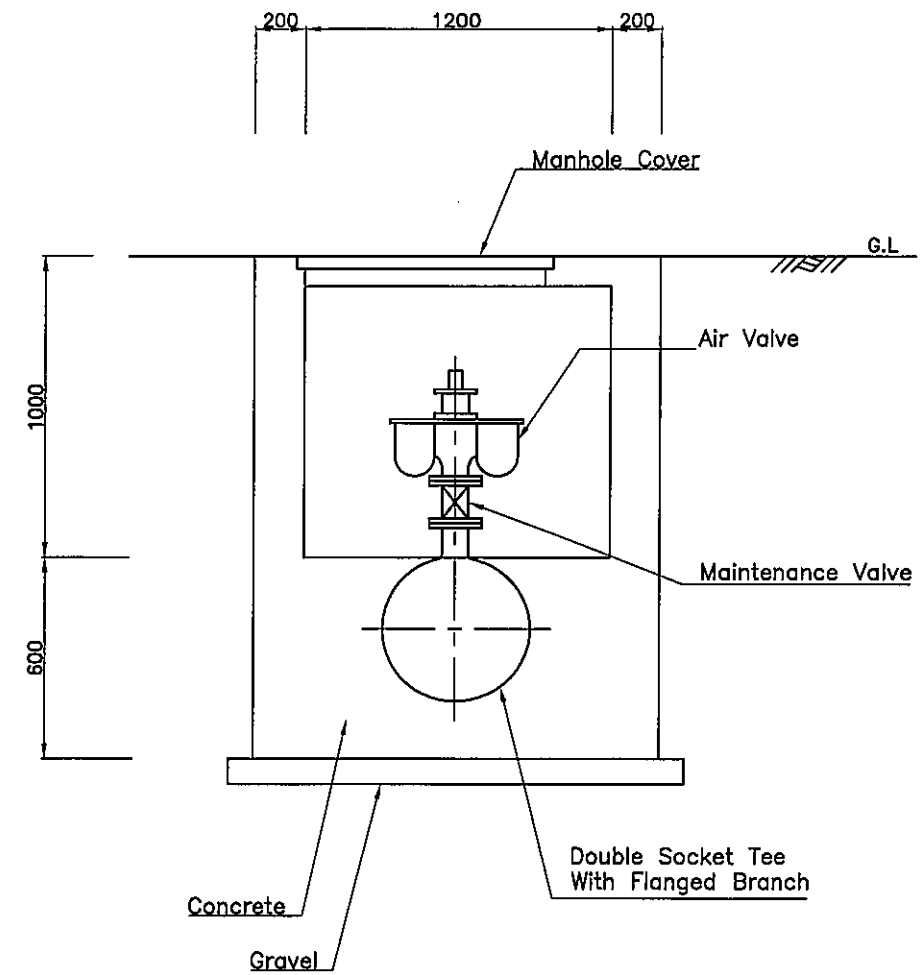
Dual Main Pipes + Header Pipe (Asphalt Road)

JWP-PL-01 MAIN PIPE LINE - TYPICAL SECTION

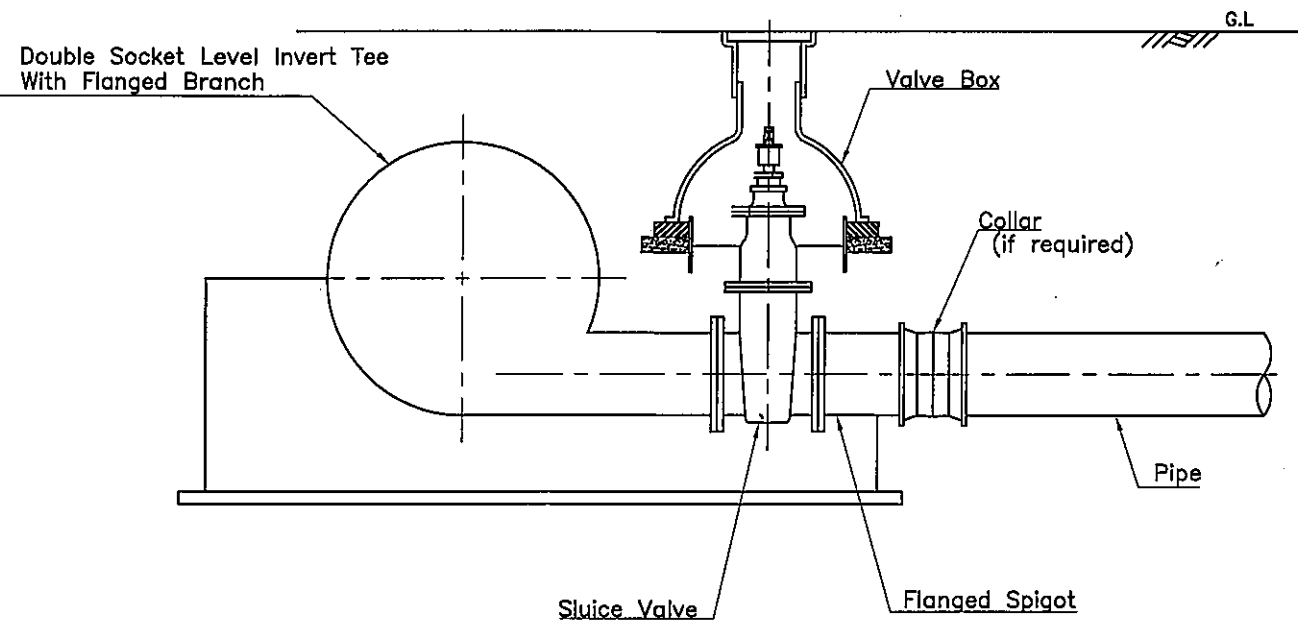
SLUICE VALVE



AIR VALVE



WASH OUT



**JWP-PL-02 TYPICAL INSTALLATION DRAWING OF VALVES
(SLUICE VALVE, AIR VALVE, WASH OUT)**

MAIN PIPE
 ⓐ 300A ,250A ,200A
 ⓑ 150A , 100A

NO.	NAME	DETAIL	Qty	REMARKS
①	VALVE		3	
②	PRESSURE-REDUCING VALVE		3	
③	SLEEVE JOINT		1	

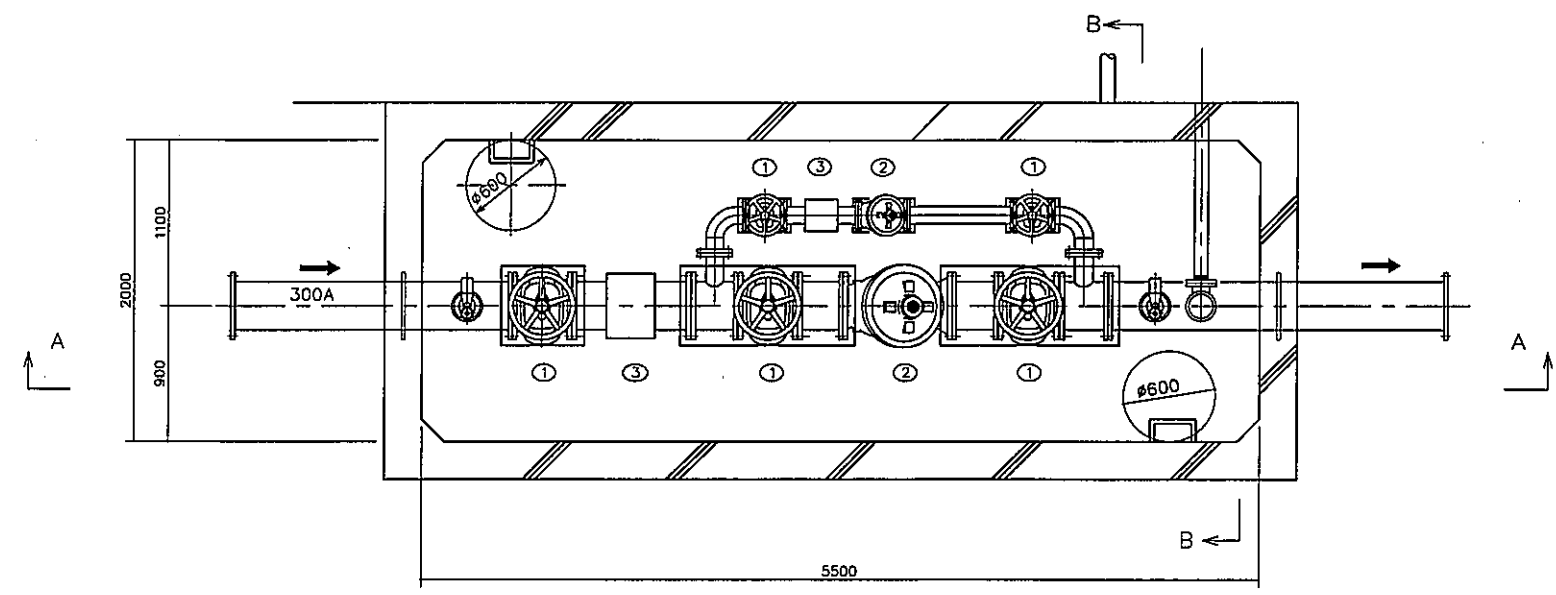
BY-PASS PIPE

NO.	NAME	DETAIL		Qty	REMARKS
		ⓐ	ⓑ		
①	VALVE	100A	80A	3	
②	PRESSURE-REDUCING VALVE	100A	80A	3	
③	SLEEVE JOINT	100A	80A	1	

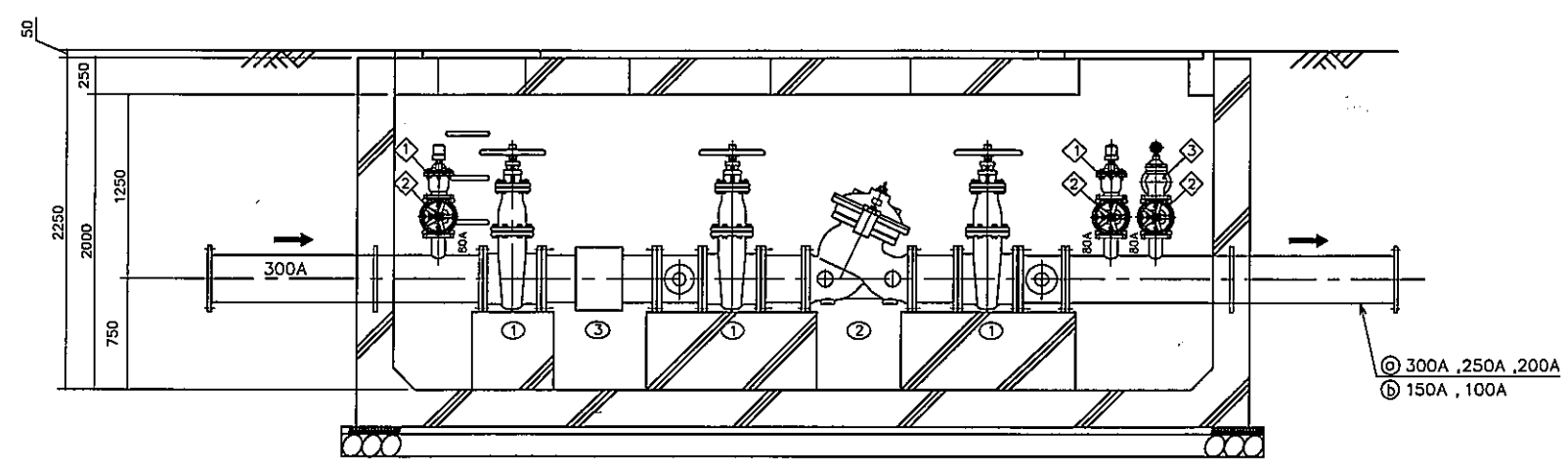
AIR VALVE / SAFTY VALVE

NO.	NAME	DETAIL		Qty	REMARKS
		ⓐ	ⓑ		
①	AIR VALVE	80A		2	
②	VALVE	80A		2	
③	SAFTY VALVE	80A	50A	1	

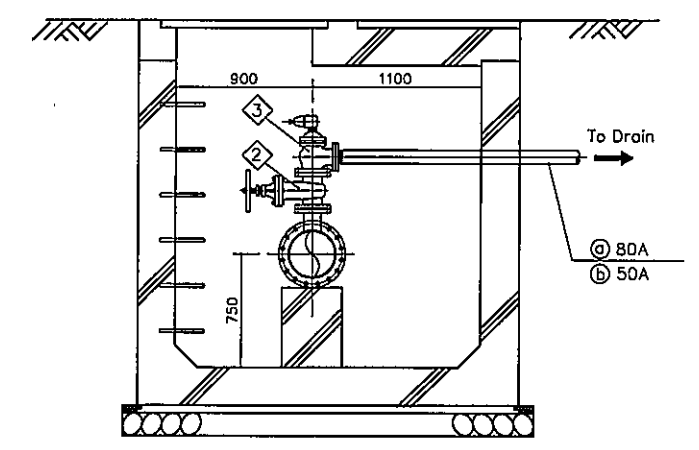
PLAN



SECTION A-A

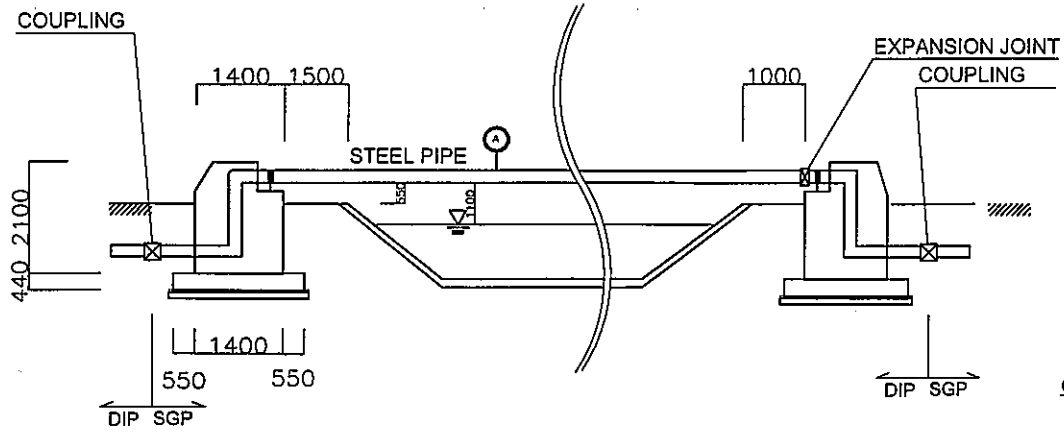


SECTION B-B

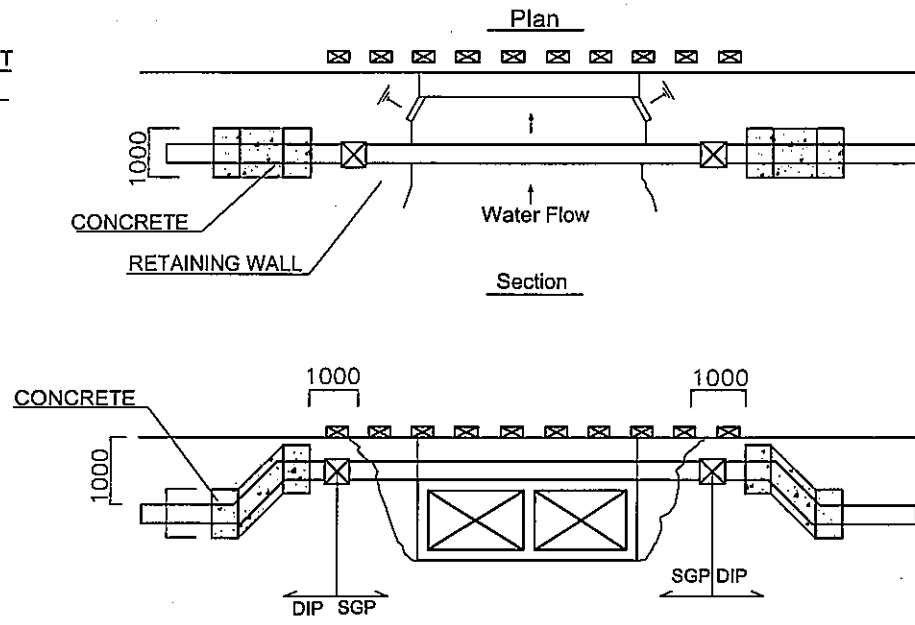


JWP-PL-03 TYPICAL INSTALLATION DRAWING OF PRESSURE REDUTION VALVE

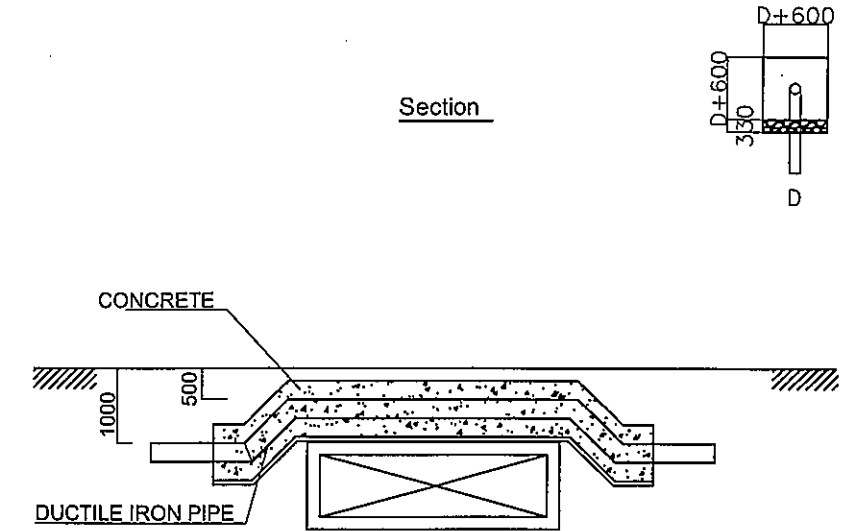
AQUEDUCT



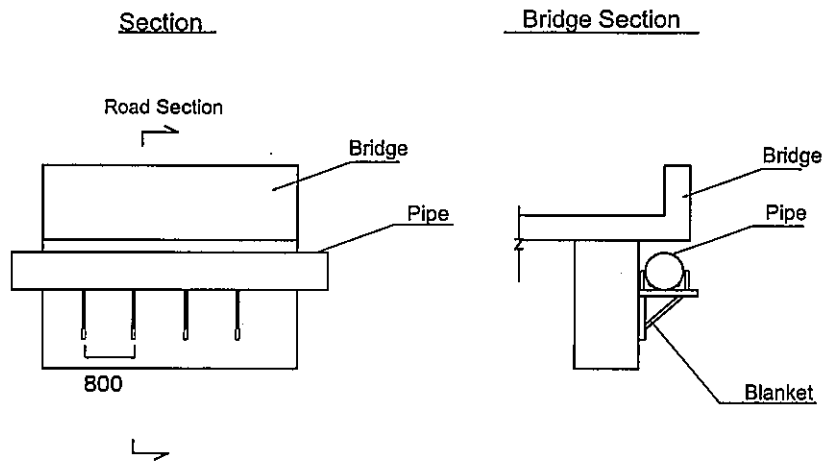
CULVERT CROSSING



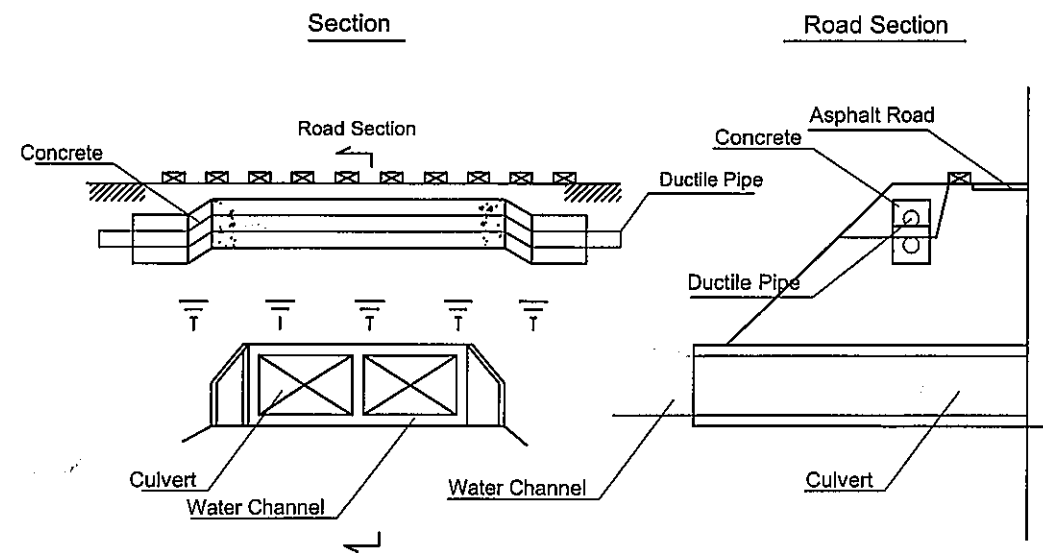
CULVERT CROSSING



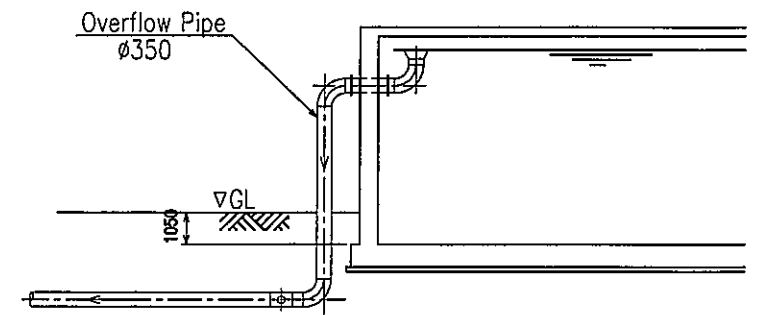
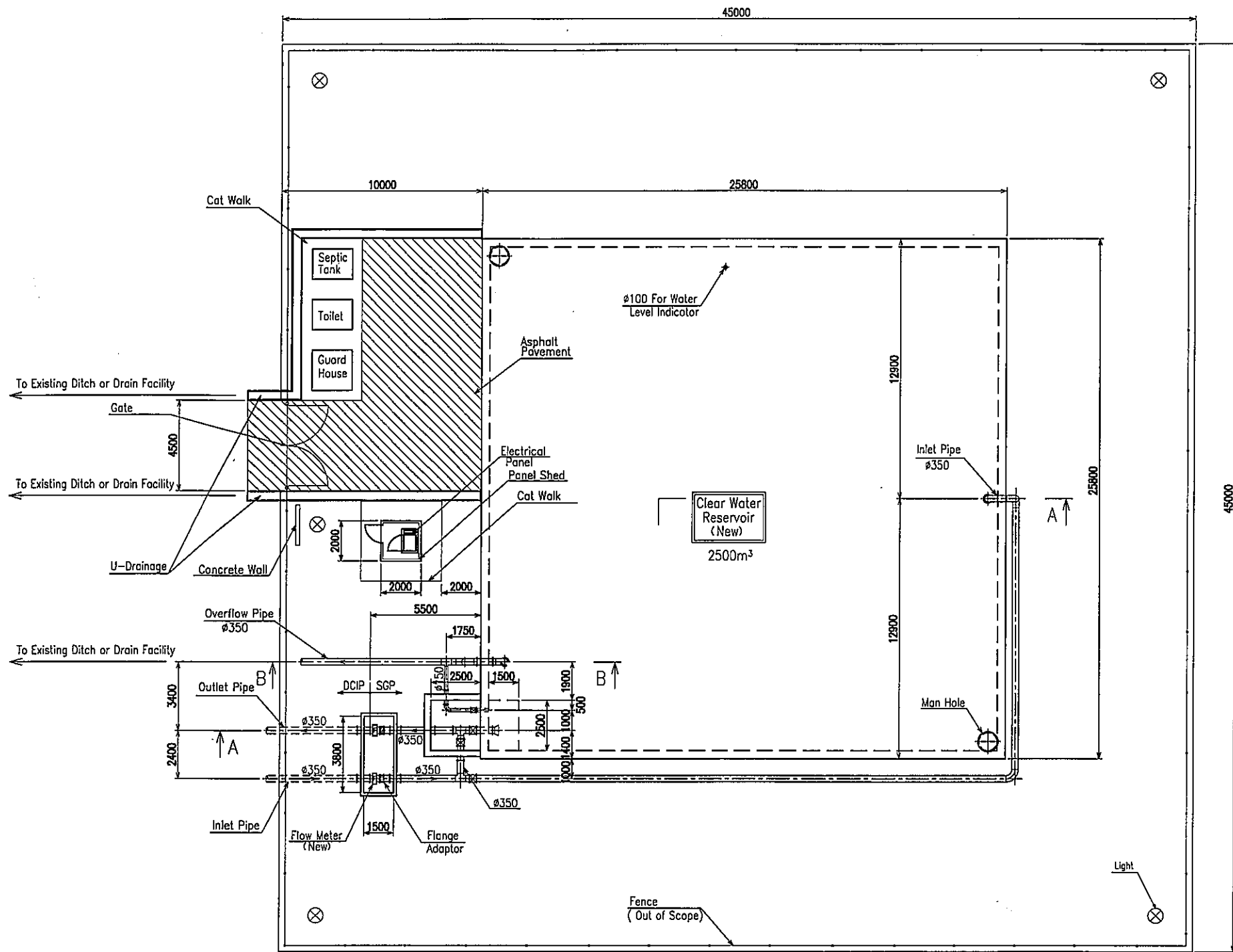
ROAD EDGE PIPELAYING



