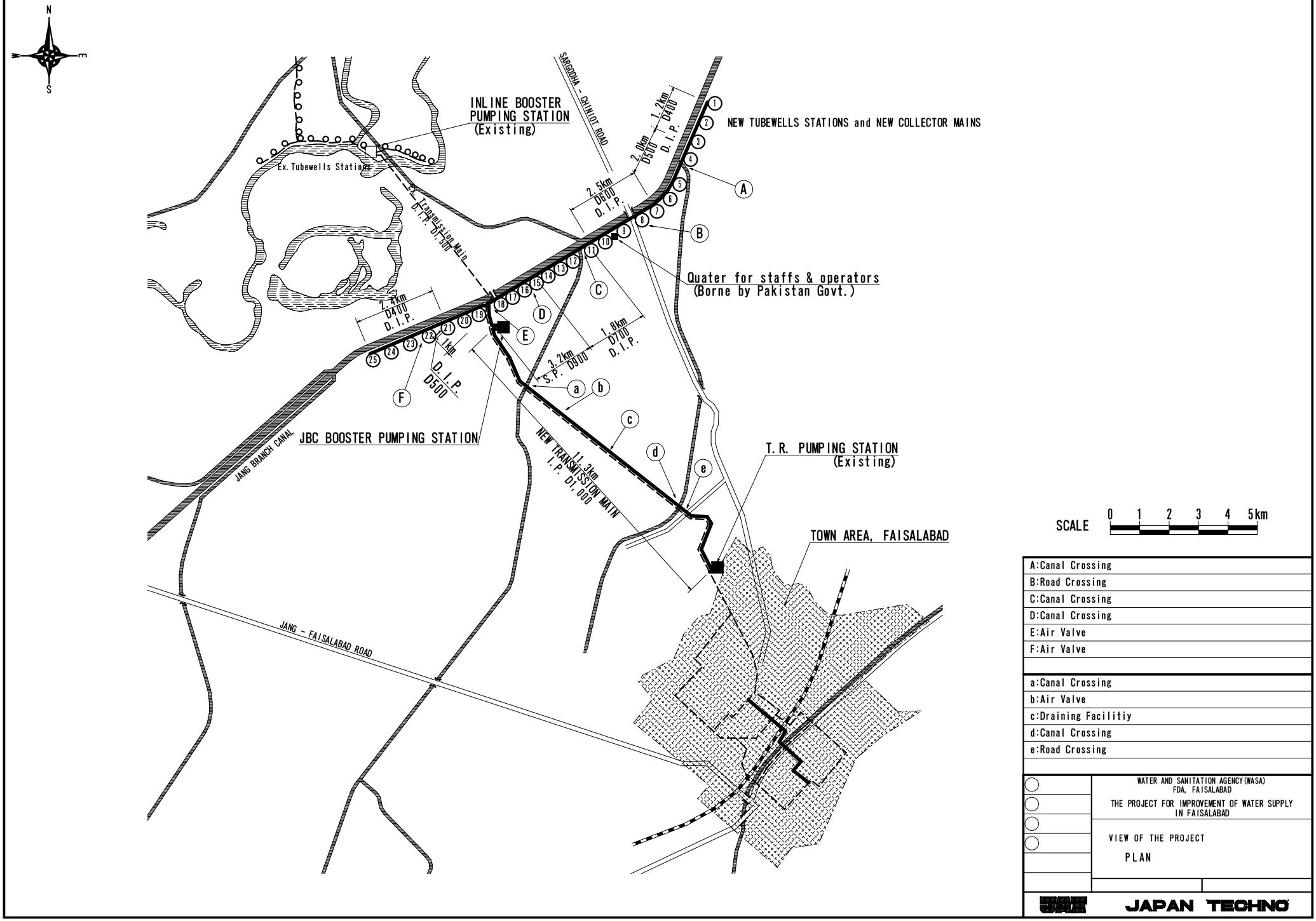
OUTLINE DESIGN DRAWING



A:Canal Crossing
B:Road Crossing
C:Canal Crossing
D:Canal Crossing
E:Air Valve
F:Air Valve

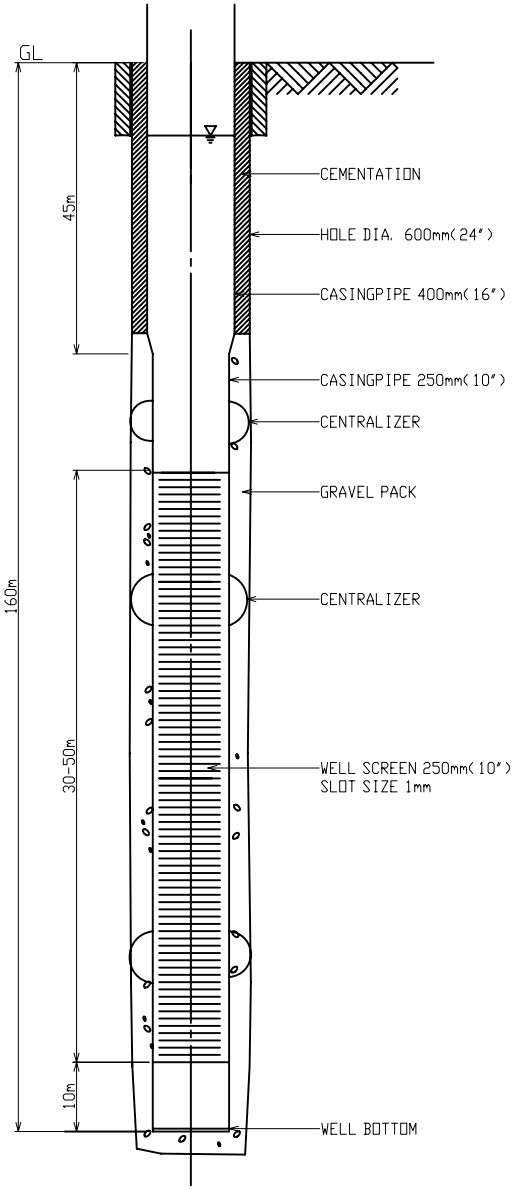
a:Canal Crossing
b:Air Valve
c:Draining Facilitiy
d:Canal Crossing
e:Road Crossing

WATER AND SANITATION AGENCY(WASA)
FDA, FAISALABAD
THE PROJECT FOR IMPROVEMENT OF WATER SUPPLY IN FAISALABAD

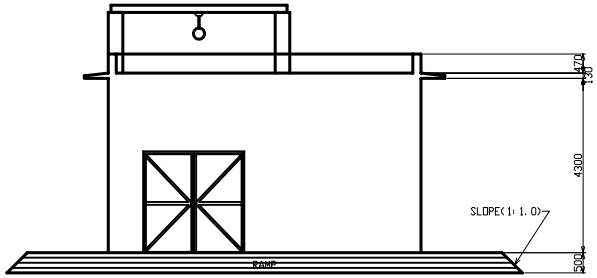
VIEW OF THE PROJECT
PLAN

JAPAN TECHNO

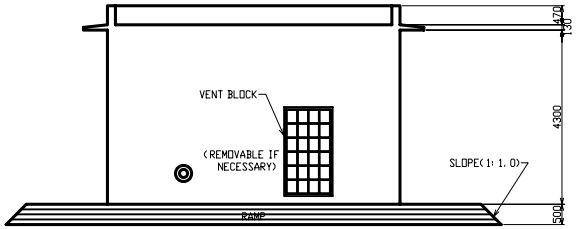
TUBEWELL



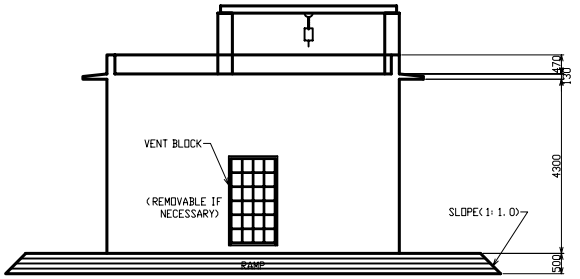
PUMPHOUSE



PUMPHOUSE
(ELEVATION-1)



PUMPHOUSE
(ELEVATION-2)



PUMPHOUSE
(ELEVATION-3)

	WATER AND SANITATION AGENCY(WASA) FDA,FAISALABAD
	THE PROJECT FOR IMPROVEMENT OF WATER SUPPLY IN FAISALABAD
	TUBEWELL STATION
	TUBEWELL / PUMPHOUSE ELEVATION
	JAPAN TECHNO

2-2-4 Implementation Plan

2-2-4-1 Implementation policy

This project is aimed at constructing the water source facilities with Japan's grant aid for augmenting water supply rate for Faisalabad city in the Punjab province of Pakistan. The construction work for the project will be carried out with the establishment of an appropriate implementation system in which the work schedule, quality control, safety and environmental considerations will satisfactorily be realized to achieve the objectives of the projects and the given project effects. Fig.2-12 shows the setup of the project implementation system planned in this project.

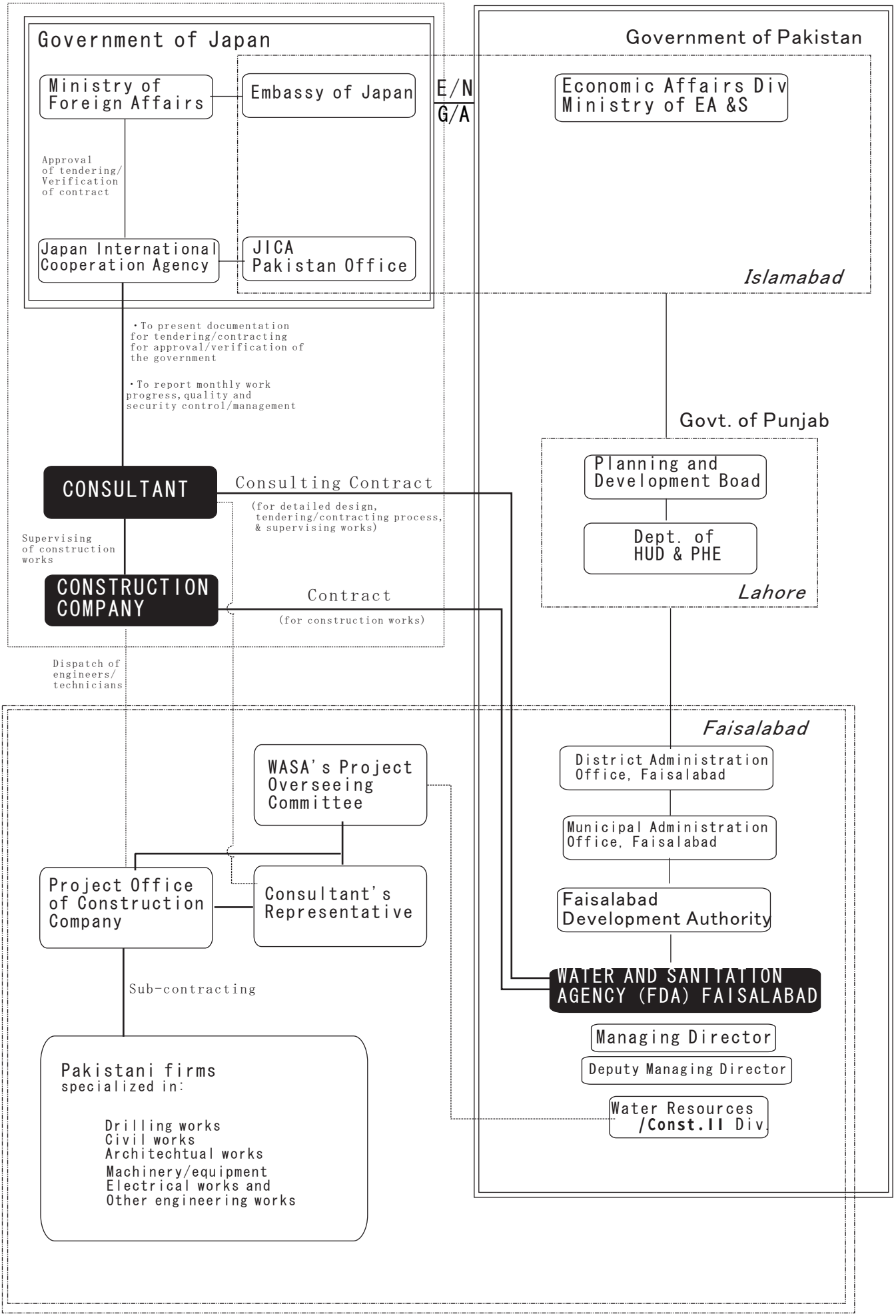
Under Japan's grant aid scheme, the construction work will be undertaken by a Japanese firm(s) as prime contractor under supervision of a Japanese consultant. In the ADB project, main equipment and materials such as piping materials and pumps were procured from Japan through tenders, while the construction work was undertaken by the leading contractors in Pakistan. Some contractors that participated in the ADB project still exist within Faisalabad. Furthermore there are many contractors specialized in large-scale construction works in the provincial capital of Lahore to which access from Faisalabad is now about 1.5 hours through the expressway completed in October 2003. The new road also links the city directly to the metropolitan area of Islamabad-Rawalpindi where enterprises abound. It is highly encouraged, therefore, that the Japanese prime contractor will employ these leading local companies to take advantage of their expertise and experiences for satisfactory execution of the works.

Drilling work of tubewells in the project is required to employ the reverse rotary method exclusively developed in the Punjab province, requiring special technical skills and equipment. In order to satisfy such technical requirements, prospective Japanese contractors who intend to participate in tendering for the project will be listed for the examination of qualification in the pre-tendering stage. One of the qualification requirements is that the contractor shall have an official license for the construction of water facilities. The tender will be authorized solely to the companies qualified in this procedure.

The successful contractor in the tender will be required to prepare the detailed plans for his work describing the method of construction of each facility and its quality control together with temporary works, including considerations for safety and environmental protection, for the review and approval of the consultant.

The executing agency for the project, WASA, plans to assign a project supervising committee for Phase 2 of the ongoing project for construction management involving the staff members of the Water Resources Directorate in charge of operation and maintenance of water facilities, senior officials and technical experts from other related directorates. The Japanese consultant assigned to the project will play a principal role in effectively promoting the supervision of the construction work through the coordination between WASA and the Japanese contractor.

Fig. 2-12 STRUCTURE FOR PROJECT IMPLEMENTATION



2-2-4-2 Implementation conditions

1) Drilling work

For the drilling work, a number of local professional companies in Faisalabad and/or its neighboring cities such as Lahore, Rawalpindi and Islamabad will be employed as subcontractors. The structure of tubewells in this project is designed to meet the hydrogeological features predominant all over the Indus Plain including the project site. Lahore, the provincial capital, has more than 200 tubewells for its municipal water supply system along the Ravi river running through the area, and local professional companies have a wealth of experience and expertise in similar drilling works with machines locally produced.

The key to proper groundwater development is the structure of the tubewell, particularly the design of screen. As one of important procedures in the construction of tubewells, the borehole geophysical survey is required after completion of drilling to determine the exact setting position(s) of the screen. On the other hand, in this area it is a common practice to determine the screen design only based upon the geological features of the strata that are drilled through. Since logging of the geophysical survey can provide data to supplement drilling results, the project plans to include it in the drilling work as one of its basic components to determine the optimum screen position resulting in a higher efficiency of wells.

Since the beginning of the study for the project, the impact of the WASA's tubewells on those for irrigation in the neighborhood has been a social problem since villagers had fears that the withdrawal of groundwater by WASA might result in lowering of the regional groundwater level likely to result in the depletion of resources. This situation urged to arrange the design considerations to minimize such risks. However, since these considerations are based on various assumptions, their actual effects remain yet to be seen. Taking such a situation into account, the simultaneous pumping test is planned at 23 tubewells out of 25 during their test run in order to collect detailed data and information for forecasting the movement of groundwater level more precisely.

2) Pump installation work

The tubewell pump is a vertical hollow shaft turbine pump Pakistani make. Since this type of pump was employed in the previous ADB project, WASA has an ample experience and expertise in its operation and maintenance. Pumps shall be installed true to line in the pump housing casing at the designated mounting depth. The well cover shall be equipped with a small hole of a size suitable for an electrode for water level measurement, with piping when it is necessary.

3) Appurtenant plumbing work

The pump discharge line in the pump station is required to be extended to the outside of the station for connection to collector main now under construction by another contractor for the 2nd phase of the project. The length of extension pipe shall basically be 18 m. The length may, however, be changed according to the distances between the pump stations and collective main, after consultation with the consultant during the work.

4) Concrete works

The tubewell pump stations are of reinforced concrete structure. However, there is no ready-mixed concrete plant within the city as well as its surrounding areas, the contractor is required to install a temporary concrete batch plant for the required works. The concrete work in the preceding ADB project conformed with the UK's BS standards, but through the inspection of the existing structures this project plans to employ the requirements of the JIS standards for strict quality control.

Since the temperature in the daytime during the summer season in Faisalabad reportedly exceeds 48°C, appropriate measures such as shortened concrete placing time, water spraying and preparation of a protective cover, etc. are required to ensure quality of concrete structure.

2-2-4-3 Scope of works

For the construction work of the project, Japan will undertake the construction of major water facilities planned by the study under its grant aid scheme, while the Pakistani side will be responsible for the provision of primary electrical system and other appurtenant facilities. The major undertakings by the respective parties are listed in the following table 2-14:

Table2-14 Major Undertakings by the Respective Countries

Item	Japan	Pakistan
(1) Water source /intake facilities	Tubewells/Tubewell pumps/Tubewell pump stations x 25 units	a. Land acquisition b. Site preparation c. Primary power supply system including 400V transformer system, to an integrating wattmeter.) x 25 units d. Access/connecting roads (metalled road 5m x approx. 15km) e. Fence work for pump station f. Operation quarters (one no.)

(2) Project management and construction supervision	Provision of consulting services for the detailed design and supervision of construction work	

Concerning land acquisition for the construction work, WASA already completed negotiations with the Irrigation Department of Punjab government which were in charge of this property together with the canal.

For the road for access to the 25 tubewells, it has been decided on metal paving of public roads, and WASA has already started the construction of more than 15km.

For the primary power supply system for the tubewells, the Pakistani side is requested to provide the 11 kV high-voltage power supply and step-down transformers from 11 kV to 400 V to each of 25 tubewells, as was the case with the existing tubewells in the Chenab wellfield. The Japanese side will undertake to install the secondary power system including the pump starting and control panel and connections to pumping equipment in each pump house.

2-2-4-4 Consultant supervision

This project will be implemented as grant aid program of Japan and a Japanese company as the consultant for the project will undertake the detailed design and supervision of the construction works. The consultant's main activities are as follows:

1) Pre-construction stage:
- Preparation of tender documents
- Assistance in tendering
- Evaluation of tender results
- Assistance in contracting

2) Construction stage:
- Construction supervision
- Inspection service
- Training service in operation of facilities
- Reporting (to WASA and JICA)

After the official agreement for implementation of the project are signed and exchanged by both the governments of Pakistan and Japan, the Japanese consultant will enter into the consulting agreement with WASA. Normally the first stage will be to make an implementation design, but since the detailed design has already been prepared in the preceding project, this process will be omitted in this Project. Any modification to be made on the specification will be incorporated as part of the preparation of

tender documents.

The consultant will dispatch an expert specialized in groundwater development exclusively for this project. Since the Japanese consultant already established a supervising team in Faisalabad with a resident engineer (expert in water supply engineering) for the ongoing works in Phase 2, engineers in the team can undertake quality control of the whole work and supervision of works except drilling work.

2-2-4-5 Quality control plan

In the early stage of construction, the consultant will train local supervisors to establish a quality control system. Throughout the construction period, quality control is carried out with a team of the local supervisors trained under the guidance of the Japanese experts. Also, as records of work progress and quality control, photos shall be taken and compiled. Photos shall be taken for all kind of works. For specially important portions of works, which cannot directly be seen after completion of works, additional photos from various angles will be taken.
See Table 2-15 for a summary of methods for quality control of each work.

Table 2-15 Quality Control Method

Inspection Items		Method	Frequency
1) Earthwork			
For Building structure	Ground elevation	Level measurement	4 pt/structure
Trench excavation	Dimensions	Scale measurement	Per 100m
Backfilling	Depth of cover Compaction	Visual check Scale measurement	Per 100m
2) Tubewell drilling work			
Drilling	Diameter of drilling bit Drilling depth Vertical alignment	Scale measurement	Each tubewell
Casing installation	Screen depth Verticality Quality of connection	Scale measurement Plumb bob mesurement Visual check	All joint
Gravel packing	Quantity	Quantity measurement	Each tubewell
Pumping test	Water discharge	Orifice meter or triangular weir	Each tubewell
Water quarity test	24 items	Official laboratory	Each tubewell
3) Mechanical and Electrical work			
Tubewell pump installation	Setting depth of pump Wiring connection status Riserpipe jointing status	Scale measurement Visual check	Each tubewell
Pumping equipment	Operating condition	Extensive testing for all operation	
Wiring and lighting	Wiring status Electrical panels setting status Lighting status	Scale measurement Visual check	Each building

Inspection Items		Method	Frequency
	Power distribution status	Cable size Connection strength Switch on / off	Each building
	Insulation resistance	by 500V Megatester	Each building
4)Pipeline installation			
Installation	Laying Jointing Welding (steel pipe) Painting (steel pipe)	Visual check	As needed
Leakage test	Leacage	Visual check	
5) Concrete Work			
Reinforcement	Quantity Assembly accuracy Fixation Position/Jointting process Spacer setting status	Millsheet Tensile strength test Scale measurement Visual check	Before casting
Formwork	Reference level Width Hight Length Displacement of centerline Span length Timbering setting Tightening status	Photogrammetric instruments Visual check	Before casting
Mixing	Slump Air content Mixing ratio of WCSG Temperature of concrete Chloride quantity	Visual check Various test (by instruments)	Trial mixing Each concrete batch
Casting/Curing	Casting method Placing joint Tamping Curing method	Visual check Casting duration Palpate test	Before casting As needed while casting
Finishing	Member position Workmanship	Visual check Photogrammetric instruments	Formwork removal timing
	Compressive strength	Compressive strength test	7 and 28 days after casting
Structure	Reference level Thickness Width Hight Length Displacement of centerline Span length	Photogrammetric instruments	Each structure
6) Building work			
Masonry	Workmanship	Visual check	Each Building
Plastering	Workmanship	Visual check	Each Building
Painting	Workmanship	Visual check	Each Building
Roofing	Workmanship	Visual check	Each Building
Joiner's work	Workmanship	Visual check	Each Building

2-2-4-6 Procurement plan

1) Equipment and materials for drilling work

The water service in the provincial capital city of Lahore relies on tubewells of about 200 in number developed in the floodplain of the Rabi River, one of the main tributaries of the Indus. Groundwater development, therefore, has ever been active and a large number of enterprises specialized in drilling have emerged there. Tubewells in this area are commonly drilled by the reverse rotary method fitted to the hydrogeological features of aquifers consisting of recent sediments of the Indus system, employing equipment and materials locally developed and manufactured. In this project, this conventional drilling method is adopted, together with the procurement of local equipment and materials except for the stainless steel screens.

The selected type of pump for the tubewell in the project is a vertical shaft turbine pump, which is popular not only in Faisalabad but also all over the Indus plain, since its mechanism and structure are fit well to the performance of aquifers in this region, although internationally the submersible motor pump is more preferred. The selected pump is one of the main products of domestic pump manufacturers.

The stainless steel wire-wound screen will be procured from Japan or any third country. For the planned tubewells the stainless steel wire-wound screen is adopted, as it previously was for the existing ones in the Chenab wellfield, since this type of screen has the largest open area, which can assure the least drawdown at a given discharge, providing the effect of controlling the water level lowering. The leading local product is the brass-made vertical-grooved slit type screen that is available at a low cost, but its smaller open area is a disadvantage. In recent years, the domestic-make glass-fiber casing and screen have widely been used, but it is slit-processed and has the same level of open area as the brass-made screen.

The spiral steel casing pipe of domestic make will be adopted in this project. The features of this product will be described in the next paragraph.

The list of main equipment and materials to be procured is shown in table 2-16.

Table 2-16 List of Materials/Equipment Procured for Drilling Work

Equipment	Country of origin			Remarks
	Pakistan	Japan	Other	
Casing	○			Spiral steel pipe of domestic make
Screen		○	○	Stainless steel, wire –wound type
Packing gravel	○			
Pumps for tubewell	○			Vertical turbine pumps

2) Materials for civil work

The main materials for civil work such as cement, aggregates, reinforcing steel bars and forms are all procured in Pakistan. As there is no ready-mixed concrete plant in Faisalabad, a batch plant facility is needed at each site to place concrete for large structures such as the terminal reservoir and pumping station. In the ADB project, the local contractors built similar temporary plants for large-scale facilities. The standard concrete strength in this project will not conform to the BS standards project, but to the JIS standard as the result of survey on the existing facilities. The Japanese standard has been adopted in other projects with Japanese assistance in this country and it is deemed to be appropriate for the strict strength required for the main structures to be built in this project.

4 to 5 brands of cement are domestically produced, but those meeting the quality standards including strength are reportedly limited to half of those. It is necessary to select brands that can satisfy the quality requirements through testing to be made at each site. Faisalabad is an industrial city where the market for industrial products is thriving, assuring constant stable supply of materials.

Aggregates are available from the large-scale river bed site below the Chinito Bridge on the bank of the Chenab river about 30 km north of the city. The right to collect sand there is renewed by tendering every year. There are many aggregate suppliers within the city and in its surroundings and any required quantity of quality materials is available from them.

The raw materials for reinforcing steel bars are imported and processed by domestic manufacturers to meet demand. In this project, the domestic products will be used. Forms for concrete structure will be of steel type. They can be fabricated by processing the materials that are domestically available.

Table 2-17 List of Main Materials for Civil Works

Item	Country of origin			Remarks
	Pakistan	Japan	Third countries	
Cement	○			
Aggregate	○			
Reinforcing steel bars	○			
Steel form	○			

3) Building materials

All the building materials for the structures including steel and wooden trusses and bricks and for fixtures such as doors and windows at two pumping stations will be procured in the local market. It has been confirmed in the market survey that the quantities as sufficient.

4) Electric equipment/materials

The electric power is supplied by the state-owned WAPDA in Pakistan and the electric products are available from the manufacturer operating under the license of an international company based in

Germany, keeping a market share of 90% or more in Pakistan. In this project, the primary power of 11kV will be supplied from WAPDA, so that it is desirable to adopt domestic electric products. The results of survey made on the availability of electric equipment including transformers, electric motors, generators, power distribution boards and instruments that are required for this project will be described below.

The electric products in Pakistan comply with the standards of "International Electrotechnical Commission (IEC) having slightly different criteria for cable sizes and testing methods from those of the Japanese standard JIS, although there is little problem in compatibility. Of the electric products required in this project, both the high- and low-voltage transformers are locally manufactured so that it is appropriate to procure them. However, there is no high-voltage electric motors of Pakistani make. Only the low-voltage products up to 400 V are available. The generators are limited to the low-voltage type as well. Instruments are all imported. Therefore, it is appropriate to adopt the pumps with which the pump manufacturer will procure together with the power control panels and instruments as accessories. Based on the above survey results, the plan of procurement of electric products is shown in Table2-18 below.

Table2-18 List of Equipment/Materials for Electrical Works

Item	Country of Origin			Remarks
	Pakistan	Japan	Third countries	
Transformer	○			
Electric motor (high-voltage)		○	○	
Electric motor (low-voltage)	○	○	○	
Generator (high-voltage)		○	○	
Power distribution/control panels and instruments		○	○	

5) Construction machinery and vehicles

The construction industry in Pakistan has been keeping up with international standards in various fields as typically shown in the construction of highways in recent years. The construction machines required for the work in this project can fully be procured domestically in types and quantity. There are many construction machines available from Europe, Japan and Korea. Trucks and passenger cars of Japanese models are locally produced and they have a high share in the market of Pakistan. The Japanese contractor is expected to procure or lease these machines for his construction work.

2-2-4-7 Initial operation guidance plan

Since the technical level for the operation of the new facilities is the same as that for the existing facilities, the operation can be managed with the present technical level of WASA. However, since the

tendency of water consumption after the increase in the supply rate is unknown until service actually starts, the optimum operation settings can be determined during the test operation period of about 1 month. During the test operation period, by giving guidance on operation, the optimum operation conditions will be finally decided.

2-2-4-8 Implementation schedule

The implementation procedure of a grant aid project is normally taken as follows:

Step 1	Exchange of Notes by both Governments
Step 2	Consulting agreement between the executing agency and the Japanese consultant
Step 3	Detailed design study by the consultant
Step 4	Preparation of tender documents
Step 5	Pre-qualification and tendering of Japanese contractors
Step 6	Construction contract between the executing agency and the Japanese contractor
Step 7	Construction work by the contractor under supervision of the consultant
Step 8	Completion

A grant aid project is executed, following the above procedure for a period of a single fiscal year. Under this scheme the net construction period will be limited to more or less 6 months. On the other hand, the implementation schedule of a large-scale project requiring longer construction period is determined in a different scheme, taking into account various factors including Japan's grant aid scheme, components of the project and their design and scale, as was initially arranged for the preceding phases of the project.