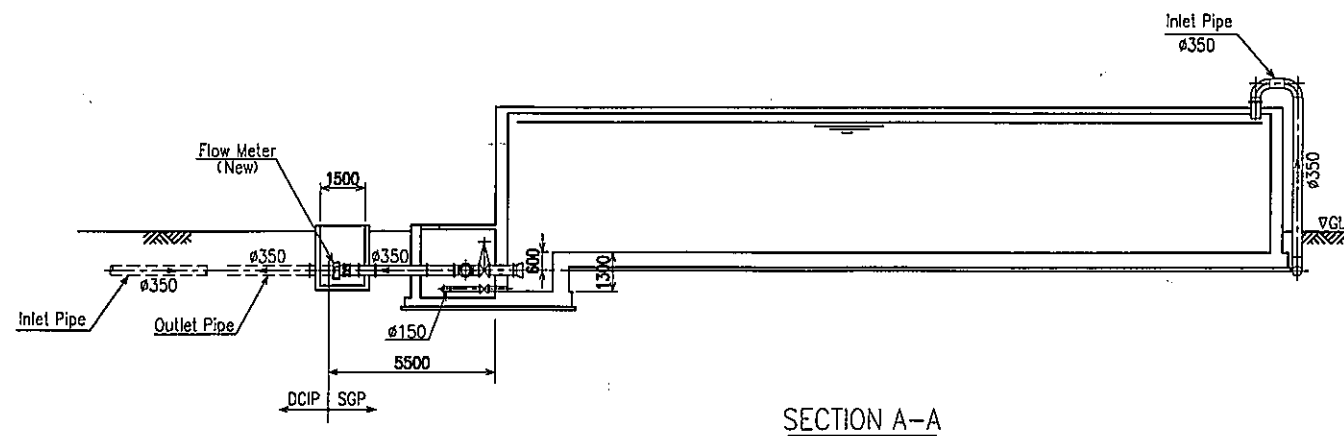
ROAD EDGE PIPELAYING



JWP-PL-04 PLAN OF RIVER CROSSING

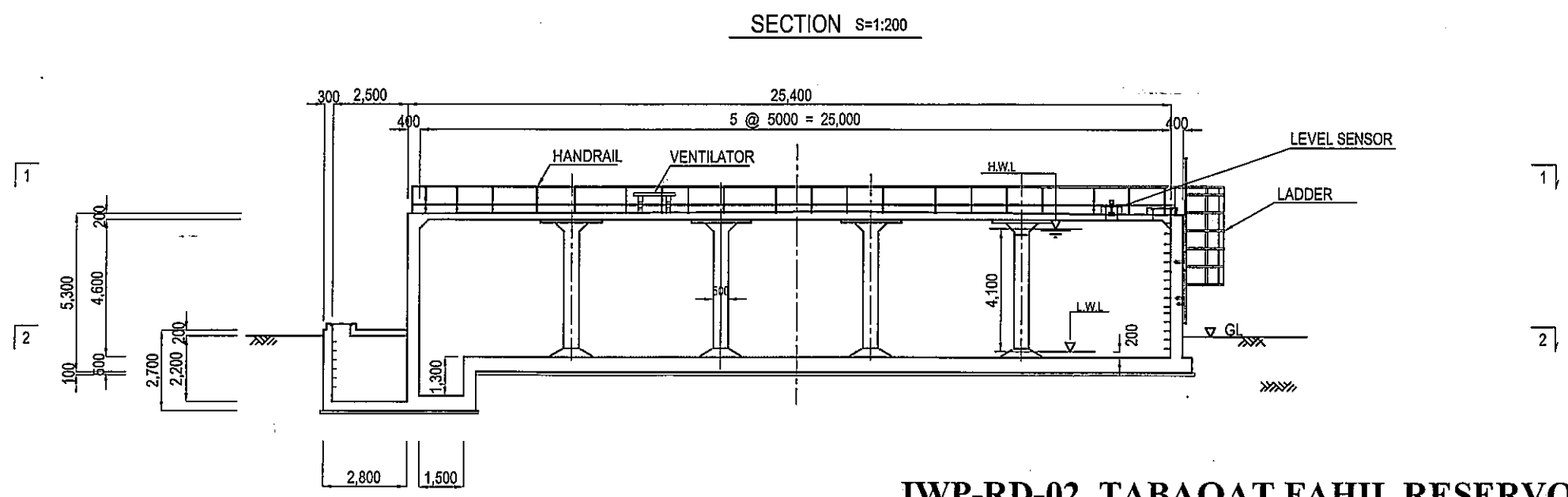
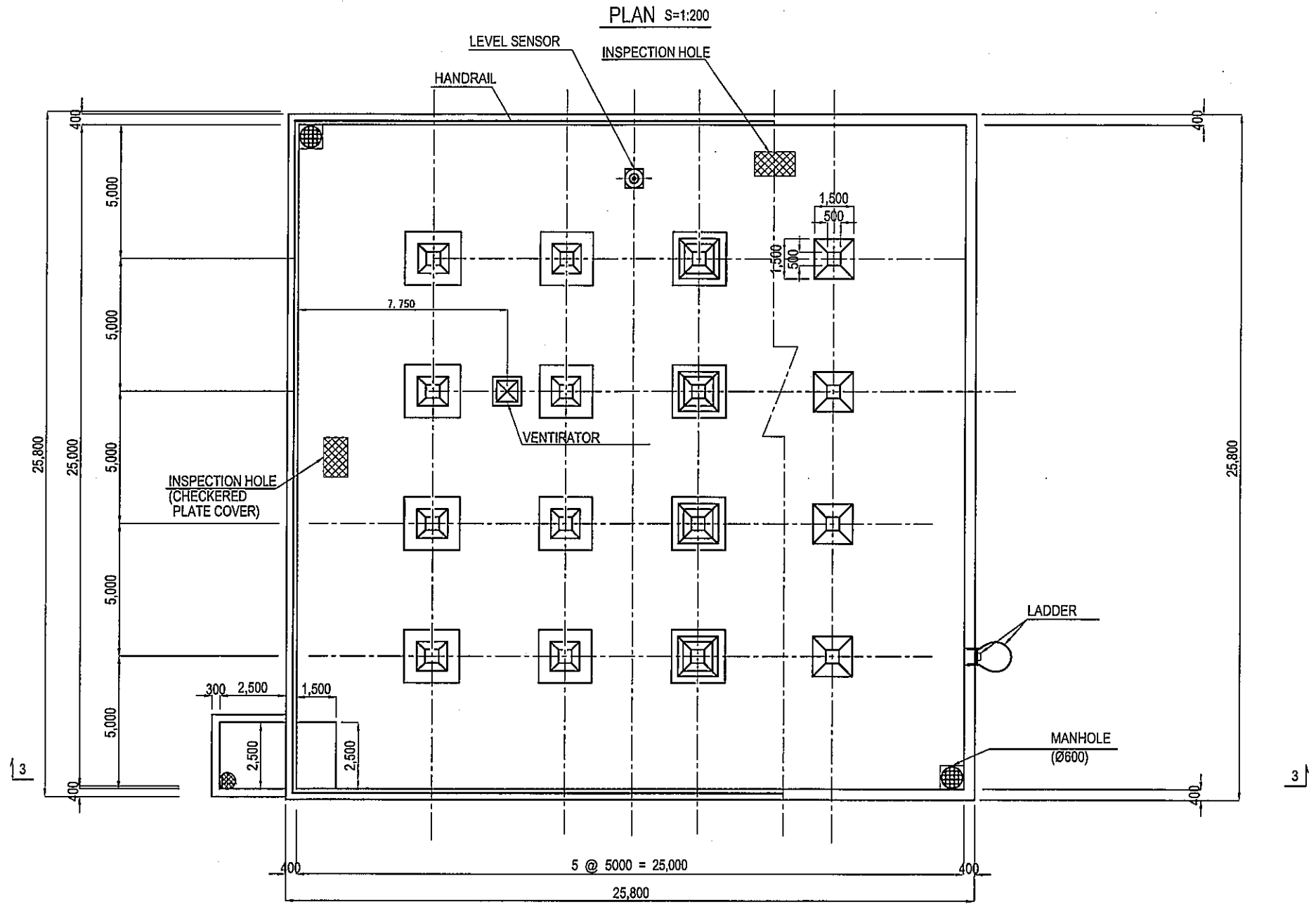


SECTION B-B

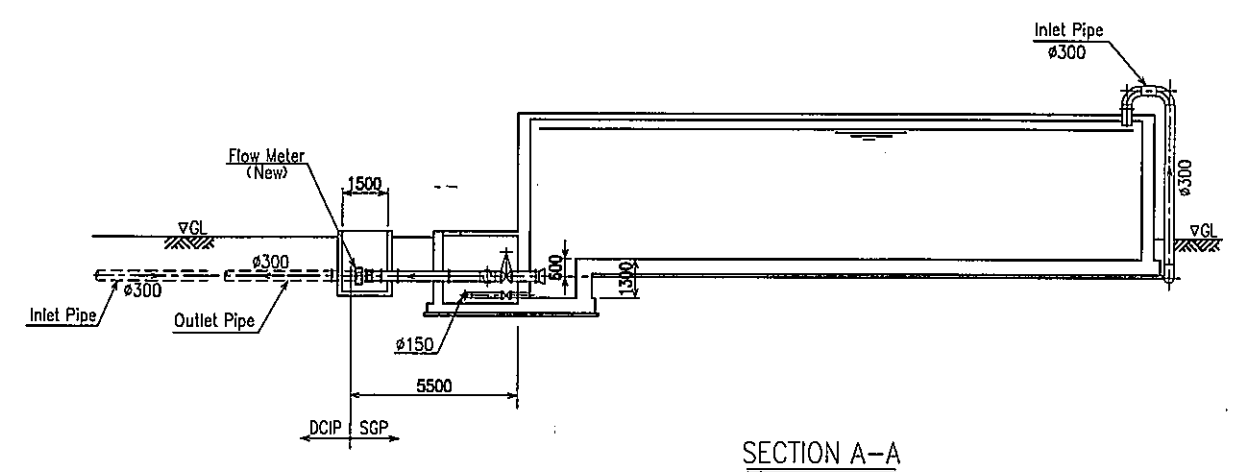
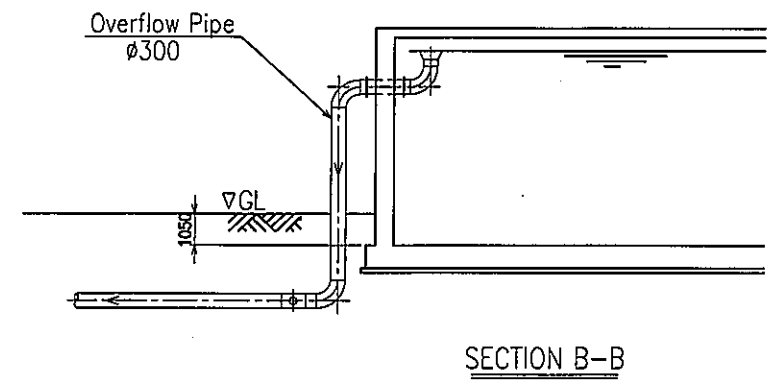
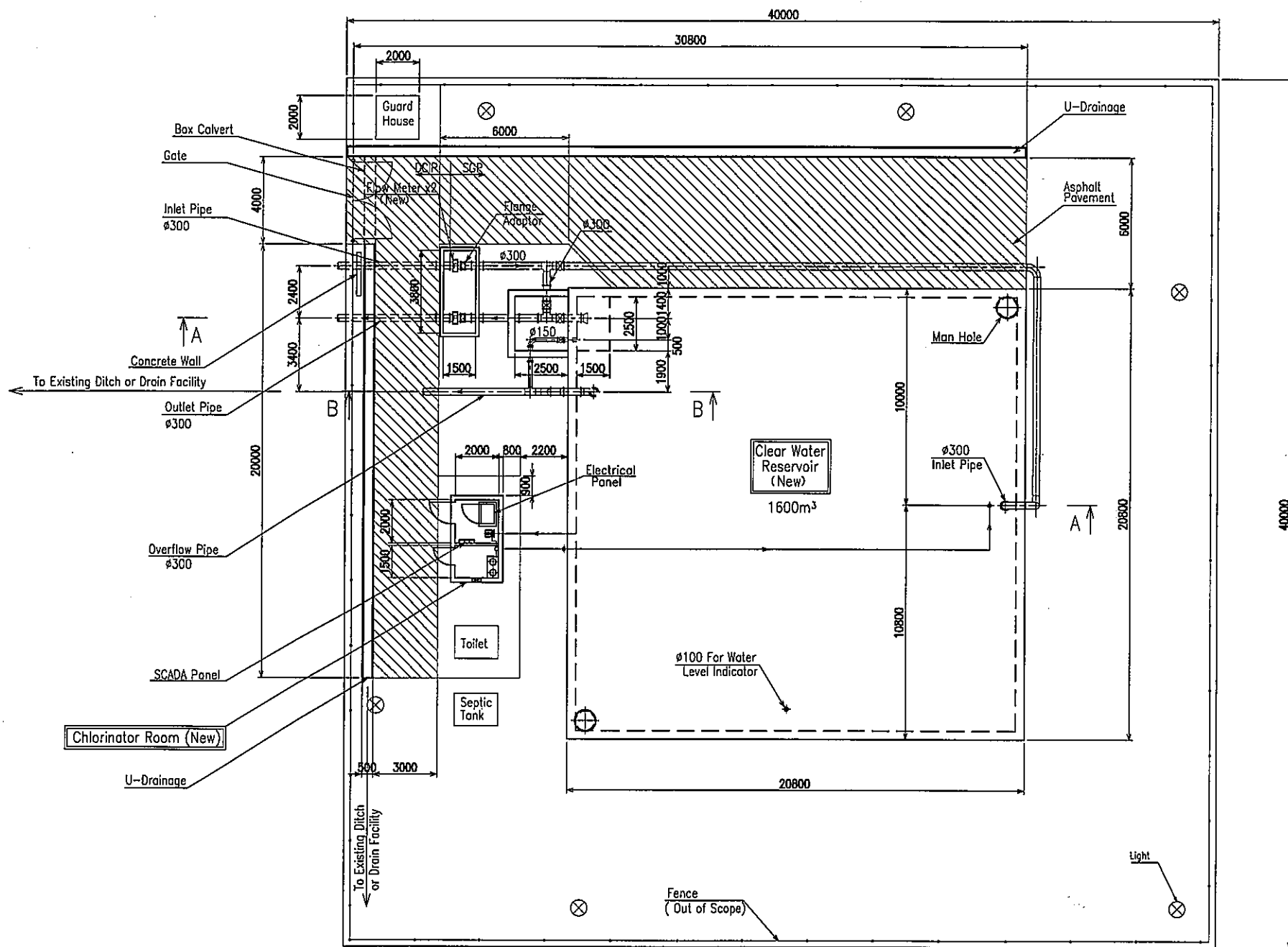


SECTION A-A

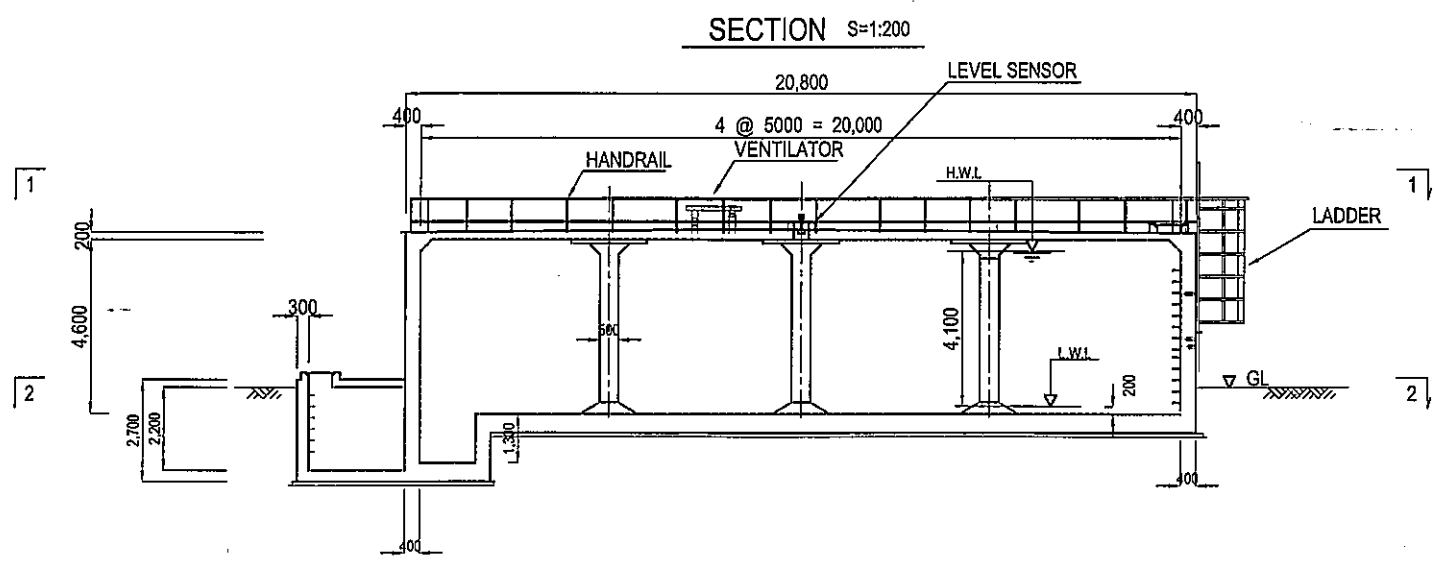
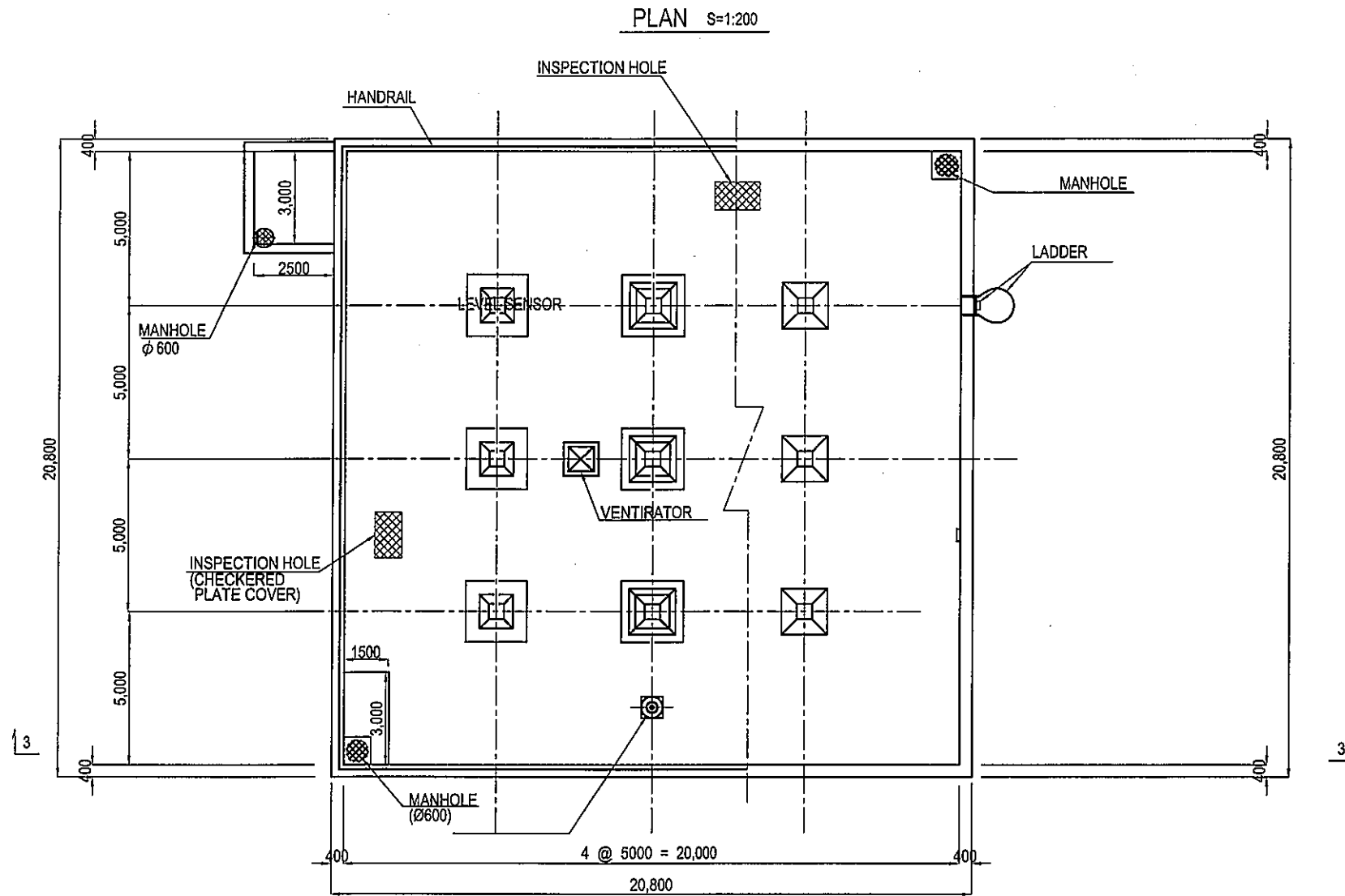
JWP-RD-01 FACILITY LAYOUT OF TABAQAT FAHIL RESERVOIR



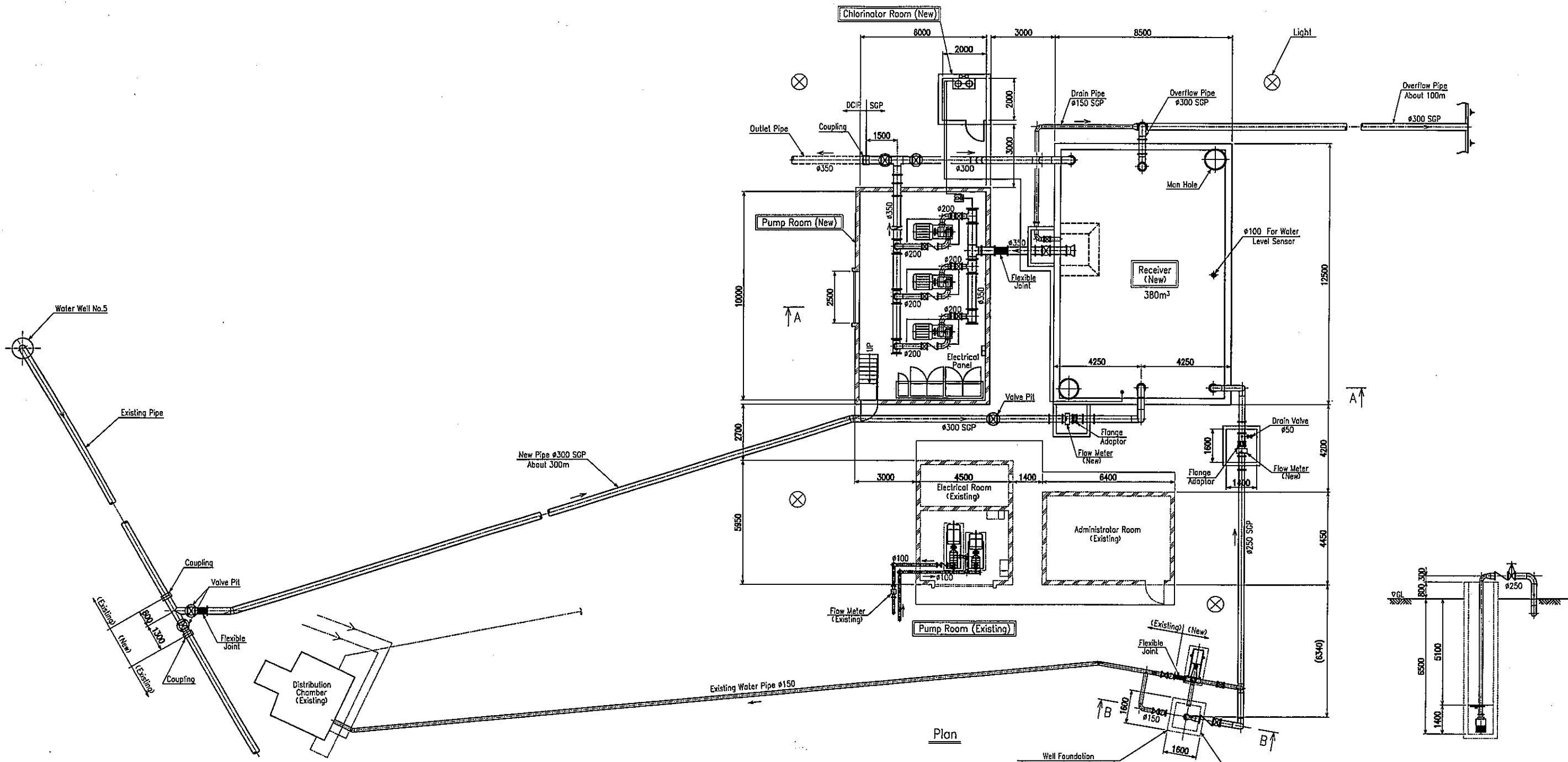
JWP-RD-02 TABAQAT FAHIL RESERVOIR - STRUCTURE PLAN



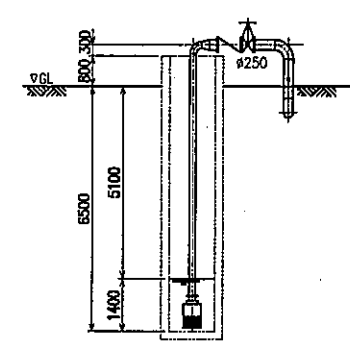
JWP-RD-03 FACILITY LAYOUT OF MOA'S RESERVOIR



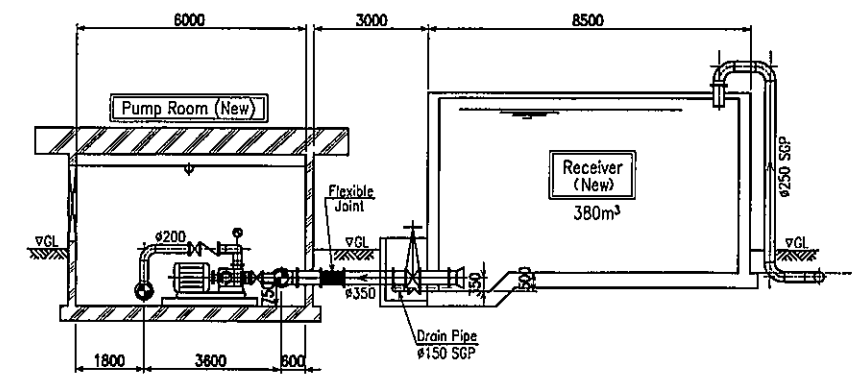
JWP-RD-04 MOA'S RESERVOIR - STRUCTURAL PLAN.