The plan for the water source facility in this project was previously a part of the framework for Phase II. After this component was separated into an independent grant aid project, the new structure of JICA re-organized in 2008 has decided to provide its fund under the new system for ODA. If the project is realized, JICA will conclude a grant agreement (G/A) with a recipient country, in addition to the routine Exchange of Notes between both governments. In other points, the schedule will follow the ordinary process of a single-year grant project. The procedure of implementation is expected to follow the following process:

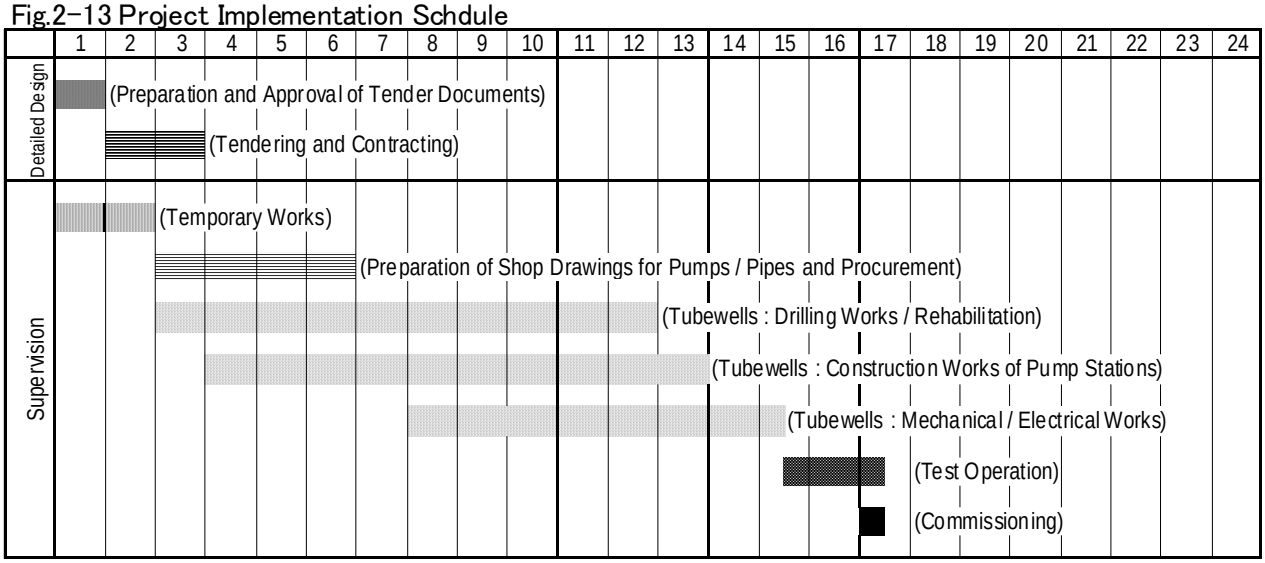
* E/N and G/A
* Consulting agreement between the executing agency and the Japanese consultant
* (Detailed design study)
* Preparation of tender documents
* Tendering
* Contracting between the executing agency and the Japanese contractor
* Commencement of construction works

* Completion

As the detailed design for the facility in the project has already been completed in the preceding project, the field study will not be conducted for this project. This process is set for the preparation of tender documents including necessary modifications of previous design.

The estimated project period is 17 months as shown in the diagram of the work schedule in Fig.2-13.

Fig.2-13 Project Implementation Schdule



2-3 Obligations of Recipient Country

The government of Pakistan must confirm undertaking the following responsibilities.

- To secure land necessary to construct the water supply facilities, and clear, level and reclaim the land prior to commencement of the construction work.
- To provide facilities for the supply of primary electric power to the constructed facilities, and other incidental facilities in and around the project sites, as necessary.
- To extend assistance in prompt execution of unloading, customs clearance at the port of disembarkation and internal transportation of the products imported for the execution of the project with grant aid, in case products are imported.
- To exempt Japanese nationals of customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the verified contracts.
- To accord Japanese nationals, whose services may be required in connection with the supply of the products and services under the verified contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.
- To assure the safety of the said Japanese nationals and provide full-time police accompaniment at sites where security is highly suspicious.
- To operate and maintain the facilities constructed and equipment procured through the implementation of the project properly and effectively, and to appoint necessary staff for this operation and maintenance.
- To bear the advising commission for an Authorization to Pay (A/P) and the payment commissions to the Japanese foreign exchange bank for the banking services based upon on the banking arrangement (B/A).
- To bear all the expenses other than those covered by the grant aid.

This project for the construction of water resource facility in this implementing review study was previously included in the framework of Phase II now under construction, and the responsibilities on the Pakistani side regarding this component were already agreed by both parties. PC-1 for the initial planning of the project eventually approved by ECNEC, and WASA has completed a part of its responsibilities for the work.

The following table 2-19 shows such responsibilities on the Pakistani side previously agreed in 2007.

Table 2-19 List of Major Undertakings by the Pakistani Side Concerning Construction Work

	Description of undertakings	Estimated cost (x 10^6 Rs)	(Equivalent in yen) (x 10^6 yen)	Remarks
1	Installation of primary power supply system	80.00	172.00	* Installation of high voltage primary power supply system of 11 kV capacity with step-down transformers to 400V for 25 units of tubewell stations * Installation of high voltage primary power supply system of 11kV for the booster pumping station and the terminal reservoir.
2	Land acquisition	10.94	23.52	* Procurement of private properties is required for the wellfield and connecting road along the Jhang Branch Canal in addition to public land where the 25 tubewels are planned. Further, along the route of the planned transmission main on Bawa road, patches of private land will have to be purchased.
3	Site clearance and ground leveling	0.90	1.94	Required for the wellfield and booster pumping station.
4	Road construction	80.00	172.00	Access road to the tubewells and the booster pump station, about 20 km in total length, and rehabilitation of part of public road along the Jhang Branch Canal
5	Installation of enclosures (fences and gates	8.00	17.20	Required for the 25 tubewell stations and the booster pump station in the Jhang Branch Canal area
6	Procurement of furniture, fixtures, office equipment and others	8.00	17.20	Required for the booster pumping station and the terminal reservoir
7	Site preparation cost for premises of the booster pumping station	6.00	12.90	Required for the construction of the road on the premises, gardening, lighting, security measures and others for the booster pumping station along the Jhang Branch Canal
8	Project supervision cost	48.00	103.20	Required for project management and supervision committee established by WASA
9	Procurement of vehicles for supervision	6.00	12.90	Required for WASA's supervisors of the project
10	Construction of residence	30.00	64.50	Housing for new WASA's staff for new water supply facilities (3 nos.)
11	Public relations expenses	2.50	5.38	Expenses for public relation activities for the urban and rural residents
12	Compensation package program for concerned villages around the wellfield	60.00	129.00	Required with environmental improvement of drainage, road and others in return for water sources development
13	Banking commission on payment of foreign currency	36.47	78.41	Includes commission of the domestic banks, as well as the Japanese banks
14	Others	15.00	32.25	
15	Operation quarters	12.22	26.27	Required for the tubewell stations, the booster pumping station and the terminal reservoir pumping station(total 3 units)
	Total	391.81	842.47	

(The exchange rate of Japanese yen 2.15 against 1 Rupee was adopted when the agreement was made in 2007. Since then WASA has completed a part of works such as the compensation package programme for the villages. The current rate is Japanese yen 1.29 for 1 Rupee at the time of this study.)

Most of the costs of undertakings by the Pakistani side regarding the construction of water source

facility were previously estimated and included in the sum presented in Table 2-19. The approximate amount of such direct expenses in the work for the water source facility is presented as follows:

1) Primary power supply work for the tubewell pump stations 40.00 (mil Rs)
The work in this project takes half of the entire cost of electrical works in the initial framework. WASA already negotiated with FESCO in charge of regional electric supply (Faisalabad Electric Supply Co.). The estimate for this work WASA received from FESCO is said to be still valid. The work is yet to be started.

2) Procurement of land 10.94 (mil Rs)
Land for the wellfield along the Jhang Branch Canal has been transferred to WASA, based upon the agreement concluded between WASA and the Electricity and Irrigation Department of the Punjab government in September 2009.

3) Site clearance and leveling 0.50 (mil Rs)
The work is yet to be started.

4) Road construction 80.00 (mil Rs)
A part of the road about 20 km has already been completed, with the remaining part under construction.

5) Operation quarter 0.30 (mil Rs)
A guest house of the Irrigation Department intended for canal control was transferred to WASA. Rehabilitation work is yet to be carried out.

6) Compensation package programme for the concerned villages 60.00 (mil Rs)
The work was commenced in 2005 and completed by 2007.

7) Bank commission charge for foreign currency payment 3.19 (mil Rs)
Since this project is separately executed, an additional charge for this independent project will be necessary.

The local portion of the cost is disbursed from the budget for the Annual Development Programme of the Punjab government, based upon the approval of PC-1 by ECNEC. (A part was already issued after the project started in 2005.) Since the entire project cost (Phase I and II plus this one-Project II of Phase I) seems to exceed the initial estimate cost in 2004 proposed in PC-1, the Pakistani side is requested to take necessary steps for the revision of the initial PC-1.

2-4 Project Operation Plan

The water source facility to be installed in this project will be operated and maintained as a part of new water supply system. The planning for its operation and maintenance, therefore, needs to be examined, involving other facilities for collecting, transmitting and distributing water from the tubewells, which are now under construction in Phase II of the project. This study confirmed that upon completion of the project, WASA will practice sustainable operation and maintenance of the system, based upon a plan agreed in the previous studies.

Since the planned system is similar in elements such as system components, functions, technical level and types of equipment, etc to those in the existing system installed under the ADB project, its operation and maintenance are not likely to raise any serious difficulties in technical aspect. However, this new project threatens to impose heavy financial burden on WASA due to huge cost for power consumption. WASA's financial performance has been held to a poor level, although efforts for reform have recently been made. It is strongly recommended to accelerate such steps for reform at the earliest date to ensure satisfactory service to the citizens.

The major elements for the operation and maintenance of the planned system are examined as follows.

1) Personnel plan

The WASA is considering the following personnel plan for new facilities.

(1) Basic standards for employment

i. Daily working hours: 8 hours (WASA regulation based on the labor standard of Pakistan)
ii. Number of working days in a week: 6 days (same as above)
iii. Working system: 3-shift system for the 24-hour operation of tubewells, booster pumping station and the terminal reservoir

(2) Personnel plan

Table 2-20 Personnel Plan for the New Facilities

	Job type	25 tubewells	1 booster pumping station	1 terminal reservoir pumping station(T/R)
		23 wells are in full-time operation daily	3 booster pumps, 2 chlorinators in full-time operation	3 pumps for distribution in full-time operation
1	Chief Technical manager	-	1	Manager of the existing T/R

2	Technical manager	-	1	-
3	Work supervisor (in charge of electricity and machines)	1	1	Staff in charge of the existing facility at T/R
4.	Chlorinator manager	-	1	ditto
5	Electrician	1	1	ditto
6	Mechanic	1	1	ditto
7	Plumber	1	1	ditto
8	Driver	1	1	ditto
9	Warehouse worker	-	2	ditto
10	Operator	90	14	11
11	Security guard	3	3	Staff working at the existing facility at T/R
12	Watchman	-	4	4
13	Radio communication staff	1	2	Staff working at the existing facility at T/R

In WASA's personnel plan, the number of the operators working at the tubewell pump stations is especially large because they are posted at each of 23 stations (69 for the 3-shift system including the reserved staff).

WASA plans to recruit them as follows:

- Previously more than 50 tubewells were in operation in the wellfield along the Rakh Branch Canal running through the city, but after completion of the Chenab system, they were reduced to about 20 in recent years through the rehabilitation by WASA. As a result, the staff who used to work at the tubewells and the tubewell stations was drastically reduced. Most of those who left the jobs still live in the city. Since they are skilled operators of water facilities with long-term experience, a part of them could be considered for the posts in this project.

- Most of the staff now working at the 28 tubewells in the existing Chenab wellfield are the residents of the nearby villages under consideration to give employment opportunities to local residents. As for the basic operation of pumping system, a short-term training was given to them and the opportunities to learn the technique are given to them through the daily inspection of the tubewells by WASA's supervisors. The same measures are considered for the project.

In addition to such employment of operators, recruiting of senior staff is easy by advertising in

newspapers and so on. It is possible to acquire competent and capable experts since Faisalabad is close to Lahore, the capital of the province.

2) Operation and Maintenance of Facilities

a) Power Supply Facilities

At each site of the tubewell stations, booster pumping station and terminal reservoir, a high-tension 11 kV supply will be extended under the responsibility of the Pakistani side. Similar extensions were made in the ADB project with difficulty in securing a supply base for the Chenab wellfield as well as the terminal reservoir. The situation for power supply has changed since then, and it is now provided with a choice of grid stations around Faisalabad, one station in the city itself and another in Chiniot city to which the Jhang Branch Canal is close. Each station is connected with national grid to greatly improve the power supply environment more than before.

Power supply is provided by the state-owned WAPDA, and operation and maintenance is handled by the power service company under WAPDA. Since Faisalabad is a key industrial city, WAPDA established a service company called FESCO (Faisalabad Electric Supply Company) for stable supply to large consumers as well as ordinary citizens.

WASA plans to station permanent electricians at each of the 3 facilities to continue a normal operation and maintenance system.

Table 2-21 summarizes the power supply installations and allocation of responsibilities.