Plan

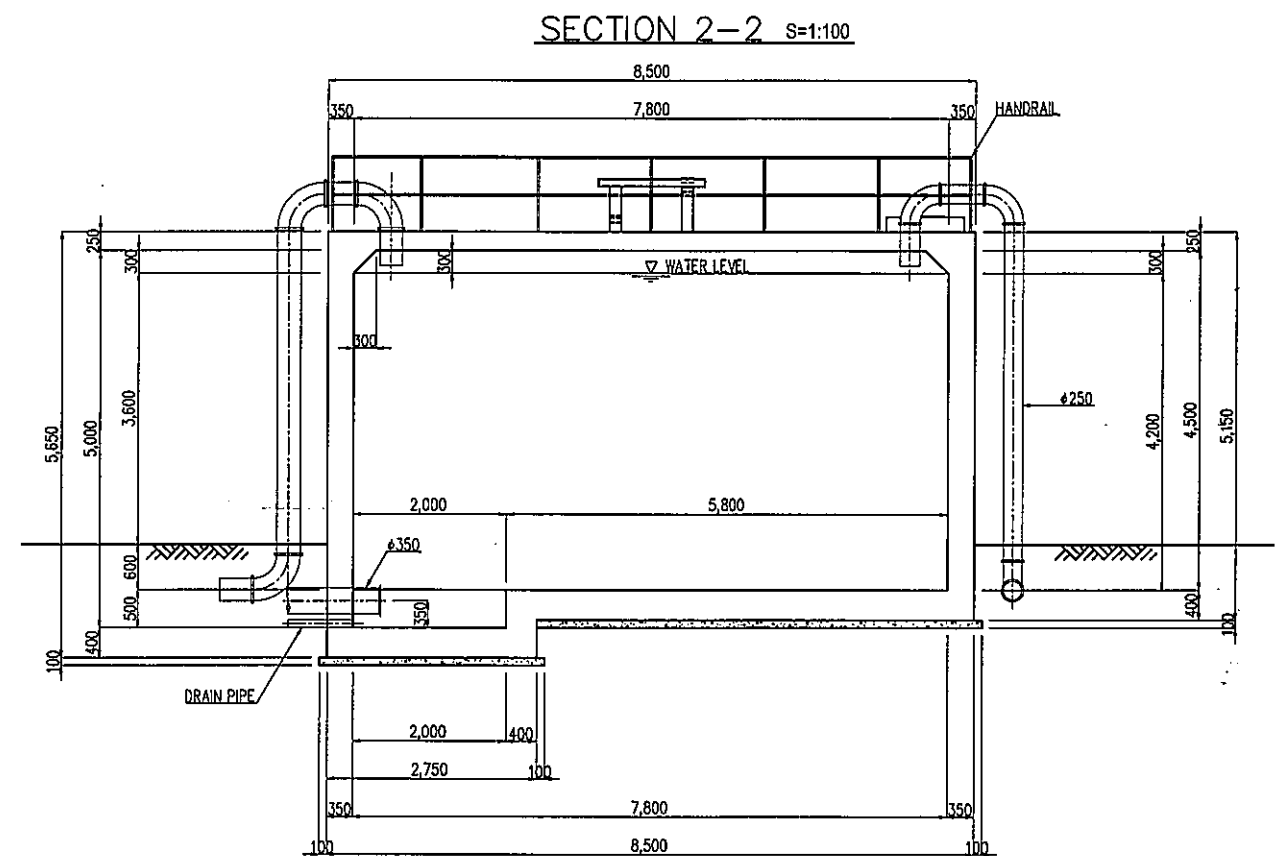
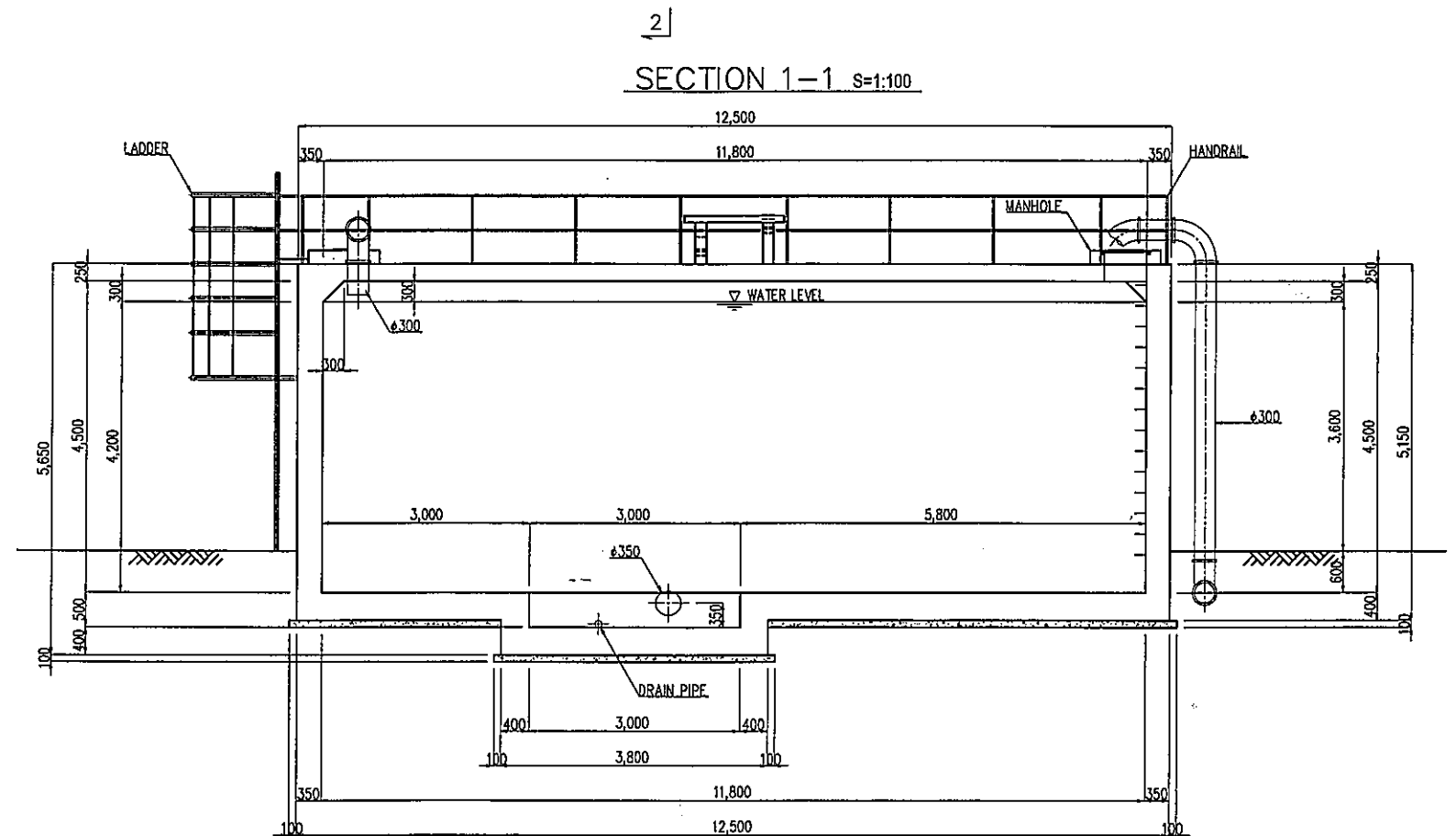
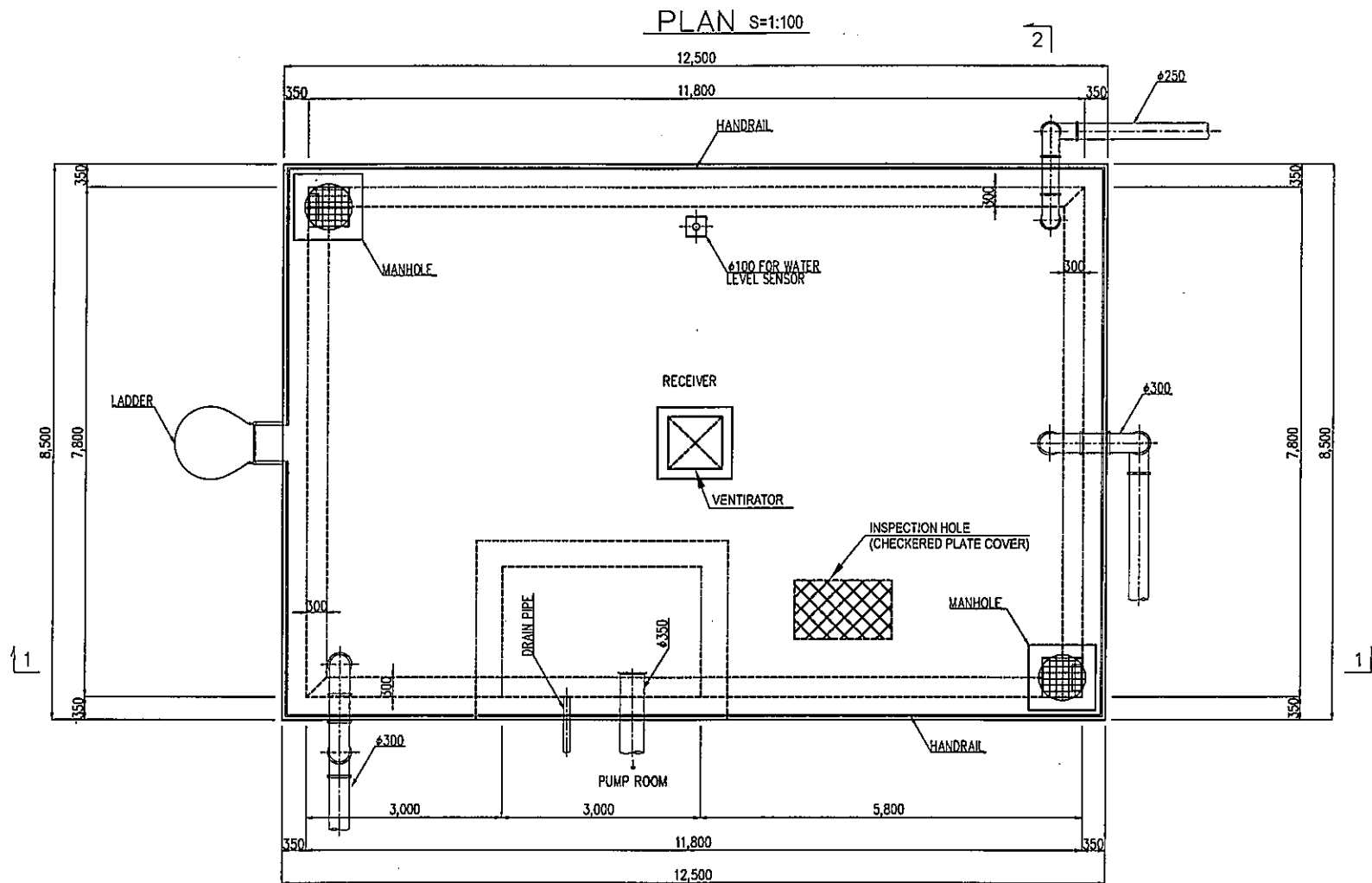


B-B Section

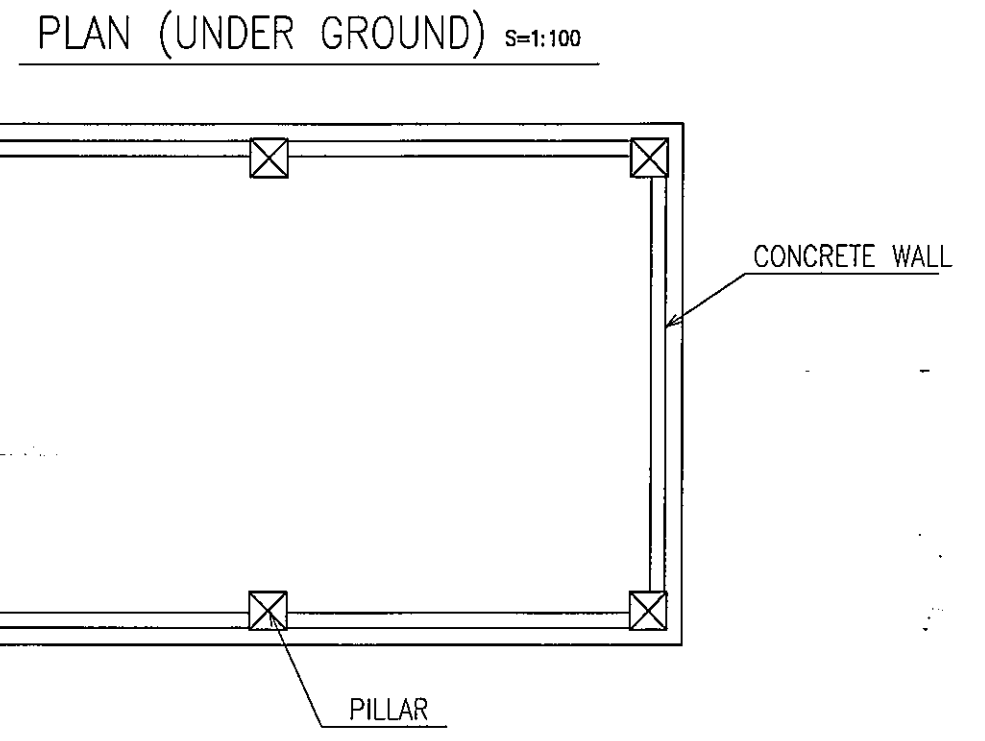
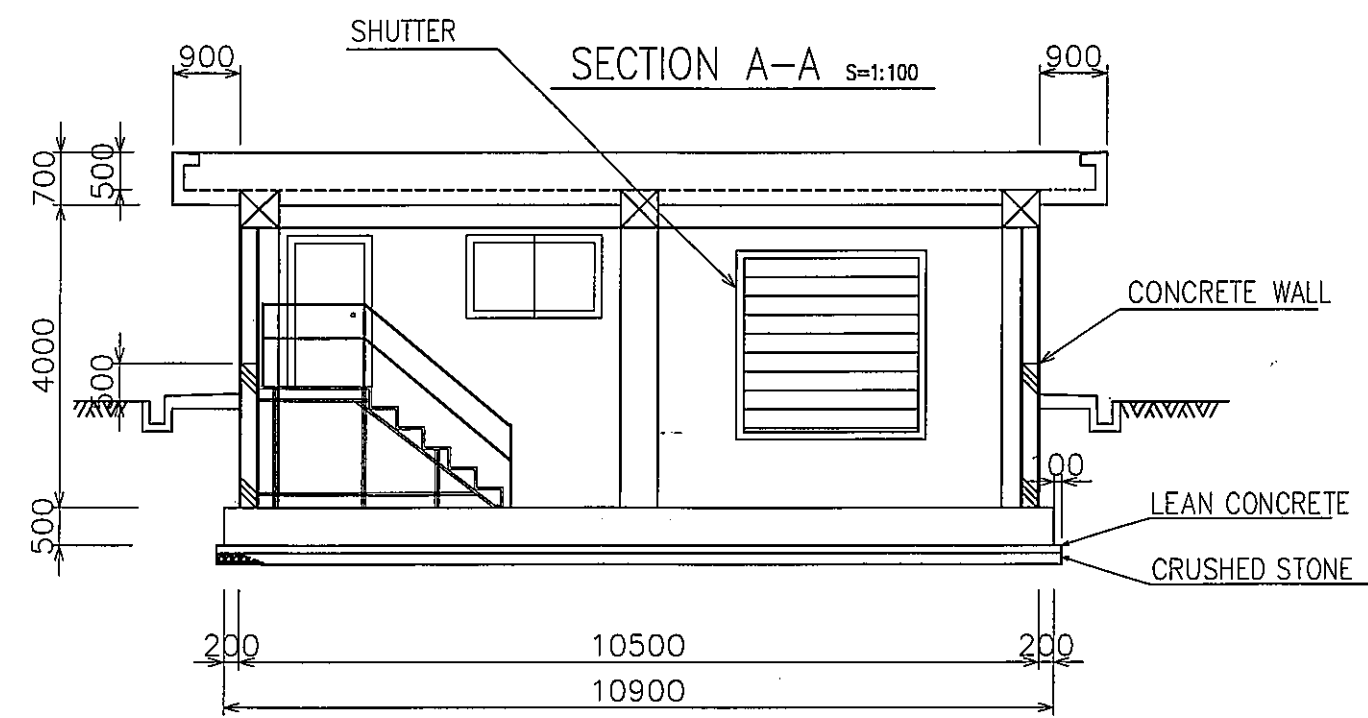
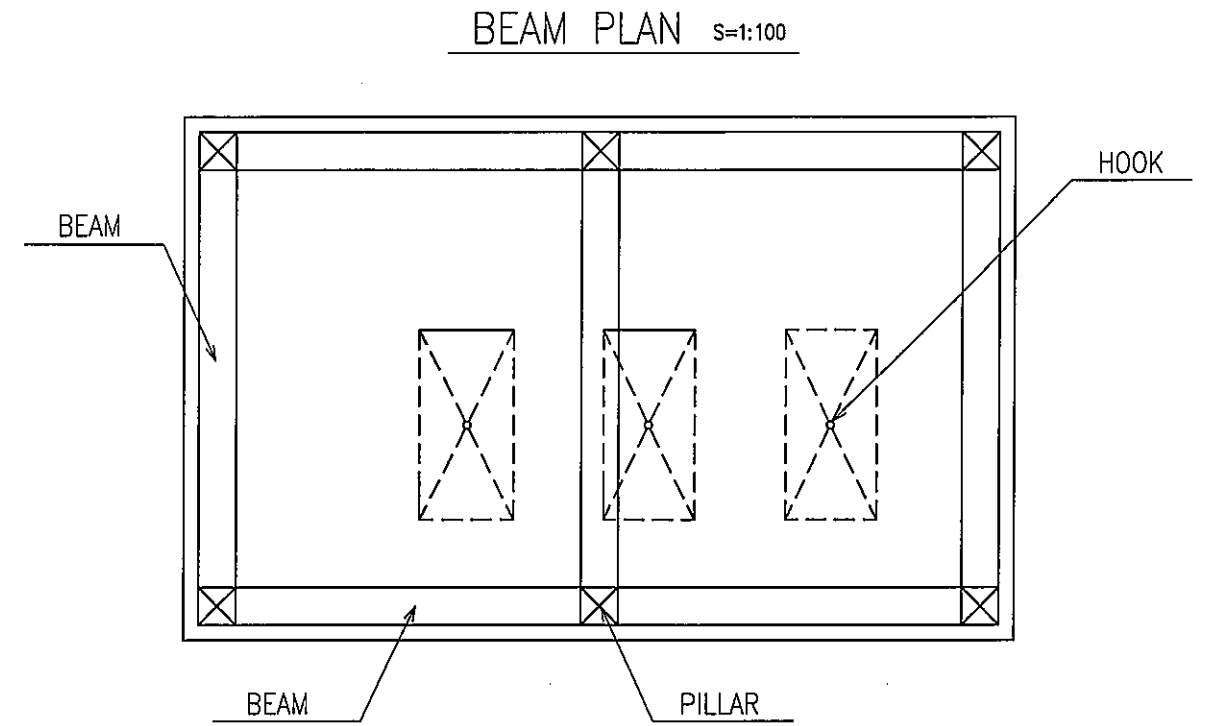
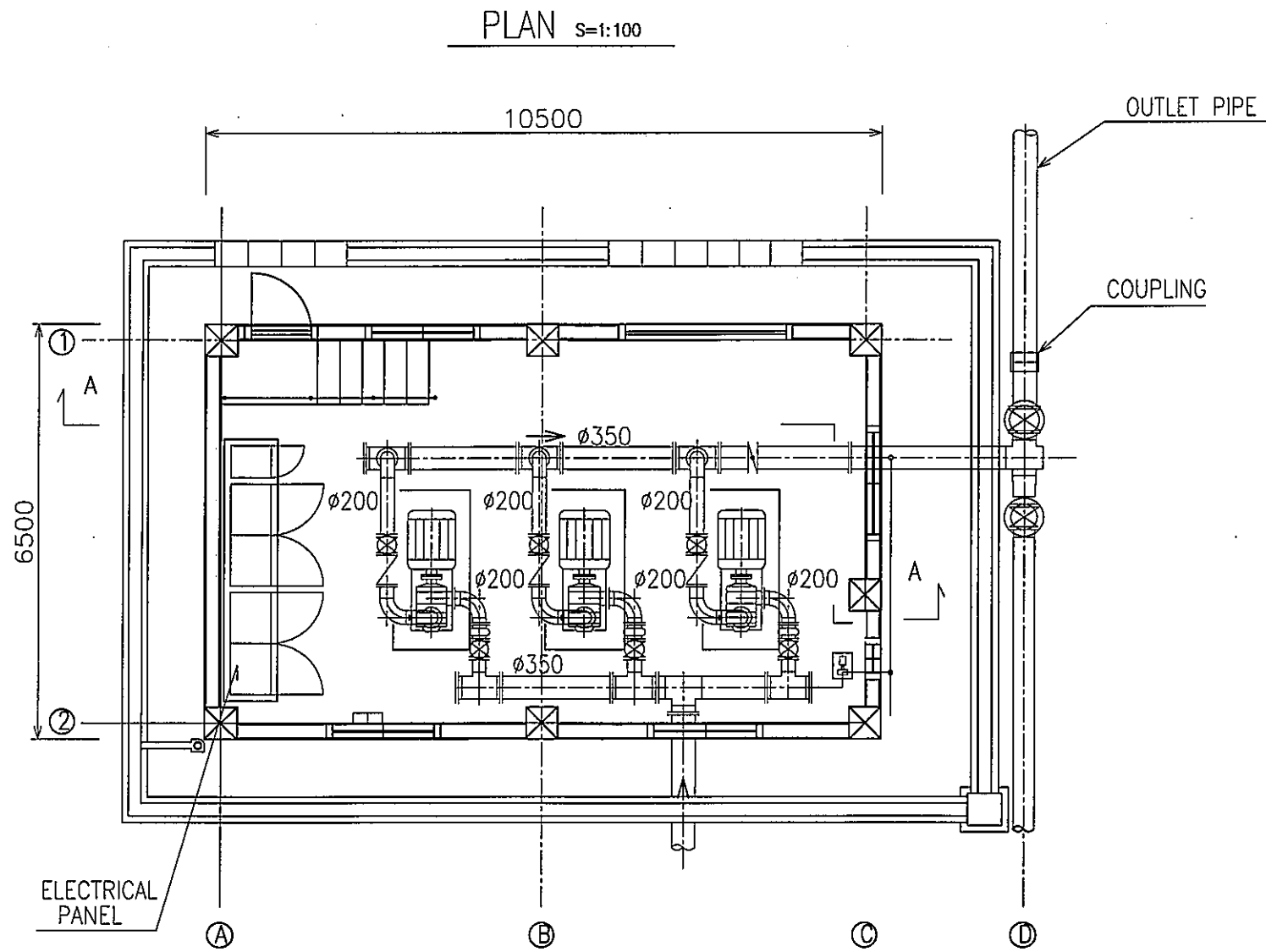


A-A Section

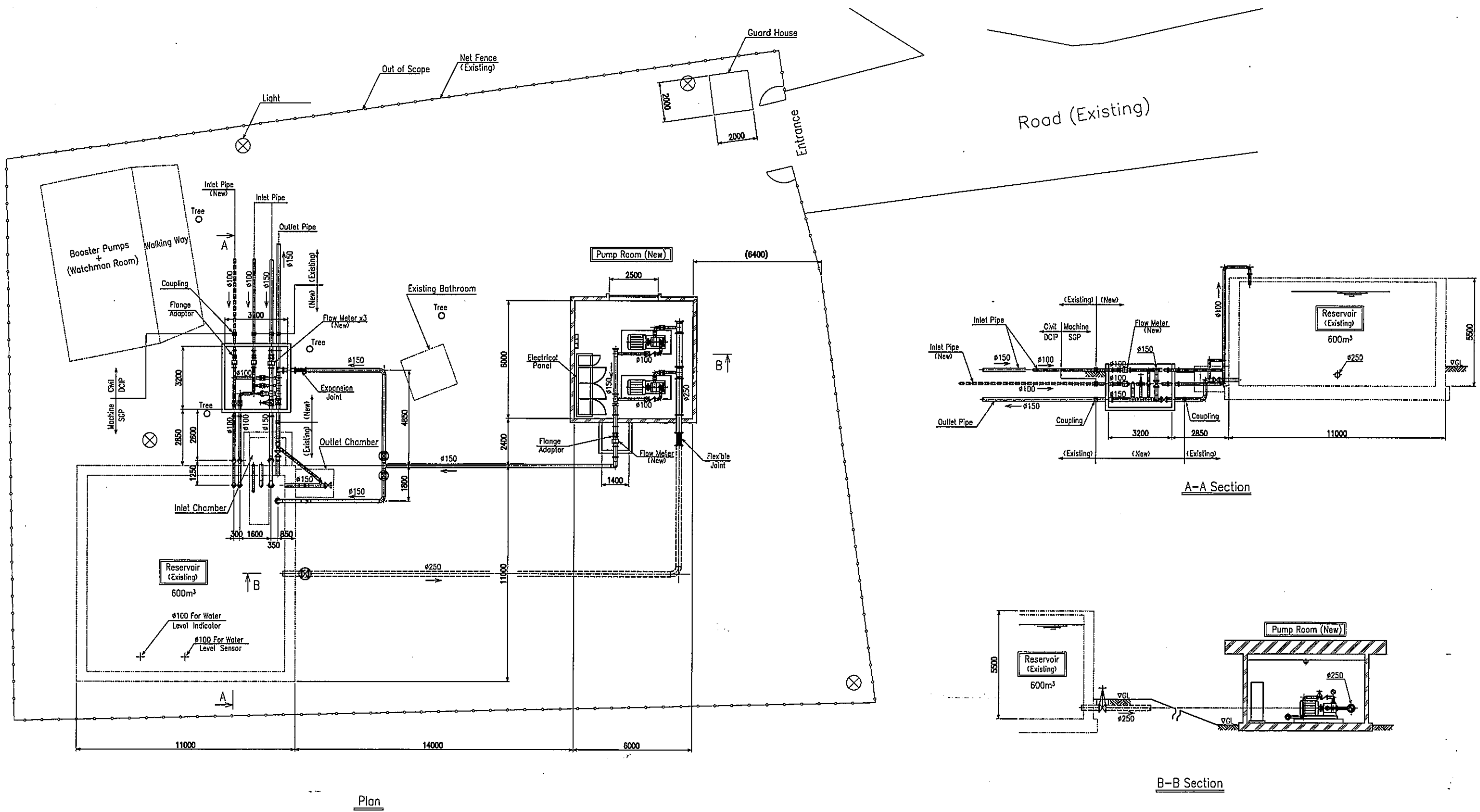
JWP-PS-01 FACILITY LAYOUT OF TABAQAT FAHIL PUMP STATION