Table 2-21 Classification of Required Power Facilities

	Facility name	Loads of main equipment	To be borne by the Pakistani side	To be borne by the Japanese side
1	25 tubewell stations	25 tubewelll pumps Details 380 V x 80 HP at 6 stations 380 V x 60 HP at 7 stations 380 V x 50 HP at 10 stations 380 V x 30 HP at 2 stations	11 kV power lead-in at the primary side, transformers for step down to 400V, and the watt hour meters inside the tubewell stations	Secondary power feed including the power switch boards inside the tubewell stations

2	Booster pumping station	1) 3 nos of booster pumps: 3.3 kV x 190 kW 2) Equipment at 400 V (Chlorinator and crane: 400 V x approximately 25 kW) 3) Single phase equipment for lighting, etc : 230 V x approximately 6 kW in total	11 kV power lead-in at the primary side	11 kV high-voltage incoming panel, 11kV/3.3kV transformers and 3.3 kV and 400 V switch boards inside the pump station
3	Terminal reservoir pumping station	1) 3 nos. of distribution pumps: 3.3 kV x 630 kW and 2 nos. of distribution pumps: 3.3 kV x 330kW 2) Ancillary equipment: 400 V x approximately 12 kW 3) Single phase equipment for lighting, etc.: 230 V x approximately 6 kW in total	11 kV power lead-in at the primary side	11 kV high-voltage incoming panel, 11 kV/3.3 kV transformers and 3.3 kV and 400 V switch boards inside the pump station

b) Equipment

Major equipment for the project includes tubewell pumps, booster pumps and distribution pumps and chlorinators. Similar models with which WASA has experience through the ongoing operation of the existing facilities were selected, and their operation and maintenance can be carried out without difficulty. Having been run for more than 10 years without serious troubles and damages, their conditions are found good in general. The most vulnerable components seem to be electrical equipment, particularly power starting and control panels locally manufactured, where minor damages and malfunctions in switches and controls are reported. These troubles used to be dealt with by their manufacturers, and WASA trusts them, as they turned out technically reliable with their products guaranteed with licenses from leading EU engineering companies.

A stable supply of liquid chlorine gas for chlorinators is available through a contract with a chemical plant located about 30 km away from the city.

c) Other Facilities

After the completion of the construction work, the Water Resources Division of WASA will be in charge of the operation and maintenance of the newly-installed facilities of this project, with support of the Operation and Maintenance Division which owns heavy equipment and machinery for maintenance and repair works of facilities. In addition, special works required for tubewells,

pipeline and equipment can be handled by contractors available in the city. Although special equipment for repairing facilities is not included in the project, WASA can continuously operate the system without any difficulty.

3) Financial management

The balance sheet of WASA to date shows that its revenue has continuously been less than the cost for water service. In an effort to remedy this trend, WASA raised the tariff in 2004 and 2007.

WASA's water tariff is not a metered system, but a flat rate one based on the dimensions of consumer' property, as has been widely employed in most cities in the country. According to a survey by ADB (1998), the water tariff of Pakistan cities was remarkably low among major Asian cities. The flat rate system has been a principal cause for lower income and degraded management of water agencies including WASA. The deficits are usually covered by government subsidies from shares of property tax.

With its latest tariff revision, the increase in income from the collection of water fees may cover the cost of service with the existing facilities. Yet if the new facilities are added, the power cost will dramatically increase, and there is a risk to return to imbalance of the income and cost under the current tariff system, unless WASA makes efforts in acquiring new clients large in number. The only effective measure to ensure sound finance will be the changeover to the metered tariff system.

The changeover to the metered system has been considered by WASA under the strong direction of the provincial government under the National Drinking Water Policy, and actually the metered system was adopted in a model service area in 2006. With endorsement of the FDA as a overseeing organization, WASA decided to expand stepwise adoption of the metered system for other areas, and 2 areas were selected as candidates. In 2007, however, WASA's proposal for procuring water meters for commercial and domestic use failed to receive approval of the provincial government. However, the implementation of the project will provide a good momentum to trigger the changeover to the metered system, and WASA will have an opportunity to enforce a policy to obligate prospective new clients to install a water meter.

Meanwhile, due to the persistent shortage of water, part of the city has been left under an extremely poor service condition. As a result, illegal actions by a part of citizens unsatisfied with the ongoing service are widespread, partly rejecting payments or daring illegal connections to the service pipes or withdrawing the water forcibly with pumps. Under the direction of P&D of the provincial government, the following measures are recently being taken by WASA.

(1) Private sector participation (PSP)

In order to improve an inefficient official collection system, the collection service by the private sector is now in place, although partly. WASA held a briefing for candidates shortlisted from interested companies which are recruited by press advertising in 2007. t been reached, but the future move of this effort must be closely watched.

(2) Mandatory disconnection

As a sanction against nonpayment clients, “Disconnection Campaign” was established and is in practice, which is to cut off service pipe and disconnect it, and as a result, 473 cases against vicious clients were confirmed from February to June of 2007. This policy is now supported by the city of Faisalabad.

The increased water supply through the implementation of the project is anticipated to reduce such illicit behaviors. For the improvement of WASA's financial status, WASA is requested to continue its efforts in extending appropriate service to all the consumers as well as collecting fees by the metered system along with the establishment of legal regulations to contain illicit practices of a part of consumers.

2-5 Project Cost Estimation

2-5-1 Initial Cost Estimation

(1) Cost to be borne by the Pakistani side

Table 2-22 Cost to be borne by the Pakistani Side

	Description	Basic Design Study (2002 - 2003)		Implementing Review Study (for Phase II in 2007)		Implementing Review Study (this study, in 2009)	
		Million Rs	Million ¥ (approx.) 1Rs=JY2.19	Million Rs	Million ¥ (approx.) 1Rs=JY2.15	Million Rs	Million ¥ (approx.) 1Rs=JY1.29
1	Primary power supply	35.83	78.47	80.00	172.00	90.00	116.10
2	Land acquisition	10.94	23.96	10.94	23.52	—	—
3	Site clearance	0.90	1.97	0.90	1.94	—	—
4	Road construction	101.69	222.70	80.00	172.00	131.03	171.58
5.	Enclosures (fences/gates)	6.12	13.40	8.00	17.20	6.06	7.82
6.	Procurement of office equipment/furniture for the booster pump station	11.44	25.05	8.00	17.20	4.75	6.13
7.	Site preparation of premises for the booster pump station	6.12	13.40	6.00	12.90	1.78	2.30
8	Project supervision	48.00	105.12	48.00	103.20	43.97	56.72
9.	Vehicles for supervision	5.50	12.05	6.00	12.90	5.00	6.45
10.	Construction of residence for staff	21.46	47.00	30.00	64.50	49.76	64.19
11	Public relations	2.50	5.45	2.50	5.38	1.50	1.94
12	Compensation package programme for villages	—	—	60.00	129.00	—	—
13	Banking commission on foreign currency payment	—	—	36.47	78.41	36.47	47.05
14.	Others	—	—	15.00	32.25	—	—
15.	Construction of operation quarters	—	—	12.22	26.27	12.22	15.76
16	Rehabilitation of road along transmission main	—	—	—	—	32.87	42.40
17	Provision of security arrangements	—	—	—	—	12.00	15.48
18	Provision for additional compensatory package in the affected area	—	—	—	—	80.00	103.20
	Total:	250.50	548.57	404.03	868.67	509.41	657.14

2-5-2 Conditions for Estimation

a. Estimation Base	November 2009
b. Exchange Rate	1 US$ = 93.9 Yen
	1 Rs = 1.29 Yen
c. Period of Construction and Procurement	The construction period is shown in Fig. 2-13 in Chapter 2. (Total 17 months)
d. Others	This project is to be implemented in accordance with the guidelines for grant assistance of the Japanese government.

2-5-3 Operation and Maintenance Cost

In accordance with the policy for the operation and maintenance for the project explained in Section 2-3, the required cost for the integrated system combining all the facilities in this project is considered. The approximate cost for the total system operation was calculated in the previous implementing review study in 2007. Reviewing it, the electrical cost that shared the largest portion remains the same as was in the previous estimate since the unit the same electric cost is used. Accordingly the size of the expense is considered nearly the same as the previous one. The breakdown of the cost is as follows:

a. Remuneration for staff and operators		Rs	12,528,000/year
b. Electric cost		Rs	160,855,000
c. Cl_2 gas・chemicals for water analysis		Rs	2,000,000
d. Maintenance/repairing cost		Rs	70,000,000
e. Management cost		Rs	2,000,000
	Total	Rs	184,383,000/year

(Various Indirect costs for management of WASA organization is not included in this estimate.)

2-5-4 Account Balance

Through the review of WASA's performance in financial management up to the present, an account balance for the operation and maintenance after the commissioning of the completed facilities is prospected as follows.

(1) The financial management of WASA is divided into urban water and sewerage services and development projects including facilities construction. Recently, the total income has been increasing every year with support of the provincial government active for the development

projects, particularly for improvement of sewerage system. However, new contracts with consumers are quite limited in number due to shortage of water supply, and about 2/3 of income from water and sewerage service is spent for payment for electrical cost.

The annual cost for electricity accounts for a large share of the ordinary expenditures, which presses the financial management of WASA. Results of the income from services and the cost for electricity for the past 4 years are shown in Table 2-23.

Table 2-23 Income from Services versus Expenditure for Electricity

Year	Income from services		Cost for electricity	
	Rs (x 10^3)	JY (x 10^3)	Rs (x 10^3)	JY (x 10^3)
2004-2005	318,520	410,890	178,515	230,284
2005-2006	320,000	412,800	196,000	252,840
2006-2007	310,000	399,900	197,828	255,198
2007-2008	378,585	485,790	209,041	269,663

The operation of new facilities can contribute to improving the ongoing water supply service to the citizens, while it brings huge expenditure for power consumption of a similar level to the one for the operation of existing supply system. It is required, therefore, to tackle the measures for the cost recovery of additional huge expenditure without delay, including switchover to metering system.

(2) In WASA's account, the expenditures continue to surpass the income from tariffs of water and sewerage services by 30-40%, and the deficit is subsidized by fixed property tax allocations to WASA each year. The National Drinking Water Policy in 2005 targets independent financial management of urban water supply, but currently there is no alternative but to subsidy the financial management as a temporary measure due to current situation such as unfamiliar and unpopular metered system and rampant nonpayment of water tariff. Therefore, the positive response of provincial governments is highly required for prompt improvement of the financial management system of WASAs in charge. In response to this requirement, P&D of the Punjab government directs Faisalabad WASA to adopt private consignment of water tariff collection and promotes the changeover to the metered system. In this regards, however, quick improvement is difficult in major cities, and the improvement of WASA has just been prefaced finally.

(3) The water tariff revised in 2004 was raised about 12% in January 2007. This tariff revision was approved by the Punjab government officials in consideration of water sources of Faisalabad locating further away compared to other big cities in Punjab province and of the consequent cost

increase for electricity.

According to this new tariff, the unit cost for metered system is approximately Rs 10.0 (JY13.0) per 1 m^3. If the water supply with the new facilities could be paid according to the metered system, the income from only the water consumption amounts to about Rs 270 million Rupee a year, and can cover entirely the production cost including electric cost. .

(4) Under the direction of the provincial government, WASA is making efforts for the improvement of their financial management at the moment, and the changeover to the metered system is one of priority measures. To execute these measures and attain the independent financial management are pressing duties of WASA. Although direct contribution to the improvement of the current balance from the increase in water supply in this project is not apparent, the following benefits can be anticipated due to the water augmentation.

a. Improved city water supply will attract new consumers.
b. Due to the increase in contracts for supply, the current balance of WASA will be stabilized through setting of appropriate tariff levels and the changeover to the metered system will become easier, and eventually lead to the sound financial management.

2-6 Issues for Consideration on Project Implementation

(1) Revised PC-1

With respect to implementation of this project, ancillary facilities works such as high-tension primary power line extension to the pumping station and construction of access road to the water source, as well as land purchasing and supervisory costs including compensations to surrounding villages due to water source development are the responsibilities of the Pakistani side. At the beginning of the first phase, the PC-1 for this project was approved by the Executive Committee of National Economic Council (ECNEC), the highest examination organization of the central government, and partial funding is already provided from 2005. However, since the cost to be borne by the Pakistani side has increased from the budget secured by the previous PC-1, WASA is planning to acquire the additional cost by resubmission of a revised PC-1. During discussions on Explanation of the Draft Final Report for the Implementing Review Study in February 2010, the Pakistani side promised to receive approval of ECNEC by the middle of April 2010. In order to implement this project quickly and smoothly, promotion of the responsibilities of the Pakistani side to be executed in line with the construction schedule of this project is essential. In order to implement the project smoothly and without delay, therefore it is essential that the Pakistani side will execute its responsibilities in line with the construction schedule. To ensure it, close tie and cooperation between WASA and the Japanese side will have to be firmly held.

(2) Management Improvement of WASA

After completion of this project, when water supply service starts, the operation and maintenance costs will put pressure on the management of WASA. Although WASA has gone through various management improvements through instructions from the provincial government, including changeover to the metered system, it is necessary to constantly encourage WASA to put such measures firmly in place by the time the construction work in completed and the operation of the new system starts in order to improve financial management.

(3) Information Sharing to Residents

To ensure consent of stakeholders and residents of villages in the project site on implementation of this project, WASA will make a series of talks and give compensations. Subsequently, a liaison committee will be formed by WASA, representatives of municipalities and concerned parties in order to mutually share information. Furthermore, meetings and discussion sessions need to be held to receive understanding by residents.

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CHAPTER 3

PROJECT EVALUATION AND RECOMMENDATIONS

Chapter 3 Project Evaluation and Recommendations

3-1 Project Effects

This project is aimed at augmenting water supply in Faisalabad with the third largest population of 2.6 million in the country where water service has been worsening due to the shortages of water source. The ongoing municipal water service depends mainly on the facilities completed in 1992. Despite a steadily increasing population at a high rate of 3.7% since then, the substantial expansion of facilities remains yet to be seen, currently resulting in (a) low service coverage, (b) decrease in a per capital daily average supply rate and (c) unbalanced water distribution within the city. There is no other way for citizens suffering from water shortages than relying on contaminated groundwater sources which threaten to jeopardize the health of the citizens. As a result, illegal and unlawful acts such as rejection of payments, unregistered connections, forced water withdrawal from supply pipes with pumps, etc. are rampant across the city. The financial status of WASA, the executing agency of the project, is in a dire predicament.

Under such circumstances, the augmentation of water supply through the execution of this project is anticipated to have effects for the improvement of the current situation as follows:

(1) Direct effects

a. The study for the project revealed that presently the water service coverage in Faisalabad is at a level of 58% with a served population of 1,430 thousand among an estimated population of 2,600 thousand, with a per capita daily average supply rate at 87 liters. After an additional water supply of 91,000m^3/day is secured through the implementation of the project in 2012, the coverage will increase to 64% with a served population of 1,887 thousand in the estimated 2,948 thousand with a per capita daily average enhanced to 130 liters.
b. Currently water is served to citizens only for 6 hours a day (3 times/day each with duration of 2 hours). The increase of water supply by this project can double the service time to 12 hours a day (3 times/day each with duration of 4 hours).
c. Extremely poor water service in the east side of the city with one third of the entire city population can be improved with water pressure in the arterial mains in that area increased from current 0.5 kg/cm^2 at the maximum to 1.0kg/cm^2.

(2) Indirect effects

a. The significant increase of safe and stable water supply can contribute to alleviating water-borne diseases such as hepatitis, diarrhea, typhoid, etc., and to improving health environment for citizens.

b. The improved water service can have effects to raise revenues as it may decrease arrears and rejection of payments of water fees, illegal connections, forced withdrawals with consumers' own pumps, etc. The implementation of the project will offer WASA the best chance to shift to a metered water tariff.

c. Taking into account the social-environmental impact of the project, it will be implemented with the consensus of stakeholders across the region. Careful measures were undertaken through the previous stage of the study for this project not only in the technical aspects such as limiting the lowering of groundwater level to a minimum, but also in social arrangement such as the realization of compensation measures for the stakeholders. Such a process to ensure the agreement of all stakeholders in the project could be referred to as a good practice for WASA's undertakings in the future.

Table 3-1 shows the extent of these effects and the method of evaluation of indicators after the completion of the project.

Table 3-1 Effects and Improvements due to Project Implementation

Current status	Measures by the project	Anticipated results	Evaluation of indicators
(1)Water coverage in the city is hovering around 58% (estimated in 2009)	Augmentation of water supply in an amount of 91,000m^3/day through the development of a new wellfield	Water coverage rises to 64% in 2012.	a. Water can be served to additional 300 thousand new consumers in the year of the completion of the project. Population estimate in the study is as follows: ・Average yearly growth rate: 2.4% (Refer to the Appendix 5-1). Year Total population Served population 2009 2.74 million 1.590 million 2012 2.948 million1.887 million b. The basic design study for the project estimated the current water service rate at 55%, based upon WASA's proposal to employ the proportion of the size of the currently served area with piped water to that of the whole city. (The sizes of served areas in the city were based upon WASA's calculation.) Since the served areas are concentrated in population-congested area, extra 10% allowance was added to the calculated result of 50%. c. For the evaluation of the indicator after the completion of the project, the following data and information shall be taken into account: ・Population census ・WASA's working record for additional pipelines in the city after 2007. ・WASA's record of new consumer contracts ・Household survey carried out with the population census which includes a survey for water supply

			condition. An alternative method, if any at the time of evaluation, may be employed to ensure a more accurate estimate.
(2)An average per capita daily supply rate is low, about 87 litters to the complaint of citizens.	Augmentation of water supply in an amount of 91,000m^3/day through the development of a new wellfield	It can be increased to 130 liters.	a. For the estimate of this rate, the study employed WASA's daily records as follows: ・Water supply record ・Estimated rate of leakage = 15%, ・Supply records of bulk consumers(a part of them are metered). b. WASA keeps the foregoing records available for the evaluation after the completion of the project.
(3)The east side of the city accounting for 1/3 of the whole city suffers from extremely poor water service, with low pressure of 0.5 kg/cm^2 in the trunk mains at the time of pumped distribution and 0 at the time of gravity distribution.	The project provides supplementary sections to the trunk mains, focusing on the east side of the city.	The water pressure can be improved to 1.0 kg/cm^2 at the time of pumped distribution. Furthermore, increase of service time will contribute to maintaining improved water pressure in the area in question.	a. Flows and pressures in the existing trunk mains were measured during the BD study for the project. For network analysis, WASA's daily supply record was referred to. b. Based upon this analysis, a relevant design for increasing pressure in the east area was worked out. c. For the evaluation of the indicator after the completion of the project, it is possible to use equipment for testing flows and pressures, which was procured in this project.
(4)Currently water is served to citizens for only 6 hours at the maximum (3 times a day, each for 1 to 2 hours)	The effective and efficient pump operation combining the new and existing ones is planned. New pumps are equipped with control valve specially designed for prevention of cavitation.	With increased water supply, duration of daily service time can be doubled to 12 hours.	a. The existing pumps cannot handle variation of demand, resulting in malfunctioning with damages on the equipment. b. Actual demand and trend in consumption of citizens remain yet to be seen. The control of pump operation, therefore, will closely be examined during the test operation, and proposed the most appropriate method of operation for ensuring the maximum effect. c. For the evaluation of the indicator, reference shall be made to WASA's pump operation record.
(5)WASA's yearly financial balance shows a continued loss. Current water supply cannot improve its financial situation.	Indirect effect by means of increased supply	The revenue can be increased, as outstanding payments and rejection of payment decrease, owing to increased supply.	a. The evaluation can utilize the following data: ・WASA's annual financial report ・WASA's bill collecting record (computerized data) ・WASA's record for promotion of arrears reduction programme b. Check the situation of WASA's planning for the shift to metered tariff system.
(6)Citizens suffering from shortages of water supply depend upon contaminated groundwater as alternative, resulting in frequent occurrence of waterborne diseases.	Increase of water supply coverage rate and a per-capita daily average supply rate	Dependence on groundwater from private wells decreases.	The additional water supply targeted by the project corresponds to nearly 40 % of the ongoing supply rate. Although it cannot cover the whole population, such significant increase of safe and stable water can contribute to improvement of health of citizens. The city has good medical facilities and their records of diseases can be accessed at the health department of the district office.

3-2 Recommendations

a. For the development of groundwater under the project, the provincial government and WASA agreed to promote measures for risk management against likely groundwater level lowering in the surrounding wellfield. WASA is expected to formulate practical measures including compensations in case of a real threat of the expansion of influence due to pumping at the project tubewells and to release relevant data and information to stakeholders through public meetings and dialogues. It is of vital importance for WASA to ensure their agreement to the implementation of the project through such steps.

b. WASA is recommended to undertake its own plan for continuously monitoring groundwater level in the region, in compliance with the requirements of the environmental impact assessment and JICA's guideline, as described in this report. Data obtained through the monitoring program will provide an accurate basis for predicting the influence of pumping at its tubewells to the surrounding areas and to formulate practical measures for dealing with adverse effects. In respect of water quality, the result of the study indicates that good quality to meet the requirement of the national criteria for water quality can be maintained thanks to the constant recharge from infiltration of the canal. However, its monitoring is necessary as well, since the survey in the region found a trend of quality worsening in the surroundings, apparently due to the expansion of contamination by domestic waste waters in the nearby villages.

c. The augmentation of water supply as the target of this project depends upon the potential of groundwater resource along the Jhang Branch Canal. It has been confirmed by this study that the main source of its recharge is infiltration from the canal. Accordingly stable flows through the canal are one of the essential conditions for the sustainable operation and maintenance of the project.

The Jhang Branch Canal is one of the secondary mains of the Lower Chenab Canal, which is the largest in scale in the existing irrigation network of the Indus system. Since the Lower Chenab Canal system including its intake headwork has now been overage due to its oldest construction, the provincial government of Punjab plans a large-scale rehabilitation work as well as extensive lining of the existing channels for the purpose of enhancing discharges. This study was informed, however, that the lining is planned for the distributaries and smaller downstream channels, with the trunk mains remaining unchanged. The flow through the Jhang Branch Canal is not likely to decrease significantly by the implementation of such a plan. This situation seems to guarantee the soundness of water sources for the project for a foreseeable future. Notwithstanding WASA is requested to pay close attention to the operation of the canal, collecting data and information from the authorities, particularly during the period of its closure, for its proper management of water sources.

d. Although the augmentation of water supply by the project can satisfy urgent need of the city, it is not in a level to meet a long term demand, and WASA is required to continue its efforts to acquire additional water sources. However, as the development of urban water facilities requires a huge investment as well as a long term for realization, it is necessary to make efforts to promote a more effective water supply. One of the main targets is to reduce leakage from trunk mains, branches and house connections. The actual range of leakage of the existing system in Faisalabad remains unidentified, since the level of the exact consumption is unknown due to the lack of household meters. According to the inspection of existing pipelines during the study in 2003, the ductile cast iron lines composing arterial mains, which were completed in 1992, showed little signs of leaks as yet, while asbestos cement lines mainly used for secondary mains and branches seemed to tend to leak. There remain within a city lot of deteriorating sections, particularly among household connections, which are vulnerable to damages resulting in leaks. As the total length of the existing lines in the city now reaches nearly 1,000 km, the eradication of leaks is not an easy task. As a first step, a pilot project for examining the real situation of existing pipelines in a couple of selected colonies in the city should be planned. It is recommended to work out practical measures for the remedy of leaks, based upon data and information obtained through the project and put them into practice in stages.

e. The plan for the reinforcement of arterial mains targets the area at the end of arterial mains in the east side of the city which is suffering the poorest service. Meanwhile WASA has been continuously carrying out the plans to expand and reinforce the existing network proposed by the revised master plan in 1993. To assist its efforts, this project plans to procure equipment for monitoring flow and pressure of pipelines. It is recommended such equipment be effectively utilized in their planning for the improvement of the network.

f. WASA's current tariff system is based upon the sizes of properties of consumers, regardless of consumed water quantities. Under this fixed tariff system, citizens are anxious to withdraw as much water as possible during the restricted supply hours. In this competition, those in the west side of the city close to the terminal reservoir have a clear advantage over those in the east side away from it. Under the ongoing unbalanced water supply, the latter is inclined to reject payments of tariff.

The changeover to the metered system has already been studied by WASA under the reinforced government instruction, and the metered system has been adopted in some areas in 2006. The areas adopting metered system are planned to be expanded, but complete shift will still require some time. In order to improve its finance, it is recommended to establish the practical strategies to switch to it as earlier as possible along with the implementation of the project.

g. According to the Punjab Province Urban Environment Survey conducted by the World Bank in 2005, the groundwater of Faisalabad is not suitable for drinking and intake from distant wellfiellds is necessary. Transferring large quantity of water from the source requires huge amount of electricity cost and is putting pressure on the financial status of WASA. Continuous water supply will require further increase in the energy-related cost.

Other cities in the province are suffering from similar difficulties of water supply, pricing and fees collection systems, and their operation and management costs have been supported by property tax. This situation has been a concern of the NDWP, and although the difficulty to abolish such subsidy is recognized, a gradual shift to self-supportive management is strongly being advised. Based on this policy, the provincial government is strengthening WASA's management and the adoption of meter system and consignment of water fee collection to private companies are two of the measures being considered. WASA is requested to improve its services, review its operation, and make efforts towards healthier financial management.

h. Earlier acquisition of revised PC-1

For the implementation of the project, WASA pledged its share of undertakings such as installation of high-tension primary power connections for the tubewell stations, pumping stations, access construction across the wellfield, execution of a compensation package project, land acquisition cost, etc. The fund for these responsibilities on the Pakistani side is granted to WASA by the government, based upon its application called PC-1 which is to be approved through the official channel of the provincial and federal governments. At the onset of the preceding implementation stage, PC-1 was already ensured. However, the new project cost to be increased for the implementation of the Project for the Expansion of Water Supply System in Faisalabad is required to ensure renewed approval of revised PC-1 by the related authorities. Since the Japanese side needs the approval of PC-1 for its final approval by mid April 2010, the Pakistani side is requested to follow the process with close attention to meet the required deadline.

3-3 Project Feasibility

The following points can provide a basis to verify feasibility for the implementation of this project with Japan's grant aid:

a. Those who can receive benefits through the implementation of the project are ordinary citizens in Faisalabad. According to the household survey in 1993 by the revised master plan financed by the World Bank, nearly 40% of the whole citizens were estimated at a level of the poverty line, and this structure is generally believed to be still persisting.

b. The citizens suffering from extremely poor water service have also been relying upon progressively deteriorated groundwater. The household survey in the master plan showed nearly 90% of the entire households in the city have their own tubewells or those for common use. According to the past studies, groundwater within the city is unfit for drinking, since the deeper one has a high concentration of salts, while the shallower one is artificially contaminated. The social survey under this study has shown that more than 20% of the respondents see there are “frequent” risks of waterborne diseases such as hepatitis, diarrhea, typhoid, etc., under the ongoing water practice. The augmentation of safe and stable water supply by this project can contribute to the improvement of health and sanitation environment of citizens.

c. The project is managed by WASA, the municipal water authority, with a newly recruited staff of about 160 along with the ongoing manpower of about 1,700. The new system added to the current one is composed of similar facilities as the ongoing ones with their technical grades at similar levels. It is operated and maintained by WASA consistently with the existing one with which WASA has acquired expertise and experience through the past operation.

WASA’s financial management so far, however, has been facing difficulties with its yearly deficit in the operation cost supplemented by the government subsidies. The deficit derives from the insufficient revenue due to the low and fixed tariff system common in large cities of the country. In its efforts to improve the situation, WASA lately revised its tariff, and moreover is now planning to shift to a metered tariff system, encouraged by the government policy. The remedy of its financial situation will be able to have a significant effect, once WASA switches its tariff to a metered system. The implementation of the project will offer a good chance for such a fundamental shift of management policy WASA has long been thinking about.

d. Since the development of groundwater in the project was feared to threaten the agricultural groundwater use in the region, the opposition of surrounding communities devoted to agriculture broke out while the study for the project was underway. The rural population had a profound anxiety since it had encountered an adverse effect of WASA’s groundwater withdrawal in the preceding ADB project. This project, therefore, adopted a design policy to minimize such a risk. In addition, both sides have agreed to work out measures to alleviate the fear of the stakeholders around the wellfield, including appropriate compensations in case of real danger as a prerequisite for the implementation of the project. Such steps have never been taken for WASA’s preceding projects, and open up a new way for WASA to go through in launching another project in the future, since it evidently needs further expansion of its water system to keep up with the development of the city.

3-4 Conclusions

This project is aimed at urgently improving public water service targeting the increased water supply and per capita supply rate for citizens including large numbers of the poor in a significantly big city of the country. It will contribute to improvement of their BHN and health environment. All these characteristics of the project, together with effects enumerated as follows, are deemed adequate for verifying feasibility of extending Japan's grant aid to the implementation of the project. This operation and management of the project will be implemented under the condition that WASA will be able to study and act upon the problems of staffing, finance, and social environment.

Finally it is requested to WASA to take the following measures into account to enhance the effects of the project:

(1) Conservation of the well field through execution of relevant monitoring system

The augmentation of water supply in this project entirely depends upon groundwater resource along the course of the Jhang Branch Canal. As a result of the survey, groundwater in this wellfiled has proven to satisfy the targeted quantity and quality thanks to the ample recharge from the canal. However, there seems risk of occurrence of potential damage to the current advantages by the influence of external elements. As the most effective measure to protect the quantity and quality of the wellfield, the establishment of pertinent monitoring system is essential. The essential monitoring approach is introduced in this report. Testing equipment such as tubewell level meters and potable water analysis devices have been delivered under the previous implementation stage. WASA is strongly advised to formulate the most pertinent monitoring system and utilize the collected data effectively for the protection of the wellfield.