JWP-PS-02 TABAQAT FAHIL PUMP STATION - RECEIVER - STRUCTURAL PLAN

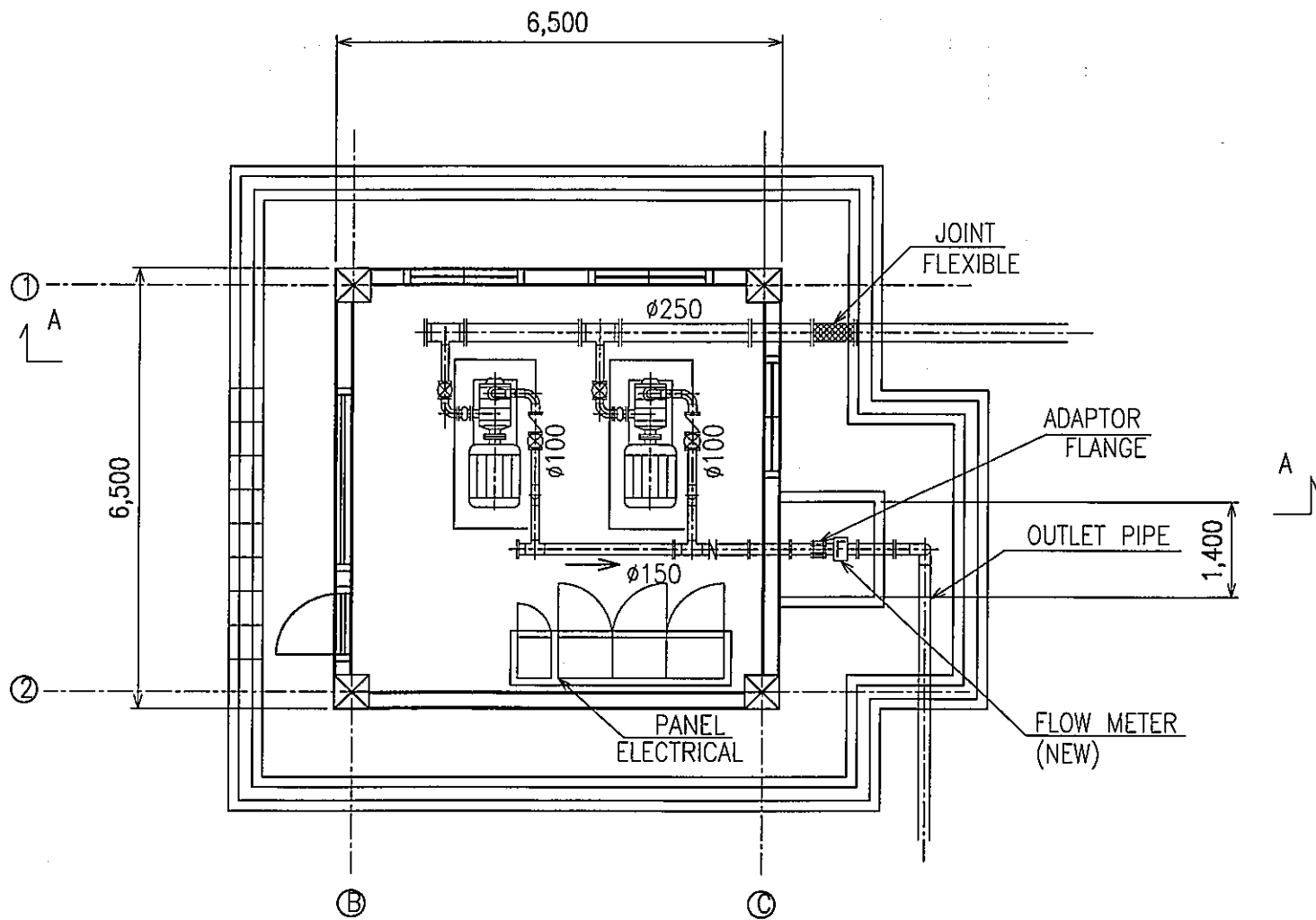


JWP-PS-03 TABAQAT FAHIL PUMP STATION - PUMP ROOM PLAN

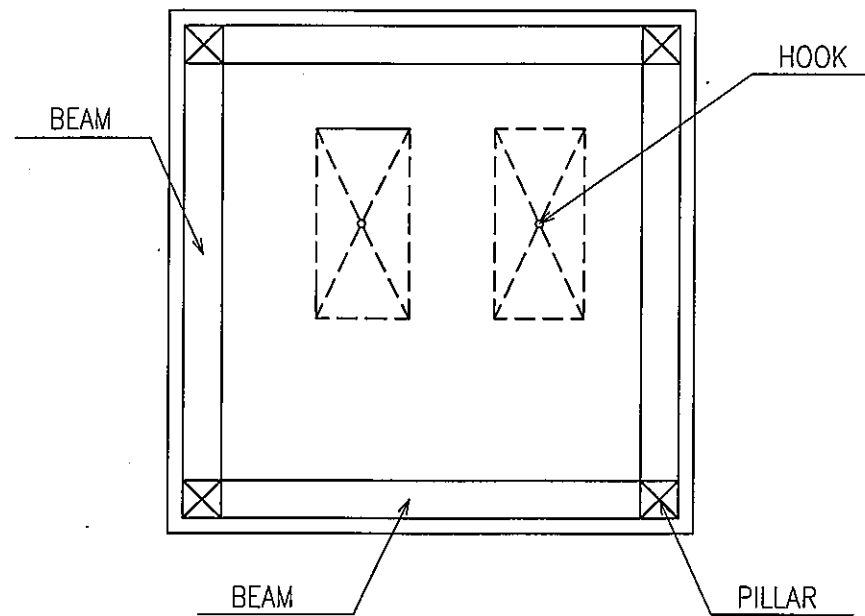


JWP-PS-04 FACILITY LAYOUT OF KREYMA PUMP STATION

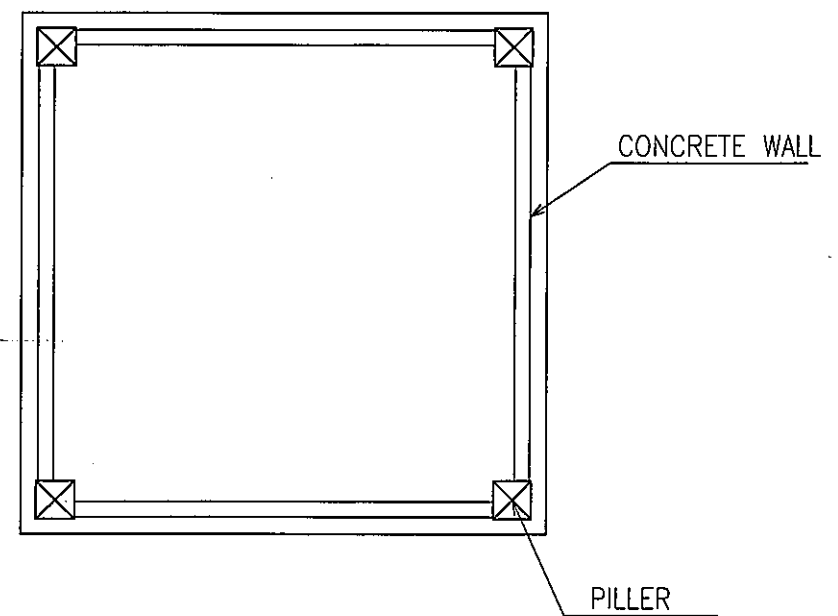
PLAN S=1:100



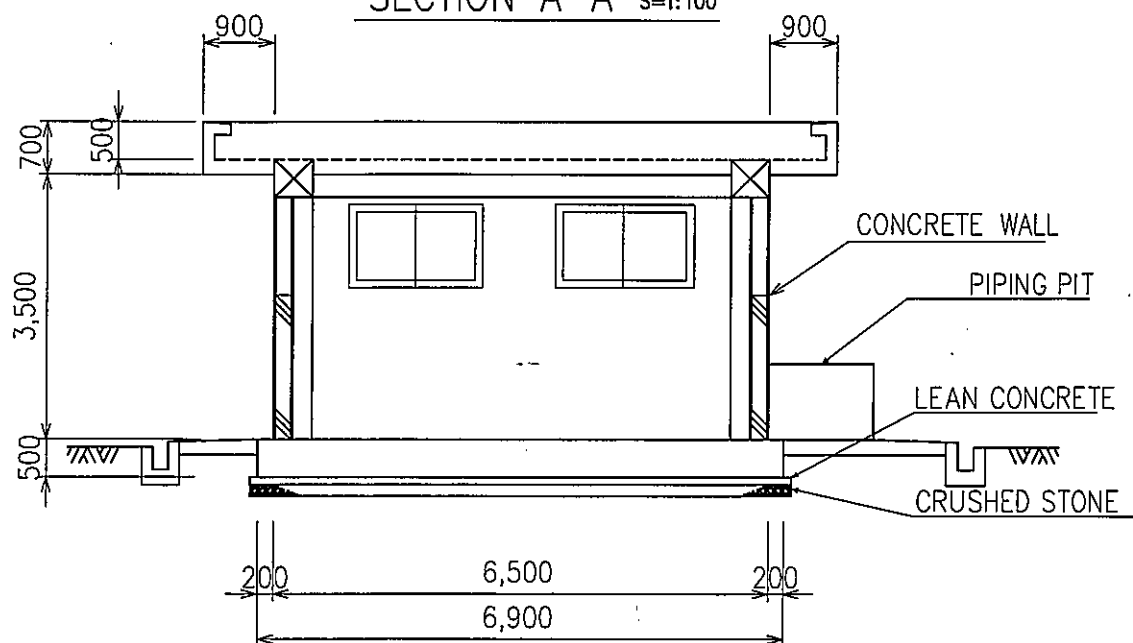
BEAM PLAN S=1:100



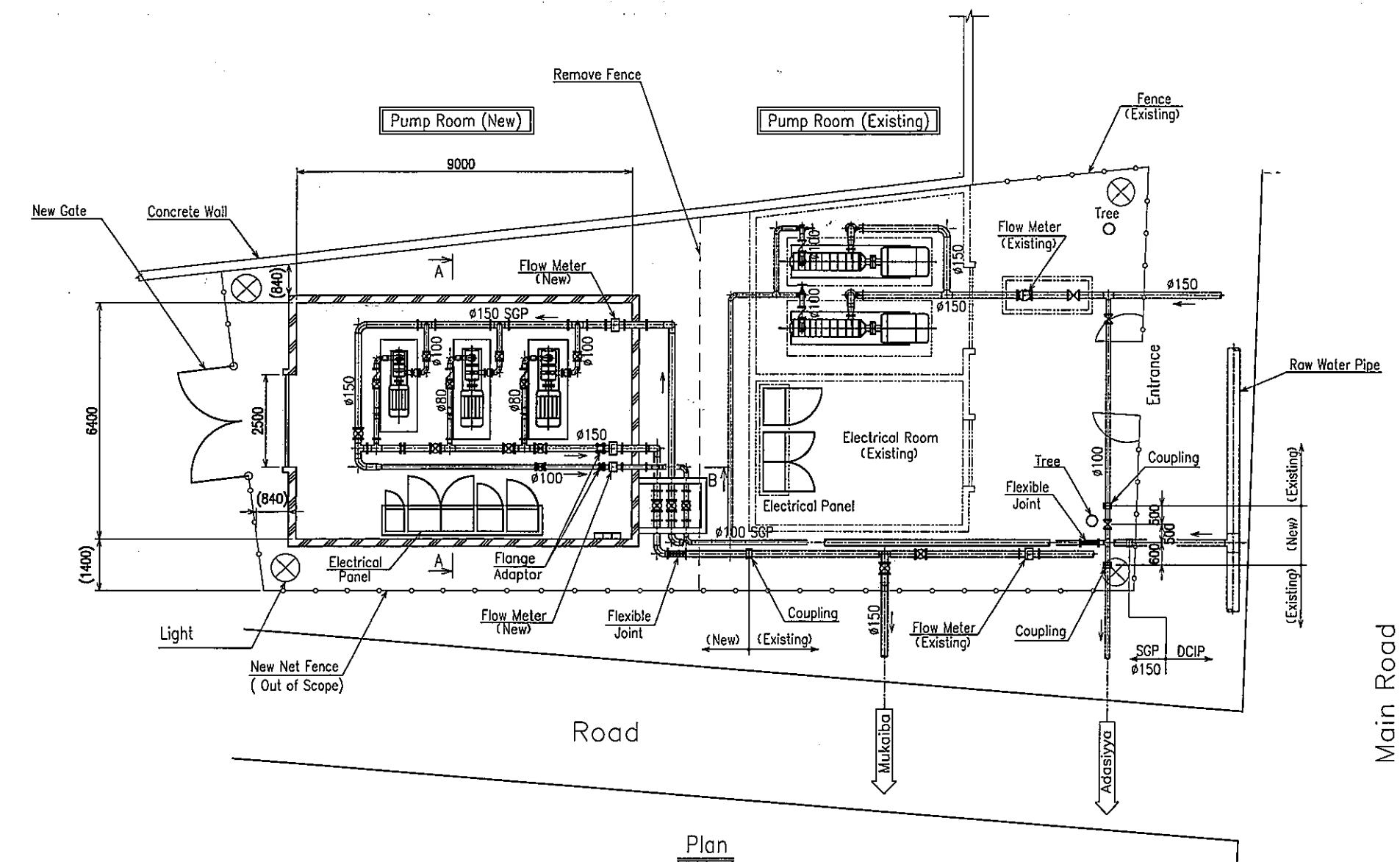
PLAN (UNDER GROUND) S=1:100



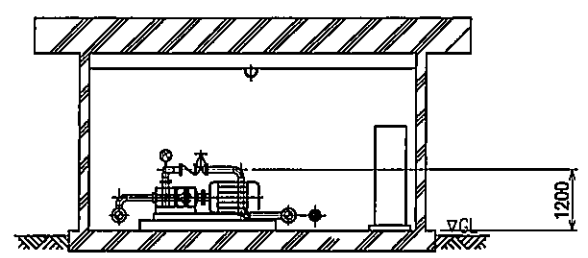
SECTION A-A S=1:100



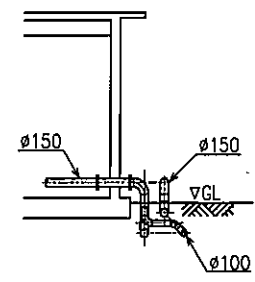
JWP-PS-05 KREYMA PUMP STATION - PUMP ROOM PLAN



Plan

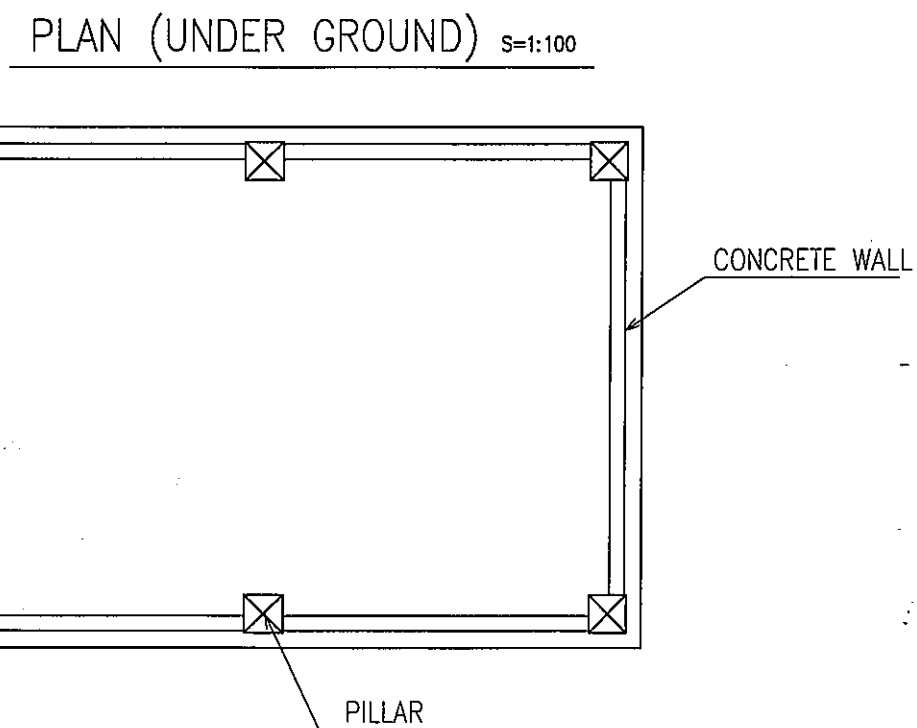
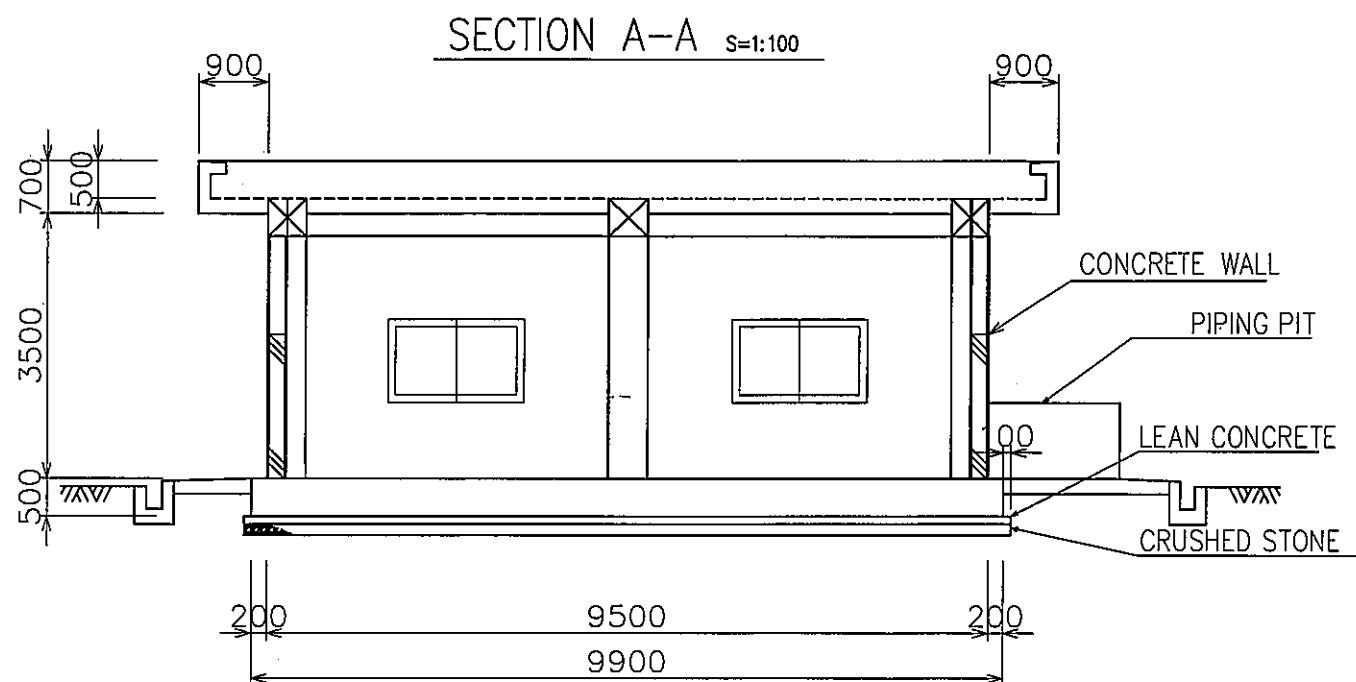
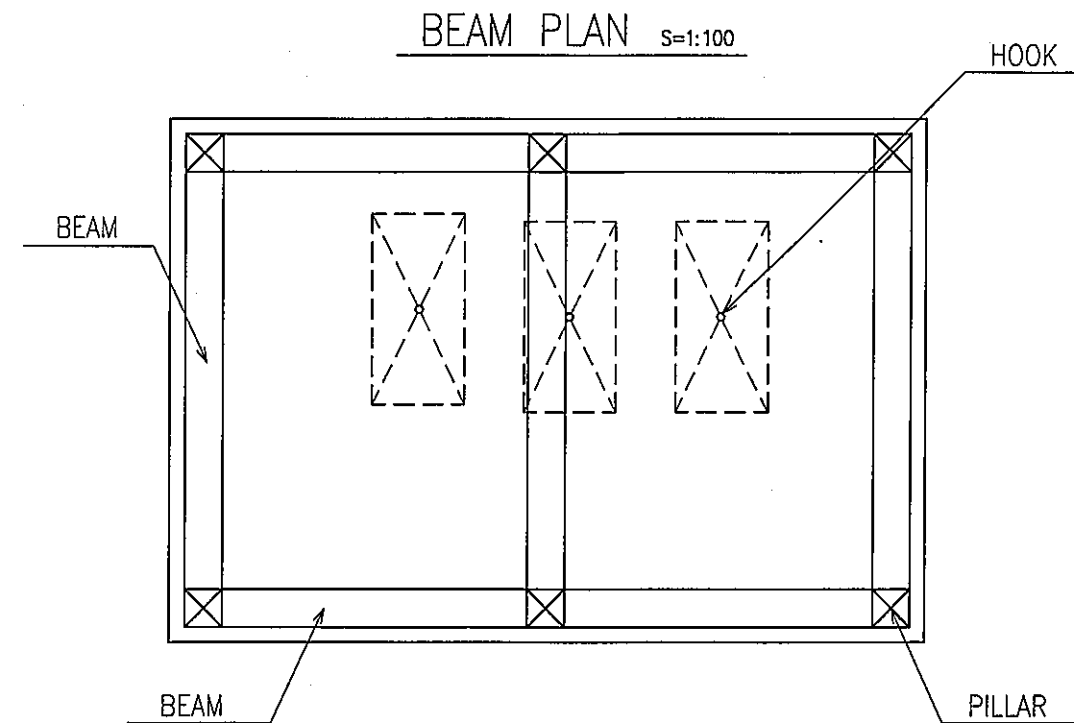
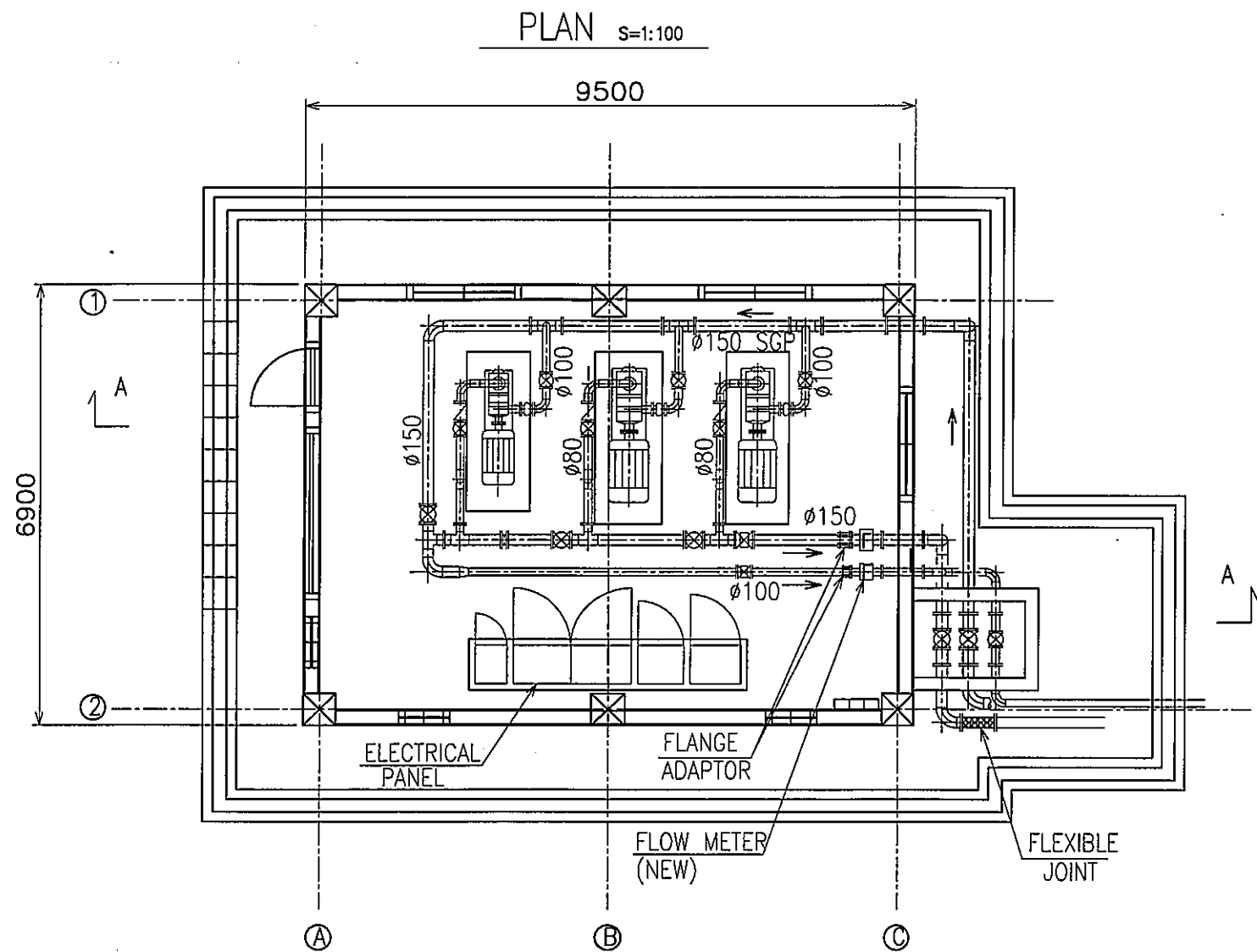


A-A Section



B ~ Section

JWP-PS-06 FACILITY LAYOUT OF ADASIYYA PUMP STATION



JWP-PS-07 ADASIYYA PUMP STATION - PUMP ROOM PLAN

2.2.4 Construction Plan and Procurement Plan

2.2.4.1 Implementation Policy of Construction and Procurement

The Project will be implemented in accordance with the framework of Japan's grant aid scheme. Following approval by the Governments of Jordan and Japan, the Exchange of Notes (E/N) regarding the detailed design will be signed to initiate the actual implementation process of the Project. After the E/N is ratified by the national assembly of Jordan, the E/N shall become effect on and after the date when the ratification of the E/N is notified to the Government of Japan by the Government of Jordan. Subsequently, the Government of Jordan will select the Japanese Consultant firm to begin the detailed design work. After that, the Japanese Contractor firm selected through open tendering, will carry out the construction of facilities and procurement of equipment. Basic procedures and particular considerations in the implementation of the project are as follows.