The conceivable external elements are as follows:

a. Possibility of decline of groundwater level during the rehabilitation season of the canal for one month in a year when the authorities ceases to discharge the canal flow.

b. Possibility of change in water quality due to the expansion of contaminated groundwater flow from the surrounding villages where waste water is not dealt with properly.

(2) Necessity of information release and risk management

As a result of the Basic Design Study in 2003 it was revealed there might be a risk of groundwater level lowering in the surroundings of the planned wellfield on the medium to long term basis. WASA,

therefore, made close contacts with stakeholders in the area and launched a compensation package project for the concerned villages. Due to such efforts friction from them have been subsided for the moment. When WASA starts the operation of new tubewells there upon completion of the construction work, however, old hostility may revive among them as the study team encountered during the Basic Design Study in 2002～03. As a measure to prevent such a situation, constant contacts with stakeholders will be required through the organization of a liaison office involving representatives of city officials and stakeholders where information and data obtained through monitoring is to be openly provided to ensure understanding of stakeholders. Occasional public meeting and hearing with villagers in general will also have effects. The environmental impact assessment report prepared for the project by WASA is of a similar opinion.

(3) Efficient water supply by means of reduction of leakage and improvement of distribution

In order to minimize loss of water, WASA is required to take aggressive actions to reduce leakage of pipelines which is reportedly at a level of 25 to 30%, although the real situation is unknown since house connections have no meters. WASA was forced in 2006 to renew house connections in a colony where a tragic incident happened resulting in 11 casualties of infants due to contamination of water pipes by sewers. After this incident, WASA is poised to replace deteriorated pipelines in other service areas. Since this measure is especially effective for reducing leaks, WASA is strongly recommended to realize it gradually, based upon a practical plan.

Another effort should be turned to reinforcing the existing network for distribution. As a model case, this project carried out the installation of bypass line intended for the improvement of water pressure in the east area of the city. In addition, various kinds of monitoring and testing equipment for pipeline were provided to WASA. To remedy or rehabilitate the existing network, these devices will be essentially helpful, telling actual pressures and flows in the field. WASA is recommended to use these equipments effectively and realize efficient distribution for the respective service areas.

(4) Shift to metering system

Augmentation of water supply can have its maximum financial effect under the metered tariff system, which WASA undertook for the colony hit by the incident cited in the foregoing clause in combination with the renewal of house connections. WASA is said to have a policy to practice it in other areas where pipe renewals are being planned. The shift of all the current consumers of about 100 thousand is estimated to take more than three years. Since its preparation seems likely to take time, at least WASA should start with new consumers from now on. Earlier realization of the plan is strongly recommended.

(5) Necessity of improvement of financial management

According to the calculation in this implementing review study, the combined operation of distribution pumps for longer service hours after the commencement of operation of a new system is likely to cause WASA a huge amount of expenditure for operation and maintenance, particularly energy cost. Since WASA has lately been under strict control and advice from the provincial government for the improved financial management including the shift to the metering tariff, WASA is required to aggressively address challenges to its financial management and establish a balanced financial base for reliable service.

****

APPENDICES

Appendix 1 Member List of the Study Team

1-1 Implementing Review Study

Name	Function	Organization
Mr. Tsutomu SHIMIZU	Mission Leader	Deputy Resident Representative JICA Pakistan Office
Ms. Hiromi SAWADA	Project Planning and Management	Assistant Director Grant Aid Project Management Division 3 Financing Facilitation and Procurement Supervision Department
Mr. Toshimichi NAGANUMA	Chief Consultant /Tubewell Designing	Japan Techno Co., Ltd.

1-2 Implementing Review Study (Draft Report Explanation Team)

Name	Function	Organization
Mr. Toshiya Sato	Mission Leader	Deputy Resident Representative JICA Pakistan Office
Mr. Koji Miyauchi	Deputy Chief Consultant /Procurement and Execution Program Specialist/Cost estimator	Japan Techno Co., Ltd.

<Reference> Implementing Review Study

Name	Position	Affiliation
Mr. Tsutomu SHIMIZU	Team Leader	Senior Deputy Resident Representative, JICA Pakistan Office
Mr. Norihito YONEBAYASHI	Project Officer	Water Resources Development and Environmental Management Team, Project Management Group III, Grant Aid Management Department, JICA
Mr. Tetsuji NIWANO	Chief Consultant /Groundwater Development Specialist	Japan Techno Co., Ltd.
Mr. Shunichi HATANO	Water Supply Engineer /Facilities Planner	Japan Techno Co., Ltd.
Mr. Koji MIYAUCHI	Procurement and Execution Program Specialist /Cost-estimator	Japan Techno Co., Ltd.

1-2 Implementing Review Study (Draft Report Explanation Team)

Name	Position	Affiliation	Remarks
Mr. Tsutomu SHIMIZU	Team Leader	Senior Deputy Resident Representative, JICA Pakistan Office	-
Mr. Norihito YONEBAYASHI	Project Officer	Water Resources Development and Environmental Management Team, Project Management Group III, Grant Aid Management Department, JICA	The dispatch was canceled because of the security problem.
Mr. Tetsuji NIWANO	Chief Consultant /Groundwater Development Specialist	Japan Techno Co., Ltd.	The dispatch was canceled because of the security problem.
Mr. Koji MIYAUCHI	Procurement and Execution Program Specialist /Cost-estimator	Japan Techno Co., Ltd.	The dispatch was canceled because of the security problem.

<Reference> Member List of 2nd Basic Design Study

Study (1)

Name	Position	Affiliation
Mr. Yoshiki OMURA	Team Leader	Senior Advisor, Institute for International Cooperation, JICA
Mr. Kohei SATO	Project Officer	First Project Management Div., Grant Aid Management Department, JICA
Mr. Tetsuji NIWANO	Chief Consultant /Groundwater Development Specialist	Japan Techno Co., Ltd.
Mr. Nobuyuki ISHII	Water Supply Engineer /Facilities Planner	Japan Techno Co., Ltd.
Mr. Akihiro ABE	Hydrologist (Water resource development)	Taiyo Consultants Co., Ltd.
Mr. Naoki TAIRA	Hydrogeologist /Drilling Specialist	Japan Techno Co., Ltd.
Mr. Shunichi HATANO	Procurement and Execution Program Specialist /Cost-estimator	Japan Techno Co., Ltd.

Study (2)

Name	Position	Affiliation
Mr. Tetsuji NIWANO	Chief Consultant /Groundwater Development Specialist	Japan Techno Co., Ltd.
Mr. Shunichi HATANO	Water Supply Engineer /Facilities Planner	Japan Techno Co., Ltd.
Mr. Toshimichi NAGANUMA	Hydrogeologist /Drilling Specialist	Japan Techno Co., Ltd.
Mr. Koji MIYAUCHI	Procurement and Execution Program Specialist /Cost-estimator	Japan Techno Co., Ltd.

Draft Final Report Explanation Team

Name	Position	Affiliation
Mr. Hiroshi KURAKATA	Team Leader	Director First Project Management Div., Grant Aid Management Department, JICA
Mr. Tetsuji NIWANO	Chief Consultant /Groundwater Development Specialist	Japan Techno Co., Ltd.
Mr. Shunichi HATANO	Water Supply Engineer /Facilities Planner	Japan Techno Co., Ltd.

Appendix 2 Study Schedule

2-1Study Schedule

No.	Data	Consultant		Officials	
		Accommodation	Activity	Accommodation	Activity
1	2009.12.9	Islamabad	Dept from Narita, Arrival at Islamabad		
2	2009.12.10	Faisalabad	Meeting with JICA Move to Faisalabad		
3	2009.12.11	Faisalabad	Explanation of IC/R to WASA, Minutes of Meeting with WASA		
4	2009.12.12	Faisalabad	Explanation of IC/R, Minutes of Meeting with WASA		
5	2009.12.13	Lahore	Data collection, Move to Lahore	Lahore	Dept from Narita, Arrival at Lahore
6	2009.12.14	Lahore	Internal Meeting including WASA Explanation of draft M/M to P&D, HUD/PHED, Modification of M/M	Lahore	Internal Meeting including WASA Explanation of draft M/M to P&D, HUD/PHED, Modification of M/M
7	2009.12.15	Faisalabad	Modification of M/M, Signing of M/M with P&D, HUD/PHED & WASA, Collection of quotation from local contractor, Move to Faisalabad	Lahore	Signing of M/M with P&D, HUD/PHED & WASA
8	2009.12.16	Faisalabad	Collection of questionnaire Field survey(Tubewell site, Booster pump station, Terminal Reservoir)	Faisalabad	Move toFaisalabad Field survey(Tubewell site, Booster pump station, Terminal Reservoir)
9	2009.12.17	Faisalabad	Collection of questionnaire Field survey(ADB facility, Distribution pipe of Phase I	Faisalabad	Field survey(ADB facility, Distribution pipe of Phase I Move to Islamabad
10	2009.12.18	Faisalabad	Collection of WASA action plan and financial data	Airplane	Explanation of M/M to EAD and Signing of M/M with EAD Report to JICA and EOJ Dept from Islamabad
11	2009.12.19	Faisalabad	Data collection from WASA		Arrival at Narita
12	2009.12.20	Faisalabad	Field survey on tubewell site		
13	2009.12.21	Faisalabad	Data collection from WASA		
14	2009.12.22	Faisalabad	Data collection from WASA		
15	2009.12.23	Lahore	Data collection from WASA Move to Islamabad		
16	2009.12.24	Bangkok	Meeting with local drilling company, Report to JICA, Dept from Lahore		
17	2009.12.25		Arrival at Narita		

2-2 Implementing Review Study (Draft Report Explanation Team)

No	Data	Accommodation	Activities
1	2010.2.1	Lahore	Departure from Narita, Arrival at Lahore
2	2010.2.15	Faisalabad	Move to Faisalabad Meeting with WASA
3	2010.2.16	Lahore	Meeting with WASA Move to Lahore
4	2010.2.17	Lahore	Explanation of DF/R to WASA & Govt Punjab, Minutes of Meeting with WASA & Govt Punjab
5	2010.2.18	Lahore	Minutes of Meeting with WASA & Govt Punjab, Signing of M/M, Move to Islamabad
6	2010.2.19	Islamabad	Report to JICA & EOJ, Departure from Islamabad
7	2010.2.20		Arrival at Narita

<Reference> Implementing Review Study

No	Date	JICA	Consultant	Accommodation	
		Team Leader : Mr. Tsutomu SHIMIZU, JICA Pakistan Office Project Officer : Mr. Norihito YONEBAYASHI, JICA HQ	Chief Consultant : Mr. Tetsuji NIWNO (Japan Techno) Water Supply Engineer : Mr. Shunichi HATANO (Japan Techno) Cost-estimator : Mr. Koji MIYAUCHI (Japan Techno)	JICA	Consultant
1	07.7.17	Tokyo > Bangkok > Islamabad	Same as on the left		
2	07.7.18	Courtesy call & meeting w/JICA Pakistan Office, Embassy of Japan (EOJ) Move to Lahore by air	Same as on the left (Mr. NIWANO) Move to Faisalabad by car (Mr. HATANO & Mr. MIYAUCHI)	Lahore	Faisalabad
3	07.7.19	Courtesy call to HUD / PHED (Lahore) Meeting w/HUD /PHED, P&D and WASA (Lahore) Move to Faisalabad by car	Same as on the left (Mr. NIWANO) Courtesy call to WASA (Mr. HATANO & Mr. MIYAUCHI) Discussion for questionnaires w/WASA and site survey	Faisalabad	Faisalabad
4	07.7.20	Discussion on Minutes of Meeting (M/M) w/WASA Site survey Move to Lahore by car	Same as on the left Move to Lahore by car (Mr. NIWANO) Site survey (Mr. HATANO & Mr. MIYAUCHI)	Lahore	Lahore / Faisalabad
5	07.7.21	Discussion on M/M w/HUD / PHED, P&D and WASA (Lahore) Signing of M/M by HUD / PHED, P&D and WASA(Lahore) Move to Islamabad by air	Same as on the left (Mr. NIWANO) Move to Faisalabad by car (Mr. NIWANO) Site survey (Mr. HATANO & Mr. MIYAUCHI)	Islamabad	Faisalabad
6	07.7.22	Internal meeting	Data analysis	Islamabad	Faisalabad
7	07.7.23	Discussion & signing of M/M by EAD Report to JICA and EOJ	Collecting & analysis the data of MRS rates of Punjab. Meeting w/Local Contractor (NPI)	Islamabad	Faisalabad
8	07.7.24	Islamabad > Bangkok Bangkok > Tokyo	Meeting w/Local Contractor (Petrocon) Meeting w/Local supplier of domestic motor pump (KSBPAK)		Faisalabad
9	07.7.25	Arrival at Tokyo	Site survey		Faisalabad
10	07.7.26		Discussion & meeting w/WASA		Faisalabad
11	07.7.27		Discussion & meeting w/WASA		Faisalabad
12	07.7.28		Orchestrate the questionnaires w/WASA		Faisalabad
13	07.7.29		Data analysis		Faisalabad
14	07.7.30		Collecting the data of operating record of TR pumping station Visiting water cleaners in Faisalabad city Move to Islamabad by car (Mr. MIYAUCHI)		Faisalabad /Islamabad
15	07.7.31		Site survey (Mr. NIWANO & Mr. HATANO) Meeting W/Local Contractor (Mr. MIYAUCHI) Move to Islamabad by car (Mr. NIWANO & Mr. HATANO)		Islamabad
16	07.8.1		Report to JICA Move to Karachi by air		Karachi
17	07.8.2		Meeting w/steel pipe manufacturer (Crescent Steel) Meeting w/transportation companies (PAKGRO, Speedway)		Karachi
18	07.8.3		Visiting steel pipe plant (Crescent Steel) Meeting w/steel pipe manufacturer (DATA Steel) Karachi > Bangkok (Mr. NIWANO & Mr. HATANO)		Karachi
19	07.8.4		Meeting w/transportation companies (PAKGRO, Speedway) Bangkok > Tokyo (Mr. NIWANO & Mr. HATANO)		Karachi
20	07.8.5		Data analysis (Mr. MIYAUCHI)		Karachi
21	07.8.6		Contact w/ steel pipe manufacturer (Indus Steel 社) Karachi > Bangkok (Mr. MIYAUCHI)		
22	07.8.7		Bangkok > Tokyo (Mr. MIYAUCHI)		

Implementing Review Study (Draft Report Explanation Team)

No	Date	JICA		Consultant	Accommodation	
		Team Leader : Mr. Tsutomu SHIMIZU, JICA Pakistan Office	Project Officer : Mr. Norihito YONEBAYASHI, JICA HQ	Chief Consultant : Mr. Tetsuji NIWNO (Japan Techno) Cost-estimator : Mr. Koji MIYAUCHI (Japan Techno)	JICA	Consultant
1	07.11.19	Discussion on M/M	The dispatch was canceled because of the security problem.	Same as on the left	Lahore	-
2	07.11.20	Discussion & signing of M/M			Lahore	-

Study Schedule of 2nd Basic Design Study

Study (1)

No	Date	Accommodation	Team Leader Project officer	Chief Consultant /Groundwater development specialist	Hydrogeologist /Drilling specialist	Water supply engineer /Facilities planner	Hydrologist (Water resource development)	Procurement and executing program specialist/Cost estimator
1	02.12.9		Tokyo→Islamabad					
2	02.12.10	Islamabad	Courtesy call to JICA, Embassy of Japan(EOJ), Move to Lahore					
3	02.12.11	Faisalabad	Courtesy call to Gov. of Punjab, Move to Faisalabad					Tyo→Karachi
4	02.12.12	Faisalabad	Coutesy call & meeting w/FDA、WASA, Explanation of Inception Report, Preparation of survey					Karachi →Faisalabad
5	02.12.13	Faisalabad	Meeting w/FDA, WASA, Site survey					Procurement survey
6	02.12.14	Faisalabad	Site survey					
7	02.12.15	Faisalabad	Internal meeting				Tyo→Karachi	Int. meeting
8	02.12.16	Faisalabad	Discussion on Minutes of Meeting(M/M) w/FDA,WASA				Karachi→Faisalabad	Labour survey
9	02.12.17	Faisalabad	Signing of M/M by Gvt.of Punjab		Hydrogeological survey	Site survey		
10	02.12.18	Faisalabad	Signing of M/M by EAD, Report to JICA, Embassy of Japan; Consul: Move to Faisalabad by car			Site survey	Hydrologic survey	Survey for local contractor
11	02.12.19	Faisalabad	Ar. Tokyo	Sit survey				
12	02.12.20	Faisalabad		Sit survey				
13	02.12.21	Faisalabad		Sit survey				
14	02.12.22	Faisalabad		Sit survey		Survey for existing facilities		
15	02.12.23	Faisalabad		Sit survey				Survey for regulations concerning construction
16	02.12.24	Faisalabad		Sit survey		Survey for water supply planning		
17	02.12.25	Faisalabad		Sit survey				Survey for execution program
18	02.12.26	Faisalabad		Survey for water resources		Survey for facilities planning		
19	02.12.27	Faisalabad						
20	02.12.28	Faisalabad						
21	02.12.29	Faisalabad		Data analysis				
22	02.12.30	Faisalabad		Survey for water resources	Hydrogeological survey	Survey for facilities planning	Hydrologic survey	Survey for execution program
23	02.12.31	Faisalabad						
24	03.1.1	Faisalabad				Faisala→		
25	03.1.2	Faisalabad				Karachi→Tyo		
26	03.1.3	Faisalabad		Survey for operation & maintenance of water supply facilities			Faisalabad→	
27	03.1.4	Faisalabad					Karachi→Tyo	Survey for execution program
28	03.1.5	Faisalabad						
29	03.1.6	Faisalabad			Faisalabad→			
30	03.1.7	Faisalabad			Karachi→Tyo			
31	03.1.8	Faisalabad						
32	03.1.9	Faisalabad						
33	03.1.10	Faisalabad						
34	03.1.11	Faisalabad						
35	03.1.12	Faisalabad						
36	03.1.13	Faisalabad						
37	03.1.14	Faisalabad		Survey for water supply planning				Survey for water supply situation
38	03.1.15	Faisalabad						
39	03.1.16	Faisalabad						
40	03.1.17	Faisalabad						
41	03.1.18	Faisalabad						
42	03.1.19	Faisalabad		Data analysis				Data analysis
43	03.1.20	Faisalabad		Survey for facilities planning				Survey for water supply situation
44	03.1.21	Faisalabad						
45	03.1.22	Faisalabad						Faisal→
46	03.1.23	Faisalabad						Karachi
47	03.1.24	Faisalabad		Islamabad→				Karachi→
48	03.1.25	Islamabad		Report to JICA, EOJ				→Tokyo
49	03.1.26	Islamabad		Islamabad→				
50	03.1.27			→Tokyo				

Study (2)

No.	Date	Accommodation	Chief Consultant /Groundwater development specialist	Water supply engineer /Facilities planner	Procurement and executing program specialist/Cost estimator	Hydrogeologist /Drilling specialist
1	03.8.2		Tokyo			
2	03.8.3	Islamabad	→Islamabad			
3	03.8.4	Islamabad	Courtesy call to JICA, EOJ			
4	03.8.5	Faisalabad	Move to Faisalabad, Courtesy call to WASA			
5	03.8.6	Faisalabad	Meeting withWASA			
6	03.8.7	Faisalabad	Survey for existing well	Survey for water supply facilities plan(Existing facilities)		
7	03.8.8	Faisalabad				
8	03.8.9	Faisalabad	Site selection			
9	03.8.10	Faisalabad				
10	03.8.11	Faisalabad	Survey for water supply facilities plan(Existing facilities)		Tokyo→	
11	03.8.12	Faisalabad			→Faisalabad	
12	03.8.13	Faisalabad	Geophysical survey		Procurement survey	
13	03.8.14	Faisalabad			Survey for water supply facilities plan(Existing facilities)	
14	03.8.15	Faisalabad				
15	03.8.16	Faisalabad	Geophysical survey /Socio-economic survey			
16	03.8.17	Faisalabad				
17	03.8.18	Faisalabad				
18	03.8.19	Faisalabad				
19	03.8.20	Faisalabad		Topographic survey		Tokyo→
20	03.8.21	Faisalabad				→Faisalabad
21	03.8.22	Faisalabad	Survey for water supply facilities plan(Existing facilities)			Preparation for test drilling
22	03.8.23	Faisalabad				
23	03.8.24	Faisalabad				
24	03.8.25	Faisalabad	Topo. survey/Submit TN & meeting w/WASA	Faisalabad→		Test Drilling
25	03.8.26	Faisalabad	Topo. & meeting w/WASA	→Tokyo		
26	03.8.27	Faisalabad	Topo. & meeting w/WASA Site survey by Mayor		Procurement survey /Cost estimation	
27	03.8.28	Faisalabad	Signing of TN Move to Islamabad			
28	03.8.29	Islamabad	Report to JICA, EOJ			
29	03.8.30	Faisalabad	Islamabad→			
30	03.8.31	Faisalabad	→Tokyo			
31	03.9.1	Faisalabad				
32	03.9.2	Faisalabad			Karachi→	
33	03.9.3	Faisalabad			→Tokyo	
34	03.9.4	Faisalabad				
35	03.9.5	Faisalabad				
36	03.9.6	Faisalabad				
37	03.9.7	Faisalabad				
38	03.9.8	Faisalabad				
39	03.9.9	Faisalabad				
40	03.9.10	Faisalabad				
41	03.9.11	Faisalabad				
42	03.9.12	Faisalabad				Meeting w/WASA
43	03.9.13	Faisalabad				
44	03.9.14	Faisalabad				
45	03.9.15	Faisalabad				Faisalabad→
46	03.9.16					→Tokyo

Draft Final Report Explanation Team

No.	Date	Accommodation	Team Leader Project officer	Chief Consultant /Groundwater development specialist	Water supply engineer /Facilities planner
1	04.3.16			Tokyo→Karachi	
2	04.3.17	Islamabad		→Faisalabad, Courtesy call to WASA Explanation of D/F report to WASA, Meeting w/WASA	
3	04.3.18	Faisalabad		Meeting with WASA	
4	04.3.19	Faisalabad		Meeting with WASA	
5	04.3.20	Faisalabad		Meeting with WASA	
6	04.3.21	Faisalabad	Tokyo→Lahore	Move to Lahore	
7	04.3.22	Islamabad	Courtesy call to Gvt. of Punjab, Move to Islamabad Courtesy call to JICA, EOJ		
8	04.3.23	Faisalabad	Move to Faisalabad, Site survey		
9	04.3.24	Lahore	Discussion on M/M with WASA, Move to Lahore		
10	04.3.25	Islamabad	Signing of M/M with Gvt. of Punjab & WASA Move to Islamabad		
11	04.3.26	Faisalabad	Signing of minutes with EAD, Report to JICA & EOJ		
			Islamabad→	Move to Faisalabad	
12	04.3.27	Faisalabad	→Tokyo	Meeting with WASA	
13	04.3.28			Move to Lahore, Lahore→	
14	04.3.29			→Tokyo	

Appendix 3 List of Participants Concerned in the Recipient Country

1) Pakistani Side

(1) Planning & Development Department, Government of The Punjab

Mr.Ubaid Rubbani Qureshi	Secretary
Mr. Marim Riaz	Senior Chief
Mr. Nazina Riy	Senior
Mr. Sohail Ahktar Shahzed	Chief (Urbane Development UD)
Mr. Amjad Duraiz	Assistance Chief (ACECA II)

(2) Housing, Urban Development & Public Health Engineering Department, Government of the Punjab

Mr. Irfan Ali	Secretary (to PHED)
Mr. Latif Shahid	Additional Secretary (Technical) (to HUD & PHED)
Mr. JAMIL Muazzam	Deputy Secretary (Urbane Development) (to HUD & PHED)
Mr. AKHTAR Aijaz	Chief engineer(South)

(3) Water & Sanitation Agency, Faisalabad Development Agency (WASA)

Mr. Malik Idrees	Managing Director
Dr. Arshad Mahmood	Managing Director（Leave his post）
Dr. Ijaz Ahmad Randhawa	Director (Construction-II)
Mr. Abdul Majid	Deputy Managing Director
Mr. Aamer Aziz	Director Administration
Mr. Muhammad Aslam	DCPADS

(4)Faisalabad Development Agency

Mr. Arshad Mahmood	Director General

(5)Economic Affairs Div., Ministry of Economic Affairs and Statistics

Mr. Zafar Hasan Reza	Joint Secretary
Mr. Syed Muhammad Usman	Section Officer

2) Japanese Side

(1) Japan International Cooperation Agency, Pakistan Office

Mr. Toshiya Sato	Senior Resident Representative
Mr. Tsutomu Shimizu	Senior Resident Representative(Leave his post)
Mr. Nozomu Ono	Representative
Mr. Junya Hiroshima	Representative(Leave his post)
Mr. Mahmood A. Jirani	Chief Programme Officer

(2) Embassy of Japan

Mr. Shigeki Nakanishi	First Secretary

<Reference>Implementing Review Study

(1) Economic Affairs Div., Ministry of Economic Affairs and Statistics

Mr. Muhammad Saleem Sethi	Joint Secretary

(2) Planning and Development Board, Government of the Punjab

Mr. Shahid Mahmood	Secretary

(3) Housing, Urban Development and Public Health Engineering Dept., Government of the Punjab

Mr. Shabbir Ahmad	Special Secretary
Mr. Shaukat Ali	Additional Secretary (Technical)

(4) Water and Sanitation Agency, Faisalabad (WASA)

Mr. Mahboob Elahi	Managing Director
Mr. Ijaz Ahmad Randhawa	Director (Construction-II)

(5) Embassy of Japan

Mr. Shigeki Nakanishi	Second Secretary

(6) Japan International Cooperation Agency, Pakistan Office

Mr. Takao Kaibara	Resident Representative
Mr. Tsutomu Shimizu	Senior Deputy Resident Representative
Mr. Mahmood A. Jilani	Deputy Resident Representative & Chief Programme Officer
Mr. Shinsaku Fukazawa	Deputy Resident Representative
Mr. Go Nakaya	Assistant Resident Representative

<Reference> List of Participants Concerned in the Recipient Country

(2nd Basic Design Study)

(1) Economic Affairs Div., Ministry of Economic Affairs and Statistics

Mr. Muhammed Ashraf Khan	Joint Secretary
Miss Yasmin Masood	Deputy Secretary, Japan Desk (Phase 2)

(2) Planning and Development Board, Government of the Punjab

Mr. Sohail Ahmad	Secretary
Dr. Shaheen Khan	Chief Economist
Mr. Nazim Riaz	Chief (ECA)
Mr. Mukhtar Ahmad Chaudry	Section Chief
Mr. M.H. Malik	AC., UD/PPH

(3) Housing, Urban Development and Public Health Engineering Dept., Government of the Punjab

Mr. Syed Ali Raza Gilani	Minister
Mr. Riaz Ahmed	Secretary
Engr. Ch. Safdar Ali Cheema	Technical Advisor

(4) Faisalabad District Office

Mr. Chaudhary Zahid Nazir	Chairman (District Nazim)
Mr. Tahin Hussain	District Coordination Officer
Mr. Waseen Ajmal Ch.	Executive District Officer (Finances & Planning)
Mr. Mian Riaz Ahmed	Executive District Officer (Works & Services Dept.)
Dr. Tariq Sardar	Senior Administrative Officer
Mr. Shoukat Hayat	(Environment Protection Dept.)
Mr. Muhammad Yaqoob Khan	Deputy District Officer (Revenue Dept.)
Mr. Rashid Mohamood Putwary	(Revenue Dept.)
Mr. Muhamood Shahid Putwary	(Revenue Dept)
Mr. Rana Ahmad Qanoonoo	(Revenue Dept)

(5) Tehsir Faisalabad

Mr. Mumtaz Ali Cheema	Nazim Faisalabad City
Dr. Syed Pervaiz Abbas	Senior Administration Officer

(6) Faisalabad Development Authority (FDA)

Mr. Maqsood Khawaja	Director General (PCS) (Phase 1)
Mr. Safdar Hussain Raja	Director General (Phase 2)
Mr. Atta Ullar Khan	Director (Environmental Control Dept)

Mr. Farooq Pall	Deputy Director (Estate Management Dept.)