(1) Project Implementing Agency

The Water Authority of Jordan (WAJ) under direct jurisdiction of the Ministry of Water and Irrigation shall be the supervisory and responsible agency for the Project. The WAJ includes the Water Affairs, Sewerage Affairs, Laboratories & Quality, Aqaba Affairs, North Region, South Region, Middle Region, Financial Affairs and Administrative Affairs departments. The Northern Governorate Water Administration (NGWA) and the Middle Region Department will be in charge of the Project. The North Shouna Regional Operational Unit (ROU) of NGWA will be in charge of most areas of NGWA under the Project. The North Shouna ROU will implement operation and maintenance after facilities are constructed in the relevant areas. Balqa in the Middle District consists of Balga, Zarqa and Madaba is responsible for Balwaneh Villages located in southern part of the project site. Balqa is in charge of operation and maintenance of Balwaneh Villages.

(2) Consultant

For the construction of the facilities and procurement of equipment under the Project, the Japanese Consultant will conclude a design and supervision agreement with the WAJ which is the project implementing agency in Jordan to carry out a detailed design of facilities and work supervision. The Consultant will also prepare the tender document and will conduct an examination of tender qualification as well as conducting the tendering on behalf of the WAJ and provide necessary advice regarding the tender and implementation of the Project.

(3) Contractor

In accordance with the framework of Japan's grant aid scheme, the Japanese contractor selected by the Jordanian side through open tendering will carry out the construction of facilities and procurement of equipment under the Project.

As the Contractor is expected to provide after-care service, including the supply of spare parts and arrangements for repair work based on the request even after completion of the Project, it should consider carefully the post-Project liaison arrangements after delivery of relevant facilities.

Given the use of locally procured construction materials and others and the planned construction work in areas of heavy traffic and also in densely populated areas, the contractor should have a sound understanding of the local natural and socioeconomic conditions, construction market, labor situation, labor laws and ordinances.

(4) Necessity to Dispatch Japanese Engineers

Construction work under the Project will require specialized technologies in the construction of a water distribution reservoir station in order to ensure water tightness and aqueducts. In order to construct facilities under the Project within the scheduled work period in Jordan, it will be necessary to invest several teams simultaneously for the laying of the main water distribution pipes. Since it will also be necessary to continue water supply during construction, except during the connection of existing pipes or to protect existing cables, an engineer in charge of quality and safety should be dispatched. In addition, as it appears it will difficult to secure engineers specialized in the SCADA system and pumping equipment, specialists should be dispatched from the specialized Japanese companies and equipment manufacturers.

Aside from the specialists mentioned above, it will not be difficult to secure local engineers, skilled workers, technicians and site workers in Jordan.

2.2.4.2 Points to Note for Construction and Procurement

Important points in the construction plan and procurement plan are as follows.

(1) Pipe Laying

Pipes will be laid on public lots such as roads. The guidelines for laying are as follows:

- Pipes should be laid approximately 2m from the curb stones of paved roads in cities;

- Pipes should be laid on the un-paved or shoulder section of the road if there is not enough space between a boundary of a public lot and paved road;
- Pipes should be laid approximately 2m from the boundary of a public lot, such as an electric poles or fences if sufficient space can be secured between the boundary of public lot and paved road. If the pipeline is close to a road, the pipes should be buried 4m or more away from the end of the road on the assumption that the road may be expanded in the future (approximately 3 to 4m per lane).

The basic guidelines on backfilling of pipelines are as follows:

- The depth of backfilling for paved roads or shoulders should be 1m or more;
- The depth of backfilling for un-paved locations except for rock excavation should be 0.6m or more;
- The depth of backfilling for un-paved locations should be 0.3m or more.

Other policies:

- Aqueducts should be applied at the crossing of the King Abdullah Canal;
- Coupling or concrete should be applied at the crossing of culverts;
- Box culverts should be used for crossing expressways;
- Since groundwater flows in the area of the Tabaqat Fahil well (approximately 200m), water distribution pipes should be buried with polyethylene sleeves to prevent rusting;
- Existing pipes should be left in the ground as is.

(2) Facility Construction

Basic construction materials such as cement, aggregate and reinforcing steel necessary for civil engineering and construction work can be procured locally. However, ductile iron pipes for water transmission and distribution main pipes are difficult to procure locally and should be imported from Japan or a third country. It is also difficult to obtain pumping system equipment, etc. locally so they should also be imported from Japan or other country.

Although the general labor force and construction machinery necessary for facility construction and materials can be procured locally, most of the builders who can supply the necessary materials and manpower for construction and quantity are located in Amman, the capital. Consequently, the labor force, equipment and materials will be procured in Amman. However, concrete for reservoirs will be obtained from a ready mixed concrete trader in Irbid.

(3) Procurement of Equipment and Materials

Equipment and materials, include spare parts for the pumping system, are to be constructed. Therefore, it would be appropriate that the builder who constructs the facility to procure and transport the relevant equipment during construction.

All equipment and materials to be procured under the Project are necessary to operation and maintenance and will therefore be effectively applied to pilot operation of the facility. Accordingly, equipment and materials should be procured in advance before operation test.

2.2.4.3 Division of Construction, Procurement and Installation Work

Division of construction, procurement and installation work between the Japanese and Jordanian sides is shown in Table 2-2-11.

Table 2-2-11 Division of Construction, Procurement and Installation Work between the Japanese and Jordanian Sides

Division of Construction	Japan	Jordan	Remarks
1. Construction of transmission and distribution pipes			
(1) Replacement of transmission and distribution pipes			
• Procurement and replacement of transmission and distribution pipes (100 to 400mm in diameter, approx. 61km)	○		
• Procurement of branch distribution pipes (50mm in diameter, approx. 74km)	○		
(2) Laying of the above-mentioned branch distribution pipes and connecting work to supply water to each household		○	
2. Construction work of water distribution place, pumping system and SCADA system			
(1) Securing of construction lots		○	
(2) Removal and transfer of existing buildings and land preparation at construction lots		○	
(3) Installation of electric power receiving facilities			
• Conducting local 10.5kV power distribution lines		○	
• Integrated watt-hour meters		○	
(4) Conducting communication cables for the SCADA system and securing place of installation of equipment		○	
(5) Construction of water reservoirs	○		
(6) Construction of water distribution pump station			
• Construction of pump houses	○		
• Supply and installation of pumps	○		
(7) Construction of the SCADA system facility	○		
(8) Construction of inside paved roads	○		
(9) Construction of outdoor lighting of the site		○	
(10) Fences and gates		○	
(11) Landscaping		○	
(12) Drainage system for miscellaneous wastewater from pumping station	○		
(13) Connection of water reservoir overflow and drainage from drainage pit to public sewer line		○	
(14) Security of temporary land and land for disposal of surplus soil		○	
(15) Securing of service water for test		○	

2.2.4.4 Construction and Procurement Supervision Plan (Consultant Supervision)

In accordance with the Japanese grand aid scheme, the Consultant will carry out smooth progress of all of the work by forming a project team which will be consistently involved in the detailed design, construction and procurement supervision stages considering the purpose of the basic design. The Consultant will also ensure process, quality control and safety management by dispatching the following field supervisors with skills suitable for construction according to the work schedule during the work supervision stage.

Plumbing supervisor	: 1 person (permanently stationed)
Structure (such as reservoir) construction supervisor	: 1 person (permanently stationed)
Mechanical and electrical installation supervisor	: 1 person (spot)
SCADA system construction supervisor	: 1 person (spot)

Moreover, the Consultant will witness the factory inspection and pre-shipment inspection of equipment and materials manufactured in Japan or a third country and provide supervision and advice with the view to preventing any problems with such equipment after its delivery to the Project site with the participation of experts in Japan.

(1) Basic Policy of Construction and Procurement Supervision

The Consultant will supervise work progress in order to ensure completion of the work within a predetermined period and will supervise and promote work safety among contractors. The major key areas for work supervision are explained as follows.

1) Schedule Control

By comparing the process scheduled at the time of an agreement and its progress through monthly and weekly checks of the following items, if a delay is anticipated the Consultant will warn the contractor of the possible delay and demand the submission of countermeasures to complete the work within the period.

- Confirmation of the work progress (including the amount of equipment manufacture at the factories)
- Confirmation of delivered quantities of equipment and materials
- Confirmation of planned and actual number of engineers, skilled workers and laborers

2) Safety Control

Through consultations and cooperation with contractors responsible, the Consultant will provide supervision in order to prevent any on-site industrial disaster or accident during the construction period. The key points for on-site safety control are as follows.

- Preparation of safety control regulations and appointment of a safety manager
- Prevention of accidents through periodical inspection of construction machinery
- Preparation of routes for construction vehicles and machinery and strict implementation of safe driving
- Enforcement of welfare measures and holidays for workers

(2) Project Implementation Schedule

The relationship between various bodies involved in the implementation of the Project is shown in Fig. 2-2-15.

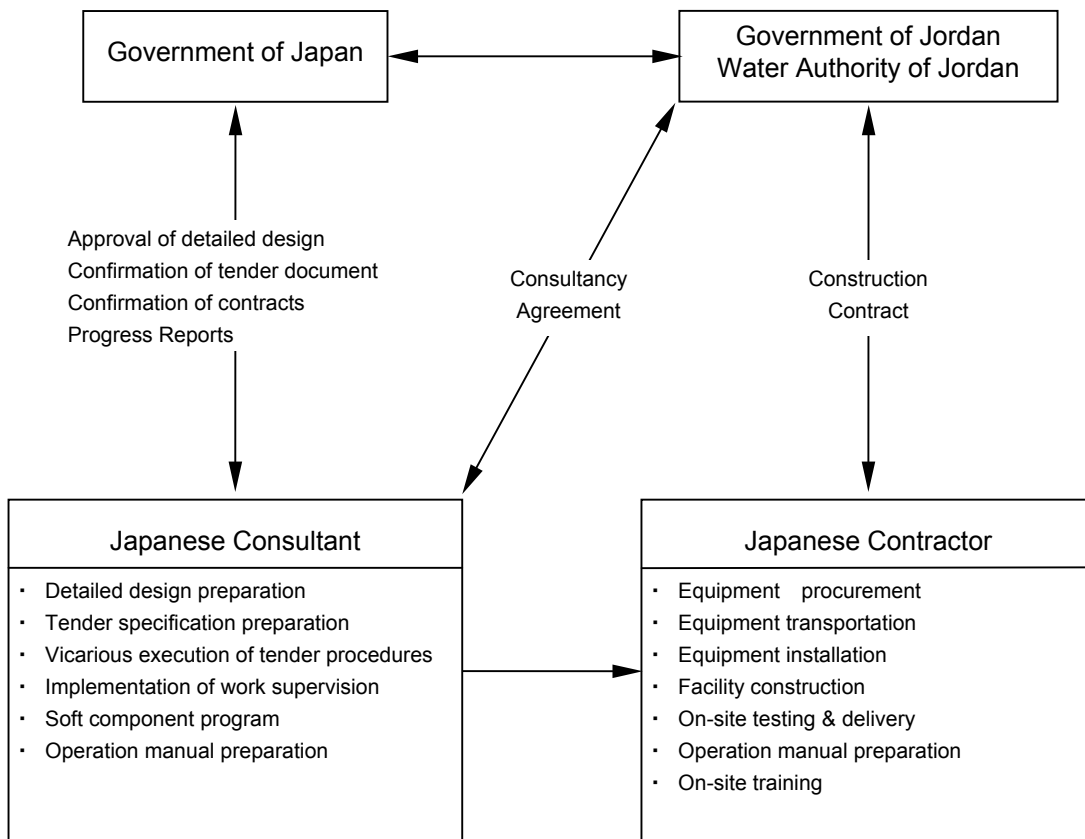


Fig. 2-2-15 Project Implementation Relationship

(3) Work Supervisor

The contractor will employ through local contractors or directly employ local engineers and skilled workers in order to complete facility construction and procurement of equipment and materials within the construction period in accordance with a construction agreement. Consequently, a contractor should dispatch engineers who have experience with similar operations overseas to the local site so that local contractors or local engineers and skilled workers can be directly employed to directly observe schedule control, quality control and safety control during the construction period.

The number and types of necessary full-time and spot work supervisors on the contractor side based on the facility scale and contents of the Project are anticipated as follows.

- On-site representative (full-time)
1 person : Consultations with related parties, coordination, acquisition of approvals, etc.
- Chief clerk (full-time)
1 person : Labor management, procurement of equipment and materials
- Chief engineer (full-time)
1 person : Guidance and supervision of the entire construction
- Water supply piping construction engineer (full-time)
2 person : Guidance and supervision of distribution pipeline construction
- Mechanical and electric installation engineer (spot)
1 person : Guidance and supervision of water distribution pumping system
- Data processing engineer (spot)
1 person : Guidance and supervision of SCADA system construction

2.2.4.5 Quality Control

The Consultant will determine whether or not a contractor has secured the quality of facilities, equipment and materials described in the contract documentation (such as technical specifications and detailed design drawings) based on the following items. If quality appears to be a problem, the Consultant may order a contractor to make corrections, changes or revisions.

- Checking of shop drawings and specifications of equipment and materials
- Checking of the results of factory inspections or witnessing of inspection of equipment and materials.

- Checking of installation manuals for equipment, manuals for on-site operation test and adjustment and inspection, working diagrams
- Supervision of on-site installation of equipment and witnessing of pilot operations, adjustment and inspections
- Checking of shop drawings
- Checking of shop drawings and progress of work at the site

Quality control will be scheduled for the following types of construction during work supervision under the Project.

Table 2-2-12 Quality Control Plan

Construction Type	Control Item	Method	Frequency	Standard
Pipe materials	• Strength & size	• Confirmation of factory inspection reports	Every approval	Japanese standards
Aqueduct	• Appearance & size • Welding • Coating	• Visual inspection & dimension measurement • Color check • Visual inspection	Every delivery	Japanese standards
Pipe laying	• Depth • Torque • Leakage	• Clearance gauge • Torque wrench • Hydraulic test	All Joints All pipe laying extension	Japanese standards
Paving	• Base course	• Plate bearing test	Every 1km	Japanese or Jordanian standards
Foundation ground	• Soil bearing capacity	• Plate bearing test	Every reservoirs Every aqueduct abutment	Japanese standard
Concrete	• Aggregate • Cement • Ready mixed concrete • Concrete strength	• Mechanical analysis • Physic & chemical test • Slump, air & chlorides • Compressive strength test	Every 3000m ³ Every 1000 tons Every installation Every installation site or 150m ³	Japanese or Jordanian standards
Reinforcement bar	• Strength • Bar arrangement	• Tensile strength • Bar arrangement test	Every 200 tons Every installation site	Japanese or Jordanian standards
Structure workmanship	• Workmanship dimension	• Dimension measurement	All major components	Japanese standard
Water proofing	• Material quality • Film thickness & adhesive strength • Paint film • Leakage	• Confirmation of quality control certificates • Film thickness test & tension test • Visual inspection • Water filling test	Every approval Every reservoir Every reservoir	Japanese standard
Mechanical installation	• Installation accuracy • Function	• Measurement of installation location • Loading operation test	All equipment All equipment during pilot operations	Japanese standard
Electrical installation	• Installation accuracy • Function	• Measurement of installation location • Loading operation test	All equipment All equipment during pilot operations	Japanese standard
Flow rate control SCADA system	• Communication • Data taking-in	• Facing test • Communication test	All equipment All equipment at the time pilot operations	Japanese standard

2.2.4.6 Equipment and Materials Procurement Plan

(1) Place for Procurement of Equipment and Materials

Equipment and materials for the Project will be procured in Jordan wherever possible provided that they meet the set specifications, quality, delivery period and price, etc. Those which cannot be procured in Jordan will be procured in Japan or a third country. Important points to remember when selecting the place for procurement are as follows.

- 1) Except for the SCADA system, reservoir and water supply pumping machinery and electrical equipment, most construction materials are readily available in Jordan.
- 2) Ductile cast iron pipes, fittings, and valves, steel pipes for aqueducts, etc. cannot be procured in Jordan.

The division of procurement of major equipment and materials (Table 2-2-12) to be utilized under the Project is determined after due consideration of the policy mentioned earlier in [2.2.3.1] and the above-mentioned points.

Table 2-2-13 Division of Procurement of Major Equipment and Materials

Item	Local	Japan	Third Country	Remarks
Equipment and Materials				
Cement	○			
Aggregate	○			
Reinforcing bars	○			
Formwork materials	○			
Scaffolding & timber materials	○	○		Mass procurement through unified standards
PVC pipes	○			
Blocks	○			
Tiles	○			
Ductile cast iron pipes		○	○	Straight pipes, bend pipes, socket & valves will be procured from a third country and Japan
Hard Polyethylene pipes	○			
Special pipes		○		From the aspects of high water pressure performance, delivery, safety and design
Ladders & covers for reservoirs		○		Corrosion resistant
Flow meter & water gauges		○		Conform to safety & water supply system
Flow rate control SCADA system		○		
Booster pumps		○		
Construction Machinery				
Backhoes	○			
Dump trucks	○			
Trucks with crane	○			
Bulldozers	○			
Truck cranes	○			
Concrete mixer vehicles	○			
Concrete pump vehicles	○			
Dynamos	○	○		
Air compressors	○			
Trucks with crane	○			
Tamping machines		○		

(2) Transportation Method

Adequate packaging to withstand long-term marine transportation, unloading at port, overland transportation to the project site and storage should be applied to construction equipment transported from Japan and third countries.

The free port at Aqaba, which is utilized by many Japanese and Western liners and boasts modern unloading facilities, is considered the best for unloading.

Liners will be used for marine transportation from Japan or a third countries to the Aqaba Port. Truck transportation, which is a principal means in Jordan, will be utilized for land transportation from Aqaba Port to the project site (approximately 360km).

2.2.4.7 Soft Component Program

(1) Background of the Soft Component Program

Jordan is taking measures to reduce unaccounted-for water for the purpose of effective utilization of the limited water resources as one of its water policy goals. Japan is also providing technical cooperation for the WAJ's program to reduce unaccounted-for water through the current dispatching of two experts to assist with the Jordanian goal.

In line with the Jordanian goal, the primary aim of the Project is to increase the amount of water supply per capita at the target site by reducing the amount of leakage from pipelines through the rehabilitation of the existing water supply system. Unaccounted-for water is the amount obtained by deducting accounted water (volume in which water charges are collected) from the distributed water, including the amount due to errors arising due to the inaccuracy of water supply meters or meter-reading method, in other words, the amount of water illegally stolen in addition to physical loss associated with leakage. Consequently, accurate grasping of unaccounted-for water is an important task not only for facility maintenance but also for the soundness of water administration. For the primarily purpose of grasping unaccounted-for water under the Project, a SCADA system will be introduced for accurate data measurement at each facility.

In the SCADA system under the Project, an electromagnetic will be installed at each water supply facility in order to measure flow data. In addition, a water pressure gauge and water level indicator will be installed to obtain data to be measured on daily basis so that the data can be directly transmitted to the North Shouna ROU office (hereinafter referred to as the "ROU office") by utilizing general telephone lines. The data transmitted to the ROU office from each water supply facility will be processed with computers and necessary information will be recorded. In addition, water level indicators will be installed at major reservoir wells within the Project site in order to provide data on underground water levels to the ROU office. By processing the data and grasping a tendency of a change in long-term underground water levels, it will become possible to control water resources.

Since the above-mentioned SCADA system is being introduced gradually, even in Jordan, where the Great Amman Water Supply System Improvement Project is currently being implemented, a SCADA system is included within the scope of each donor. Under these circumstances, in order to conduct smooth operation of the said system after implementation of the Project, technical guidance on application and maintenance skills for personnel in the recipient's implementing body should be provided.

Technology transfer through the soft component program does not refer only to the application skills of the SCADA system but is also an important factor in processing technology in line with the flow of data processed, data analysis and effective utilization of data. Trainees of the soft component program are scheduled to take technical training on the SCADA system in line with a program of technical cooperation (to improve capability of skills for unaccounted-for water measures). They are also assumed to have acquired general knowledge in technology behind the SCADA system through training by the contractor. Accordingly, with respect to the fundamental skills on operation and maintenance of the SCADA system, its contents will be re-confirmed so that training will emphasize processing, analysis and effective utilization of data by applying actual data. Training that utilizes actual data is feasible under the soft component program as one type of training directly connected to practical business. Experience cultivated through this training is expected to be extremely useful in the smooth application of the SCADA system after handing over of facilities.

(2) Goal of the Soft Component Program

It will become possible for staff of the ROU office to prepare information necessary for the ROU office's control by utilizing data to be measured at each facility and collected at the office ROU through the smooth application of the SCADA system. Based on the information, appropriate operation and maintenance of the water supply system can be continuously conducted. In addition, appropriate control of water resources at major wells is possible.

(3) Outcome of the Soft Component Program

The following outcome can be expected at the ROU office through the introduction of the soft component program.

- ① Operation and maintenance skills of the SCADA system will be established.
- ② Skills on processing, analysis and application of data will be established.

(4) Method to Confirm Degree of Outcome

The degree of achievement obtained from the outcome of the soft component program will be confirmed through the following methods.

- ① Establishment of operation and maintenance skills of the SCADA system.
The degree trainees acquire is confirmed by implementing a short test at the end of training.
- ② Establishment of skills on processing, analysis and application of data.
The degree trainees acquire is confirmed by implementing a short test at the end of training.
Since the operation after completing to hand over facilities at the time of implementing the

soft component program will begin, it is evaluated by preparing the outcome with actual data.

(5) Activities of the Soft Component Program (Input Plan)

Training will be implemented by the Japanese consultant for the soft component program. The contents of basic operations of the Japanese consultant are described below and the details are also shown in Table 2-2-17.

- ① Formulation of a training plan
- ② Preparation of text books (various manuals) to be utilized in training
- ③ Implementation of lectures
- ④ Comprehensive evaluation of training outcome

In the case of implementing the soft component program, Japan's technical project (improvement in competence of skills on measures for unaccounted-for water) to be implemented will be applied effectively. Eligible trainees for the soft component program are presumed to have already taken a training course in "SCADA system application technology" of the said program and the "OJT on SCADA system application technology" conducted in accordance with the contract.

An organization in charge of the implementation of the soft component program and the contents of activities are described as follows.

1) Technical Guidance on SCADA System Application Technology

Technical guidance necessary for the establishments of an operation and maintenance scheme subject to the SCADA system to be constructed under the project will be provided.

Persons subject to technology transfer will be staff of the ROU office who will control the overall water supply system where a center will be established and operators of each facility at a pump station, reservoir and well where monitoring equipment will be installed.

- ① Guidance on a maintenance method of equipment at the control center (ROU office)
 - Guidance on a maintenance method of data processing-related equipment such as PCs.

② Guidance on maintenance of measuring instruments (electromagnetic flow meter, water pressure gauge and water level indicator)

- Guidance on a maintenance method
- Guidance on calibration of measuring instruments

③ Guidance on a maintenance method of data transmitter

- Guidance on a maintenance method

2) Guidance on Skills of Processing, Analysis and Application of Data

By utilizing data to be transmitted to and to be accumulated at the ROU office, technical guidance for the preparation of information required to maintain the water supply system will be provided.

Persons subject to technology transfer will be personnel of the ROU office who control the water supply system. Those who actually decide its application method in the water supply system will be eligible.

① Guidance on a program usage method

- Guidance on the operation method of a program involving a series of processes including data processing, analysis and application.

② Guidance on data processing

- Guidance on a method to prepare various ledgers subject to monthly processing (change in water supply amount, unaccounted-for water amount and water level of reservoir wells).
- Guidance on method to prepare various ledgers subject to annual processing (change in water supply amount, unaccounted-for water amount and water level of reservoir wells).

③ Data analysis and application

- Guidance on a calculation method of demand-supply balance conditions by service zone and its evaluation method.
- Guidance on method to assume the occurrence of abnormal leakage due to an accident, etc.
- Guidance on method to control appropriate transmission and distribution water pressure.

- Guidance on method to control appropriate operations at reservoirs.
- Guidance on method to control water resources through long-term trend analysis at reservoir wells.

④ Guidance on method for early detection of problems and troubleshooting.

- Guidance on the setting up of values (water pressure, flow) of control items and its scope for various types of information to be obtained through data processing. If information swerves from the control scope, guidance on method to assume the possibility of a problem in some way.

(6) Method to Procure Resources for the Implementation of the Soft Component Program

The SCADA system is a relatively new area in Jordan so that it is difficult to effectively utilize local resources. Consequently, it is reasonable to apply the direct support system of a Japanese consultant.

(7) Implementation Process of the Soft Component Program

The positioning of the overall process of the soft component program with regards to technology transfer of the SCADA system, the overall process related to the soft component assumed under the Project and its implementation schedule (draft) are shown in Table 2-2-16, Table 2-2-17 and Table 2-2-18 respectively.

(8) Outcome of the Soft Component Program

Outcome of the soft component program under the Project are described in Table 2-2-14.

Table 2-2-14 Outcome of the Soft Component Program

Name of Outcome	Remarks
Equipment control manual	- Measuring instrument (electromagnetic flow meter, water pressure gauge and water level indicator) - Center equipment (such as PCs and printers) - Data transmitter (transmitting side, receiving side)
Application manual	- Program operation method - Data processing chart - Data analysis & application chart - Chart on methods to detect problems and troubleshooting
Evaluation report on degree of understanding of trainees	- Compilation of the results of trainees after implementing a short test and evaluation
Final Report on Soft Component (Technical Assistance) at the Completion of Activities (English version)	To be presented to the implementing agency of the recipient country (in accordance with the JICA Soft Component Guidelines: April 2004)
Final Report on Soft Component (Technical Assistance) at the Completion of Activities (Japanese version)	To be presented to the JICA (same as above)

(9) Estimated Cost of the Soft Component Program

The estimated cost of the soft component program is shown in Table 2-2-15.

Table 2-2-15 Estimated Cost of the Soft Component Program

Cost	Estimated Amount (¥)
Direct personnel Expenses	630,000
Direct Cost	1,100,367
Indirect Cost	882,000
Total Estimated Cost	2,612,367

(10) Responsibilities of Implementing Agency in Recipient Country

1) Feasibility

The ROU office is an operating agency of the target water supply system and has accumulated know-how on the operations of the water supply system through accumulated practical experience. Based on this experience, they are aware of the importance of monitoring at each water supply facility and the effective usage of data to be monitored. The SCADA system is not an entirely different area for them, so this tool is feasible for efficient monitoring of the water supply system. Since personnel of the ROU office understand the objectives and functions of the SCADA system very well, they are deemed to have enough aptitude for maximum utilization of the system. In addition, a system of SCADA is being actively introduced even in Amman city at the present time so that the ROU office which is a sub-office of the WAJ can obtain technical cooperation on the SCADA system application through technical exchanges with WAJ. Therefore, the ROU office will be able to operate the SCADA system.

2) Hindering Factors

① Computer Technology

Compared with the WAJ headquarters and the NGWA headquarters where the entire office is networked, the ROU office does not have even one computer, so they conduct their business operations as in the past. Since data to be monitored at each water supply facility should be transmitted to the ROU office and the data should be processed by computers for the SCADA system, basic skills of computer operations and maintenance are dispensable so that personnel accustomed to computer operation should be secured at the ROU office.

② Maintenance of Measuring Instruments

In order to operate the SCADA system in the optimum conditions, it is extremely important to control measuring instruments (electromagnetic flow meter, water pressure gauge and water level indicator). Since the most important job in monitoring

is to read data correctly, daily maintenance of measuring instruments and calibration of scales it requested for the ROU office.

3) Necessary Measures

① Computer Technology

At the present time, there are no personnel who are familiar with computers at the ROU office. By contrast, there are many applicable personnel at the WAJ headquarters and the NGWA headquarters, so one way of securing personnel is through personnel reshuffling. It is also feasible to implement computer education for office automation at the ROU office by utilizing such human resources in the future.

② Maintenance of Measuring Instruments

Generally speaking, maintenance for the SCADA system is to be implemented in accordance with the O & M manual. If a problem in measuring instrument arises, necessary spare parts should be always secured. Since the SCADA system to be delivered under the Project is decided in reference to the specifications of other projects in Jordan, in order to secure spare parts, spare parts for the SCADA system should be shared with other projects whenever possible.

With respect to the calibration of scales, the enforcement of routine calibration should be exhaustively made known by sufficiently transferring skills on its method and frequency through the soft component program.

Table 2-2-16 Detailed Activities Plan

	Category	Description of Activity	Instruction Manual, etc. (Visible Outcome)	Activity Method	Necessary Input
1	Manual Preparation	① Equipment Control Manual	Equipment control manual		2 persons/day
		② Equipment Control Manual	Application manual		2 persons/day
		③ Preparation of Questions for a Short Test	Short test questions		1 person/day
2	Technical Guidance on Skills for the SCADA System Application	① Guidance on Method to Maintain the Control Center (ROU Office) <ul style="list-style-type: none"> • Method of maintaining equipment (such as PCs) at the Center 	Equipment control manual Training records Guidance records	Classroom training (ROU office) Target: Personnel at the ROU office	1 person/day
		② Guidance on Maintenance of Measuring Instruments (electromagnetic flow meters, water pressure gauges and water level indicators) <ul style="list-style-type: none"> • Guidance on maintenance method • Guidance on calibration of measuring instruments 	Same as above	Classroom training (ROU office) Target: Personnel at the ROU office Operators at pump stations Operators at reservoirs Operators at well pump stations	1 person/day
		③ Guidance on a Method to Maintain a Data Transmitter <ul style="list-style-type: none"> • Guidance on Maintenance Method 	Same as above	Same as above	1 person/day
		④ Implementation of Short Test (Equipment Control)	Marking and evaluation of a short test	Same as above	1 person/day

	Category	Description of Activity	Instruction Manual, etc. (Visible Outcome)	Activity Method	Necessary Input
3	Guidance on Skills for Processing, Analysis and Application of Data	① Guidance on Method to Utilize Programs <ul style="list-style-type: none"> Program operation method to execute a series of processes on processing, analysis and application of data. 	Application manual Training records Guidance records	Classroom training (ROU office) Target: Personnel at the ROU office	1 person/day
		② Guidance on Data Processing <ul style="list-style-type: none"> Guidance on a method to prepare various ledgers subject to monthly processing (change in water supply amount, unaccounted-for water amount and water level of reservoir wells). Guidance on method to prepare various ledgers subject to annual processing (change in water supply amount, unaccounted-for water amount and water level of reservoir wells). 	Same as above	Same as above	2 persons/day
		③ Guidance on Data processing & Application Methods <ul style="list-style-type: none"> Guidance on calculation method of demand-supply balance conditions by service zone and its evaluation method. Guidance on method to presume an occurrence of abnormal leakage due to an accident, etc. Guidance on method to control appropriate transmission and distribution water pressure. Guidance on method to control appropriate operations at reservoirs. Guidance on method to control water resources through long-term trend analysis at reservoir wells. 	Application manual Training records Guidance records	Classroom training (ROU office) Target: Personnel at the ROU office	2 persons/day
		④ Guidance on method to a method for early detection on the occurrence of a problem and its troubleshooting <ul style="list-style-type: none"> Guidance on setting up of values (water pressure, flow) of control items and its scope for various information to be obtained by data processing. If information swerves from the control scope, guidance on a method to presume the possibility of the occurrence of a problem in some way. 	Same as above	Same as above	2 persons/day
		⑤ Implementation of Short Test (Effective Utilization of Data)	Marking and Evaluation of a Short Test	Same as above	1 person/day

Table 2-2-17 Overall Time Schedule for Technology Transfer of the SCADA System

Items	Data	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40																																	
[Activity period of technical cooperation project (assumed)]																																																																										
(1) Technology transfer of leakage detecting technology																																																																										
(2) Technology transfer of meter reading technology																																																																										
(3) Technology transfer of supervisory management of water supply pipe construction																																																																										
(4) Technology transfer of flow and pressure control by utilizing the SCADA system																															■																																											
[Construction work]																																																																										
(1) Construction of the SCADA system																																▬																																										
(2) Implementation of OJT on the SCADA system																																▬																																										
[Soft component program]																																					▬																																					
[Operations of the water supply facilities]																																																																										

Note) Period of technology transfer (training) for the SCADA system under the technical cooperation project is based on the assumption.

Table 2-2-18 Implementation Schedule of the Soft Component Program

Item	Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Number of trainee	
		Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat		
Travel (Narita → Amman)																																	
Consultation with clients & parties concerned																																	
[Manual preparation]																																	
①Equipment control manual																																	
• Maintenance of measuring instruments																																	
• Maintenance of equipment at the Center																																	
• Maintenance of transmitters																																	
②Application manual																																	
• Program operation method																																	
• Data processing chart																																	
• Data analysis & application charts																																	
• Problem detecting & troubleshooting charts																																	
③Preparation of questions for short test																																	
[Technical guidance]																																	
①Equipment control																																	
• Maintenance of equipment at the Center																																	
• Maintenance of measuring instruments																																	
• Maintenance of transmitters																																	
②Implementation of short test (equipment control)																																	
③Program operation method																																	
④Data processing																																	
⑤Data analysis & application																																	
⑥Problem detecting & troubleshooting methods																																	
⑦Implementation of short test (effective utilization of data)																																	
Marking & compilation of short test																																	
Review of manual & distribution to trainees																																	
Preparation of final report (English version)																																	
Reporting to clients & parties concerned																																	
Preparation of final report (Japanese version)																																	
Travel (Amman → Narita)																																	

2.2.4.8 Implementation Process

The Project will commence following the approval of project implementation by the Government of Japan and the exchange of notes (E/N) between the two countries. The construction for the Project will consist roughly of three stages: ① preparation of detailed and tender specifications, ② tender and construction agreement, and ③ facility construction and procurement of equipment and materials.

The components of the Project include the replacement of transmission and main distribution pipes, to construct water supply facilities (reservoirs and a receiver) and pump stations, and to create the SCADA system. Since transmission and distribution pipes cannot display their function until the completion of work on the both the Jordanian and Japanese sides, a schedule should be planned that sufficiently takes into consideration the construction process on the Jordanian side. The outline of implementation process of the Project is shown in Fig. 2-2-16.

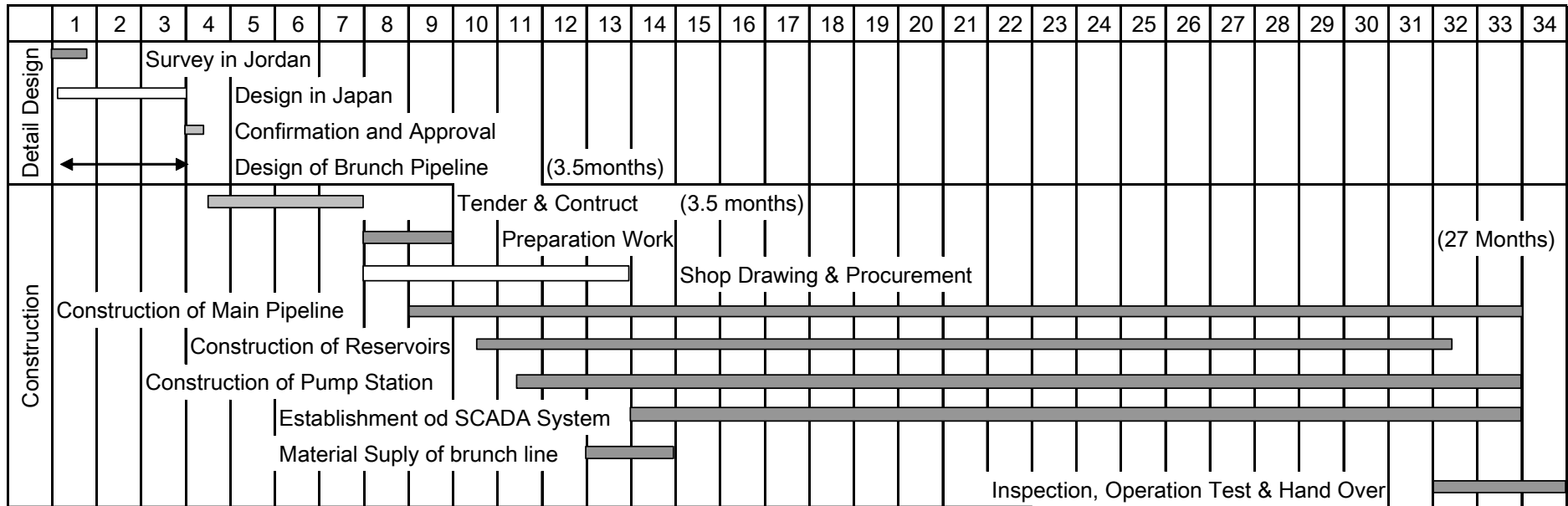


Fig. 2-2-16 Implementation Schedule of the Project

2.3 Obligations of the Recipient Country

The Project consists of undertakings in which Japan will cooperate and undertakings in which the Jordanian side will implement through self-supporting efforts. Undertakings to be implemented through self-supporting efforts by the Jordanian side are summarized as follows.

- ① To prepare access to the proposed reservoir construction sites and to reclaim and level land before commencement of the construction by the Japanese side.
- ② To provide at no charge a place to store materials and temporary land during construction period.
- ③ To provide information and data necessary for the detailed design under the Project.
- ④ To demand the acquisition of licensing necessary to the implementation of the Project.
- ⑤ To obtain permission for all detailed survey operations of the Project such as surveying and trial boring on roads.
- ⑥ To act as liaison between related authorities and to ensure confirmation in the case of trial boring or protection of underground installations.
- ⑦ To take necessary measures to obtain the cooperation of local residents and traffic control.
- ⑧ To take necessary measures and treatment in the case of encountering ruins.
- ⑨ To provide disposal places for excess soil and waste water during the construction period.
- ⑩ To install in required electricity to newly constructed reservoir sites and pump stations before electrical equipment is installed by the Japanese side.
- ⑪ To replace distribution branch pipes (distribution branch pipelines of smaller diameter than 50 mm) prior to completion of construction by the Japanese side.
- ⑫ To replace household water supply facilities in municipalities of the project site before completion of construction by the Japanese side.
- ⑬ To appoint engineers and operators, etc. to take a training in application guidance for the appropriate operation and maintenance of facilities to be upgraded or application of the SCADA system or soft component program.
- ⑭ To appropriately utilize and maintain facilities and equipment to be constructed or procured through the Japanese grant aid scheme.
- ⑮ To provide telephone lines and instruments for the facilities.
- ⑯ To bear service charges for issuance of irrevocable A/P (Authorization to Pay) and funds necessary for Japanese consultants and contractors.

- ⑰ To implement procedures and custom clearance necessary for prompt unloading of equipment and materials to be imported into Jordan at the port of disembarkation in Jordan.
- ⑱ To provide facilities necessary for entry and stay in Jordan of Japanese nationals who are engaged in the procurement of equipment and materials and services under the Project.
- ⑲ To undertake tax exemption procedures for customs and domestic taxes imposed in Jordan on Japanese firms and assign individuals to procure necessary equipment and materials and services.
- ⑳ To bear all expenses necessary to the implementation of the Project not included in the Japanese grant aid scheme.

2.4 Project Operation and Maintenance Plan

2.4.1 Basic Concept

It is important that equipment under the Project be maintained and the environment conserved in order to effectively utilize facilities and to provide stable and continuous water supply corresponding to daily demand.

The Jordanian side should implement appropriate preventive conservation and maintenance by improving reliability of facilities and equipment, safety and efficiency in order to maintain performance and a stable water supply.

The basic concept on maintenance of facilities for the Project is shown in Fig. 2-4-1.

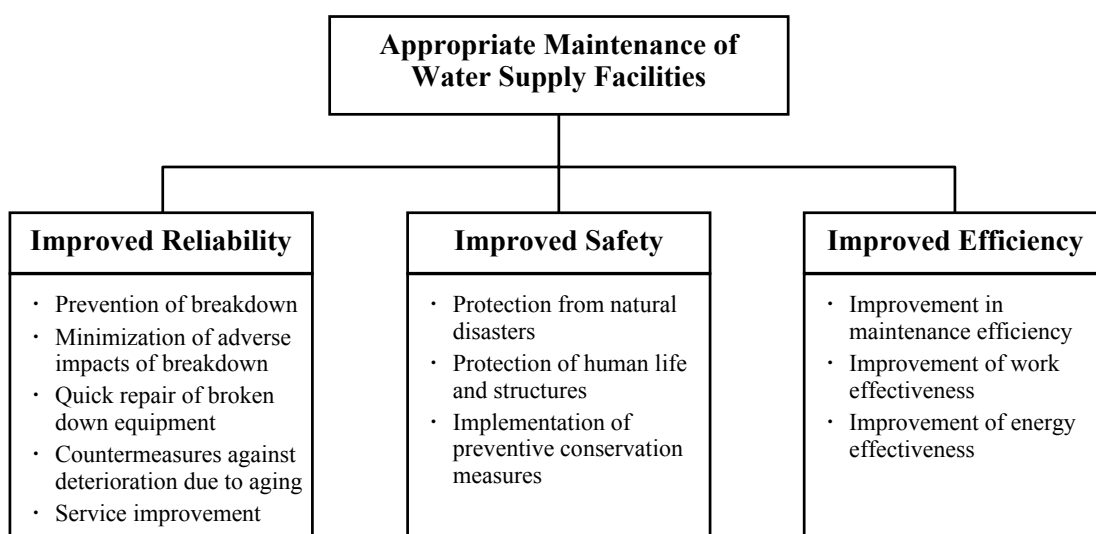


Fig. 2-4-1 Basic Concept of Water Supply Facility Maintenance

The contractor will provide technical guidance on the operation and maintenance of individual equipment to be procured when implementing the Project to the North Shouna ROU during construction period. Whereas, the consultant will provide technical guidance on the application method for the SCADA system (such as operation method, data analysis on distribution water volume, analysis on non revenue water, countermeasures for abnormal values and troubleshooting steps) in order to create a sustainable operation and maintenance system. The Jordanian side should implement appropriate operation and maintenance by effectively utilizing technologies to be transferred.

2.4.2 Items for Periodical Inspection

In due consideration of the above-mentioned concept, basic items that the North Shouna ROU should implement to operate and maintenance water supply facilities are roughly classified as follows. Major items for operation and maintenance of water supply facilities and equipment under the Project are shown in Table 2-4-1.

- Operation Management: Equipment or devices should be appropriately operated and controlled.
- Maintenance Management: Facilities, equipment and devices should be maintained and repaired to constantly display the maximum functions during operations.

Table 2-4-1 Major Items for Operation and Maintenance of Facilities under the Project

Classification	Major Maintenance Items
Operation Management	① Water Volume Management: Equipment should be operated and controlled to conform to the target water volume decided. ② Water Quality Management: Quality should be controlled to conform to the target quality value by measuring water quality and adjusting chemical injection volume at reservoirs. In addition, data to judge and control water quality should be effectively utilized by categorizing and analyzing water control records.
Maintenance Management	① Patrol inspection: Trouble or defect parts should be maintained or repaired by patrolling or inspecting facilities and equipment through visual observation, etc. Chemicals for disinfection (chlorine) should be also safely stored. ② Preventive conservation: Reliable operation should be maintained by conducting preventive improvement at a certain interval decided according to the importance and characteristics of facilities and equipment even if trouble or any defect does not exist and by ensuring reliability and safety.

Based on the individual operation and maintenance manuals submitted by manufacturers for the procured equipment, the North Shouna ROU should carry out appropriate operation and maintenance of equipment. Individual standard inspection items are shown in Tables 2-4-2 to 2-4-5.

The SCADA system operation manual will be also submitted by the consultant through a soft component program. The North Shouna ROU should efficiently and appropriately operate the entire

water supply system through analysis of the distribution amount records, formulation of target control values of non revenue water rate and leakage rate and enforcement of water quality control.

Periodical and daily maintenance inspection should be implemented in order to ensure reliability. Daily inspections are simple short-period checks for the purpose of discovering abnormalities or trouble at an early stage. Periodical inspections such as cleaning and maintenance involve inspections, maintenance and general operation conditions. For example, daily maintenance of a pump system's rotor has a direct affect on the life of the system, so periodical inspections become increasing important.

Due to the design of the SCADA system, periodical calibration is also required. Standard maintenance inspections of items at each facility are described in Tables 2-4-2 to 2-4-5. The Jordanian side should recognize the importance of such inspections in the overall operation plan for water supply facilities in the North District by formulating an operation and maintenance plan for facilities and equipment based on the maintenance inspection manual submitted by manufacturers of facilities and equipment.

Table 2-4-2 Standard Inspection Items for Pump System

Pumps	Daily inspection (in operation)	<ul style="list-style-type: none"> • Daily operation record ① Recording of water supply volume ② Visual check of various sections ③ Check for abnormal sounds ④ Check for axial temperature rise ⑤ Check for water leakage ⑥ Recording of suction and discharge pressures
	Monthly inspection	<ul style="list-style-type: none"> • Check of bearings (bearing oil deterioration, measuring of bearing temperature)
	Three-month inspection	<ul style="list-style-type: none"> • Change bearing oil and replenish bearing grease • Measure shaft center accuracy • Measure vibrations and noise levels
	Six-month inspection	<ul style="list-style-type: none"> • Change bearing grease and gland packing
	Annual inspection	<ul style="list-style-type: none"> • Overhaul • Check accessories and auxiliary machines
Motors	Daily inspection (in operation)	<ul style="list-style-type: none"> • Daily operation record ① Measure current value ② Visual check of various sections ③ Check for abnormal sounds ④ Check for axial temperature rise
	Six-month inspection	<ul style="list-style-type: none"> • Replenish bearing grease • Measure vibration and noise levels, axial temperature
	Annual inspection	<ul style="list-style-type: none"> • Check bearings • Measure insulation resistance

Table 2-4-3 Periodical Inspection Items for SCADA System

Inspection Item	Inspection Interval	
	Monthly	Annually
① Visual inspection	○	
② Calibration (Zero value, span correction)	○	

Table 2-4-4 Periodical Inspection Items for Reservoirs

Inspection Item	Inspection Interval	
	Monthly	Annually
① State of water leakage, if any		○
② Damage due to uneven ground subsidence, etc.		○

Table 2-4-5 Periodical Inspection Items for Transmission and Distribution Pipes

Inspection Item	Inspection Interval	
	Monthly	Annually
① State of water leakage, if any	○	
② State of ground subsidence, if any		○
③ Conditions of valves, plugs and lids, etc.	○	
④ State of damage, if any	○	
⑤ Availability of emergency equipment and tools	○	
⑥ Blow-off valve function		○
⑦ State of manhole covers	○	
⑧ State of interior of manholes	○	
⑨ State of damage to aqueduct painting, if any		○

2.4.3 Spare Parts Procurement Plan

Spare parts for water supply facilities under the Project are classified into two categories: standard accessories for regular replacement and emergency replacement parts required during a breakdown or accident, etc. Accordingly, the Jordanian side should procure these parts in order to meet the periodical inspection cycles described in the previous paragraph.

A two-year supply of spare parts is planned under the Project. Items and quantity should meet the above-mentioned maintenance plan, and so the Jordanian side should prepare the funding necessary to purchase standard accessories and emergency spare parts within two years of the completion of the Project.

2.4.4 Operation and Maintenance Plan

The Project is designed mainly to improve the existing transmission and distribution system. In addition, the frequency of operating valves to restrict water supply will decrease by approximately one fifth (1/5) through improvements made in the distribution system under the Project. No increase in operation and maintenance personnel is anticipated, and existing staff members (90 personnel in total) are regarded to be sufficient.

It is judged that the SCADA system will be operated smoothly after the implementation of the Project through the introduction of the soft component program in order to provide technical guidance on initial operations to North Shouna ROU personnel.

The Personnel Scheme under the Project scheduled by the North Shouna ROU is shown in Table 2-4-6 which is judged to be the appropriate system in implementation of the Project.

Table 2-4-6 Operation and Maintenance System at North Shouna ROU

(Unit: persons)

Shift	First Shift	Second Shift	Third Shift	Total
Personnel	8:00~15:00	15:00~23:00	23:00~8:00	
Transmission and Distribution Pipeline Network				
[Areas-A and B]				
Distribution valve operators			2	2
Plumbers	2	2		4
Workers	2	2	1	5
Drivers	2	2	1	5
Sub-total	6	6	4	16
[Area-F]				
Distribution valve operators			1	1
Plumbers	1	1		2
Workers	1	1	1	3
Drivers	1	1	1	3
Sub-total	3	3	3	9
SCADA System				
Control Room	2			2
Area-A (Operator)	3	3	3	9
Area-B (Operator)	2	2	2	6
Area-F (Operator)	3	3	3	9
Sub-total	10	8	8	26
Total	19	17	15	51

Note) Refer to basic design drawings of Areas-A, B and F.

2.5 Estimated Project Cost

2.5.1 Estimated Project Cost of the Requested Japanese Assistance

The total cost for implementing the Project is estimated to be ¥2.368 billion. The financial breakdown between the Jordanian and Japanese sides based on the work share described earlier is estimated as follows. Conditions applicable to the estimation are described in (3).

(1) Cost to be borne by the Japanese Side

Estimated Project Cost: Approximately ¥2,072.73 million

Item		Estimated Project Cost (million yen)		
Facility	Transmission and distribution pipeline construction	1,302.83	1,835.10	1,886.41
	Reservoir construction	180.08		
	Pump station civil engineering works	41.67		
	Pumping system construction	166.91		
	SCADA system construction	143.61		
Equipment		51.31		
Detailed design & construction/procurement supervision & technical guidance		186.32		

Note) This cost estimate is provisional and would be further examined by the Government of Japan for the approval of the Grant.

(2) Cost to be borne by the Recipient Country

Estimated Project Cost: Approximately ¥296.83 million

Agency	Item	Estimated Project Cost (million yen)		
WAJ	Distribution pipe laying construction	151.49	296.83	
	Material procurement and construction for house connection	129.56		
	Land reclamation for planned reservoirs	1.05		
	Construction of telephone lines	14.73		

(3) Estimated Conditions

1) Date of Estimation : August 2004

2) Foreign Exchange Rate :

1.0 US\$ = ¥110.49 (Average for the past six months since August 2004)

1.0 JD = ¥156.06 (Average for the past six months since August 2004)

- 3) Work Period : The government bonds scheme is applied for facility construction over Japan's three fiscal years.
- 4) Other : The Project will be implemented in accordance with the grant aid scheme of the Government of Japan.

2.5.2 Operation and Maintenance Cost

The operation and maintenance cost after implementation of the Project is based on the following conditions.

Table 2-5-1 Conditions for Calculation of Operation and Maintenance

Item	2003	2010
Service population (person)	100,077	116,995
Daily average water supply amount(m ³ /day)	11,412	15,106
Leakage rate (%)	30	20
Non revenue water rate (%)	53	40
Accounted water(m ³ /day)	5,364	9,064
[Other Conditions]		
1. Water charge income is proportional to accounted water.		
2. Expenditure is proportional to daily average water supply amount.		
3. There is no sewerage-related income or expenditures since there are no public sewers at the project site.		
4. Leakage from deteriorated distribution pipes is expected to be reduced to 10% through replacement at the project site. The non revenue water rate is also expected to drop to 13% together with a reduction in leakage rate as sales losses fall to 3% through Jordanian efforts.		
5. Water conveyance (Inter Northern Governorates Sales) from the project site to other areas is expected to continue at the current state in the future due to an increase in water supply at the project site.		
6. Maintenance personnel will remain the same since improvements in the distribution system make additional staff unnecessary (No increase in salaries is anticipated.)		

The operation and maintenance costs for 2003 and 2010 based on the above-mentioned conditions are shown in Table 2-5-2.

From the table, depreciation, interest expenses and net income (or loss) before deducting other losses amounted to a deficit of 274,000 JD (approximately ¥43 million) in 2003. However, it will be 165,000 JD (approximately ¥26 million), so it is expected to improve by approximately 40% (¥17 million).