(7) Water and Sanitation Agency (WASA)

Lt. Col Engr Syed Chias ud Din	Managing Director (Phase 1)
Mr. Rashid Ahmad Chaudry	Managing Director (Phase 2)
Mr. Abdul Haleem Chaudhry	Deputy Managing Director
Mr. Asmo Ali Chaudhry	Director(Operation &Maintenance)
Mr. Abdul Majid	Director (Water Resources)
Mr. Saleem Ahmad Awan	Director (Planning & Design)
Mr. Mahammed Ashraf	Deputy Director (Planning & Design)
Mr. Shulam Murtaza Buffa	Director (Administration)
Mr. Ali Sajjad Sheikh	Deputy (Water Resources)

(8) Department for International Development, British Government)

Mr. Stephen Young	Infrastructure Adviser, Western Asia, Middle East & North Africa
Mr. Malick Zulfiqar Ahmad	Programme Officer

(10) Embassy of Japan

Mr. Tamotsu Shinozuka	Minister
Mr. Hiromichi Kitada	First Secretary
Mr. Hideo Murata	Second Secretary (Phase 1)
Mr. Takeshi Matsunaga	Head of Economic & Development Section (Phase 2)
Mr. Teruo Kobayashi	Second Secretary (Phase 2)

(11) Japan International Cooperation Agency, Pakistan Office

Mr. Nobuyuki Yamamura	Resident Representative
Mr. Yujiro Ishi	Senior Deputy Resident Representative (Phase 1)
Mr. Hidekazu Tanemura	Resident Officer (Phase 1)
Mr. Mahmood A. Jirani	Deputy Resident Representative
Ms. Mitsumi Sachiko	Senior Deputy Resident Representative (Phase 2)
Mr. Makoto Takahashi	Resident Officer (Phase 2)

Appendix 4-1 Minutes of Discussion on the Implementing Review Study

MINUTES OF DISCUSSIONS
IMPLEMENTING REVIEW STUDY ON
"THE PROJECT FOR THE EXPANSION OF WATER SUPPLY SYSTEM
IN FAISALABAD"
("THE PROJECT FOR THE IMPROVEMENT OF WATER SUPPLY SYSTEM IN FAISALABAD")
IN ISLAMIC REPUBLIC OF PAKISTAN

In response to a request from the Government of Islamic Republic of Pakistan (hereinafter referred to as "the Pakistan"), the Government of Japan decided to conduct an Implementing Review Study (hereinafter referred to as "the Study") on the Project for the Expansion of Water Supply System in Faisalabad (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent to Pakistan the Implementing Review Study Team (hereinafter referred to as "the Team"), which is headed by Mr. T. SHIMIZU, Senior Representative, JICA Pakistan Office, and is scheduled to stay in the country from December 9 to December 24, 2009.

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

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

Lahore, December 15, 2009

Tsutomu SHIMIZU
Team Leader
Implementing Review Study Team
Japan International Cooperation Agency

Mr. Ubaid Rubbani
Secretary
Planning and Development Department
Government of the Punjab

Mr. Zafar Hasan Raza
Joint Secretary (ADB/Japan)
Economic Affairs Division
Ministry of Economic Affairs & Statistics
Government of Pakistan

Mr. Irfan Ali
Secretary
Housing, Urban Development and
Public Health Engineering Department
Government of the Punjab

Dr. Arshad Mahmood
Managing Director
Water and Sanitation Agency
Government of the Punjab

ATTACHMENT

1. Purpose of the Study:

The purpose of the Study is mainly to review the Project cost estimation, earlier prepared on the basis of the Basic Design Study of the Project conducted in 2004 (hereinafter referred to as "the B/D Study") and Implementation Review Study conducted in 2007 for "the Project for the Improvement of Water Supply System in Faisalabad", with consideration of current socio-economic and hydrogeological situation of Pakistan.

2. Components of the Project:

The Pakistani side and the Team (hereinafter referred to as "Both sides") confirmed that the framework, purpose and contents of the Project are same as confirmed in the B/D Study and Implementing Review Study.

The main components of the Project are grouped into two categories, namely undertakings by the Japanese side and those by the Pakistani side. They are separately shown in the following tables:

(1) Undertakings by the Japanese side

Category	Description of Facilities	Quantity
Water Intake Facility	1) Tubewell(approx.160m deep on average)	25 nos.
	2) Tubewell pump house	25 nos.
	3) Tubewell pumps (200 m^3/hr, max 60 kW) with internal electrical works and connection to collector main	25 nos.

(2) Undertakings by the Pakistani side

	Description of Undertakings
1	Securing of land for facilities construction Tubewells/stations (25 sites)
2.	Construction of access roads to water facilities (for tubewell pump stations, approximately 16 km)
3.	External electrical works up to Tubewell pump stations
4.	Any works other than the undertakings by the Japanese side

Both sides also confirmed that there is and will be no duplication to the Project by the other Donors, Organizations and Agencies.

3. Responsible and Implementing Organization:

3-1. The Responsible organization is the Housing, Urban Development and Public Health Engineering Department, Government of the Punjab.

3-2. The Implementing organization is Water and Sanitation Agency (hereinafter referred to as "WASA") and WASA implements the Project, which is a subsidiary of Faisalabad Development Authority (hereinafter referred to as "FDA").

3-3. Organization chart of implementing organization:

The organization chart of WASA is described in Annex-1-1 and of FDA in Annex-1-2.

4. Japan's Grant Aid Scheme:

4-1. The Pakistani side understood the Japan's Grant Aid Scheme explained by the Team, as described in Annex-2.

4-2. The Pakistani side will take the necessary measures and allocate necessary budget properly, as described in Annex-2, for smooth implementation of the Project, as a condition for the Japanese Grant Aid to be implemented.

4-3. The Team clarifies the necessary measures and budget to be taken care by the Pakistani side, besides the general measures described in Annex-2, by further study.

4-4. The Pakistani side promised to implement the Project properly following to "The Japanese Grant Aid Scheme" if the Project is approved by the Japanese Cabinet.

5. Schedule of the Study:

5-1. The consultant members will proceed to further studies in the Pakistan until December 24, 2009.

5-2. JICA will prepare the draft report in English and dispatch a mission in order to explain its contents in February 2010 at the earliest.

5-3. In case that the contents of the report are accepted in principle by the Pakistani side, JICA will complete the final report and send it to the Pakistan by around April 2010 at the earliest.

5-4. The Pakistani side understood that the implementation of the Study did not imply and commit the implementation of the Project.

6. Exemption of Taxes and Duties.

The Team explained that the Pakistani side should take necessary measures to exempt Value Added Tax, custom duties and any other taxes and fiscal levies in the Pakistan arisen from the Project activities and they will be borne by beneficiary organizations in accordance with the implementation schedule.

The Pakistani side promised to take necessary measures for these taxes and duties exemptions.

7. Prioritization and Selection for the Project:

The Team explained that contents of the Project would be considered by the Government of Japan by evaluating the result of the Study.

Both sides agreed that the contents of the Project might be prioritized, selected and adjusted in accordance with the result of the Study and the budget allocated for the Project.

8. Components implemented by the Pakistani side:

When some components are adjusted from the Project after analyzing the result of the Study, the Team will inform the components to the Pakistani side immediately. In that case, the Pakistani side agreed to consider whether or not the Pakistani side could bear the components, then inform the results to the Team.

9. Other Relevant Issues:

9-1. Change of the Project Title:

The Team suggested that the project title would be "the Project for the Expansion of Water Supply System in Faisalabad". If the Project is approved by the Cabinet of Japan, new Exchange of Notes (hereinafter referred to as "E/N") will be signed by both Governments. Then there might be three E/Ns for completion of whole Project.

The Pakistani side explained that PC-1 will have to be revised under same nomenclature "the Project for the Improvement of Water Supply System in Faisalabad". However, while preparing the cost estimate for balance portion, the new name will be used under Phase-II as under: Phase II – Project II (The Project for the Expansion of Water Supply System in Faisalabad)

9-2. Environmental Impact Assessment (EIA):

Both sides confirmed that EIA approval already have been taken in Pakistan. The Team will implement environmental survey additionally to fulfill the requirement of JICA under its new environmental guideline.

9-3. Land Acquisition for the Project Facilities:

The Pakistani side explained that the land has been secured in collaboration with the concerned Departments.

9-4. Procedure for PC-1:

The Team requested that the Pakistani side should complete revision and approval of the PC-I from Central Development Working Party (CDWP) by March 2010 as it is one of the prerequisites for the Japanese Government to make commitment of grant for the Project.

The Pakistani side explained that the original PC-1 for the Project was already approved by the Government of Pakistan, which fully enables the Government to start the implementation of the Project forthwith. No revision is required except when the increase is more than 15% of the approved cost.

Both sides agreed that the Team will provide the cost estimates by the end of January 2010 to the Government of Punjab for processing of revised PC-1.

The Pakistani side confirmed that as soon as the Japanese side provides the formal cost estimation, the PC-1 will be revised accordingly and informs the result to the Japanese Government by official route.

9-5. Fair Implementation of the Project:

The Team explained that some information of the relevant Report should be dealt with carefully until the Tender is implemented, since the information will affect the fair implementation of Tender process.

The Pakistani side understood and promised to do so.

9-6. Arrangements for the Study:

As a response to the request by the Team, The Pakistani side agreed to arrange counterpart personnel for the Study and to provide promptly all the data and information relevant to the Project for the smooth implementation of the Study.

9-7. Safety and Security for the Team:

The Team explained that security measures are indispensable for effective study. The Pakistani side agreed to take all necessary measures to secure the safety of the members of the Team.

9-8. Lesson Learnt from the Past Cooperation by Japanese ODA:

The Team requested to the Pakistani side that outcome of technical transfer and the Grant Aid implemented in the past should be utilized to improve the living conditions of the Pakistan people.

The Pakistani side agreed and promised to utilize the lesson learnt from the past cooperation.

Annex 1 : 1-1. Organization Chart of WASA
1-2. Organization Chart of FDA

Annex 2 : The Japan's Grant Aid Scheme

End

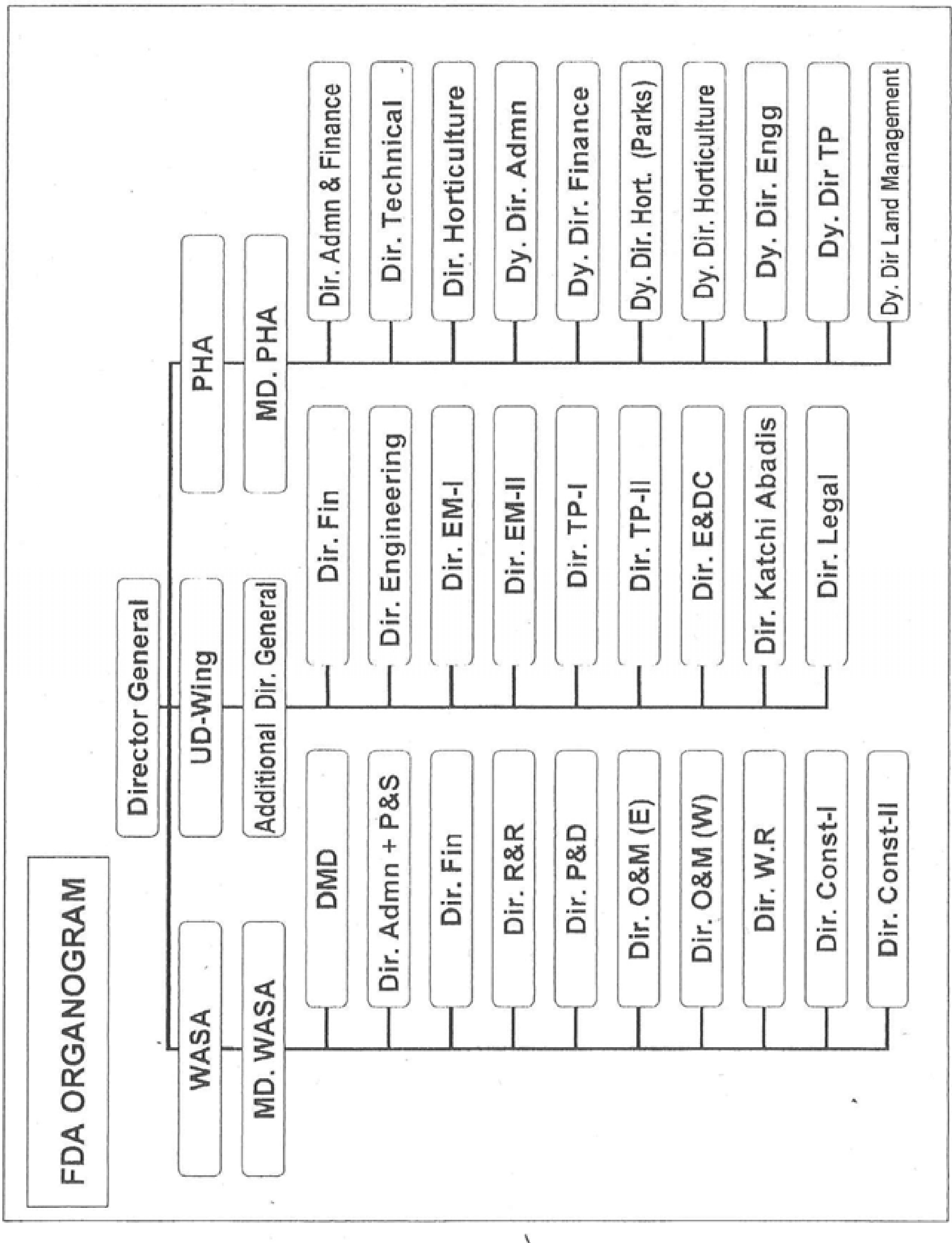
WASA ORGANOGRAM

Managing Director
Water & Sanitation Agency

Deputy Managing Director — **Mechanical & Drainage Division**

- Director Administration and P&S
- Director Finance
- Director Construction-I
- Director Planning & Design
- Director Construction-II
- Director Water Resources
- Director Operation & Maintenance (East)
- Director Operation & Maintenance (West)
- Director Revenue and Recovery

Regular	Officer (133) + Official (2239)	=	2372
Contract	Officer (6) + Official (314)	=	320
Total Posts		=	**2692**
Work charge Staff	Skilled (14) + Semi-skilled (379)	=	393


FDA ORGANOGRAM
Director General
WASA
MD. WASA
UD-Wing
Additional Dir. General
PHA
MD. PHA
DMD
Dir. Admn + P&S
Dir. Fin
Dir. R&R
Dir. P&D
Dir. O&M (E)
Dir. O&M (W)
Dir. W.R
Dir. Const-I
Dir. Const-II
Dir. Fin
Dir. Engineering
Dir. EM-I
Dir. EM-II
Dir. TP-I
Dir. TP-II
Dir. E&DC
Dir. Katchi Abadis
Dir. Legal
Dir. Admn & Finance
Dir. Technical
Dir. Horticulture
Dy. Dir. Admn
Dy. Dir. Finance
Dy. Dir. Hort. (Parks)
Dy. Dir. Horticulture
Dy. Dir. Engg
Dy. Dir TP
Dy. Dir Land Management