Table 2-5-2 Prospect for Gain and Loss for North Shouna ROU (2010)

(Unit: JC)

Description	2003	2010
Revenue		
Water Revenue		
Subscribers Water Sales	441,523	746,095
Water Sales by Tankers	15,268	15,268
Water Sold to other Governorates	69,784	69,784
Inter Northern Governorates Water Transfers	263,302	263,302
Sales to Irrigation	592	592
Water Revenue - Total	790,469	1,095,042
Sewerage Revenue		
Sewerage Charges Revenue	0	0
Inter Northern Governorates Sewerage Transfers	0	0
Sewerage Revenue -Total	0	0
Water & Sewerage Revenue - Total	790,469	1,095,042
Less:		
Net Adjustments to Revenue	△ 3,491	△ 3,491
Provision for Un-collectable Revenue	△ 5,043	△ 5,043
Total Revenue	781,935	1,103,576
Expenses		
External Water	9,872	13,067
Inter Northern Governorates Sales	263,302	263,302
Electricity	444,118	587,876
Generator Fuel	10,426	13,801
Chemicals	11,473	15,187
Salaries and Wages	216,098	216,098
Spare Parts and Maintenance	47,471	62,837
Vehicles Expenses	30,370	40,200
Cost of Wastewater Treatment Plant	0	0
Other expenses	34,385	45,515
Total Expenses	1,067,516	1,257,885
Revenue less Expenses	△ 285,580	△ 154,309
General and Administrative Expenses	△ 77,949	△ 103,180
Other Income	73,527	124,247
Net Counter Fees Revenue (Expense)	△ 6,545	△ 8,664
Other Expenses	△ 1,021	△ 1,351
Net Profit (Losses) Before Depreciation, Interest Expense and Extraordinary losses	△ 273,592	△ 165,361

Source) Estimated by the consultant based on NGWA data.

Note) △ indicates minus.

CHAPTER 3

PROJECT EVALUATION AND RECOMMENDATIONS

CHAPTER 3

PROJECT EVALUATION AND RECOMMENDATIONS

3.1 Project Effects

Current situation and problems at the Project site, improvement measures to be taken under the Project and effects of the Project's implementation are compiled in Table 3-1-1.

Table 3-1-1 Current Situation, Problems, Measures and Effects, etc. of the Project

Current Situation and Problems	Improvement Measures under the Project (Requested Japanese Assistance)	Effects and Degree of Improvement under the Project
1. The leakage ratio is high. The deterioration of transmission and distribution pipes including asbestos pipes laid in 1978 is the cause for a high leakage ratio of about 30%.	The existing deteriorated transmission and distribution pipes will be replaced with ductile pipes.	The leakage ratio will decrease to about 20% (2001).
2. Per capita daily water consumption is insufficient. Due to the deterioration of the distribution pipe network, per capita daily water consumption is small at 80ℓ per day per person.	The existing deteriorated transmission and distribution pipes will be replaced with ductile pipes.	Per capita daily water consumption will increase to 103ℓ per day per person for the planned population of 137,000 (2010) at the Project site.
3. The distribution branch pipe network has not yet improved. Due to the deterioration of the existing distribution branch pipes, there is much leakage.	Straight pipes and fittings will be procured in order to replace the ductile cast iron pipes (50mm or less in diameter) with much leakage.	The leakage ratio will decrease so that this will contribute to an increase in per capita daily water.
4. The water supply system is insufficient to the deterioration of reservoirs and pumping equipment. Due to the deterioration of the existing reservoirs and pumping equipment, the operations are inefficient.	Pumping stations will be renewed, as well as new reservoirs will be arranged in appropriate position.	It is possible to re-construct efficient water supply facilities.
5. A flow cannot be controlled. A flow at the existing pumping stations or reservoirs is not appropriately controlled.	A SCADA system will be introduced for flow control.	By introducing a SCADA system, an accurate volume of water to be distributed can be grasped so that actual conditions of unaccounted-for water can be clarified. It is possible to formulate countermeasures for reducing unaccounted-for water and to prevent leakage.

<p>6. Impacts of the existing asbestos pipes on health An impact of asbestos free from water supply due to the wearing away on human health is apprehensive.</p>	<p>All asbestos pipes will be not utilized due to the replacement.</p>	<p>It is possible provide safe water without impacting on residents' health.</p>
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3.2 Recommendations

The pending tasks in need of further improvement and related recommendations for the successful implementation of the Project and the sustainable operation and maintenance after the completion of the Project are described as follows.

(1) Implementation of the Work by the Jordanian Side

For the smooth implementation of the Project and the achievement of its targets, the WAJ should secure expenses pertaining to the implementation of the improvement work for the distribution pipe network including the laying of distribution branch pipes and pipes to be connect to each household without delay and should make sure to implement the construction work.

(2) Improvement of Business Management

The present management conditions in the water supply sector at the WAJ amounts to an annual loss and indicates its severe state. Since the improvement projects of a water supply system for the purpose of sound management of the WAJ are being implemented through the financing of cooperation of the EIB, KfW, Italy and the World Bank even in Greater Amman where distribution volume accounts for 40% in all of Jordan, a sharp reduction in the maintenance cost is expected at the time of completion in 2005.

For the feasibility of the comprehensive operation and maintenance after the completion of the Project, the WAJ should steadily implement improvement items in accordance with this improvement Project and realize a sound financial state in its early stage.

(3) Connecting Method of Distribution Branch Pipes

Since distribution branch pipes will not be directly benched off from main distribution pipes in principle through the implementation of the Project, the present haphazard connecting state of the distribution pipe network will be improved. Consequently, the valves at the time of limiting water supply will be easily operated so that burdens for the maintenance will be alleviated. Even after taking over facilities, the North Shouna ROU, administrative organ of the facilities, should remodel and expand the facilities in accordance with this principle.

(3) Implementation of Laying Distribution Branch Pipe Network and Connecting Distribution Pipes to Each Household

The WAJ will improve the distribution branch pipe network by utilizing pipe materials to be procured by Japan under the Project. If the improvement of the distribution branch pipe network

and the construction of pipes to be connected to each household are delayed, the effects expected under the Project cannot be manifested. Accordingly, in order for the WAJ to conduct the said construction without delay, budgetary measures necessary for the construction should be taken by formulating a process plan, personnel plan, equipment and materials purchase plan and construction ordering plan, etc. in preparation for the completion of the Project.

(4) Coping with the SCADA System Application Technology

Since accurate grasping of unaccounted-for water is an important task not only for facility maintenance but also the soundness of water administration, a SCADA system for accurate data measurement at each facility mainly for the purpose of grasping unaccounted-for water will be introduced under the Project.

For the system operation, it is necessary to provide technical guidance on operation and maintenance technologies to the North Shouna ROU office. Although maintenance personnel at the North Shouna ROU office have abundant experience and achievements related to the maintenance of the water supply system in North Jordan Valley, a soft component program should be implemented for reliable operation and maintenance technology, data processing, analysis and application technologies to be introduced in this system, and for continuing appropriate operation and maintenance of the water supply system. Consequently, the WAJ should promptly appoint operation and maintenance personnel in charge of operating the distribution facilities under the Project and should have them participate in the component program to be implemented in the SCADA system.

APPENDICES

**APPENDIX-1 Member List of
the Study Team**

Members of the Study Team

(1) Basic Design Study Team

Name	Assignment	Current Position / Company
Mr. Naoyuki OCHIAI	Leader	Deputy Resident Representative Japan International Cooperation Agency Jordan Office
Mr. Shinsaku FUKAZAWA	Planning Management	Water and Sanitation Team Project Management Group I Grant Aid Management Department Japan International Cooperation Agency (JICA)
Mr. Masatoshi SENO	Chief Consultant / Water Supply Planner	Yachiyo Engineering Co., Ltd.
Mr. Masahiro TAKEUCHI	Water Supply Facility Planner/SCADA System Planner	Yachiyo Engineering Co., Ltd.
Mr. Makoto HOMMA	Machinery Planner	Yachiyo Engineering Co., Ltd.
Mr. Toshio TAKESHIMA	Procurement Planner / Cost Estimator	Yachiyo Engineering Co., Ltd.

(2) Draft Report Explanation Team

Name	Assignment	Current Position / Company
Mr. Naoyuki OCHIAI	Leader	Deputy Resident Representative Japan International Cooperation Agency Jordan Office
Mr. Masatoshi SENO	Chief Consultant / Water Supply Planner	Yachiyo Engineering Co., Ltd.
Mr. Masahiro TAKEUCHI	Water Supply Facility Planner/SCADA System Planner	Yachiyo Engineering Co., Ltd.

APPENDIX-2 Study Schedule

Study Schedule

(1) Basic Design Study

Day	Date		Weather	Stay	Travel	Activities
1	7/17	Sat	fine	on plane	JL703 Narita 15:45 Bangkok 20:15 RJ183 Bangkok 23:15	- Mr. SENO and Mr. HOMMA leave Japan
2	7/18	Sun	fine	Amman	Amman 03:55	- Mr. SENO and Mr. HOMMA arrive in Amman - Visiting and Meeting with JICA - Courtesy call and discussion with Ministry of Planning - Courtesy and Discussion with WAJ - Courtesy and meeting with Embassy of Japan (EOJ)
3	7/19	Mon	fine	Amman		- Discussion with WAJ
4	7/20	Tue	fine	Amman		- Courtesy call and discussion with NGWA - Site survey on North Shouna
5	7/21	Wed	fine	Amman		- Site survey on Nourth Shouna
6	7/22	Thu	fine	Amman		- Site survey on Middle District
7	7/23	Fri	fine	Amman		- Internal meeting
					JL703 Narita 15:45 Bangkok 20:15 RJ183 Bangkok 23:15	- Mr. TAKESHIMA leave Japan
8	7/24	Sat	fine	Amman	Amman 03:55	- Mr. TAKESHIMA arrive in Amman - Meeting with NGWA
					JL703 Narita 15:45 Bangkok 20:15 RJ183 Bangkok 23:15	- Mr. FUKAZAWA(leader) and Mr. TAKEUVHI leave Japan
9	7/25	Sun	fine	Amman	Amman 03:55	- Mr. FUKAZAWA(leader) and Mr. TAKEUVHI leave Japan - Meeting with WAJ
10	7/26	Mon	fine	Amman		- Site survey and data collection
11	7/27	Tue	fine	Amman		- Meeting with NGWA、MWH and CDM - Meeting with JICA
12	7/28	Wed	fine	Amman		- Discussion on M/D with WAJ
13	7/29	Thu	fine	Amman		- Signing M/D - Report to EOJ and JICA
14	7/30	Fri	fine	Amman		- Internal meeting
15	7/31	Sat	fine	Amman		- Survey on related projects - Survey on water supply facilities - Survey on natural conditions - Survey on marketing and construction
16	8/1	Sun	fine	Amman		- Survey on related projects - Survey on water supply facilities - Survey on natural conditions - Survey on marketing and construction
17	8/2	Mon	fine	Amman		- Survey on water supply facilities - Survey on natural conditions - Survey on marketing and construction - Survey on relating site contract
18	8/3	Tue	fine	Amman		- Site survey - Survey on water supply facilities

Day	Date		Weather	Stay	Travel	Activities
						- Survey on natural conditions - Survey on marketing and construction
19	8/4	Wed	fine	Amman		- Site survey - Survey on relating site contract - Survey on water supply facilities - Survey on natural conditions - Survey on marketing and construction
20	8/5	Thu	fine	Amman		- Survey on relating site contract - Survey on SCADA system
21	8/6	Fri	fine	Amman		- Internal meeting
22	8/7	Sat	fine	Amman /Irbid	move to Irbid	- Mr. HOMMA and Mr. TAKESHIMA move to Irbid - Survey on SCADA system - Survey on water supply facilities - Survey on natural conditions - Survey on existing pipelines
23	8/8	Sun	fine	Amman /Irbid		- Survey on water supply facilities - Survey on natural conditions - Survey on existing pipelines
24	8/9	Mon	fine	Amman /Irbid		- Survey on water supply facilities - Survey on natural conditions - Survey on existing pipelines - Survey on marketing and construction
25	8/10	Tue	fine	Amman /Irbid		- Survey on water supply facilities - Survey on natural conditions - Survey on existing pipelines - Survey on marketing and construction - Reviewing and analysis of GIS data
26	8/11	Wed	fine	Amman /Irbid		- Discussion on Middle District water supply system - Survey on water supply facilities - Survey on natural conditions - Survey on existing pipelines - Survey on marketing and construction - Reviewing and analysis of GIS data
27	8/12	Thu	fine	Amman /Irbid	move to Amman	- Mr. HOMMA and Mr. TAKESHIMA move to Amman - Discussion on Middle District water supply system - Survey on water supply facilities - Survey on natural conditions - Survey on existing pipelines - Survey on marketing and construction - Reviewing and analysis of GIS data - Leakage test
28	8/13	Fri	fine	Amman		- Internal meeting
29	8/14	Sat	fine	Amman		- Examination on cooperation planning - Survey on construction situation - Reviewing and analysis of GIS data - Leakage test
30	8/15	Sun	fine	Amman		- Examination on cooperation planning - Survey on construction situation - Reviewing and analysis of GIS data - Leakage test
31	8/16	Mon	fine	Amman		- Meeting with Road department Irbid branch - Examination on cooperation planning - Survey on construction situation
32	8/17	Tue	fine	Amman		- Examination on cooperation planning - Survey on construction situation
33	8/18	Wed	fine	Amman		- Examination on cooperation planning

Day	Date		Weather	Stay	Travel	Activities
						- Survey on construction situation
34	8/19	Thu	fine	Amman		- Survey on implementation body - Survey on O & M - Supplementary survey
35	8/20	Fri	fine	Amman		- Internal meeting
36	8/21	Sat	fine	Amman		- Survey on implementation body - Survey on O & M - Supplementary survey
					RJ182 Amman 02:30 Bangkok 15:15 JL718 Bangkok 22:15	- Mr. TAKEUCHI leave Amman
37	8/22	Sun	fine	Amman	Tokyo 06:15	- Mr. TAKEUCHI arrive in Tokyo
						- Meeting with JVA - Survey on implementation body - Survey on O & M - Supplementary survey
38	8/23	Mon	fine	Amman		- Discussion on existing buried cables with Army - Preparation for Field Report (F/R)
39	8/24	Tue	fine	Amman		- Discussion on existing buried cables with Air Force - Preparation for (F/R)
40	8/25	Wed	fine	Amman		- Meeting with electricity company (EDCO) - Preparation for (F/R)
41	8/26	Thu	fine	Amman		- Preparation for (F/R)
42	8/27	Fri	fine	Amman		- Preparation for (F/R)
43	8/28	Sat	fine	Amman		- Preparation for (F/R)
44	8/29	Sun	fine	Amman		- Discussion on (F/R) with related authorities
45	8/30	Mon	fine	Amman		- Discussion on (F/R) with related authorities
46	8/31	Tue	fine	Amman		- Acquisition of approval of (F/R) - Report to JICA and EOJ
					RJ182 Amman 02:30 Bangkok 15:15 JL718 Bangkok 22:15	- Mr. TAKESHIMA leave Amman
47	9/1	Wed	fine	on plane /Amman	Tokyo 06:15	- Mr. TAKESHIMA arrive in Tokyo
					RJ612 Amman 11:30 Dubai 15:30	- Mr. SENO and HOMMA leave Amman
48	9/2	Thu	fine	on plane	JL5090 Dubai 02:30 Oosaka 17:00 JL1316 Oosaka 18:40 Haneda 19:45	- Mr. SENO and HOMMA arrive in Tokyo

(2) Draft Report Explanation

No	Date	Day	Weather	Stay	Movement	Contents of Work
1	11/6	Sat	fine	on plane	JL703 Narita 15:55 Bangkok 20:55	- Mr. SENO and Mr. TAKEUCHI leave Japan
2	11/7	Sun	fine	Amman	11/6-11/7 RJ183 Bangkok 23:15 Amman 04:00	- Mr. SENO and Mr. TAKEUCHI arrive in Amman - Visiting and Meeting with JICA - Visiting and Meeting with Ministry of Planning International Cooperation - Visiting with WAJ: Discussion on study schedule, and draft basic design report (DBD) - Visiting and meeting with Embassy of Japan (EOJ)
3	11/8	Mon	fine	Amman		- Meeting with WAJ, and explanation of draft basic design report (DBD)
4	11/9	Tue	fine	Amman		- Meeting with WAJ, NGWA and explanation of draft basic design report (DBD)
5	11/10	Wed	fine	Amman		- Discussion on Minutes
6	11/11	Thu	fine	Amman		- Sign of M/D - Report the results of explanation and discussion of draft basic design report to the Embassy of Japan and JICA
7	11/12	Fri	fine		EK904 Depart from Amman 16:30 Arrive in Dubai 21:15	Depart from Amman (Consultant: SENO and Takeuchi)
8	11/13	Sat	fine		JL5090 Depart from Dubai 02:35 Arrive in Osaka 16:25 JL1316 Depart from Osaka 18:35 Arrive in Tokyo 19:35	Depart from Dubai Arrive in Osaka Depart from Osaka Arrive in Tokyo (Consultant: SENO and Takeuchi)

**APPENDIX-3 List of Parties Concerned
in the Recipient Country**

List of Parties Concerned in Recipient Country

(1) Basic Design Study Period

Agency and Position	Name
Ministry of Planning and International Cooperation (MOPIC)	
Asian Relation Section	Ms. Wafa Al. Saket
Japan Desk	Mr. Saif Bani Atta
Water and Environmental Project Section	Eng. Maha Zuobi
Water Authority of Jordan (WAJ)	
Secretary General	Eng. Munther A. Khleifat
Assistant Secretary General	Mr. khaled Al-Kodah
Head of Design Division	Eng. Nabil
Acting Head of Design Division	Mr. Mohammad Ababneh
Director of Unaccounted for water (PMU)	Mr. Waleid Sukkar
SCADA Manager (PMU)	Mr. Fahd Ayasrah
GIS Manager (PMU)	Mr. Nidal Saliba
Water Projects Division	Mr. Saddam H. Ali Khleifat
Northern Governorates Water Administration (NGWA)	
Assistant Secretary General	Eng. Khaldon Khashman
Director of Water system Directorate	Eng. Ahmad Sheikah
Technical Affairs Manager	Eng. Safwan O. Shalabi
IT Manager	Mr. Raed Hijazi
GIS Manager	Eng. Issam Jaradat
GIS Expert	Mr. Mottaz Obaidat
North Shouna ROU of NGWA	
Director of North Shouna ROU	Eng. Jamal Shehab Abadi
Supervisor	Mr. Radi Mohammed Obidat
Middle Sector of WAJ	
Assistant Secretary General	Eng. Ziad Emaish
Director of Deir Alla	Mr. Ahamad Nsour
Maintenance	Mr. Hussni
Jordan Valley Authority (JVA)	
Assistant General Director (Amman head office)	Eng. Yousef Hassan
Assistant General Manager (Deir Alla office)	Eng. Teiser Al Eghzawi
Director of North and Middle Ghor, Dept. for O & M	Eng. Qais Owais
Engineer	Eng. Shafieq Habash

Agency and Position	Name
Ministry of Public Works in Irbid	
Assistant Director	Mr. Khalid Shaher Iqali
Chief of Surveying Section	Eng. Ali El Zahrawi
Air Force of Jordan	
Engineer	Ms. Saleh Al Khattieb
For underground cable line	Mr. Rafee Ali Obeidat
MWH	
Project Manager	Mr. Richard Castle
CDM	
Associate/Chief of Party	Mr. Max S. Clark
Principal	Mr. Mehran K. Meserlian
Electric Distribution Co. (EDCO)	
Chief of Jordan Valley & Eastern Electricity Division	Eng. Yasin Khasawneh
Jordan Telecom	
Head of Planning Section	Eng. Hasan Omar
Planning Section	Mr. Adnan Safadi
Planning Section	Mr. Abdel Karim Akawi
Army	
Officer (For underground cable line)	Mr. Abdullah Sleiman
Embassy of Japan in Jordan	
Counsellor	Mr. Matahiro Yamaguchi
Second Secretary	Mr. Takayuki Ikeda
JICA Jordan Office	
Resident Representative	Mr. Hideo Morikawa
Deputy Resident Representative	Mr. Naoyuki Ochiai
Assistant Resident Representative	Mr. Yoshimasa Takemura
JICA Expert in WAJ	Mr. Mitsuyoshi Kai
Senior Program Officer	Mr. Hani H. Alkurdi

(2) Draft Report Explanation Period

Agency and Position	Name
Ministry of Planning and International Cooperation (MOPIC)	
Asian Relation Section	Ms. Wafa Al. Saket
Japan Desk	Mr. Saif Bani Atta
Water Authority of Jordan (WAJ)	
Secretary General	Eng. Munther A. Khleifat
Assistant Secretary General	Mr. khaled Al-Kodah
Head of Design Division	Eng. Nabil
Director of Unaccounted for water (PMU)	Mr. Waleid Sukkar
Water Projects Division	Mr. Saddam H.Ali Khleifat
Northern Governorates Water Administration (NGWA)	
Assistant Secretary General	Eng. Khaldon Khashman
Embassy of Japan in Jordan	
First Secretary	Mr. Tetsuro Endo
JICA Jordan Office	
Resident Representative	Mr. Hideo Morikawa
Deputy Resident Representative	Mr. Naoyuki Ochiai
Assistant Resident Representative	Mr. Yoshimasa Takemura
Senior Program Officer	Mr. Hani H. Alkurdi

**APPENDIX-4 Minutes of
Discussions**

MINUTES OF DISCUSSIONS
ON THE BASIC DESIGN STUDY
ON THE PROJECT FOR REHABILITATION AND EXPANSION
OF THE NETWORKS IN NORTH/MIDDLE JORDAN VALLEY
IN THE HASHEMITE KINGDOM OF JORDAN

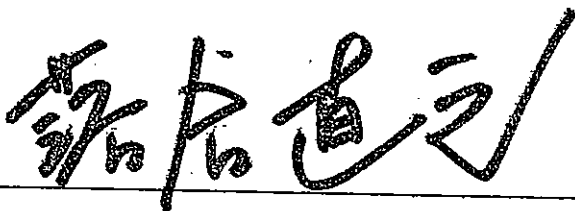
In response to a request from the Government of The Hashemite Kingdom of Jordan (hereinafter referred to as "the Jordan"), the Government of Japan decided to conduct a Basic Design Study on THE PROJECT FOR REHABILITATION AND EXPANSION OF THE NETWORKS IN NORTH/MIDDLE JORDAN VALLEY (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent to the Jordan the Basic Design Study Team (hereinafter referred to as "the Team"), which is headed by Naoyuki OCHIAI, Deputy Resident Representative JICA Jordan Office, and is scheduled to stay in the country from July 18 to September 1, 2004.

The Team held discussions with the officials concerned of the Government of Jordan and conducted a field survey at the study area.

In the course of discussions and field survey, both parties confirmed the main items described on the attached sheets. The Team will proceed to further works and prepare the Basic Design Study Report.

Amman, July 29, 2004



Naoyuki Ochiai
Leader
Basic Design Study Team
Japan International Cooperation Agency
Japan



Eng. Munther Khleifat
Secretary General
Water Authority of Jordan,
The Hashemite Kingdom of Jordan

ATTACHMENT

1. Objective of the Project

The objective of the Project is increasing the capability for municipal water supply through rehabilitation and expansion of the water networks in North/Middle Jordan Valley.

2. Project sites

The sites of the Project are North Jordan Valley and northern part of Middle Jordan Valley as shown in Annex- I .

3. Responsible and Implementing Agency

The Responsible and Implementing Agency is Water Authority of Jordan.

4. Items requested by the Government of Jordan

After discussions with the Team, the items described in Annex-II were finally requested by the Jordanian side. JICA will assess the appropriateness of the request and will recommend to the Government of Japan for approval.

5. Japan's Grant Aid Scheme

5-1. The Jordanian side has understood the Japan's Grant Aid Scheme explained by the Team , as described in ANNEX-III

5-2. The Jordanian side will take the necessary measures, as described in Annex-IV, for smooth implementation of the Project, as a condition for the Japanese Grant Aid to be implemented.

6. Schedule of the Study

6-1. The consultants will proceed to further studies in Jordan until September 1, 2004.

6-2. JICA will prepare the draft report in English and dispatch a mission in order to explain its contents in November 2004.

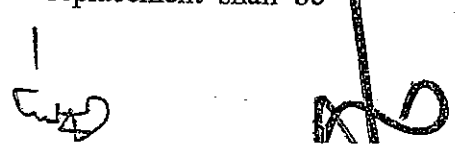
6-3. In case that the contents of the report is accepted in principle by the Government of Jordan, JICA will complete the final report and send it to the Government of Jordan by January 2005.

7. Other relevant issues

7-1 The Jordanian side explained to the Team that the Project is planned based on "National Water Master Plan 2004" (2004) as the master plan of water supply and "Water Sector Planning & Associated Investment Program 2002-2011"(2002) as investment plan.

7-2 The Jordanian side confirmed that the Project will not overlap with any other projects by other donors or own budget.

7-3 Both sides agreed that the material supply and construction as the replacement shall be



considered only for the pipelines clarified in the GIS drawings of NGWA (Northern Governorate Water Authority) and/or other existing drawings, if any.

7-4 Both sides agreed that target year of the project will be 2010. The components, specification, dimensions and locations of requested facilities will be reviewed based on the available drinking water supply volume and demand for the Project area at the target year.

7-5 Both sides agreed that the basic design study will be done according to the following technical consideration to construct efficient water supply system in the Project area.

- (1) Reduction of physical losses in the water supply network
- (2) Appropriate pressure distribution in the water supply network
- (3) Minimization of operation costs
- (4) Appropriate size of pipeline according to the hydraulic analysis

7-6 The Jordanian side agreed that they will implement following works in the Project area by the completion of the Project.

(1) Replacement of distribution branch pipelines of diameter 50 mm or less and connection to the main distribution pipelines

(2) Replacement of service pipelines

7-7 The Jordanian side agreed to submit a document that certifies to secure enough budgets for implementation of necessary measures to be taken by the Jordanian side and the schedule of implementation of the measures to the study team of draft report.

7-8 The Jordanian side explained to the Team the new water resource development plan in the Project area as shown in Annex-V. Also they confirmed that they will take necessary measures to supply enough volume of water for the Project area by the target year.

7-9 The Jordanian side explained that the privatization will not be introduced into the drinking water supply sector in the Project area.

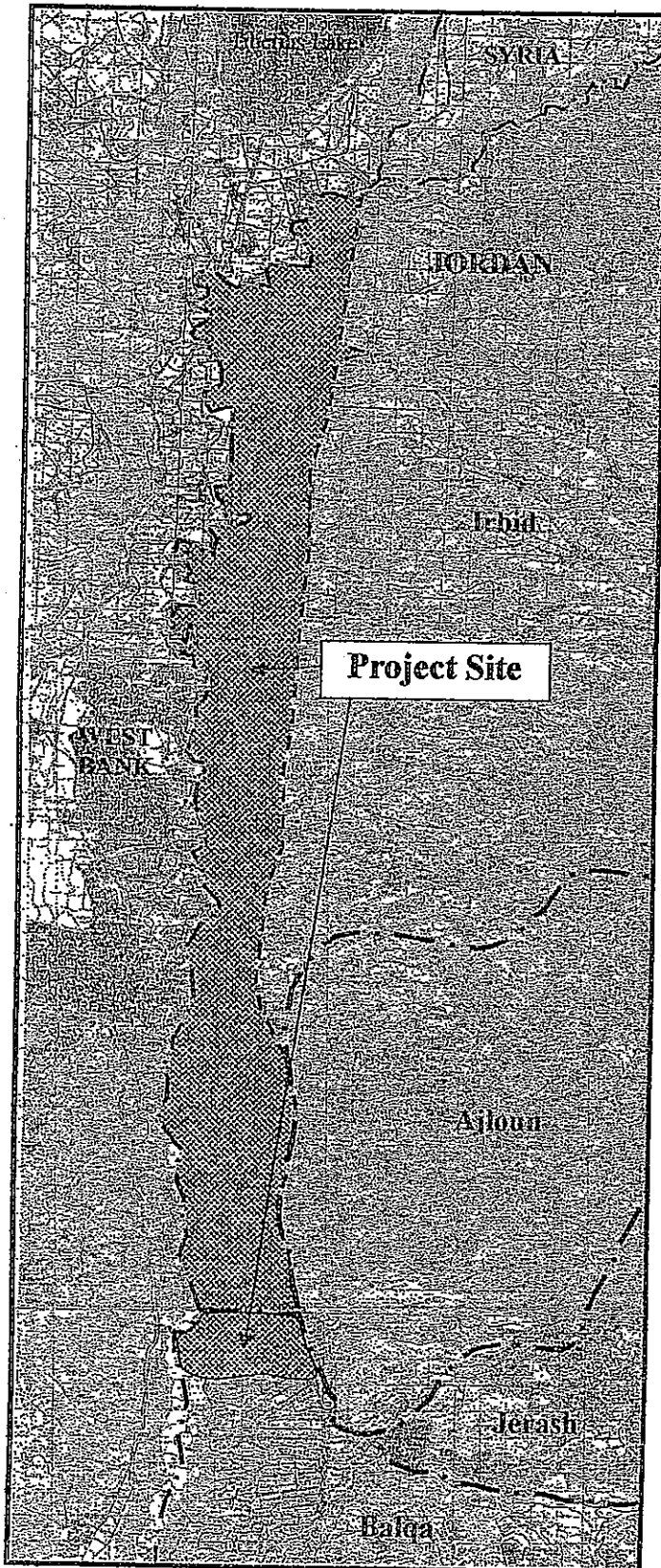
7-10 Both side agreed that existing asbestos pipes will be left under the ground to avoid environmental contamination. The Ministry of Environment confirmed that the way of disposal is appropriate for the Jordanian laws.

7-11 Both side agreed that SCADA (Supervisory Control and Data Acquisition) system shall be such a level as the remote monitoring of supplied water from the main water supply facilities can be achieved, provided that the standard and specification of such system shall match with and similar to other ongoing SCADA projects.

7-12 The Jordanian side agreed to take necessary measures to secure land, to clear, level and reclaim the site when needed and construction of gates and fences in and around the site.

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Annex-I Project Site



Name of Towns & Villages in the Project Site

Area	Name of Town & Village
North Jordan Valley (North Shouna)	Aladasyeh
	North Shouna
	Almansheyeh
	Waqqas
	Eskan Waqqas
	Qulei'at
	Almashare'a
	Wadi Al-Rayan
	Eskan Ma'ath
	Asskukhneh
	Alfiddeen
	Almaramsha
	Tall Alarbaa'een
	Bosseileh
	Seil Alhimma
	Al-Harawayeh
	Azzamalyeh
	Tabaqat Fahil
	Karemeh
	Abu Sedu
Sleikhat	
Alqarin	
Abu Habil	
South Karemeh	
Eskan Karemeh	
Sowfarah	
Middle Jordan Valley	Al-Balwaneh
	Ghor Al-Balwaneh

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Annex-II

Items Requested by the Jordanian Side

Component	Items	Specifications	Quantity	Remark
Replacement of the existing distribution and transmission pipelines (*1)	- Main distribution and transmission pipelines	Dia.300 – 100 mm	52 km	Material supply and construction by the Japanese side
	- Distribution branch lines	Dia.50 – 20 mm	50 km	Material supply by the Japanese side and construction by the Jordanian side
Renewal and/or expansion of pump equipment at the existing pump stations (*1)	- Al-Adasyeh	50 m ³ /hr, H = 350 m	1 set	Including rehabilitation of pump shed, if required
		80 m ³ /hr, H = 250 m	1 set	
	- Tabaqat Fahil	75 m ³ /hr, H = 125 m	1 set	
		150 m ³ /hr, H = 52 m	1 set	
	50 m ³ /hr, H = 150 m	1 set		
- Wadi Rajeb	50 m ³ /hr, H = 150 m	1 set		
	20 m ³ /hr, H = 200 m	1 set		
Expansion of the existing water reservoirs (*1)	- Ma'as (Shouma)	650 m ³	1 set	Including replacement, if required
	- Sleikhat	500 m ³	1 set	
	- KaremeH	600 m ³	1 set	
	- Al-Masharea'	650 m ³	1 set	
	- Rajeb	1,000 m ³	1 set	
Installation of SCADA system	- SCADA and control room equipment	Equipment required only for monitoring water supply data at the main water supply facilities	1 lot	For North Jordan Valley (North Shouma) only

Note 1 : Specifications for these components show the diameters, lengths or capacities for the existing water supply facilities.

ANNEX-III: The Japan's Grant Aid Scheme

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.

(1) Grant Aid Procedure

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 Cabinet) |
| Determination of Implementation | (The Notes exchanged between the Governments of Japan and the recipient country) |

2) Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (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. If necessary, JICA send a Preliminary Study Mission to the recipient country to confirm the contents of 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 Program, 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:

- 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;
- evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from the technical, social and economic points of view;
- confirmation of items agreed on by both parties concerning the basic concept of the Project;
- preparation of a basic design of the Project; and
- 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 consulting firm selected through its own procedure (competitive proposal). The selected firm participates in the Study and prepares for a report based upon the terms of reference set by JICA.

At the beginning of implementation after the Exchange of Notes, for the services of the Detailed Design and Construction Supervision of the Project, JICA recommends the same consulting firm which participated in the Study to the recipient country in order to maintain the technical consistency.

(3) Japan's Grant Aid Scheme

1) 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.

2) "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.

3) 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.

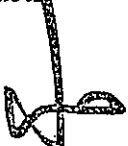
However, the prime contractors, namely consulting, constructing and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

4) 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 to Japanese taxpayers.

5) Undertakings required to the Government of the recipient country

- a) to secure land necessary for the sites of the Project and to clear, level and reclaim the land prior to commencement of the construction;
- b) to provide facilities for distribution of electricity, water supply and drainage and other incidental facilities in and around the sites;
- c) to ensure all expenses and prompt execution for unloading and customs clearance at ports of disembarkation in the recipient country and internal transportation therein of the products purchased under the Grant Aid;

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- d) 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;
- e) 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;

6) "Proper Use"

The recipient country is required to operate and maintain the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign the necessary staff for operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.

7) "Re-export"

The products purchased under the Grant Aid shall not be re-exported from the recipient country.

8) 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 a 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.

9) Authorization to Pay (A/P)

The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commissions to the Bank.

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ANNEX-IV: Major Undertakings to be taken by Each Government

No.	Items	To be covered by Grant Aid	To be covered by Recipient Side
1	To secure land		☉
2	To Clear, level and reclaim the site when needed		☉
3	To construct gates and fences in and around the site		☉
4	To construct the parking lot	☉	
5	To construct roads		
	1) Within the site	☉	
	2) Outside the site		☉
6	To construct the buildings	☉	
7	To provide facilities for the distribution of electricity, water supply, drainage and other incidental facilities		
	1) Electricity		
	a. The distributing line to the site		☉
	b. The drop wiring and internal wiring within the site	☉	
	c. The main circuit breaker and transformer	☉	
	2) Water supply		
	a. The city water distribution main to the site		☉
	b. The supply system within the site (receiving and elevated tanks)	☉	
	3) Drainage		
	a. The city drainage main (for storm, sewer and others) to the site		☉
	b. The drainage system (for toilet sewer, ordinary waste, storm drainage and others) within the site	☉	
	4) Gas supply		
	a. The city gas main to the site		☉
	b. The gas supply system within the site	☉	
	5) Telephone system		
	a. The telephone trunk line to the main distribution frame/panel (MDF) of the building		☉
	b. The MDF and the extension after the frame/panel	☉	
	6) Furniture and Equipment		
a. General furniture		☉	
b. Project Equipment	☉		
8	To bear the following commissions to a bank in Japan for the banking services based upon the B/A		
	1) Advising commission of A/P		☉
	2) Payment commission		☉
9	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 port of disembarkation to the project site	☉	
10	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.		☉
11	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 contract.		☉
12	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant		☉
13	To bear all the expenses , other than those to be borne by the Grant, necessary for construction of the facilities as well as for the transportation and installation of the equipment		☉

B/A:Banking Arrangement

A/P:Authorization to Pay

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وزارة المياه والري
سلطة المياه

Ministry of Water & Irrigation
Water Authority



Annex - V

The Hashemite Kingdom
Of Jordan

ef. WA-7/2 / 11888

Date 29/7/2009

التاريخ

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Basic Design Study Team
Japan International Cooperation Agency (JICA)

Subject: Commitment letter.

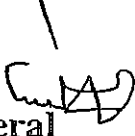
Project: Rehabilitation And Expansion Of The Networks In North/Middle
Jordan Valley

According to your request in the meeting, held in our offices on the 25th of July regarding the subject above.

We would like to confirm you that securing an extra water resources to satisfy any future needs until 2010 to the project area by reallocation of local resources is our responsibility.

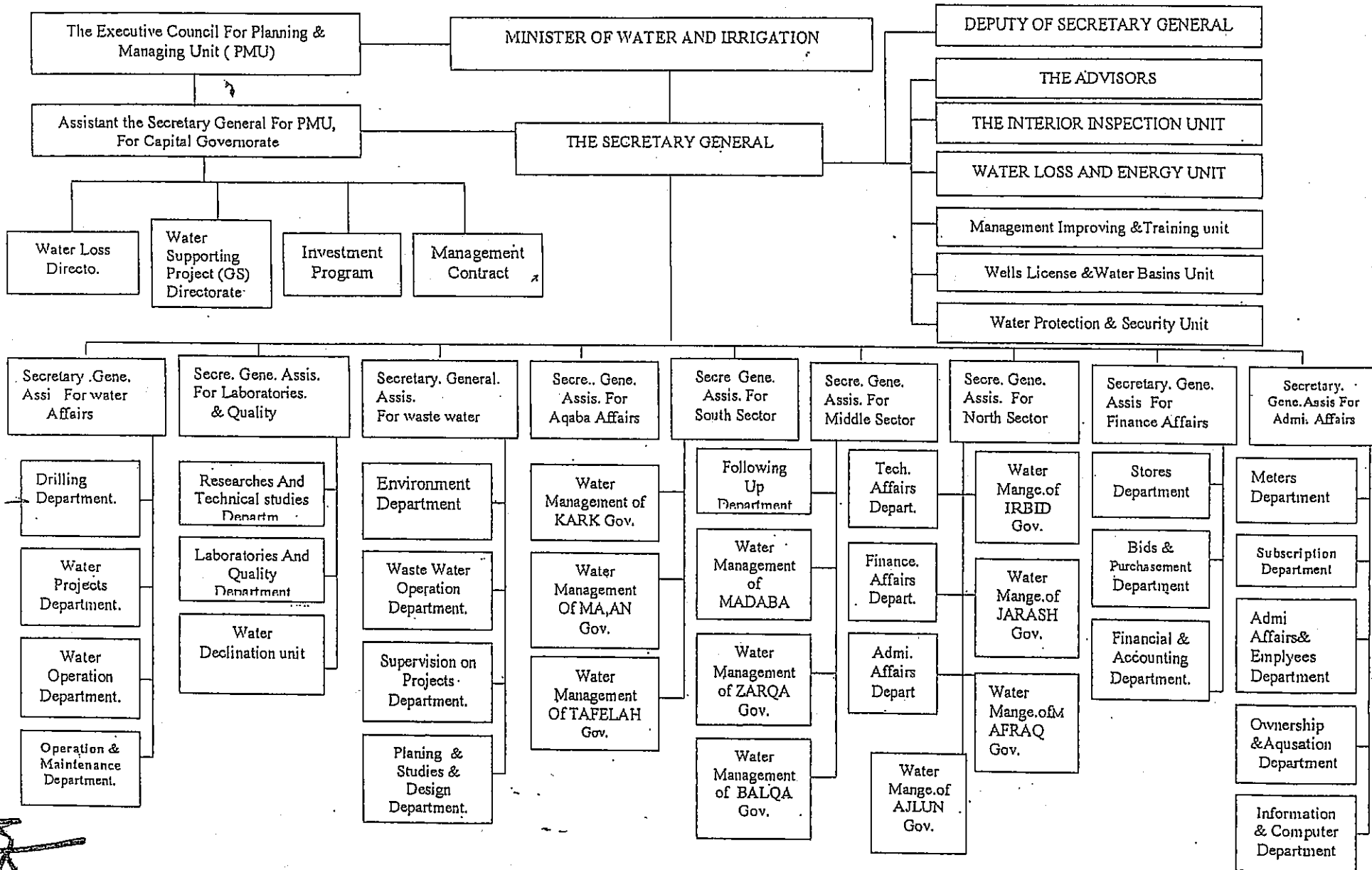
Unity Dam water treatment plant, Abu Zeighan desalination plant, Tabaqat Fahil project, development of ground water wells including desalination of brackish water may be considered as future water resources to project area in long term.

Best Regards,


Secretary General
Eng. Munther Khleifat

Cc: Deputy Secretary General
Cc: Assistant/ water Affairs
Cc: Circulation.

ORGANIZATION CHART OF THE WATER AUTHORITY



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MINUTES OF DISCUSSIONS
ON
BASIC DESIGN STUDY
ON
THE PROJECT FOR REHABILITATION AND EXPANSION
OF THE NETWORKS IN NORTH/MIDDLE JORDAN VALLEY
(EXPLANATION ON DRAFT REPORT)

In 2004 July, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched a Basic Design Study Team on THE PROJECT FOR REHABILITATION AND EXPANSION OF THE NETWORKS IN NORTH/MIDDLE JORDAN VALLEY (hereinafter referred to as "the Project") to THE HASHEMITE KINGDOM OF JORDAN (hereinafter referred to as "Jordan"), and through discussions, 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 Jordanian side on the components of the draft report, JICA sent to Jordan the Draft Report Explanation Team (hereinafter referred to as "the Team"), which is headed by Naoyuki Ochiai, Deputy Resident Representative, JICA Jordan Office, from November 7 to 12, 2004.

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

Amman, November 11, 2004



Mr. Naoyuki Ochiai
Leader
Basic Design Study Team
Japan International Cooperation Agency
Japan



Eng. Munther Khleifat
Secretary General
Water Authority of Jordan
The Hashemite Kingdom of Jordan

ATTACHMENT

1. Components of the Draft Report

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

2. Japan's Grant Aid Scheme

The Jordanian side has understood the Japan's Grant Aid Scheme and the necessary measures to be taken by the Government of Jordan as explained by the Team and described in Annex-III and Annex-IV of the Minutes of Discussions signed by both parties on July 29, 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 Jordan by the end of December, 2004.

4. Other Relevant Issues

- 1) The Jordanian side stated that they will secure enough budgets for the 2005-2007 fiscal years for laying distribution branch lines to be executed by the Jordanian side. The Jordanian side also stated that they will complete the construction for laying distribution branch lines within the E/N term of the Project. (Annex-I)
- 2) The Jordanian side stated that they will secure enough budgets for the 2006-2007 fiscal years for purchasing and construction of the necessary house connections to be executed by the Jordanian side. The Jordanian side also stated that they will complete the construction of the necessary house connections within the E/N term of the Project. (Annex-I)
- 3) The Jordanian side promised to secure enough quantity of water for the target area of the Project as explained in Annex-II.
- 4) Technical Transfer (Soft Component)
The Japanese side proposed in the draft final report to conduct technical transfer (hereinafter referred as to "soft component") through lecturing and training for the SCADA system in order to improve the operation and maintenance skill for the staff of WAJ according to the Jordanian side's request.

The Jordanian side agreed to secure enough number and skillful personnel for soft component of SCADA system to be implemented under the Project.

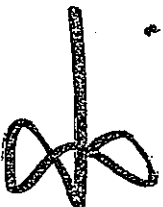
- 5) The Jordanian side stated that the diameter of the distribution branch pipes to be supplied by the Japanese side shall be 50mm instead of 20mm and 25mm according

to the policy of WAJ and the specifications for water supply projects of WAJ mentioning that 50mm shall be the minimum size for the distribution branch pipe line to connect the main distribution pipe line (diameter of 75mm or larger) to the house connection pipe (diameter of 25mm and 20mm) as attached in Annex-III.

The Japanese side has understood their policy and specifications and agreed to adopt 50mm as the diameter of the distribution branch line instead of 20mm and 25mm.

- 6) The Jordanian side stated that WAJ will secure the land for the planned water reservoirs and pump stations before the commencement of the construction by the Japanese side.

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ANNEX- I (1/2) Tentative Implementation Schedule
The Project for the Rehabilitation and Expansion of the Networks in North/Middle Jordan Valley in the Hashemite Kingdom of Jordan

Activities	2004					2005												2006												2007												2008					
	8	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	4	5	6												
Main Works by the Japan's Grant Aid																																															
Detail Design						▲																																									
Exchange of Notes																																															
Agreement for the Consultant Services						▲																																									
Detail Design						—	—	—	—	—																																					
Construction & Equipment Supply																																															
Exchange of Notes													▲																																		
Agreement for the Consultant Services													▲																																		
Preparation for Tendering													—	—																																	
Pre-Qualification for Tenderers													—	—																																	
Tenderers' Preparation														—	—																																
Opening of Tenders																▲																															
Selection of the Contractor & Contract for Construction and Material Supply																																															
Preparation for Construction																		—	—																												
Procurement of material and equipment																		—	—	—	—																										
Construction of Distribution Main and Transmission lines																						—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—										
Construction of Reservoirs																						—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—										
Construction of Pump Stations																						—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—										
Trial Operation & OJT																																															
Handing Over																																															
Material supply of branch lines																							—	—																							
Main Works undertaken by the Jordanian Side																																															
Construction Drawings for Branch lines														—	—																																
Land reclamation for planned reservoirs														—	—																																
Construction of telephone lines																																															
Preparation for construction of branch lines such as tendering for local contractor																							—	—																							
Construction of distribution branch lines																																															
Material procurement for house connections																																															
Construction of house connections																																															

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وزارة المياه والري

سلطة المياه

Ministry of Water & Irrigation
Water Authority



Ref. WA/7/2/17564 Date 10 / 11 / 2004 التاريخ

الرقم

Basic Design Study Team
Japan International Cooperation Agency (JICA)

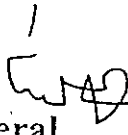
Subject: Commitment letter.


Project: Rehabilitation And Expansion of the Networks in North/Middle Jordan Valley

According to your request; we would like to confirm that we have no objection to allocate 20 m³/hr from kraymeh wells no. 5 and 6 to be used for this project and these quantities will be substituted from Abu Zegan desalination plant.

Also we have no objection to utilize 135 m³/hr from Tabaqat Fahel wells no. 5 and 9 to be used for this project, and these quantities will be substituted for Irbid area from new project. WAJ is planning to construct new water treatment plant at PS0 to convey 500 m³/hr from KAC to Irbid.

Best Regards,


Secretary General
Eng. Munther Khleifat

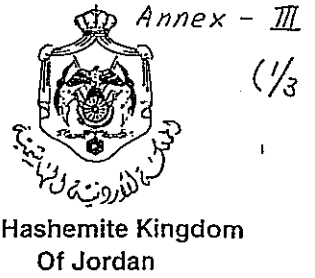

Cc: Deputy Secretary General
Cc: Assistant/ water Affairs
Cc: Assistant/ Financial Affairs
Cc: Circulation.

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ
وزارة المياه والري
سلطة المياه

Ministry of Water & Irrigation
Water Authority



Ref. WA-7/2/ 17565

Date 10/11/2009 التاريخ

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Basic Design Study Team
Japan International Cooperation Agency (JICA)

Subject: Specifications for Water Supply Projects.

Project: Rehabilitation And Expansion of the Networks in North/Middle Jordan Valley

We would like to inform you that the attached specifications have been authorized and applied to the water supply projects owned by the water authority of Jordan.

Best Regards,

Secretary General
Eng. Munther Khleifat

Cc: Deputy Secretary General
Cc: Assistant/ water Affairs
Cc: Assistant/ Financial Affairs
Cc: Circulation.

SPECIFICATIONS OF MATERIALS VALVES, PIPES AND FITTINGS

1. General :

1. Supply and Quality of Materials :

All materials shall comply with those Standards and Specifications laid down by internationally recognized institutions, for the water industrial. Preference will be given to manufacturers that are quality certified to ISO. 9001.

All materials supplied to the site in Jordan shall be subject to acceptance tests carried out by the Royal Scientific Society, or a similar approved Authority.

All materials supplied shall be subject to the Engineer's approval.

Any or all materials and manufactured articles supplied by the Contractor for use in the works, shall if so required by the Engineer be tested in advance at the Contractor's expense, in accordance with the required specs.

Inspection or approval by the Engineer of any equipment or materials shall not release the Contractor from any of his obligations under this Contract.

All information and specifications relating to Products and materials proposed for this Contract, must accompany each Tender Submission.

2. Storage of Materials :

The Contractor shall be responsible for the storage and well being of all materials purchased under this Contract, and any discrepancies found therein.

The Contractor shall manage and maintain stock - yards that can accommodate all materials purchased and approved by the Engineer under this Contract, stored either in the open or under cover as required by the Manufacture's / supplier's instructions , and shall be regularly inspected by the Engineer's staff and maintained to the Engineer's satisfaction.

3. Scope :

The Contractor shall furnish and deliver to the site, all kind of pipes, valves, fittings, closure pieces, flanges, bolts, nuts gaskets, jointing materials ...etc. and appurtenances as specified and required.

All valves shall be flanged. Pipe fittings and valves shall be Suitable for buried installation.

All tapers (reducers) required at tees and other locations to meet the specified diameters may be furnished in the manufacturer's standard lengths and diameters.

Service Pipelines Connection Installation

A service pipeline of 2" diameter made of high density Polyethylene pipes shall be used to connect the main pipeline (3" and larger) to the House Connection pipe line (1" or 3/4" P.E pipes).

Service Connections on existig pipelines shall be made by under pressure tapping or as shown in the detailed drawing.

A gunmetal saddle is to be provided with stainless steel nuts and bolts and Nitille rubber sealing ring / washer Suitable for working pressure of 16 bar. The tapping will be made for 2".

The gunmetal ferrules shall have single or double (twin) outlet with pushfit outlet suitable for 2" inch outlets. The Engineer will issue instructions regarding the size location and fittings of each service connection.

Tapping shall be positioned on the main so that the ferrule is inserted into the main at the crown. The jointing of the threaded ferrule to the main line shall be made using lead free jointing compound.

The outlet of the ferrule shall be set to point in the direction in which the service pipe is to be laid. The service pipe (polyethylene) shall be laid with a cover of not less than 50cm. below the ground surfaces unless shown otherwise on Drawings.

House Connections Installation

A complete house connections shall be installed by the Contractor. The location of these house connections is to be determined by the Engineer on site. The trenches for the connections shall be reinstated with asphalt curbstones and sidewalk where applicable.

Polyethylene pipes of 1" or 3/4" shall be used for house connection, the contractor shall supply and install all Fitting Valves, Bends, Tees, Pushfit, Tapers, Unions, compression fittingsetc. which may be needed to complete the job.

In case it is required to make the house connection from 4" pipelines, self tapping saddle and ferrule shall be used and shall be supplied by the contractor.

N.P

The Contractor shall supply and install the compression fitting shown on the drawing but at the limit of the contract, that means it shall be fitted at the ground surface but not higher or near the meter as in Drawings.

Specs.1

APPENDIX-5 Reference

Reference

Name of Study: the project for Rehabilitation and Expansion of the Water Supply Networks in North/Middle Jordan Valley

No.	Name of reference	Form book, video, map, photo, etc.	Original/Copy	Name of government office to be approached or name of issuing government office	Year of publication
1	Site Map in North of Jordan	Map	Original		
2	Site Map in Middle of Jordan	Map	Original		
3	Site Map in South of Jordan	Map	Original		
4	THE NATIONAL SOCIAL AND ECONOMIC DEVELOPMENT PLAN (2004-2006): EMERGING REQUIREMENTS FOR SUSTAINABLE DEVELOPMENT EXECUTIVE SUMMARY	Data	Copy	MINISTRY OF PLANNING AND INTERNATIONAL COOPERATION	2004
5	Summary of the Social and Economic Development Plan For the Years 1999-2003	Data	Copy		
6	Ministry of Water and Irrigation Water Authority of Jordan (WAJ) Greater Amman SCADA Volume Three Particular Specification	Data	Copy	Halcrow Group Limited	2003
7	NORTHERN GOVERNORATES WATER TRANSMISSION FEASIBILITY STUDY Basis of Planning Meeting 17 August 2004 MARRIOTT HOTEL, AMMAN	Data	Copy		2004
8	THECHNICAL AND FEASIBILITY STUDY AND FINAL DESIGN OF THE UPGRADING AND EXPANSION OF WATER FACILITIES IN CENTRAL GOVERNORATES Water Resources And Demand Assessment Report	Data	Copy	engicon	2004
9	Water Loss Reduction Programme – Northern Governorates Consulting Services For Project Implementation DRAFT Conceptual Design Criteria Section 4 – Restructuring Design Criteria	Data	Copy	Water Authority of Jordan Kreditanstalt für Wiederaufabu (KfW)	2004
10	Water Loss Reduction Programme – Northern Governorates Consulting Services For Project Implementation	Data	Copy	Water Authority of Jordan Kreditanstalt für Wiederaufabu (KfW)	2004

No.	Name of reference	Form book, video, map, photo, etc.	Original/Copy	Name of government office to be approached or name of issuing government office	Year of publication
	DRAFT Conceptual Design Report Volume 2				
11	Northern Governorates Water Transmission Feasibility Study Monthly Progress Report No.3	Data	Copy	Camp Dresser & McKee International, Inc.	2004